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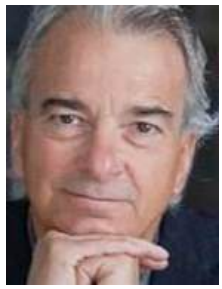
Racial Disparities in Cancer Care | Access to Care for Transgender Veterans | Hepatitis C Among US Veterans | Battling Tobacco Use at Home | [illegible] | How Might the Provision of Culturally Competent Services Be Enhanced for American Indian and Alaska Native Veterans? | Improving Trends in Gender Disparities | Suicidality Among Hispanic and African American Veterans Following Surgery

APHA

Building Bridges to Fix Health Policy



A year ago, the APHA staff working group for the National Public Health Week (#NPHW) was more prescient than it could have suspected when it chose "building bridges" as its theme for 2021. Indeed, this year was born under both a good star and a bad star. The bad star is the January 6 insurrection on the US Capitol, which was the culmination of four years of destruction of bridges and solidarities across and between states, geographic areas, and populations, in the country and globally, from the Paris Accord on climate change to the Muslim ban (https://am.ajph.link/FascistThreat). All of these are symbolized by building a wall between the United States and Mexico. Walls not bridges.

The old bridges had rotten foundations and crumbled. Institutions built on a racist ideology, including those involving public health are easily challenged. Actually, SARS-CoV-2 thrived in the United States because it was able to take advantage of the profound inequity of the public health system. We were not all in the pandemic together (https://am.ajph.link/LB_NotAltogether).

The good star is that the country has mandated a new presidential administration to rebuild the bridges and make them stronger. In public health, this means guaranteeing that access to prevention and care is a common good and not a function of one's income or wealth (https://am.ajph.link/CommonGood).

This April issue of *AJPH* includes, like the past April issues since 2018, a section dedicated to public health dialogue (https://am.ajph.link/APRIL_2018; https://am.ajph.link/APRIL_2020). This is one of the journal's ways of "building bridges." Pairs of public health professionals from different political leanings discuss issues such as vaccine hesitancy, the future of the Centers for Disease Control and Prevention, the 10 essential public health services, the future of state and local health departments, whether there is still a role for primary care, and the pathway to health care equity. The divergent points and counterpoints go beyond the usual information silos, in which Democrats, Republicans, and Independents talk only among themselves, relishing being among people who think alike. The dialogue may be disturbing, but it enriches our understanding of how the other half lives and thinks. It helps everyone to be more effective. Georges Benjamin, executive director of the American Public Health Association, introduces these exchanges with insightful comments (p. 542).

The new bridges will be indispensable for fixing US health policy. In this issue, *AJPH* editors Colleen Grogan, Daniel Fox, and Paul Erwin have assembled the first set of articles from a two-step initiative to delineate lessons learned from the pandemic and determine "What Is Wrong and What Is Fixable in US Health Policy and Practice?" These articles, described by Erwin et al. (p. 540), speculate what the government, at all levels, can do in 2021 and 2022 to address old and emerging problems in health policy. This was also the topic of our February 2021 podcast (https://am.ajph.link/POD_February2021). In a future issue, the same authors will review their predictions based on the record of the first months of the new administration.

The two special sections of this issue are intimately connected. Solid bridges that convey equity and the common good across states, geographic areas, and populations, not only nationally but also globally, are needed to fix what is wrong in the current health care system. AJPH

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10 Years Ago

Health Disparities and Health Equity

[E]thical and human rights principles support prioritizing attention to those facing the greatest obstacles, and ample evidence has documented the multiple and often crushing obstacles faced by members of the disadvantaged racial/ethnic groups in the United States. . . . Previous official approaches to defining health disparities in the United States have avoided being explicit about values and principles. . . . The first decade of the 21st century has ended with little if any evidence of progress toward eliminating health disparities by race or socioeconomic status. It is time to be explicit that the heart of a commitment to addressing health disparities is a commitment to achieving a more just society.

From AJPH, *December 2011, pp. S153–S154, passim*

24 Years Ago

Racism Resurgent

[R]acism . . . fluctuating in intensity, shifting in content, but ever present—is still a major public health problem and a challenge to the goals of medicine. . . . [T]hat social construct [of race] has its . . . perils: selective and skewed associations of social and behavioral phenomena with race, and the projection of such stereotyping onto individual patients, can have consequences of . . . [great] import . . . [such as] persistent racial and ethnic disparities in the allocation of diagnostic and therapeutic resources to African-American patients.

From AJPH, *November 1997, p. 1765*

Fathers' Social Capital as a Determinant of Child Malnutrition in Myanmar

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Demographic Trends in US HIV Diagnoses, 2008–2017: Data Movies

Lauren C. Zalla, MS, Jessie K. Edwards, PhD, Stephen R. Cole, PhD, Jacqueline E. Rudolph, PhD, Tiffany L. Breger, PhD, Arti Virkud, MPH, Anna Satcher Johnson, MPH, and H. Irene Hall, PhD, MPH

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In this editorial, we introduce the data movie as a tool for investigating and communicating changing patterns of disease using the example of HIV in the United States. The Centers for Disease Control and Prevention currently tracks all new HIV diagnoses through the National HIV Surveillance System. Understanding what these data tell us is critical to the goal of ending the HIV epidemic in the United States.[1] However, summarizing trends across multiple population characteristics simultaneously—for example, exploring how the age distribution of new diagnoses varies by geographic region and how that relationship has changed over time—can be difficult. Because data movies allow us to visualize complex relationships more easily than large tables or paneled figures, they can help us take full advantage of our increasingly rich national surveillance data.

DATA DESCRIPTION

The Centers for Disease Control and Prevention provided counts of new diagnoses of HIV infection throughout the 50 states and the District of Columbia over the 10-year period from 2008 to 2017. Counts were stratified by calendar year, quarter, region (Northeast, Midwest, South, West), age group in years (13–14, 15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, 60–64, ≥ 65), sex assigned at birth (male, female), and race/ethnicity (American Indian/Alaska Native, Asian, Black/African American, Hispanic/Latino, Native Hawaiian/other Pacific Islander, White, multiple races). Hispanic/Latino individuals may be of any race; all other groups are non-Hispanic. Our data included all diagnoses that occurred between 2008 and 2017 and had been reported to the Centers for Disease Control and Prevention by December 2018.

We converted counts of new diagnoses to rates by dividing the number of diagnoses by the total number of person-years in each stratum; the number of person-years was computed by using population denominators from the US Census Bureau's 2000 to 2010 State Intercensal Datasets (for 2008 and 2009) and Vintage 2018 state population estimates (for 2010–2017). We smoothed counts and rates across the four quarters of each calendar year to improve the interpretability of our data movies (details are provided in the Appendix, available as a supplement to the online version of this article at http://www.ajph.org).

We excluded the 13- to 14-year age group because it accounted for only 345 total diagnoses from 2008 to 2017. We also combined smaller racial/ethnic groups in our presentation of the total number of diagnoses by race/ethnicity but did not combine them when calculating rates to avoid masking differences between groups. Disaggregated counts and rates of diagnoses among American Indian/Alaska Native, Native Hawaiian/other Pacific Islander, and multiracial individuals are presented separately as Supplemental Data Movies. Estimated rates from strata with no diagnoses in a given quarter were excluded from calculations of rate ratios; this exclusion affected Asian females 15 to 19 years of age in quarter 4 (Q4) of 2009, Q4 of 2016, and Q1 of 2017 and Asian females 65 years or older in Q4 of 2008, Q4 of 2012, and Q1 and Q2 of 2013.

Using methods described elsewhere,[2] we produced data movies showing time trends in (1) counts of diagnoses by race/ethnicity, stratified by sex and region; (2) counts of diagnoses by race/ethnicity, stratified by age and sex; (3) diagnosis rates by race/ethnicity, stratified by age and sex; and (4) rate ratios comparing rates of diagnoses among racialized minority groups relative to Whites, stratified by age and sex. Data movies were produced in SAS version 9.4 (SAS Institute, Cary, NC). The computer code is provided in the Appendix.

RESULTS

The data movies and more detailed interpretations are available as a supplement to the online version of this article at http://www.ajph.org. Overall, we found that the rate of HIV diagnosis fell by 25% from 2008 through 2017, decreasing steadily from 19.4 to 14.5 diagnoses per 100 000 people. Although the overall rate of diagnosis decreased, large demographic disparities persisted or increased during this period. By the end of 2017, diagnoses were even more disproportionately concentrated in the southern states, among young males, and among people of color.

Data Movie 1 (available as a supplement to the online version of this article at https://www/ajph.org) illustrates the trend in the relative size of the epidemic across the four regions of the United States. Although the number of diagnoses decreased in all regions from 2008 to 2017, decreases in the South did not keep pace with decreases in the Northeast and Midwest. Data Movie 1 also shows the growing number of diagnoses among Hispanics/Latinos in the West, driving the 1.1% average annual increase in total diagnoses in that region from 2013 to 2017 (Figure 1).

Data Movies 2 and 3 illustrate the shift in the age distribution and the racial and ethnic composition of new diagnoses from 2008 to 2017. Among people with male sex at birth, we observed a dramatic shift in the age distribution of diagnoses from middle-aged to younger males, with nearly three times as many new diagnoses among males in their 20s as among males in their 40s by 2017. We also observed a consistently high burden of diagnoses among Black and Hispanic males relative to White and Asian males. Among people with female sex at birth, Blacks remained the most likely to be diagnosed with HIV, accounting for 60% of all females receiving an HIV diagnosis in 2017. Although the total number of diagnoses decreased over the period for most groups of females, the number of diagnoses increased among Asians and among females 60 years or older (Figures 2 and 3).

Data Movie 4 tracks racial and ethnic differences in diagnosis rates from 2008 to 2017. Throughout the period, racial and ethnic differences remained most pronounced among the oldest female groups and youngest male groups. Overall, the racial gap was greatest for Black versus White females; although differences between age-specific diagnosis rates narrowed over time, Black females still had an overall diagnosis rate 14 times that of White females in 2017 (Figure 4).

DISCUSSION

The first long-term analysis of trends in US HIV diagnoses was conducted in 2014, revealing that the national diagnosis rate had declined by one third from 2002 to 2011.[3] An updated analysis showed that the total number of HIV diagnoses in the United States decreased by 18.7% from 2008 to 2013.[4] Our findings extend these earlier analyses by four years, from 2013 to 2017. We found that the national diagnosis rate has continued to drop, owing to a gradual decrease in the number of new diagnoses paired with steady population growth. After the previously reported average annual decrease of 4% from 2008 to 2013, the total number of diagnoses remained stable from 2013 to 2016 and then declined by 3.3% from 2016 to 2017.

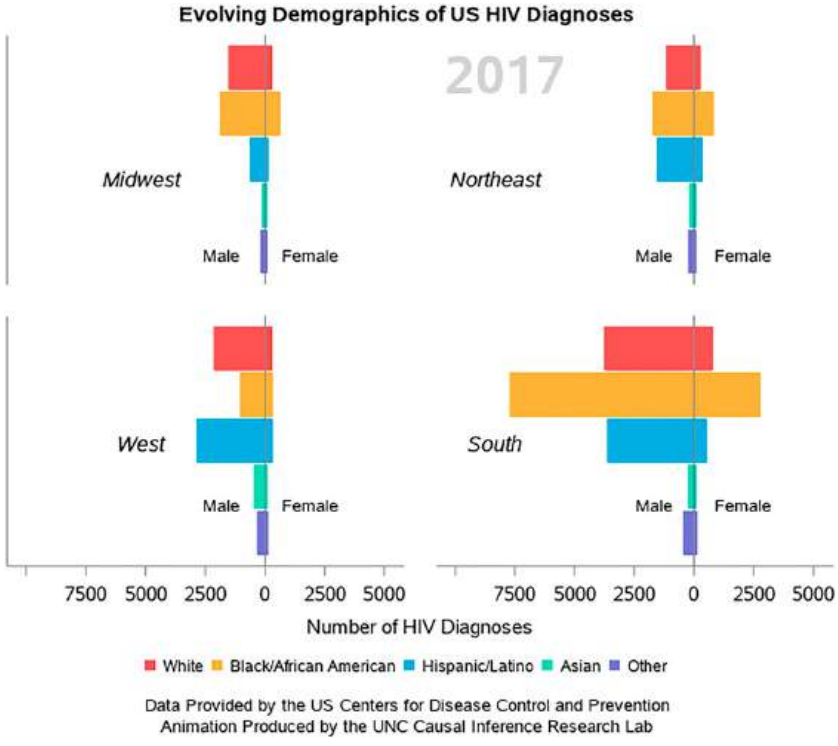

FIGURE 1— Still from Data Movie 1

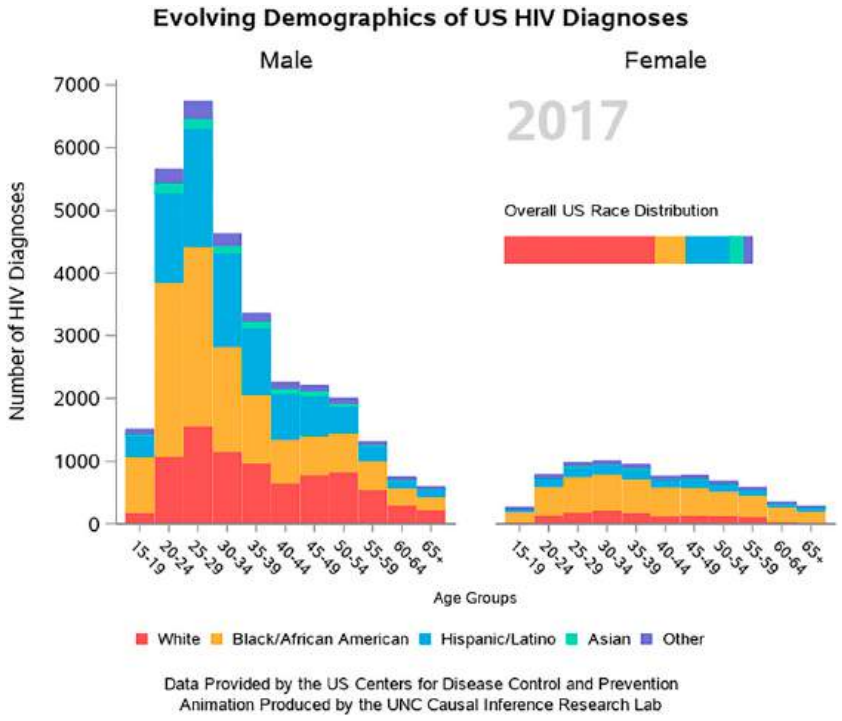

FIGURE 2— Still from Data Movie 2

One of the goals put forth by the Office of National AIDS Policy in 2010 was to reduce the disparity in new HIV diagnoses between people living in the South and the total US population by at least 15% between 2010 and 2020. However, the disparity ratio, rather than decreasing, increased by 12% from 2010 to 2017.[5] Alarming racial and ethnic differences also persisted throughout the period, with Black and Hispanic people receiving HIV diagnoses at much higher rates than White people. Such disparities may be the result of multiple factors, including but not limited to differences in testing access and uptake, differential access to preexposure prophylaxis, and differential access to care and treatment among people with HIV.

We also observed a striking shift in the age distribution of new diagnoses from middle-aged to younger males. Although we did not disaggregate diagnoses by mode of transmission, it is possible that higher rates of transmission among young men who have sex with men are at least partly responsible for the increasing proportion of diagnoses received by males in their 20s. A previous study reported that the overall diagnosis rate among males decreased by 27% from 2002 to 2011, but diagnoses attributed to male-to-male sexual contact among young males 13 to 24 years of age increased each year by an estimated 10.5% (95% confidence interval [CI] = 10.1%, 10.9%).[3] By 2014, owing to sustained decreases in all other transmission categories, more than two thirds of all new diagnoses were attributed to male-to-male sexual contact.[6]

As a result of the lag between time of infection and time of testing, trends in diagnoses may reflect earlier trends in incidence.[3] This lag is known to vary by population group. For example, among people with HIV diagnosed in 2016, median time from infection to diagnosis ranged from 29 months among Whites to 40 months among Blacks and 45 months among Hispanics.[7]

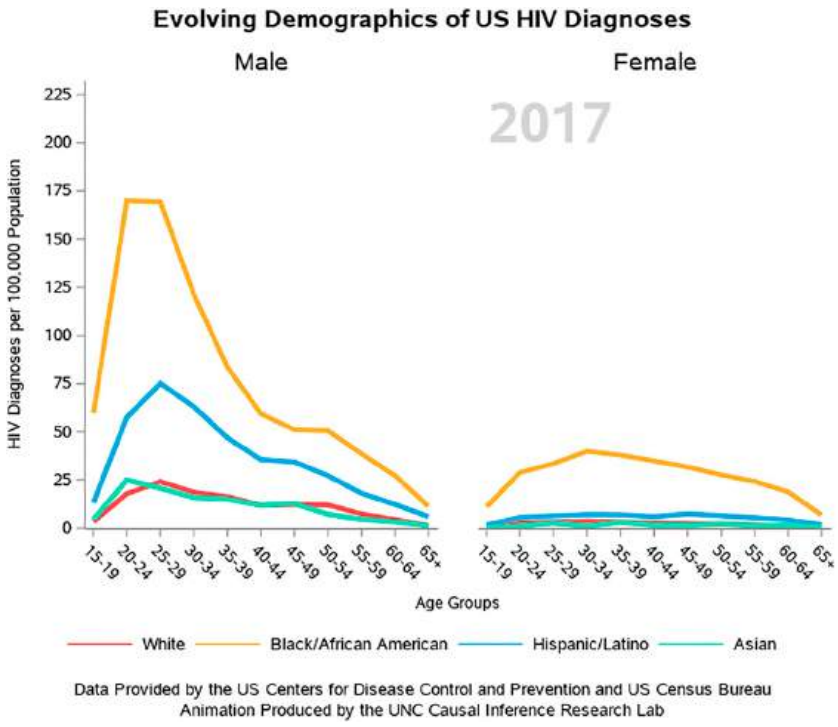

FIGURE 3— Still from Data Movie 3

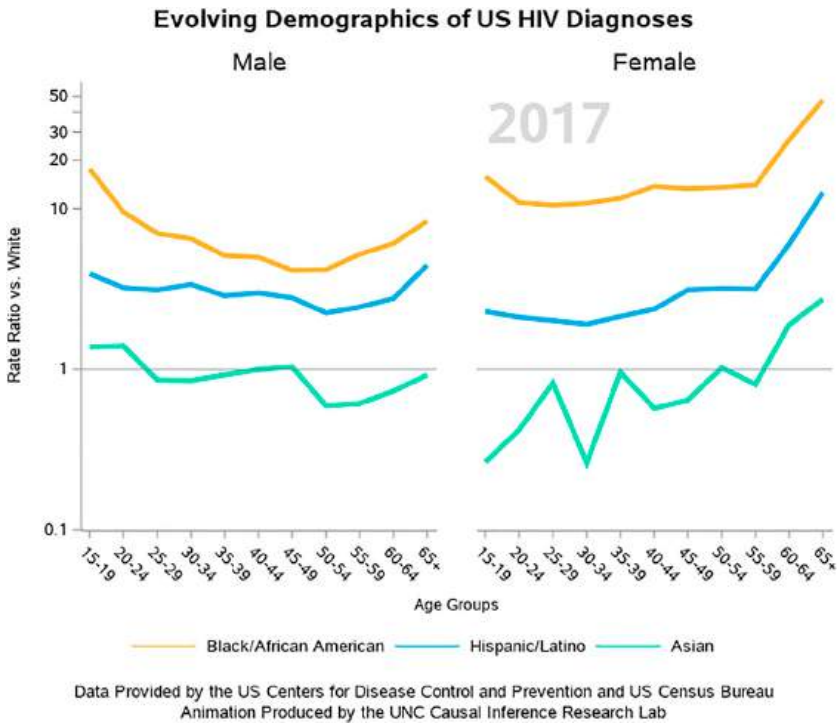

FIGURE 4— Still from Data Movie 4

Moreover, because the lag between infection and testing varies over calendar periods, trends in diagnoses conflate trends in incidence and trends in testing. Similarly, comparisons of rates between population groups (e.g., rate ratios) calculated from diagnosis data will yield conservative estimates of underlying disparities in incidence when the testing rate is higher in the reference group and exaggerated estimates of disparities when the testing rate is higher in the index group.

Despite these limitations, monitoring trends in diagnoses is a crucial step toward improving timely linkage to care, reducing onward transmission, and ultimately reducing HIV incidence and demographic disparities in incidence in the United States. AJPH

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CONTRIBUTORS

L. C. Zalla conducted the analysis and drafted the editorial. J. K. Edwards and S. R. Cole conceptualized the study, provided input on the analysis, and revised the editorial. J. E. Rudolph, T. L. Breger, and A. Virkud provided input on the analysis and revised the editorial. A. Satcher Johnson and H. I. Hall provided the data and revised the editorial.

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HUMAN PARTICIPANT PROTECTION

No protocol approval was needed for this research because no human participants were involved.

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Public Health Nutrition Deserves More Attention

Marion Nestle, PhD, MPH

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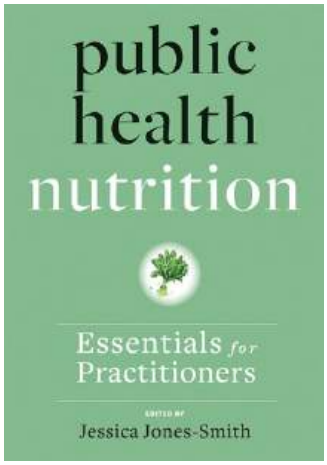

Public Health Nutrition: Essentials for Practitioners
Edited by Jessica Jones-Smith
Baltimore, MD: Johns Hopkins University Press; 2020
paperback: 432 pp; $99.95
ISBN-10: 142143850X
ISBN-13: 978-1421438504

Food and nutrition deserve much more attention from public health professionals. On the grounds of prevalence alone, diet-related conditions affect enormous numbers of people. Everybody eats. Everybody is at risk for eating too little for health or survival or too much to the point of weight gain and increased risks for noncommunicable diseases. By the latest count, nearly 700 million people in the world do not get enough to eat on a daily basis, a number that has increased by tens of millions over the past five years and will surely increase by many millions more as a result of the COVID-19 pandemic.[1] At the same time, about 2 billion adults are overweight or obese, and few countries are prepared to deal with the resulting onslaught of type 2 diabetes and heart disease.[2] Beyond that, food production, distribution, consumption, and disposal—collectively food systems—are responsible for a quarter or more of greenhouse gas emissions; climate change affects the health of everyone on the planet.[3]

The same social, behavioral, economic, and structural determinants of health affect nutritional health, and it is no accident that food choices are flash points for arguments about culture, identity, social class, inequity, and power, as well as the role of government, private enterprise, and civil society. From a public health standpoint, everyone—regardless of income, class, race, gender, or age—should have the power to choose diets that meet nutritional needs, promote health and longevity, protect the environment, and are affordable, culturally appropriate, and delicious.

NUTRITION IN 2021

For people in high-income countries, dietary prescriptions for health and sustainability advise eating a lot less meat and more foods from plant sources.[4] Optimal diets minimize the consumption of ultraprocessed foods—those that are industrially produced, bear little resemblance to the basic foods from which they were derived, cannot be prepared in home kitchens, and are now compellingly associated with noncommunicable disease risk and mortality.[5] We also now know that ultraprocessed foods encourage people to unwittingly take in more calories and gain weight.[6]

AGENDA FOR 2021

Today, a book for researchers and practitioners of public health nutrition needs to emphasize coordinated—triple-duty—recommendations and interventions to deal simultaneously with hunger and food insecurity, obesity and its consequences, and the effects of food production and dietary choices on the environment. Such approaches, as described by a Lancet Commission early in 2019,[4] should encourage populations of high-income countries to eat less meat and more vegetables, those in lower- and middle-income countries to consume a greater variety of foods, and

everyone, everywhere to reduce intake of ultraprocessed foods. As that commission argued, public health nutritionists must recognize that attempts to improve diets, nutritional status, nutritional inequities, and food systems face daunting barriers from governments captured by corporations, civil societies too weak to demand more democratic institutions, and food companies that have been granted way too much power to preserve profits at the expense of public health. Nutritionists need knowledge and the tools to resist food company marketing and lobbying, to champion regulatory controls of those practices, and to promote civil society actions to demand healthier and more sustainable food systems.[7]

UNFORTUNATE TIMING

The multiauthored chapters in *Public Health Nutrition: Essentials for Practitioners* have the bad luck of having been written before food systems, triple-duty dietary advice, ultraprocessed foods, and overcoming barriers posed by the food industry became such prominent themes, before Black Lives Matter required intentional refocusing on nutritional inequities, and before the COVID-19 pandemic so thoroughly revealed the inadequacies of existing food systems.[3] Despite these disadvantages, the book has significant strengths. Intended as a graduate-level introduction to public health nutrition for researchers and practitioners, it contains chapters on public health tools, nutrition-related diseases, frameworks for considering nutrition problems, and selected policies and programs, most with multiple authors. The chapters follow a common format: learning objectives, case studies, text covering the subject at hand, key words and concepts in bold-face type, tables and figures summarizing the content, questions for discussion, and references. The book ends with a lengthy glossary of the bold-face terms and an index.

Many of the authors are prominent experts who do an excellent job of demonstrating how public health concepts apply to nutritional problems. Their detailed literature reviews cite as many as a hundred references. The tools sections cover nutritional assessment, nutritional epidemiology, and program planning and evaluation. The chapters on diet-related diseases focus largely on international aspects, especially in lower- and middle-income countries; these will be useful to readers, as will many of the tables. I particularly appreciated one that summarizes myths and realities of how to work with communities—"I already know what the needs are in this community" (p. 58; No, you don't unless you ask)—and those on how to analyze root causes and to write process, learning, and outcome objectives. All of the chapters are worth reading; some are outstanding. The last chapter, on cash transfer programs, is a model of how to critically examine the ways these programs function in actual practice—as well as in theory. I mention theory because although several chapters devote considerable space to theoretical models of eating behavior, few go into much detail about the practicalities of what to expect from food industry opposition to public health interventions aimed at reducing intake of meat or ultraprocessed foods or how to head it off and counter it.

MORE CONTEXT WANTED

Like most multiauthored books, this one suffers from repetitions, inconsistencies, and gaps. Several chapters discuss dietary assessment methods and nutritional epidemiology, but none refer to the recent barrage of criticism of the inaccuracies of these methods and the conflation of epidemiological correlation with causation, for example, with single foods such as almonds associated with the risk of heart disease. Inconsistencies in books like these seem inevitable. A case study of the nutrition transition (from undernutrition to obesity) in Brazil mentions ultraprocessed foods but fails to cite the now-vast body of research linking them to noncommunicable disease risk. This chapter praises—justifiably in my view—Brazil's dietary guidelines for urging avoidance of ultraprocessed foods and fast food and for encouraging resistance to industry advertising. But another chapter on international guidelines does not even mention those from Brazil.

Perhaps because the chapters were written a few years ago, only one mentions food system approaches to food and nutrition problems. Neither double- nor triple-duty approaches show up in the glossary or index; neither do the terms "food system" or "ultraprocessed." The glossary provides excellent definitions of the terms it does list, but these do not appear in the index; finding how they are used in context is not easy. Mostly, I missed a discussion of how public health nutritionists can and should advocate policies to promote greater availability and affordability of healthier and more sustainable diets and suggestions for how to go about learning to do that.

Could I teach public health nutrition from this book? Yes, but with supplementation of its background information with additional resources that emphasize food systems, triple-duty approaches, Brazilian dietary advice,

and the need to push back—forcefully—against food industry opposition to public health interventions. AJPH

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Sounding the Alarm for White America—and Maybe the Rest of Us

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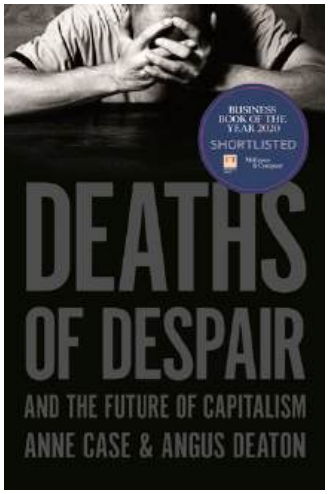

Deaths of Despair and the Future of Capitalism
By Anne Case and Angus Deaton
Princeton, NJ: Princeton University Press; 2020
Hardcover: 312 pp; $27.95
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In 2015, Anne Case and Angus Deaton, two Princeton University economists (Deaton won a Nobel prize that year) were studying suicide when they realized they had stumbled on a worrying finding. Unique to middle-aged White men, overall mortality had been increasing since the 1990s. They coined the phrase "deaths of despair" to capture the principal drivers of rising White mortality: overdose, suicide, and alcohol-related liver disease. The medical and public health communities, which had not identified this decades-long trend, did not react with the anticipated alarm. Two major medical journals declined their article. Nonetheless, the findings made headlines. The *New York Times* published a graph that captured their observations on its front page, above the fold. The phrase "deaths of despair" now is widely embraced as a reflection of US failure to protect its working class and is even used to explain the unexpected results of the 2016 US presidential election.[1]

Case and Deaton's book-length exploration of their initial study, titled *Deaths of Despair and the Future of Capitalism*, is on the bestseller lists. It was published in late March 2020, as the nation began confronting a pandemic and an exponential rise in COVID-19 deaths. Early on, it became clear that COVID-19 would cut a brutal swath through communities of color. Then in May, George Floyd had his life casually snuffed out by police. Outrage at enduring and lethal anti-Black racism resurged in the United States and many other countries. The call "Black Lives Matter" spanned the globe. "Structural racism" became part of everyday speech along with exhortations to dismantle it. In this context, I at last turned to reading *Deaths of Despair and the Future of Capitalism*.

Racism and White supremacy do not figure much in the thinking of Case and Deaton. One can read *Deaths of Despair and the Future of Capitalism* from cover to cover without encountering the fact that in every single year since data collection began, US Blacks have had shorter lives than Whites. Neither will you find a reflection on the trauma of these seemingly intractable odds. Case and Deaton acknowledge continued Black excess mortality and the concept of White privilege (chapter 5 is titled "Black and White Deaths"), but this does not appear to interest them. Their concern is White people, specifically, the White working class. Herein lies the main question about the framing of this book. Can we understand what has happened to Whites, who are the US majority racial group, without also looking at all groups? And can we ask why the White working class chooses White privilege over class solidarity? What does this limited perspective mean for interventions?

This book is important, and not only because of its unexpected finding of growing White disadvantage. The rise in mortality Case and Deaton uncovered is extremely rare. Since the 1918 flu pandemic, only the Soviet Union before its collapse and Africa in the midst of the

HIV/AIDS epidemic have experienced declining life expectancy. That the United States has joined this group is very worrying, and the experience of the White working class is, of course, an important part of this story. But there are both factual and conceptual issues that arise from a lens that focuses narrowly on White people. First, mortality trends are evolving, and White Americans do not have unique claim to rising mortality. Although not headline grabbing, the examination of Shiels et al. of patterns of premature mortality for all races/ethnicities documents the shameful fact that for decades, since 1948, mid-life mortality has gone up in successive birth cohorts of American Indian/Alaska Natives.[2] Woolf et al. showed similarly that American Indians/Alaska Natives, like Whites, have rising midlife mortality.[3] Although Case and Deaton report that in 2013 Black opioid-related mortality began to increase, Woolf et al. found that the overall mortality decline in midlife for Black and Latinx people ended in 2009 to 2011. Finally, Woolf et al. also showed that an increase in deaths occurred for a wide range of causes, beyond "deaths of despair." As I write, the COVID-19 pandemic highlights how the brunt of excess mortality continues to fall on communities of color, with disproportionate life expectancy declines a likely consequence.[4] In other words, the downward trend in mortality of people of color, especially Black and Indigenous people, now seems to have ended.

Conceptually, a distinction of these additional analyses is their focus on *all* Americans, which Case and Deaton intentionally do not pursue. This narrower framing seems mismatched with their recommendations for action. A key solution recommended in the book—universal health care—has encountered persistent resistance, in part because, as Case and Deaton note, many White people find these approaches unacceptable because they benefit Black people. This racial disjuncture would seem to put us in a corner. Fixing health care so that it is available, accessible, affordable, and of high quality would benefit more White people than Black people. As Nikole Hannah-Jones points out in her Pulitzer Prize–winning essay for the 1619 Project, the fight for Black rights resulted in universal benefits—for everyone.[5]

Case and Deaton portray a tragedy engulfing the White working class. There is "despair," "loss of a way of life," a "catastrophe." From "White people problem" may follow "White people solutions." I worry that their framing may endorse a "time to focus on Whites" approach. The reasoning would go like this: Black people (whom the authors less emotively describe as long the "least favored group") have been getting a great deal of attention. Meanwhile lives of the White working class are falling apart. There is precedent for what were effectively race-based exclusions. The New Deal depended on Franklin Roosevelt's placation of the Southern Democrats, which he achieved by excluding domestic and farm workers from Social Security, thereby barring many Black people from benefits. However, today, it is hard to imagine a democratic strategy that would benefit only Whites.

Among other books I have read during the COVID-19 pandemic was *Caste: The Origins of Our Discontents* by Isabel Wilkerson and *The Purpose of Power: How We Come Together When We Fall Apart* by Alicia Garza. Wilkerson suggests that Whites will persist in seeing maintenance of White privilege (their caste) as in their long-term interest, despite short-term pain, for example because of lack of health insurance. This gloomy prospect complements Garza's observation that for the United States, the "silent engine" is always racism. Case and Deaton have sounded the alarm about the White working class. That this country sees its problems in racially exclusive ways points to what may be the most fundamental root of despair. In the end, it may be more useful to consider racism, and how it has shaped US capitalism and its inequalities, not despair, as our most lethal killer. AJPH

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The Fascist Threat

Alfredo Morabia, MD, PhD

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Whether there is a serious fascist threat in the United States is debatable, but after the march on and the storming of the US Capitol on January 6, 2021,[1,2] no one can contest that the question of whether fascism poses a serious threat to the United States is one that needs to be dealt with seriously. People today who exalt their race and stand for some form of authoritarian regime may not call themselves fascists, but their insurrectional plans belong to the history of that political movement.

The health of the public depends upon the strength of our democracy. *AJPH* is therefore creating an ongoing section entitled "The Fascist Threat," because fascism, if not the only threat or form of extremist ideology, is the main one now menacing health equity and social justice. We invite submissions from different disciplines and from different countries that analyze the consequences of authoritarian, totalitarian, and fascist movements and regimes on public health, and investigate how the fascist threat has already undermined the response to the pandemic by focusing instead on weakening equality, inclusion, democracy, and human rights.

For almost four years, an aggressive use of Constitutional Presidential powers in the United States has exacerbated the already existing gender, racial, religious, and sexual identity tensions while tacitly supporting White supremacists, neo-Nazis, science deniers, and xenophobes. This increasing subversion of democratic values, and the verbal excesses and armed protests that accompany it, has been tolerated and in many cases supported by elected conservative politicians at the federal level.[3,4]

There also has been a progression in what appears in retrospect to be rehearsals for the January 6, 2021, insurrection in Washington, DC. In May 2020, armed far right supporters swarmed the Michigan Capitol lawn. There were also disruptions by armed protesters in Oregon, Idaho, and other states.[5] In the fall of 2020, federal agents thwarted a plot to kidnap and harm Michigan Governor Gretchen Whitmer and violently overthrow her government after storming the Capitol in Lansing and taken hostages.[6,7] All these armed events appear to have been orchestrated, carefully planned, masterminded actions building toward an insurrectional strategy. Next time—and if this is trivialized there is a 100% chance of a next time—lawmakers could be held hostage or killed, and insurrections could take place simultaneously at state and local levels in a progression resembling previous fascist takeovers in other countries. Observers of the January 6, 2021, events were astonished by the absence of an adequate police or security presence given the size of the crowd and prior knowledge of the groups that would be attending the march.[8] By contrast, the police and Army Reserve were present in substantial numbers and responded violently to a peaceful demonstration of Black Lives Matter on June 1, 2020, when the church and bible scene was staged in front of the parish house of St. John's Episcopal Church in Washington, DC.[9,10]

We want to believe that a fascist takeover is improbable, but there is urgency to consider it seriously. Think about the outcome of the Republican primaries in 2016[11] and of the following presidential election,[12] or the 74 million Americans who voted for the then-current leadership, or a US president calling on far right militias to march on the Capitol.[13] All these events were deemed a priori improbable by many experts. Yet improbable events appear more likely to occur when they are not taken seriously.

So, let's take the improbable fascist threat seriously. The time is right to revisit past effects of fascism or other forms of modern authoritarian and totalitarian movements and regimes on public health, as well as to document the current impact of fascist movements on democracy, human rights, and public health across the world. The images of the storming of the US Capitol were full of symbols directly related to the public health, whether they were genocides or follow-ups of successful insurrections by groups with similar ideologies and programs.[14] The Crusader's cross carried by some demonstrators echoed the anti-Muslim rhetoric of the Trump administration and announced spreading violence fueled by misinformation and inflammatory rhetoric. The confederate flag and nooses exhibited by the crowd

stood for slavery, lynching, and racism more generally. The violent prolife groups reproduced the authoritarian negation of women's reproductive autonomy by the Italian fascist regime (1922–1943). The "Camp Auschwitz" hoodie referred to the so-called "final solution" (1941-1945), comprising the extermination of the Jews, which was the third phase of the Nazi "public health" program, following mass sterilization which began in 1933, and mass euthanasia on disabled Germans which began in 1939.

AJPH has been actively promoting dialogue among people of different political affiliations or values within public health (https://am.ajph.link/APRIL_2018; https://am.ajph.link/APRIL_2020). This dialogue is constructive and instructive. Let's keep it alive when we discuss the fascist threat. Submissions to "The Fascist Threat" that are successfully peer reviewed will be published. Consistent with the mission of the journal, we will document the damage already done and perhaps still to come by the fascist threat to public health in order to support evidence-based policies at all levels. If the threat is overestimated, the dialogue will still be a useful contribution to knowledge. If the threat escalates, these contributions will be indispensable for emphasizing what is at stake for public health from the fascist threat. AJPH

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Lessons From the Pandemic: What Is Wrong and What Is Fixable in US Health Policy and Practice?

Paul C. Erwin, MD, DrPH, Daniel M. Fox, PhD, Colleen Grogan, PhD, and Alfredo Morabia, MD, PhD

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See also the Fixing US Health Policy section, pp. 620–657.

This is the first of two special sections of *AJPH* exploring the implications of the national elections of 2020 for addressing problems in health policy and its implementation that have emerged or been intensified during the pandemic. Editorials in this issue identify these problems and speculate about what government, at all levels, has the potential to do about them in 2021 and 2022.

In the second special section, to be published later this year or next year, the same authors will amplify and perhaps modify their editorials. They will amplify them by adding historical and contemporary context to the issues and problems they address. Where necessary, they will modify what they wrote in their editorials to take account of recent events in the politics of making and implementing health policy.

We asked the authors of the editorials in this issue and the articles that will follow them to accord particular attention to these themes:

- the implications for making and implementing policy during the pandemic in light of the incremental commercialization of hospitals, nursing homes, physician practices, and health care systems;
- the structure and operational incentives of organizations that supply protective equipment and medical devices to health care facilities and clinicians and prescription drugs to patients; and
- the recent history of funding—both sources and amounts—for essential public health services and interventions that address the social determinants of population health.

The editorials appearing in this special issue include the following:

- the social determinants of health and COVID-19—"A Data-Informed Approach to Targeting the Root Causes of COVID-19 Disparities" by Tipirneni (p. 620);
- federal, state, and local coordination during the pandemic in the context of responses to other emergencies that have threatened public health—"We Must Fix US Health and Public Health Policy" by Frieden et al. (p. 623);
- federal allocation of provider relief funds under the CARES Act (Coronavirus Aid, Relief, and Economic Security Act) to hospitals—"Health Equity and the Allocation of COVID-19 Provider Relief Funds" by Grogan et al. (p. 628);
- federal- and state-level policies that affect nursing homes' ability to provide long-term care during the pandemic—"Improving the Fate of Nursing Homes During the COVID-19 Pandemic: The Need for Policy" by Konetzka (p. 632);
- federal, state, and local government influence on the supply and distribution of prescription drugs in the context of the provision of essential public health services—"The Pandemic and the Supply Chain: Gaps in Pharmaceutical Production and Distribution" by Socal et al. (p. 635); and "The Role of Advance Purchasing Commitments in Government Drug Price Negotiations: Lessons From the COVID-19 Response" by Socal and Anderson (p. 652);
- the role of state Medicaid policies to address access to and the quality of services to prevent, treat, and manage COVID-19 and other illnesses during the pandemic—"Insuring the Population During National Emergencies Leveraging Both Medicaid and the Marketplace" by Gee et al. (p. 640) and "Politics, Pandemic, and

Racial Justice Through the Lens of Medicaid" by Michener (p. 643); and
- comparison of US states' responses to the current pandemic—"Different Responses to COVID-19 in Four US States: Washington, New York, Missouri, and Alabama" by Erwin et al. (p. 647).

We recognize the highly dynamic nature of the pandemic and policy responses to it; thus, between the time these editorials were written and when they will appear in *AJPH*, although some of the details described by the authors may have evolved, we believe the underlying perspectives hold. AJPH

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COVID-19's First Year: A Bipartisan Appraisal

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ABOUT THE AUTHOR

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See also the Building Bridges section, pp. 586–613.

On January 20, 2019, the United States identified its first case of COVID-19. This case was the start of the US component of a global pandemic that has devastated our health, our economy, and almost all facets of our lives. As societal disruptors go, this was indeed the big one. Now one year later, we look back and take measure of what this means to public health and see the extraordinary impact this pandemic has had on our understanding of public health preparedness, health inequities, and the politicization of science and public health.

This issue of *AJPH* contains a series of opinion pieces as points and counterpoints, with opposite partisan perspectives that explore some of the questions this year of turmoil and challenge has unearthed. Jeanette Kowalik (p. 602), a former health officer from Milwaukee, Wisconsin, was among the first officials in the country to recognize and report on the enormous health disparities manifested in the COVID-19 pandemic. Her thesis explores the consequences of the disinvestment of public health to the ability of the agency to do its legislated duty, as well as its effects on a community that is disproportionately minority. She addressed this issue while preparing for the Democratic National Convention, which had been scheduled to take place in Milwaukee in 2020. COVID-19 interrupted that event, as it did everything else and transformed the convention for the most part into a virtual event.

Howard Rodenberg (p. 604) from Jacksonville, Florida—which was expected to host the Republican National Convention, another event that went essentially virtual—builds on Kowalik's concerns about fundamental support for public health by focusing on the disinvestment in its leaders as well. He aptly points out the political element of public health agency leadership and the risks to careers and the hostile work environments that health officials are now finding themselves in. He keenly asks, "Who would want the job? Perhaps a few brave (or foolhardy) souls will continue to venture into the shark-infested waters" (p. 604). In many ways, that is the question the field will have to answer. How do we build principled public health leadership that can build the support of policymakers, earn the trust of the community, and therefore build sustainable systems that are prepared and resilient enough to protect the public's health?

Gee and Khan (p. 594) and Gerberding (p. 596) explore the challenges met while responding to the pandemic and key principles to consider when building the public health system of the future. All have had the experience of leading key public health agencies during infectious outbreaks: Gerberding as director of the Centers for Disease Control and Prevention (CDC) during the anthrax letters; Khan as director of the CDC Office of Preparedness and Response, where he worked on numerous infectious disease outbreaks, including Ebola, hantavirus, and SARS; and Gee, who as a state health official in Louisiana was involved in managing the Zika outbreak. All three leaders acknowledge the poor state of public health but look to opportunities for learning as we move toward building the future.

The point and counterpoint articles by Kassler (p. 606), Fine (p. 608), Butler (p. 610), and Glied (p. 612) explore our fractured health system, which has not yet achieved universality, flexibility, and seamlessness. COVID-19 has laid bare the holes in the delivery system and specifically the inadequacies of the primary care system, which should serve as the foundation of our ability to provide basic care for our population. Butler argues that to achieve a more equitable health system we should do three things: create more community-based health services, transition from employer-sponsored insurance to Medicare Advantage for All, and restructure our national system in a way that permits local variability to meet local needs. Glied counters that we should build on the employer-based system and the Affordable Care Act while working to achieve universal coverage. She acknowledges the strengths of Butler's concepts while pointing out the challenges the nation has had in moving in the policy direction Butler proposes. Nevertheless, achieving universality for

the primary health care delivery system is a key component of a reimagined and more equitable public health system.

Castrucci (p. 598) and Atchison (p. 600) take on the issue of the 10 essential services as the foundational work of public health. They both point out the need for a consensus on how to communicate about these services so all can understand what public health is. We are not there yet! One of the paradoxical lessons of the COVID-19 pandemic is that the world still associates the term "public health" with medical services delivered by doctors and nurses. "Epidemiologist" has become synonymous with "medical expert," and governmental public health practitioners are now viewed as bureaucrats focused on violating individual freedom by promoting mask wearing, physical distancing, and stay-at-home orders. In fact, public health is just the opposite. It is a discipline built on a foundation of freedom, human rights, and equity. Its goal is to ensure that all people in all communities have the opportunity for good health. Castrucci and Atchison are right on: we have work to do to ensure that public health guidance becomes acceptable to all.

The articles by Ferdinand (p. 586) and Rodenberg (p. 588) lay out the ethical reasons public health must continue to act and be vigilant. Ferdinand relates a moving experience involving the role inequity plays in our society, and Rodenberg presents the case of the ethical need to act. Combined, these two authors pay tribute to the work public health must do and lay bare in the starkest terms the counterpoint to those who believe public health practitioners are not operating in humanity's best interest.

The COVID-19 pandemic of 2019–2022 has exceeded 25 million cases in the United States and is projected to peak at more than 500 000 deaths. As of this writing, the US death toll has eclipsed the deaths from the six years of WWII. The economic toll is in the trillions of dollars, highlighting the enormous impact of a global pandemic. Considering that the US investment in health is more than $4 trillion and the public health component is only 3% of this, COVID-19 shows the fallacy of resource allocators' persistent disinvestment in public health. A weakened public health system was an important component of the inability to effectively respond to the pandemic. Indeed, the major lesson of the pandemic is that the United States needs to invest in a well-resourced and sustainable public health system. Pandemics are devastating, and this is not the last one. AJPH

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US Disparities in Life Expectancy: Not One "Population Health Iceberg" But Two

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See also Farina et al., p. 708.

Using data from the 2013–2017 American Community Survey and the 2017 United States Mortality Database, Farina et al. (p. 708) explored state-specific total life expectancy (TLE), disability-free life expectancy (DFLE), and disabled life expectancy (DLE) by gender for US adults and hypothetical worst- and best-case scenarios.

Their finding is that "stark variation in DFLE and DLE across states highlights the large health inequalities present today across the United States" (p. 708). As the authors argue clearly and thoughtfully, these findings have profound implications not only for individuals' well-being but also for the US financial costs and medical care burden.

Moreover, this study invites a body of further research. The data sets used for this study do not contain covariates at the individual level (such as education, income, or housing) or state policy level (e.g. tobacco taxes, opting out of Medicaid expansion, weak antipoverty laws, or actively implementing preemption laws) that could add important insights into understanding state and regional variations. But data to further explore these factors are readily available.

An additional issue that the authors also could not explore given the limitations of their data is that the significant variation by state and by gender may, in fact, be even more striking because for millions of poorer Americans lacking access to affordable health care, identification of disabling conditions may occur long after onset of initial injury or signs of ill health.

The authors labeled the current invisibility of these striking state and regional differences in DFLE and DLE a "population health iceberg." This is an excellent analogy. The issue of course, is not just finding that there are differences between states. The issue is also what these statistics say about national health inequalities. It asks us what we, both at state and national levels, owe to our fellow citizens—and what we should expect of ourselves as a nation. For my part, I would add that it raises other significant issues, such the United States' standing as the only high-income country without some type of universal health care and how such a system could help address these striking disparities.

AN ADDITIONAL "ICEBERG"

In these findings, I would also argue that the authors raise an additional "iceberg"—routinely overlooked by our public health community. It pertains to the concept of DLE—years of life lived with a disability.

As someone who has long worked on disability research, I am always struck by the facility with which the concept of DLE is invoked and then remains largely unquestioned. Too often, the diagnosis of "disabled" is the clinical and administrative equivalent of crossing the Rubicon—a sudden transformation from a full participant in and contributor to society to epidemiological invisibility.

Living with a disability is complex. There are different types of disabilities—physical, sensory, intellectual, and mental health—and varying degrees of severity. Age of onset[1]—when one becomes disabled—also has significant implications. The life of a newborn with significant intellectual disabilities will be very different than that of a 45-year-old with a newly acquired spinal cord injury. A young man or woman born with a visual impairment may be otherwise perfectly healthy.

Over the past several decades, a large and growing body of research globally shows how much the lives of people with disability are defined and too often limited not by their disability but by a range of socially determined factors linked to a lack of equal access to medical, social, community, and economic support as well as limited educational, employment, and civic engagement.[2,3] People with disabilities are disproportionately poorer, more socially isolated, and less likely to receive

equal access to both general health care and disability-specific health care. All of these are compounding factors that, across the life span, have clearly been shown to increase short- and long-term risks for mortality and morbidity.

Research from the United States clearly reflects these global data. In all too many communities, especially in poorer urban and rural areas, there are limited or nonexistent social services, community nursing, rehabilitation, and mental health services; there is a lack of public transportation; there are ineffective nutrition programs; and there is an absence of a range of other programs and services that we know have direct impacts on the morbidity and mortality of people with disabilities. In addition, restrictive social policies force millions of Americans with disabilities to have to decide to forgo paid full- or part-time employment to be entitled to what benefits are available. Restrictive insurance policies—often arbitrarily administered—prove difficult or impossible to navigate. And a whole new group of studies show that there are always additional expenses when living with a disability.[5]

In addition, too often in terms of community support and legislative decisions, people with disabilities are conceptualized as living in isolation or dependent on others for care and support. It is important to underscore the fact that people with disabilities are also members of families and households. Often they are husbands and wives, mothers and fathers, not only struggling to cope with issues related their own disability but also responsible for their own children, a sick spouse, or elderly parents. The implications at the household level for both immediate and multigenerational poverty are significant.

Moreover, asking that we, in public health, more critically think about what we mean when we discuss DLE is not just the right thing to do. It is the law. The Americans With Disabilities Act must be a factor in discussions of DLE, related to both services and legislation at state and national levels.[6] Globally, comparable attention to ensuring that people with disabilities have a right to a range of covariates such as health, housing, and income is a cornerstone of the United Nations Convention on the Rights of Persons With Disabilities, now ratified by 182 countries, although, regrettably, not yet by the United States.[7] This legislation has been driven by an international Disability Rights Movement, which over the past four decades has been led for and by people with disabilities themselves.[8] To consign the 1 billion people—15% of the world's population—who according to the United Nations live with a disability solely to discussions of DLE is a missed opportunity to improve population health and well-being.

IN CONCLUSION

The authors of this important article label the unequal distribution of DFLE and DLE as "the tip of the population health iceberg" (p. 710). They could not be more correct. Their findings have profound implications not only for local and national public health policy but also for questions of equality between states and regions. This study provides a lens for all of us—as a nation—to see what we need to do to ensure equity on a national scale.

And I argue that this study also provides a space for the US public health community to pause and think more broadly and far more critically of what we mean by "DLE." The authors state "disability is part of a health 'trajectory' ending in death" (p. 709). This is certainly true for people with many types of disabling conditions—but it might also be good to keep in mind that, by this definition, disability is also part of life itself. AJPH

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Sugar-Sweetened Beverage Tax Preemption and the Urgency of Unified Mobilization

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See also Crosbie et al., p. 677.

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In this issue of *AJPH*, Crosbie et al. (p. 677) analyze tactics the beverage industry has used to promote preemption of sugar-sweetened beverage (SSB) excise taxes. Preemption is a legal mechanism by which a higher level of government (e.g., a state) can prohibit a lower level of government (e.g., a city) from enacting and implementing a policy. State preemption of local laws, which the tobacco industry has employed heavily, can have a chilling effect on local laws and their attendant health and social benefits and is part of "a larger retreat from democratic values."[1(p252)] Preemption of SSB taxes is a major threat to public health because, as evaluations have shown, SSB taxes are the single most cost-effective[2] policy option currently available to decrease SSB purchases[3] and consumption.[4] Furthermore, SSB taxes promote equity when revenue is invested in low-income communities, communities of color, and public services (e.g., water access), which has occurred in the US jurisdictions with SSB taxes.[5] Based on the tobacco industry experience, SSB tax preemption attempts will likely accelerate. The fact that many tobacco preemption laws have taken more than a decade to repeal underscores the urgency of action to prevent preemption.

Crosbie et al. also answer a call to bring the commercial determinants of health out of the shadows.[6,7] Although it is broadly recognized that food and beverage companies shape health behaviors by marketing and selling unhealthy products, the authors expose far more insidious ways that the industry shapes our choices and freedoms.

INDUSTRY TACTICS TO ADVANCE PREEMPTION

Crosbie et al. highlight beverage industry tactics to advance preemption: use of front groups and trade associations, lobbying, adding preemption language to other legislation, and issuing legal threats and challenges. As the authors indicate, preemption has long been in the toolkit of industries that have undermined public health efforts. And it is part of a comprehensive approach the food and beverage industry has long used to maintain profits at the expense of people's health.

One particularly worrisome part of the industry's preemption campaigns is the creation and dissemination of misinformation. The use of dis- and misinformation is not a new tactic; for years, the beverage industry has influenced consumers' decision making through deceptive marketing, often targeted at communities of color and youths. In the preemption context, the authors describe misleading beverage industry–funded ballot initiatives to preempt new local SSB taxes in Washington State and Oregon. These initiatives, however, were framed as preempting grocery taxes, not SSB taxes. The campaigns for these initiatives, titled Yes! To Affordable Groceries and Yes! Keep Our Groceries Tax Free, featured produce aisles and grocers voicing opposition to food and grocery taxes (https://bit.ly/38vCBQe). Absent from many materials were images and mention of SSBs. However, there had been no local proposals to tax groceries, whereas there had been several active local sugary drink tax campaigns.

Ultimately, Washington's preemption initiative passed, banning new SSB taxes by prohibiting new taxes on grocery items and defining groceries to include "carbonated beverages" and "soft drinks." The tactics of framing SSB taxes as grocery taxes and using local grocers in campaigns had been used to oppose SSB taxation in Philadelphia, Pennsylvania; Oakland, California; and other cities. And disinformation may also have played a role in eliciting grocers' support. An Oakland grocer who appeared in antitax ads later said that soda company representatives had lied to him about

the measure. In an interview (https://bit.ly/34nP1sq), he said, "They tried to use me, and use my business."

In California, the SSB industry used coercion to enact SSB tax preemption by first funding a statewide ballot initiative that could have crippled local democracy and city budgets by requiring a two thirds supermajority to enact any new local tax. The beverage industry then agreed to drop the initiative in exchange for legislators passing a bill banning new local SSB taxes. A California senator described this tactic as the beverage industry "aiming . . . a nuclear weapon at . . . California and saying if you don't do what we want, we're going to pull the trigger" (https://lat.ms/38grxXe). To combat such coercive approaches, advocates must actively monitor for and mobilize against blanket antitax, antiregulatory initiatives.

It is important for the public to be aware that preemption is one of many pernicious tools industry uses to influence information and policy environments, further slowing public health progress and undermining democracy. Other strategies include publicly framing physical inactivity (not diet) as the main driver of obesity and related chronic diseases, shaping the scientific evidence base and discourse by sponsoring researchers and scientific meetings, infiltrating health organizations, criticizing science that implicates the food and beverage industry in promoting unhealthy diets, sponsoring underresourced nonprofits to influence their support for policies, and making campaign contributions to decision makers.

FUTURE RESEARCH

Existing research on SSB tax preemption is limited mostly to publicly available records. Interviews and surveys of advocates, legislators, labor unions, retailers, and other supportive and opposing groups are needed to uncover motivations for their position, persuasive messaging, and resources necessary to avert preemption. Such research could unearth the extent to which dis- and misinformation was used to persuade voters and local stakeholders to support preemption and, in exposing this tactic, shape public opinion.

Research can also quantify the costs to the state, taxpayers, and communities when preemption blocks the enactment of local policies (e.g., health care costs, lives lost, loss of revenue to support equity-promoting programs, loss of local experimentation, increased cost to advocates). Such research would answer calls to better understand the commercial determinants of health, which requires "go[ing] well beyond what happens in public . . . to understand the hidden and invisible influences on . . . policy."[7(p1168)] Lastly, it is essential to explicitly include commercial determinants in models and frameworks that guide research, advocacy, and policymaking.[6]

CALL TO ACTION

We agree with the call to action made by Crosbie et al., and we make additional recommendations. They champion media campaigns that educate the public and policymakers about how industry undermines public health. Campaign effectiveness could be enhanced by highlighting industry's misinformation tactics, such as branding SSB taxes as grocery taxes and deceiving small business owners into being the face of their campaigns. Campaigns can expose how large multinational corporations use preemption to silence community voices in support of SSB taxes—specifically the voices of youths, communities of color, parents, and educators. When industry purports that public health policies restrict freedom, advocates can emphasize the ways the industry already constrains consumer freedoms. Although funding for public health campaigns often pales in comparison with industry funding, social media may offer opportunities for cost-effective campaigns.

The authors call for a national strategy to educate policymakers about industry efforts to usurp local control. They propose a national, unified preemption effort of public health and advocacy groups and the expansion and centralization of legal networks. National efforts are under way to connect players across siloed areas threatened by preemption (e.g., health, environmental, employment, and housing policy), and such efforts should be bolstered. Litigation can also be used to push back against preemption efforts that are legally vulnerable, because of either the mechanisms of enactment or underlying legal defects in the policy. The California SSB tax preemption law, for example, is being challenged as a violation of the state constitution. Longer term, the power of local governments can be strengthened in ways that guard against preemption (https://bit.ly/3pjpnNw). As Crosbie et al. indicate, adequate funding is critical for averting preemption. To counter industry's deep pockets, advocates may need to attract a broader swath of funders interested in democracy, good governance, corporate accountability, community empowerment, or other causes threatened by preemption.

One way to address the threat preemption poses to SSB taxes is to pass state- or national-level SSB excise taxes. In the wake of COVID-19, SSB tax revenues can shore up our chronically

strained public health system and support Black and Brown communities facing disproportionately devastating consequences from the virus. However, efforts to enact state or national SSB taxation should simultaneously preserve local authority to enact SSB taxes. Not only do communities have unique needs requiring tailored solutions, but localities serve as laboratories of democracy. Local experimentation (e.g., with different tax structures, revenue distributions) also enables researchers to study what works best. Industry preemption efforts are a pernicious threat to such local innovation and to democracy more broadly. A unified, rather than piecemeal,[7] approach is needed to address preemption and the commercial determinants of health. AJPH

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Brazil's Efforts to Reduce Cigarette Use Illustrate Both the Potential Successes and Challenges of This Goal

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See also Maia et al., p. 730.

Reducing the use of tobacco and cigarettes in particular is a worldwide objective. The World Health Organization (WHO) Framework Convention on Tobacco Control[1] (adopted in 2003), along with the WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases[2] (adopted in 2013), set a goal of a 30% reduction in overall tobacco use worldwide from 2010 to 2025. Because cigarettes make up the majority of this use and are arguably the most harmful of tobacco products, they deserve the majority of the attention in this effort.

The article by Maia et al. (p. 730) presents results from the effort to reduce cigarette consumption in Brazil from 2006 to 2019. The findings indicate that Brazil's policies have been among the most successful in the Americas and the world in reducing cigarette consumption. Brazil signed on to the Framework Convention on Tobacco Control in 2006 and has carried out its major goals: reducing advertising and promotion of and raising taxes on cigarettes, employing large pictorial labels on cigarette packs, and restricting the use of cigarettes in public places. As a result, according to WHO 2018 estimates, Brazil's adult prevalence of cigarette use is 11.8%, in comparison with 16.3% in the United States.[3] Furthermore, Brazil is on track to exceed the international goal of a 30% reduction in overall tobacco use, with a decrease from 28.7% in 2010 to an anticipated 17.2% in 2025, a decline of 40%. In contrast, the United States is on track for only about a 20% reduction (from 33.2% to 26.6%).[3]

At the same time that Brazil has enjoyed success in reducing the use of tobacco and cigarettes in particular, it has encountered some of the challenges that appear to also plague the United States. Most of the decline in cigarette use prevalence identified by Maia et al. occurred in the early years of the study period. More recent years have seen much lower declines. Between 2006 and 2014, average annual declines were approximately 3.8% among men and 3.0% among women. However, from 2015 to 2019, average annual declines were only about 0.8% among men and 1.4% among women. As the Brazilian team noted, the decline in prevalence of heavy daily use (20 or more cigarettes per day) has been greater over the entire time period and especially since 2015, with reductions of approximately 4.8% among men and 6.4% among women. It appears that more smokers are reducing their daily cigarette use rather than quitting the habit.

The 2020 US surgeon general's report on quitting smoking[4] revealed a similar pattern. The prevalence of cigarette use among adults decreased by about 29% from 2000 to 2017, whereas the prevalence among those who smoke 15 or more cigarettes per day decreased by about 60% over the same period. This pattern also suggests that although the overall rate of cigarette use has declined, there has been a proportionally greater shift in heavy smoking. It appears that just as in Brazil, smokers in the United States are succeeding in reducing the amount they smoke much more than in quitting the habit entirely.

What accounts for these dramatic differences in smoking reduction? One hypothesis suggested by the Brazilian team is that tobacco control efforts have been successful in convincing smokers to reduce their consumption but may not have done enough to convince smokers that this is insufficient to reduce their risk. It is also possible that smokers who reduce their consumption believe that they are in control of their habit, which gives them a greater sense that they can quit at some point in the future.[5] As Mark Twain is credited with saying, "Giving up smoking is easy. I've done it hundreds of times."[6]

Indeed, about 72% of smokers in the United States who are interested in quitting also report that they would be either somewhat or very likely to succeed.[4] However, this sense of efficacy may actually reduce intentions to quit.[5] All of this goes to the realization that quitting is much more difficult than simply reducing use. Clearly, we need better messages to encourage smokers to reduce their consumption without also giving them the sense that reduction is an end in itself.

Another strategy to overcome the quitting challenge is to encourage smokers to switch to less harmful tobacco products such as electronic cigarettes, which still provide the presumably active ingredient of nicotine but with fewer of the cancerous agents that cause harm to the lungs and circulatory system. Brazil has not taken this route, as the sale of e-cigarettes has been illegal. The major problem with this replacement strategy, as shown in the United States, is that allowing the sale of e-cigarettes opens their use to adolescents. We now have millions of adolescent e-cigarette users who may never have tried to inhale nicotine were it not for this alluring product.[7] This has opened the door to use of other inhalants, including cigarettes, by young people once they become attracted to the nicotine in tobacco products.

One solution that allows the use of e-cigarettes only as a replacement for regular cigarettes is to restrict their use to medical prescription, as Australia has recently proposed. Although this will not remove illicit sales of these devices, it will reduce their access to young people who do not need them as a harm-reduction strategy.

A different version of the replacement strategy is the one adopted in Sweden, where smokeless tobacco pouches, known as snus, provide nicotine without inhalation. As with Brazil, Sweden has a low rate of cigarette use and is on a path to reduction of tobacco use. Snus have recently been approved as a modified-risk tobacco product in the United States. The problem with this strategy is that use of such products is also associated with greater mortality,[8] and they may not reduce overall consumption of tobacco, which is contrary to the WHO goal of tobacco reduction. Although the long-term effects of e-cigarette use are not yet known, it is likely that use of these products will also be harmful.[9]

The US Food and Drug Administration has struggled to define a strategy that can control the use of cigarettes without encouraging dependence on nicotine. The hope is that it will finally be able to introduce pictorial warnings on cigarette packages as Brazil and other countries have done. But until countries confront challenges related to effective messaging and the unanticipated consequences of permitting attractive over-the-counter replacements for cigarettes, we will be living with the costs of harmful tobacco products for years to come. AJPH

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Phthalates Should Be Regulated as a Class to Protect the Brains of Our Children

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See also Engel et al., p. 687.

Phthalates are a ubiquitous, high-volume class of synthetic chemicals often used in plastics to make them soft and pliable. They have been used in medical products, toys, vinyl flooring, food containers, paint, cleaning products, cosmetics, and more. Because they are not covalently bound to the matrix, they can leak and migrate to the surrounding environment into dust, food, and liquids. They are semivolatile, so they can also be found in the air. Consequently, humans are constantly exposed to phthalate esters in food as well as household air and dust through inhalation, ingestion, and dermal absorption. Phthalates are rapidly metabolized, and their metabolites are routinely detected worldwide in human urine. Phthalates have been associated with a plethora of adverse health effects: endocrine disruption, reproductive effects, both demasculinization and feminization, behavioral effects, asthma, obesity, diabetes, immunotoxicity, and cancer.[1]

In this issue of *AJPH*, Engel et al. (p. 687) urgently call for reducing phthalate exposure and regulating phthalates to protect our children's developing brains. Their article provides solid and sound scientific evidence from population-based epidemiology studies supported by extensive evidence from animal models and mechanistic studies that early life exposure to ortho-phthalates increases the risk of impaired neurodevelopment and sexual development. They argue that a class approach is needed for assessing health impacts to eliminate phthalates as a chemical group in consumer products. The call to treat these compounds as a class is not new. The National Academy of Sciences called for a cumulative approach to phthalate risk assessment more than 12 years ago,[2] and the Consumer Product Safety Commission supported this in 2014.[3]

Because phthalates are used in so many commonly used products, the general population is simultaneously exposed to multiple phthalates in complex mixtures. This raises concerns because most chemical risk assessment is based on a compound-by-compound approach, failing to consider that exposure is never one compound at a time. The need for cumulative assessment is based on a growing body of studies demonstrating that exposure to mixtures of phthalates may pose a health risk. A recent study from Sweden measured 26 chemicals, including phthalates, in the first trimester urine or blood of pregnant women; the researchers found that the presence of these chemicals was associated with Wechsler Intelligence Scale for Children–IV IQ scores of the women's children at age seven years.[4] The study clearly showed that exposure to this contamination of chemicals included eight phthalates above the level of detection in the urine of all 2300 pregnant women in the study. Of concern was that IQ scores of boys were 1.9 points (95% confidence interval = −3.6, −0.2) lower for an interquartile-range change in the mixture index of 10 chemicals of concern. Two phthalates, diethyl phthalate and butyl benzyl phthalate (BBzP), were found among these 10 chemicals of concern.

Another recent study used a novel approach for chemical mixture risk assessment by linking observational human studies with experimental animal tests.[5] A combined exposure of four phthalates—di butyl phthalate, BBzP, diethyl hexyl phthalate (DEHP), and diisononyl phthalate (DiNP)—in early pregnancy was associated with a shorter anogenital distance in boys at aged 22 months. A mixture of these four phthalates was further tested in an in vivo animal model using a ratio and doses relevant for human exposure to estimate a dose–response relationship

and to determine a point of departure, which was used to calculate a reference dose. This experimental reference dose was compared with human exposure to conduct a mixture risk assessment. The mixture approach showed that 13% of the pregnant women were at risk for having a child with a shorter anogenital distance; by contrast, only 1.6% of the pregnant women were considered at risk when the four phthalates were evaluated in isolation in a traditional compound-by-compound strategy.

Results from recent studies on mixture exposures therefore indicates that risks may have been underestimated with the current risk-assessment approach, even when individually all chemicals are below their guideline values. Understanding this is highly relevant for phthalates because biomonitoring data have clearly shown that different phthalates are routinely found to coexist in complex mixtures.

The problem with unfortunate substitution is another concern stressed by Engel et al., whereby chemicals of concern in products are replaced with related chemicals about which very little is known. Older, clearly toxic phthalates such as DEHP and BBzP have been replaced by DiNP and diisobutyl phthalate. Recent findings have found that these replacements also impose health risks because many of the phthalate products stay in use for many years or decades (e.g., PVC [polyvinyl chloride] flooring exposure will continue throughout the product's lifecycle, even though the phthalate additive has been removed from production). This also reinforces the need for a class approach and safe substitutions.

Finally, we find it reasonable to focus on both neuro- and sexual development because there may be shared biological mechanisms that can explain how exposure to phthalates causes these adverse effects, as Engel et al. describe. We agree that negative developmental effects on cognition and behavior are adverse health effects, as they lead to irreversible consequences for learning, social behavior, motor skills, and more throughout life. The impact of adverse early life phthalate exposure on sexual development is also associated with adverse reproductive effects later in life.

The use of phthalates in many types of products and consumer goods has led to environmental contamination and human exposure, with evidence of adverse health effects in the general population. Because phthalates are present in complex mixtures, it is imperative that all federal and state agencies in the United States and abroad take a cumulative approach to assessing their risk. And because phthalates constitute a structurally related group of chemicals, they should be assessed as a class and one should not be substituted for another. Finally, substitution of chemicals that have been found to be harmful must be done very carefully. Given that safe alternatives have been found, phthalates should be banned from production and use. AJPH

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A Political Economy Lens on Health Inequalities in the 21st Century

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The review article "The Political Economy of Health: Revisiting Its Marxian Origins to Address 21st Century Health Inequalities" by Harvey in the February issue of *AJPH* provides a brief history of the origins of the political economy perspective, with a focus on its application within public health. The article provides a practical "refresher" for public health thinkers and practitioners as to where to locate the essential causes of social epidemiological patterns in health and illness by foregrounding the perennial relevance of concepts within the Marxist tradition. Though concepts such as class cleavage, class struggle, and class exploitation can seem parochial or anachronistic, depending upon their presentation, Harvey reminds us of the key contributions to public health provided by Marx's teachings and their application via Engels, Virchow, and others. In turn, the author advocates a more common and widespread application of Marxian political economy within public health given the framework's peerless utility for "explaining and addressing persistent health inequalities and emerging public health crises under global capitalism."[1(p298)]

DEMONSTRATING UTILITY THROUGH APPLICATION

Despite Harvey's putative goal to move Marxian political economy from the "margins . . . to the mainstream"[1(p298)] within public health, the article remains generally devoted to touting the logic of key concepts and principles rather than to demonstration of the framework's utility. I share Harvey's concern regarding the excesses of contemporary global capitalism and its demonstrative incompatibility with human health and well-being; moreover, I, too, believe that public health systems would derive enormous benefit from mainstream adoption of a structural perspective on health determinants through implementation of policies that identify, and work to mitigate, the basic causes of health inequalities. Still, there is much work to do before ushering in a new era of progressive public health policy that draws energy from Marxian egalitarianism; hence, it remains the purview of committed scientists, academics, and philosophers to proselytize on the subject by consistently and convincingly demonstrating the explanatory value of political economy in elucidating the basic etiology of social patterning in health outcomes. The power of these demonstrations relies on well-articulated applications of the political economy "heuristic" to current and especially pressing public health issues.

For example, the COVID pandemic has produced a series of knock-on effects that transcend the incidence of disease to include employment losses, financial strain, and growing food and housing insecurity among vulnerable groups. The clustering of these impacts among disadvantaged populations—while the ownership class continues to consolidate power via massive gains in profit and investment wealth—can be viewed as a contemporary analog to Engels's observations regarding the consequences of a developing industrial capitalism on workers' health and well-being. In both cases, we are able to observe the direct consequences of class structure, whereby the ownership class exercises full leverage over the production and distribution of resources, while workers lack sufficient power to mitigate their exposure to risk.

On the other hand, the most obvious distinction between the class dynamics of 19th century England versus those unfolding in contemporary Western world is the relative presence of government intervention to soften the blow. Still, the short-sighted nature of contemporary public policy remains on full display as a collection of mostly one-dimensional reactionary measures to economic and public health calamities of one kind or another; a more progressive policy framework, by contrast would

incorporate a structural perspective sensitive to differences in population and community vulnerabilities, providing a comprehensive set of protections designed to pre-empt the worst consequences of acute and emergent threats to public health and well-being.

THE CRITICAL ROLE OF GOVERNMENT INTERVENTION

Elsewhere, I have made the case for how change over time in level of government activism via targeted pro-worker labor-market policies reveals these interventions to be the major bulwark against the full set of adversities experienced by workers that are otherwise inevitable under capitalism. Using a political economy lens to view shifts in the set of strategic social relations among labor, capital, and the state, we are able to trace the origins of widening labor-market inequalities and steepening social gradients in health to an increasingly competitive capitalism, coupled with a general pull-back in the state's commitment to underwriting a social compact among strategic actors that, at one time, had functioned as a tacit promise to workers of their entitlement to share fairly in economic growth. In turn, the basic insecurity that characterizes workers' position under capitalism has been laid bare, with consequences for growing employment instability, stagnating and declining wages, claw-backs in critical income security benefits like retirement pensions, and a general erosion of the opportunity structures that had been essential to workers' long-term career and life planning.[2,3] As a consequence, in the current environment, work-related insecurity constitutes a chronic work-related stressor that affects an increasingly broad segment of the working population, with discernable impacts to individual health outcomes as well as socioeconomic health inequalities.[3]

EXTENDING THE PUBLIC HEALTH IMAGINATION

In a similar vein, in prior work I have tried to demonstrate that, in the absence of a structural perspective, the public health imagination remains constrained to microlevel explanations of disease etiology that result in policy recommendations that are piecemeal and incomplete. For example, several studies document the shortcomings of employment interventions aimed at alleviating work insecurity in vulnerable low-income populations.[4,5] Outcomes from these studies show that remedial job training programs rarely succeed in creating healthy, sustained labor-market attachment among disadvantaged groups. More broadly, such studies provide evidence of how deeply seated causes of lifelong disadvantage cannot be easily (or, sometimes at all) remedied by one-off training programs, no matter how well these are designed.[4] This is because low socioeconomic status is a reliable proxy for lifelong exposures to incremental health risks. Indeed, we are awash in research evidence of the manner in which deprivation in early life produces deep and long-lasting deficits into adulthood. Early and profound influences arising from impoverished circumstances ranging from inadequate prenatal care and poor childhood nutrition to weak or noxious social networks and the breakdown of opportunity structures within low-income communities are the essential "first-causes" of poverty and labor-market detachment.

Despite estimates that peg the aggregate costs of poverty at more than a trillion dollars each year,[6] a national framework of policy commitments dedicated to both eradicating poverty and meaningfully combatting wealth inequality seems a long way off. For this, we can again credit the ongoing slippage in the balance of power toward the ownership class, which—despite populist lip service to shared concerns toward an eroding middle class—governments seem all too prepared to facilitate. Taken to their logical conclusion, however, it seems prudent to question these trends as sustainable. Direct economic costs aside, we ignore the indirect costs of reduced social cohesion, political and cultural polarization, and the slide toward populism and illiberalism at our peril.

Finally, while political economy may require some strategic "rebranding" to shake some less-appealing connotations—attributable, in large part, to the historical perversion of Marxist philosophy to justify authoritarian communism[7]—as Harvey suggests, the project of moving the perspective into the popular imagination in a manner that foregrounds class as the key explanatory variable for social inequality constitutes a crucial step toward mitigating these disparities. Like Harvey, I have taken up this cause by drawing on contemporary, real-world examples to demonstrate the perspective's interpretive power. It is my sincere hope that many more—in public health community and beyond—will soon follow. AJPH

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Addressing Vaccine Concerns: A Hopeful Path Forward for Vaccine Confidence

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In 2018, Broniatowski et al. found that bot and troll accounts tweeted about vaccination at higher rates than average Twitter users.[1] The authors pointed out that bots and trolls generate discord by promoting both pro- and antivaccine content and that disseminating more provaccine messages from real accounts is likely an inadequate response to these techniques. Although more recent work questions the dominance of bots,[2] the problem of antivaccine misinformation persists. Health care providers and public health professionals are the most trusted sources of vaccine information for most people and as such have the potential to play an important role in addressing misinformation. Here, we outline some simple principles for how one might do that.

MOTIVATION, CONTEXT, AND AUDIENCE

First, we must understand the motivation of inaccurate health information the public receives. Misinformation includes false or inaccurate information of all types. Misinformation may include content from social media users who have concerns or questions about vaccines. Disinformation describes false, inaccurate, or misleading information that specifically aims to deceive. We should also examine the reasons that disinformation might be shared and what motivates the deception. A recent analysis of vaccine-related advertising on Facebook showed that the number of ads per buyer was significantly higher for antivaccine compared with provaccine ads.[3] Several well-funded antivaccine groups use their nonprofit organizations to fund lobbying activities and antivaccine advertisements and documentaries. Understanding the forces behind a large portion of antivaccine disinformation provides context to specific concerns raised in clinical encounters and in public dialogue.

With this backdrop of a social media landscape filled with misinformation and disinformation, individuals may have a variety of questions about vaccines that each require a tailored response. For example, addressing concerns about vaccine safety requires knowledge and acknowledgment of true adverse events including common minor side effects (e.g., fever, pain at the injection site) and rare but potentially serious adverse events such as anaphylaxis. Conversely, addressing vaccine hesitancy among Black Americans requires acknowledging the contextual history and ongoing problem of racism in medicine. Parental concerns about well-studied routine childhood vaccines with long track records of safety may warrant a straightforward discussion of risks and benefits, while uncertainty about a COVID-19 vaccine calls for a more nuanced communication rooted in evolving knowledge about risks of both vaccination and disease. Personal relationships matter too: someone who has had a close personal or family experience with a known or perceived vaccine adverse event may respond differently to communication efforts about vaccines than someone who has heard concerning messages about vaccines but does not share that personal experience.

Just as different questions require different approaches, so do different audiences. Vaccine hesitancy is a spectrum including a small minority of individuals who refuse all vaccines and a larger group of people who have some questions but will receive all or some vaccines.[4] People who refuse all vaccines may not be interested in engaging in dialogue with a medical or public health professional, whereas those who are vaccine hesitant are more often receptive to new information about vaccines. Discussing vaccines with a patient in clinic is not the same as discussing vaccines with friends or strangers on social media. Positive public communication about vaccines on social media is

unlikely to change the mindset of people who are firmly antivaccine but may influence those who simply have questions or concerns.[5] A more successful approach to combatting social media disinformation about vaccines may be the removal or reframing of vaccine mis- and disinformation by the social media platform, a solution that requires advocacy and organizational change. Some social media platforms have taken steps in this direction, but more work is required.

PRINCIPLES TO ADDRESS MISINFORMATION AND BOOST CONFIDENCE

After understanding motivation, context, and audience, medical and public health professionals can apply several principles to address vaccine misinformation and strengthen vaccine confidence. First, maintaining a respectful and listening attitude is the foundation for responding to questions and concerns about vaccination. This approach is at the heart of motivational interviewing, which has proven to be an effective strategy to improve vaccination uptake and many other health behaviors.[6] Avoiding assumptions or judgments is particularly important. Respect for concerns and questions is the foundation of individual patient communication and addressing vaccine misinformation in more public forums. Individuals who have encountered or are sharing vaccine misinformation may have underlying concerns that can benefit from an open-minded approach.

In addition to listening respectfully, eliciting the reasons for concerns about vaccines or the motivation for sharing misinformation is another communication tool and principle of motivational interviewing.[7] For individual patient encounters, asking why someone is concerned about vaccines helps to focus any response on existing questions without bringing up additional types of vaccine misinformation that are not central to an individual's concerns. For social media, it may be useful to ask why someone chose to share a piece of vaccine mis- or disinformation or what they found interesting about that information. These questions help shape the response by identifying the topic(s) of concern and clarifying an individual's motivations and where they are on the spectrum of vaccine hesitancy.

After identifying specific concerns about vaccines, rather than simply providing a refutation, which can be counterproductive and turn an encounter into an argument, clinicians can use the powerful motivational interviewing technique sometimes called "asking permission to share." With this technique, rather than simply denying the misinformation and providing supporting facts, a provider could simply say: "You know, I've looked into that concern. Would you mind if I shared with you what I've found out?" Use of this technique makes an individual more receptive to the information that will then be shared. After receiving permission, the misinformation can be corrected with a direct and succinct statement of facts.

Clinicians and public health advocates must also consider the potential of a backfire effect in addressing misinformation: presenting someone with information that contradicts a strongly held belief may reinforce that existing belief. Simply repeating the misinformation also runs the risk of perpetuating it. When correcting misinformation, communication should focus on the facts and emphasize the benefits of vaccination and risks of the diseases that vaccines prevent. When specifically addressing disinformation, one must be aware of common disinformation techniques, such as reliance on "fake experts" and invoking conspiracy theories.[5] Addressing disinformation can include unmasking and responding to the technique of disinformation as well as the content.

A HOPEFUL PATH FORWARD

With all of this in mind, we must remember that, despite all we hear about vaccine hesitancy and refusal, we continue to maintain vaccination rates in the United States well over 90% for almost all childhood vaccines. There are other reasons to be hopeful. While we saw a dramatic decrease in childhood vaccination with the advent of mitigation measures to address the pandemic in March 2020, we are already seeing significant recovery. Anecdotally, we are hearing from primary care pediatricians that they are seeing less vaccine hesitancy since the pandemic began, with stories of complete vaccine refusers coming in to the office and asking, "Can we get caught up on vaccines?" This pandemic offers the opportunity to rebuild the public's trust in science that has been eroded over the last several decades. Using the principles outlined here, maintaining and increasing confidence in childhood vaccinations seems like a great place to start. AJPH

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Civilian Use of Deadly Force in Self-Defense: Public Health, Stand Your Ground

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See also Yakubovich et al., pp. 675 and e1.

Stand Your Ground and Expanded Castle Doctrine (SYG) laws are part of the broader doctrine of self-defense in US criminal law. They excuse the use of deadly force in self-defense under some circumstances, even when the actor could have safely chosen retreat over violence. The elimination of this "duty to retreat" is said by SYG proponents to reduce the legal risk for people defending themselves and deter criminals by increasing their perceived risk of encountering an armed and ready victim.[1] Although the no-retreat rule embodied in SYG laws has a venerable lineage in Anglo-American jurisprudence, the concept became more salient after the turn of the century—and spread to more states—with support from the National Rifle Association (NRA).[2]

The effects of SYG laws are hard to study. Both self-defense doctrine and the morality it reflects are complicated, and the changes entailed in SYG marginal.[2] Legal complexity arises in part because the duty to retreat is a less distinct element of self-defense in practice than it sounds in legal text (Figure 1). Even in states still requiring retreat, a defendant can set forth a version of events (possibly uncontested if the victim is dead) in which retreat was not a reasonable option. Other elements of self-defense interact with retreat. Who was the aggressor? Was violence imminent? Was the defendant's force proportional to the victim's? Had the aggressor stopped the attack before the defendant used force? The defendant's decisions must be objectively reasonable, but the jury will be composed of people with at best a normal distribution of biases and sometimes a skewed one if lawyers have used jury selection skillfully, so that the race, gender, and other characteristics of the victim–defendant dyad will influence juror perceptions of events and judgments of reasonableness.[1]

Implementation of the law by legal agents, and the public's understanding of the law, typically diverges from what legislators intend or anticipate. With SYG, there have been many reports of inconsistency and possible implicit bias on the part of police and prosecutors, who make the initial arrest and charging decisions that start, or forestall, a criminal case. Flawed decision making at these early stages is particularly important in states that create an immunity for SYG claimants, who then may also avoid civil liability.[1] For researchers, all that adds up to a process from which any signals about the causal impact of law will be subject to significant distortion.

As the article by Yakubovich et al. (p. 675) in this issue of *AJPH* shows, the signals that do emerge from this murky legal galaxy are inconsistent with the belief that SYG laws deter criminal behavior. The authors find both a modest increase in homicide at the average state level and a much bigger one in Florida, a state with one of the most protective SYG laws. These findings are consistent with individuals becoming more willing to use force in situations of perceived threat. The strongest signal detected for racial discrimination in SYG emerges in race-of-victim analysis: again the average state-level effects are small, but in Florida, people who kill Blacks and claim SYG are more likely to succeed than people who kill Whites.

This is the point in an editorial when it is customary to call for more research. We certainly need substantially more funding for research on the effects of all kinds of legal treatments to which hundreds of millions of people are exposed over decades,[3] not least research on disparate impact.[4] Until such funding materializes, the evidence reviewed by Yakubovich et al. is probably the best we can expect to get on SYG and supports the recommendations of a 2015 national task force of the American Bar Association.[1] If our aim is to reduce the negative health effects of law, and we are properly committed to extirpating racism in all its forms and mechanisms, then the article has brought us to a modest but important point: legislatures

Standard Elements of a Self-Defense Claim	Castle Doctrine	Stand Your Ground/Expanded Castle Doctrine
A person who was not the aggressor ("defendant") 1) Faces imminent risk 2) of death or serious injury, and 3) Honestly and 4) Reasonably (i.e., with an objectively sufficient basis) believes deadly force is necessary. In a minority of states, force is not "necessary" if there is a reasonable option to retreat safely ("duty to retreat")	Standard self-defense BUT If the confrontation occurs at defendant's home, use of deadly force may be considered "necessary" notwithstanding the possibility of safe retreat	Standard self-defense BUT Castle Doctrine AND Extends Castle Doctrine to any place the defendant has a right to be. In some states: • Does not apply to defendants engaged in crime • Provides immunity from arrest and prosecution and/or civil suits

FIGURE 1— Legal Elements of Self Defense in US Law

are best advised to repeal SYG laws, expressing as clearly as legislation can that society prefers retreat to homicide and racial equity to enacted racism.

Yet, as Frederick Zimmerman has recently written, public health research cannot confine itself to describing *what* happens; it must draw on broader theory and experience to consider *why*.[5] Along with serious consideration of the evidence of effects, we should step back and consider the SYG phenomenon in a wider resolution. Legislative campaigns can often be best understood as symbolically moral crusades, with interest groups seizing on the production of law to mobilize adherents and claim legitimacy for their ideas.[6] That can explain the support of the NRA for these laws—and the opposition of anyone for whom NRA support is all that is needed to prove a policy bad. The law does not create the worldview behind SYG; rather it reflects and reinforces it. It is the attitude of SYG that should bother us—and that we should be trying to change—not just its embodiment in SYG laws.

Along with a baseline of implicit racism, the moral chord sounded by proponents of SYG has three dissonant notes: bellicosity, hyperindividualism, and deep pessimism. Starting with the image of the strong man defending his castle, SYG laws evoke a tough individual, alone and with no expectation of communal assistance, resolving disputes with violence. Retreating—or as the more martial among us might say—standing down, only postpones the inevitable or, worse, betrays a dangerous weakness. In this Hobbesian world, life is nasty, brutish, and short, and the most one can hope for is to survive the war of all against all.

Public health should be articulating and actively advancing a more positive worldview. The idea of a duty to retreat plucks the more adaptive strings of ingenuity, solidarity, and optimism. Retreat is the wilier option, better because it avoids the harm that violence does both to the victim and to the fabric of society. It assumes the membership of both parties in a robust civil order to which both will revert once the immediate confrontation is defused, a community in which help can be summoned and will come. The hope that individuals can find alternatives to violence, and can routinely treat each other with more patience and respect, embodies an indispensable optimism about collective efficacy and the future of our society.

People working for public health should support repeal of SYG laws because the best evidence suggests they do harm and not good. But if we fail to understand what SYG laws represent, our advocacy is too likely to take the form of hating on the NRA, its members, and the many people in the United States who feel angry, threatened, isolated, and at their wits' end. We are apt to win or (probably) lose, without actually touching the deeper problem. The roots of both violence and endemic psychosocial suffering grow in the soil of a drastically inequitable society still living out and reproducing the trauma of racial subordination. Public health research can bring data and social theory to bear, with humility and an ethic of service rather than the pursuit of factional victory.[7] But perhaps the most important single thing we can advance is solidarity, the idea of a society that cares for itself and its members. Our goal must not just be the repeal of a bad law but that far fewer Americans feel they are alone, beset with threats, in a hostile land. AJPH

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Elevating the Value of Health to Guide Decision-Making in the Long Term

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See also Farina et al., p. 708.

We are now in the second year of health dominating the public conversation. Since the beginning of 2020, when reports of COVID-19 began emerging and the threat of worldwide transmission became clearer, the world has been galvanized by actions taken to protect the health of the global population. This is unprecedented. Although there have been previous pandemics—the 1918 flu pandemic is, appropriately, often compared to the COVID-19 pandemic—none before has occurred in an era when communication technology has made the world as small as it is today, when anyone can be aware of changes in hospitalization rates anywhere in the world. We are living in a time of extraordinary visibility of health as an animating, organizing concern for governments worldwide.

Before 2020, in this column we often commented on the importance of elevating the value that we, as societies, place on health.[1] We did not imagine then that 2021 would be a moment when health has unequivocally vaulted to the top of the global agenda and has been the central motivation for a more than a year of decision making worldwide. Time-honored aphorisms about the centrality of health to our lives surged to the fore, and for more than a year now we have had very little meaningful public discussion questioning the global efforts to change how we live, work, and play in the name of protecting our health.

THE CENTRALITY OF HEALTH

That a health concern has so captivated the world suggests indeed that we value our collective health. This is enormously promising and points the way to opportunities for change in which population health becomes the fulcrum around which policy change is oriented. This has long been an aspiration of public health, embodied perhaps most clearly in the Health in All Policies movement.[2] If we are to think collectively about how to maintain the focus on health that has dominated 2020 and 2021 to sustainably create a healthier world, we may wish to better understand how much we value health and how that value can be translated into tangible action. The central question that emerges is whether we value our health sufficiently for it to inform our actions and decision making during times when we are not afraid of a novel pathogen with features that are only now being understood.

The pre–COVID-19 evidence on how much we value health was not exactly promising, as Farina et al. capture well in this issue of *AJPH* (p. 708). The authors document disparities in life expectancy, disability-free life expectancy, and disabled life expectancy among adults across the United States. They find enormous cross-state variability in disability-free life expectancy and disabled life expectancy, with more than a 6-year gap in the former and a 1.5-year gap in the latter when comparing the healthiest and least healthy states.

This analysis builds on a well-established body of work that shows substantial interstate variability in health and that has long shown that our collective health in the United States would be much improved if we adopted efforts uniformly that we know work well in some states. For example, Yoon et al.[3] show that if all states achieved the lowest observed mortality levels among the healthiest states for the five leading causes of death, when considered separately, more than 90 000 premature heart disease, 84 000 cancer, 28 000 chronic lower respiratory disease, 16 000 stroke, and 36 000 unintentional injury deaths could be prevented each year. Importantly, analyses such as those by Yoon et al. and Farina et al. are not grounded in the expectation that we implement unattainable policies. Rather, they suggest that were we to do what we already know works, we would save a substantial number of lives and make many lives healthier. Critical for the topic of this column is the simple observation that we have not acted accordingly, despite knowing what we could do to make our lives healthier.

KEEPING HEALTH FOCUSED

What explains this paradox? Why do we transform the world we live in on, essentially, a moment's notice when it comes to a new previously unknown pathogen although we have long acted as though health was not a top priority? Do we value health sufficiently to implement policies that consistently promote it even in nonpandemic times?

We suggest that the answer to this question is that our society has not engaged sufficiently with health as a core value so that it can guide action that promotes health when we are not in the midst of a pandemic. Ultimately, most experience health as an individual phenomenon that intersects with visits to health care providers; in the pantheon of those who promote health, this elevates doctors and nurses far above the politics and policies that ultimately play a core role in generating population health. When this is how health is experienced, we do not create the opportunity for health to provide the political ballast to drive policymaking. The COVID-19 experience is an exception—but one that reinforces this observation. The novel coronavirus threatened individual health, even if COVID-19 was perhaps the ultimate population health experience.

The lesson that emerges from the article of Farina et al. is that we have far to go to elevate health as a value that motivates policy and decision making. What the COVID-19 moment teaches us is that it is possible to elevate health but that to do so we need to reorient the global conversation so that it is clear that the health of all is interlinked and an important consideration at all times. Perhaps, equally importantly, we can elevate health by making it clear that health can be improved. After all, much of the COVID-19 conversation is about the fact that we can take action to mitigate the spread of the virus. The article by Farina et al., and others like it, shows that there is much we can do to improve our collective health. Our task now is to ensure that this is well understood and that the value we have placed on health throughout 2020 becomes a growing concern—one that can lead to better population health in coming years. AJPH

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The HIV Pandemic Prevention Efforts Can Inform the COVID-19 Pandemic Response in the United States

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Although COVID-19 is new, this is not the first time that we face an infectious disease pandemic. We need to use lessons from past pandemics, like the HIV/AIDS pandemic, to enhance the COVID-19 response. The HIV and COVID-19 pandemics expose gaps in the current US health care system and highlight the role of social determinants of health in transmission and outcomes. In addition, both pandemics have clear behavioral prevention strategies (i.e., condom use or sexual partner reduction for HIV and mask wearing or social distancing for COVID-19). These are important alone or as part of combination prevention, which adds biomedical strategies such as vaccines to the prevention toolbox. While we wait for biomedical breakthroughs to be widely available, an enhanced COVID-19 behavioral prevention response is essential. In this article, we highlight six specific prevention strategies implemented in the HIV response that could enhance the COVID-19 response in the United States:

1. Address rumors and misconceptions;
2. Help people determine their level of risk to take appropriate precautions;
3. Implement prevention strategies that are targeted to vulnerable groups (i.e., key populations);
4. Develop and disseminate clear, adaptive messages through multiple trusted communication channels;
5. Implement widespread testing as a powerful prevention tool; and
6. Engage behavioral scientists to help lead our response.

ADDRESS RUMORS AND MISCONCEPTIONS

Parmet and Paul refer to COVID-19 as the "first post-truth pandemic" and point to the barrage of false information that has eroded trust in health leaders.[1(p945)] As they point out, this is not new. Rumors and misconceptions have influenced delivery of HIV interventions throughout the HIV pandemic.[2,3] Communication, community mobilization, and formative research have been key to address and dispel rumors and establish trust in the HIV response[3] and are more crucial than ever in the case of the "post-truth" COVID-19 pandemic. Skepticism and misinformation about the COVID-19 response are amplified as they spread rapidly through social media, the Internet, and high-profile individuals.

To address such "infodemics," appropriate and timely information should be the foundation of prevention efforts.[4] Rumors and misconceptions should be addressed and dispelled up front, regardless of the source of misinformation, via various channels and strategies. In the HIV response, such channels have included peers or community mobilizers and mass and social media, and strategies have included engaging religious and community leaders to provide accurate information.

DETERMINE RISK LEVEL

The HIV response has demonstrated that no single prevention strategy is

universally acceptable, appropriate, and effective. Efforts to prevent and control COVID-19 should recognize that one strategy does not fit all.[5] Instead, policymakers should contextualize prevention strategies in consultation with medical, public health, and health behavior experts.

Prevention measures should also acknowledge the spectrum of COVID-19 risk. In the HIV response, harm reduction benefits populations for whom abstinence from high-risk behaviors is infeasible.[6] In the COVID-19 era, abstaining from nonhousehold contacts is not possible for many and may present further risks by exacerbating mental distress, reducing access to income and essential services, or straining social networks. It is important to create an environment where individuals are not stigmatized for their choices around work and interactions.[7] Harm reduction for COVID-19 relies on health systems and local authorities to provide high-quality services and accurate information. As a result, policymakers and employers can support policies that reduce harm in higher-risk environments (e.g., workspaces, businesses), and individuals can make informed decisions about their activities (e.g., mask wearing).

IMPLEMENT PREVENTION STRATEGIES

In 2013, UNAIDS highlighted the need for targeted interventions, recommending a shift from "know your epidemic" to "know your local epidemics."[8] Efficient and effective HIV prevention strategies target specific groups, responding to their particular characteristics, needs, and assets.[9,10] Indeed, targeted behavioral interventions have successfully addressed HIV prevention and treatment among key populations who remain disproportionately affected by HIV as a result of behavioral factors (e.g., injection drug use), as well as social and structural issues that heighten their vulnerability (e.g., criminalization, access to health care).

Like HIV, COVID-19 has made economic and racial disparities highly visible.[11] Targeted interventions should prioritize resource allocation based on need and allow focused messaging, addressing population-specific concerns. For example, a disproportionate number of racial and ethnic minorities are low-wage essential workers without financial safety nets and are residents of multigenerational households, for whom physical distancing would not be feasible. Targeted strategies can foster interventions addressing these specific challenges while utilizing appropriate messages, language, and imagery. For example, community testing sites can provide access to quick testing, letters documenting testing date and negative results (to provide to employers), supplies such as masks, and information about relevant community resources.

Where possible, such targeted strategies should be done in partnership with affected communities. Throughout the HIV response, community-led initiatives have played a key role in curbing outbreaks. To reach vulnerable communities and ensure strategies are trusted, appropriate, and effective, COVID-19 prevention efforts should be similarly community-led.

DISSEMINATE CLEAR, ADAPTIVE MESSAGES

Throughout the COVID-19 pandemic, unclear messaging through multiple channels has bred distrust and mired uptake of interventions and innovations. However, these same channels, when paired with clear, adaptive messaging, can be used to promote intervention uptake. The global HIV/AIDS response is no stranger to adaptive prevention messaging: successful HIV prevention campaigns have identified and engaged trusted information sources, from religious leaders to peers, in combination with other outlets such as mass media.[3] In the HIV response, strategies to promote uptake of interventions have changed over time to respond to the concerns of different groups.[12,13]

Given the divisive nature of the news media in the United States,[1] there is an urgent need to leverage alternative dissemination channels for COVID-19 prevention messaging. Communication strategies should also adapt over time to promote more widespread intervention adoption and keep up with rapid changes as we learn more about COVID-19. For instance, health authorities initially recommended people abstain from purchasing and wearing face masks, fearing personal protective equipment shortages for health care workers. However, in the face of widespread community transmission, evidence of asymptomatic transmission, new evidence about the positive aspects of using face masks, and pressure to reopen economies, health authorities quickly adapted to the shifting landscape and recommended face coverings be donned in public places.

Unfortunately, the mixed messages and the lack of clarification for the reasons for shifting policy left many in the United States skeptical about the importance of wearing a mask. Adaptive communication strategies through multiple channels should not only promote widespread uptake of COVID-19 interventions but they should also keep pace with the dynamism of new findings about the virus.[14]

IMPLEMENT WIDESPREAD TESTING

HIV testing has remained at the core of global efforts to end the HIV pandemic.[15] Although initial HIV diagnostics took weeks to return results, the early development of rapid antibody assays along with algorithms that ensured correct results allowed immediate tailoring of services and messaging based on serostatus. Similar to COVID-19, an extended asymptomatic period among persons living with HIV meant that identifying positive, presymptomatic individuals was critical to mitigating transmission. Elements of HIV testing programs, which can be drawn upon for COVID-19 testing, include

- Widespread access to quality rapid diagnostics, appropriate algorithms, and immediate (or at least same-day) results and self-testing;
- Focused messaging to drive testing demand, prioritize information for contact tracing, and reduce onward transmission from those diagnosed;
- Services tailored to serostatus with a focus on linkage from testing to effective prevention and treatment interventions; and
- Use of testing volume, positivity rate, and survey data to refine programs and inform targeting by geography, population, and access points.

To enhance COVID-19 prevention efforts, identifying those who have the virus is similarly critical. Not only can case identification reduce transmission, but it also can help individuals determine their level of risk and shape uptake of preventive behaviors.

ENGAGE BEHAVIORAL SCIENTISTS TO HELP LEAD

While advances in COVID-19 vaccine and treatment research are promising, without a stronger and more coordinated prevention approach in the United States, it is likely that many more will suffer and die. Early prevention efforts erroneously relied on best-case scenarios, which assumed widespread adoption of preventive behaviors. Experience, however, has shown that policy changes are insufficient behavior change catalysts and that investments in behavioral interventions are imperative.

The HIV response, both in the United States and abroad, is multisectoral, engaging local communities, governments, and international agencies to promote preventive actions and uptake of novel biomedical agents to treat and prevent HIV. These efforts have included dissemination of evidence-based HIV prevention information, changing harmful community norms, mobilizing communities, and creating choice architectures to facilitate uptake of key prevention approaches like HIV testing. Likewise, urgent investments in behavioral COVID-19 prevention are needed in the United States to promote adoption of prevention behaviors and address vaccine hesitancy, and these efforts must be informed by behavioral scientists.

CONCLUSIONS

COVID-19 may be new, but global pandemics of a novel virus are not. In the 1980s, HIV emerged as a novel virus for which there was no treatment, vaccination, or cure. The HIV prevention response implemented by behavioral scientists and public health experts in the United States and abroad, in collaboration with local communities and leaders, provides valuable lessons from which COVID-19 response leadership could draw. Implementing such lessons can help to slow the spread of COVID-19 in the United States and save lives. AJPH

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Congress and Health Advocates Can Build a Climate Change–Adapted Health Sector

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Enactment of legislation to strengthen the capacity of the US health sector to address climate change health effects should be a high 2021 priority for Congress and for all who advocate improved health outcomes and health equity. This editorial is grounded in my experience in state government policy (Missouri, 1977–1993) and in senior policy positions at the Centers for Disease Control and Prevention (CDC; 1994–2015) as well as in preparing articles about health sector adaptation to climate change.[1–4]

Climate change and its underlying causes are resulting in death and illness in the United States through heat waves, intensified hurricanes, particulate matter from fossil fuel combustion, drought-driven wildfires, and other pathways. These impacts will escalate in coming years and may create new and as yet incompletely understood health problems.

The two general approaches to reducing climate change consequences are (1) mitigation "to reduce the amount and speed of future climate change by reducing emissions of heat-trapping gases or removing carbon dioxide from the atmosphere," and (2) adaptation to adjust "natural or human systems to a new or changing environment that exploits opportunities or moderates negative effects."[5] Adaptation is essential to protecting human health because, even if greenhouse gas emissions somehow were capped today, severe climate change health threats are an inevitable part of our future.

A NATIONAL INITIATIVE

We need a national initiative to build the adaptive capacity of the US health sector to protect Americans from these threats. Key elements of health sector adaptive capacity include sources of timely information about climate change health threats and at-risk populations; surveillance and diagnostic systems to rapidly identify climate-related health effects; actionable knowledge to develop protective interventions; vaccines and other supplies, medical facilities, and other prevention and treatment resources; an adequately sized, skilled, and compensated workforce; and reliable sources of adequate funding.

A June 2020 report from the Select Committee on the Climate Crisis of the US House of Representatives recognized these needs and recommended 38 health sector adaptation actions for consideration in the 2021–2022 session of Congress.[6]

Congressional health sector adaptation legislation is politically feasible for at least three reasons: (1) adaptation policy, unlike mitigation policy, does not threaten the interests of the fossil fuel industry; (2) federal agencies and state and local governments are increasing spending on adaptation in nonhealth sectors; and (3) public support for government action on climate change adaptation is high, as exemplified by the 85% of Harris County (largely Houston), Texas, voters who in 2018 supported a $2.5 billion property tax increase to strengthen flood-protection systems against future hurricanes.[7,8]

A COMPREHENSIVE, LONG-TERM STRATEGY

The House report recommends that Congress require the Department of Health and Human Services (HHS) to develop a strategic plan to strengthen the US health sector to address climate change threats. It cites the unenacted Climate Change Health Protection and Promotion Act of 2019 as an example of such legislation.[9]

That bill is a good beginning but would yield disappointing results if enacted in its original form because it does not define a clear strategic goal; require implementation of the strategic plan or completion by a specified deadline; authorize funding for plan development and implementation; require that full adaptive capacity, once achieved, be

maintained and enhanced as needed thereafter; or give adequate attention to the vast clinical care component of the nation's health sector, which accounts for up to 97% of national health expenditures and a proportionately large share of the health sector adaptation work to be done.

Furthermore, the bill provides inadequate leadership for a complex, nationwide initiative that will span decades and require close, sustained coordination between HHS, many other government agencies, and thousands of private and public entities. The bill assigns the HHS secretary an essentially titular role; delegates initiative leadership to the CDC, which works mainly with public health departments; and relegates the HHS agencies that finance clinical care entities to a minor, advisory role.

Health advocates should urge Congress to enact strategic health sector adaptation legislation that is strengthened with provisions that do the following:

1. Require the HHS secretary to develop and execute a science-based, long-term strategic plan to build, use, and maintain the adaptive capacity of the nation's health care system to protect against climate change health impacts, with improved health and health equity as its central objectives;
2. Establish a new HHS Office for Climate Change Health Protection in the Office of the Secretary and create the position of assistant secretary for climate change health protection to lead the initiative;
3. Establish parallel offices—modeled on the successful CDC Climate and Health Program—in all HHS divisions that engage with health care providers: the Centers for Medicare and Medicaid Services, the Health Resources and Services Administration, the Indian Health Service, and the Substance Abuse and Mental Health Services Administration;
4. Require HHS to complete the development of the strategic plan no later than two years after enacting the legislation and to complete its initial implementation no later than five years after that;
5. Authorize appropriation of funds to HHS to support the initiative, including the development of standards-based adaptive capacity for health care providers and public health departments at the state, local, tribal, territorial, and national levels;
6. Require HHS to provide health care providers with financial incentives—for example, through the payment methodologies of Medicare, Medicaid, the Affordable Care Act, and the Department of Veterans Affairs—to apply, maintain, and enhance their adaptive capacity on a continuing basis following initial implementation;
7. Require all federal agencies to implement their relevant programs and policies in ways that contribute to protecting Americans against climate change health threats in consultation with the HHS Office for Climate Change Health Protection;
8. Authorize funding for an ongoing program of research to identify emerging climate change health threats and vulnerable populations, evaluate the success of the health sector in addressing those threats, and design protective interventions and capacity-strengthening measures; and
9. Require that HHS conduct this initiative in full, open consultation with the American people and all other relevant stakeholders.

Congress can take additional, complementary steps by enacting separate, smaller-scale measures. Examples, including several mentioned in the House report, are authorization for hospitals and public health departments to allocate HHS emergency preparedness funding to climate change–related activities; increased funding of at least $4.5 billion annually to reverse long-standing underinvestment in the public health system, as recommended by the Public Health Leadership Forum[10]; funding to enable all state, local, tribal, and territorial health departments to participate in the CDC's capacity-building work; and passage of the Improving Social Determinants of Health Program legislation introduced in 2020.

THE SYSTEMIC IMPACT OF CONGRESSIONAL ACTION

Enactment in 2021 of a strengthened Climate Change Health Protection and Promotion Act will embed strategic health sector adaptation in durable federal statutory law and set in motion a comprehensive initiative to protect all Americans from climate change health threats, with additional protection to come in the future from separate mitigation legislation to reduce greenhouse gas emissions. Health professionals can provide information and advocacy to help Congress take this important step and can play a vital role in developing and implementing this systemic initiative. AJPH

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An Outbreak of COVID-19 Among H-2A Temporary Agricultural Workers

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During the COVID-19 pandemic, attention has focused on outbreaks in meatpacking and other food production facilities. However, substantive problems have also arisen among agricultural worker populations, including temporary workers brought to the United States under H-2A visas.[1,2] H-2A workers face the same environmental and occupational health risks as all farmworkers but may be even more vulnerable because they have less control over their living and working environments. Here we report on a COVID-19 outbreak in a crew of more than 100 H-2A workers in north central Florida to characterize factors that may contribute to the spread of COVID-19 in this essential workforce.[3]

METHODS

We obtained data from interviews conducted by the medical team involved in the screening of workers and from disease investigators affiliated with the local health department. Additional information was gathered from the South Florida health department where individuals in the crew were tested preceding the outbreak.

RESULTS

In late May 2020, approximately 50 H-2A agricultural workers traveled from the Homestead area of Dade County in south Florida to north central Florida, where they joined another group of H-2A workers employed by the same labor contractor. The combined group of approximately 120 workers was harvesting watermelons at farms in north central Florida. After being in the area for about one week, the contractor was notified that two people in the group had positive test results from south Florida for SARS-CoV-2 based on testing done one week prior. The two workers had been administered reverse transcription–polymerase chain reaction tests for SARS-CoV-2 at a health department in south Florida after they developed fever, cough, and body aches. The north central Florida county health department was notified on June 5 that there were workers in this crew who had COVID-19 symptoms and that most if not all of the workers had been exposed to the two individuals who tested positive for SARS-CoV-2.

After work on June 6, the labor contractor transported workers in two school buses to the north central Florida county health department for testing; the cost of testing was absorbed by the local health department. Testing began at 7 PM in the health department parking lot. One of the authors conducting interviews observed that none of the workers were wearing masks. Fifty-four of the 100 workers tested were 20 to 29 years old, whereas five workers were less than 20 years old and three were more than 40 years old; 85% were male. All were from Veracruz, Mexico, with the exception of two workers from other cities in Mexico. None were speakers of indigenous languages, and none spoke English. A bilingual (English/Spanish) testing team, dressed in appropriate personal protective equipment, conducted interviews in Spanish and collected nasopharyngeal swabs from all individuals who were present and willing to be tested. Also on-site was a social worker who evaluated whether there were signs of human trafficking, evidence of which was not identified.

Although the labor contractor stated that he had brought 113 individuals for testing, samples were obtained from only 100 people, with some individuals in the original group apparently leaving the site before testing. Histories were vague, but most of the workers reported some symptoms within the preceding two weeks. None appeared to be critically ill, and all were cooperative. After testing was completed, workers were transported back to the motels in which they were staying.

SARS-CoV-2 was identified in nasopharyngeal swab samples for 91 of the 100 workers tested. Most results were

returned six days after samples had been sent to a large commercial lab (LabCorp) for testing; the delay was due to backlogs at the testing laboratory. Eight days after testing, when all results were finally available, a local health department team, donned in appropriate personal protective equipment, met with the crew and contractor to provide linguistically and culturally appropriate disease control information together with masks and personal hygiene and bedding kits.

Workers were found by local health department staff to be housed with six to 10 individuals in each motel room. Despite the recommendation that ill individuals be isolated after initial testing, most had returned to harvesting watermelons the morning after testing was done. Several reported having gone to local emergency departments, and one was reported to have been admitted to the hospital. Further details on these cases could not be obtained. The crew departed Florida shortly after the visit, headed to other states where scheduled work was waiting. Health department inquiries regarding next destinations were unanswered by the labor contractor, precluding notification of the receiving jurisdiction.

DISCUSSION

The H-2A program allows employers to apply for permits to bring workers as "nonimmigrants" from certain countries to fill temporary agricultural jobs in the United States. H-2A workers constitute approximately 10% of agricultural labor in this country; as such, they are an "essential" labor force without whom harvesting many crops would not be possible.[4] H-2A permit holders must provide housing and transportation for workers, but H-2A workers are not required to have health insurance and generally are not provided medical leave. H-2A workers are paid on an hourly or "piece" rate basis,[5] providing them a strong motivation to continue working while ill.

The original H-2A regulation contains no health-related provisions beyond requiring employers to comply with all applicable federal, state, and local laws and regulations, including health and safety laws. The COVID-19 outbreak described here highlights the ease with which SARS-CoV-2 can spread through this population when workers are housed and transported in crowded conditions with minimal medical oversight. Although statewide data on frequency of COVID-19 among H-2A workers in Florida are not available, high rates of infection among other agricultural workforces have been reported in the media.[1,2]

In response to the special concerns facing farmworkers during the pandemic, the Centers for Disease Control and Prevention and the US Department of Labor developed COVID-19 guidance for agricultural workers and employers that considers issues related to worker transportation and housing.[6] However, this guidance is not regulatory and does not address issues specific to H-2A workers. Some states have stepped in to provide a regulatory basis for specific actions to protect migrant workers from COVID-19. For example, the Michigan Department of Health and Human Services has implemented requirements regarding screening and testing of migrant workers, including a requirement that all migrant workers be tested for SARS-CoV-2 within 48 hours of arrival at a migrant worker camp and that all workers coming from outside locations be housed separately from other workers for 14 days.[7]

H-2A workers represent a particularly vulnerable group: they frequently do not speak English and are under the control of the H-2A permit holder. They do not have agency over matters such as transportation, housing, and worksite conditions. Although conditions vary by state, H-2A workers are often exposed to environments well recognized to promote transmission of SARS-CoV-2. Testing for SARS-CoV-2 is generally not required by state or local authorities, and, although testing may be available through local health departments, workers may be reluctant to be tested as a result of fear of losing their jobs, lack of language skills, lack of transportation, or lack of knowledge about resources. There may be significant delays in obtaining test results or there may be no way for results, when obtained, to be relayed to individual workers traveling with crews through multiple states. Workers' contractors may be designated as contacts, but these individuals may also be mobile and difficult to contact.

The case described here illustrates further potential issues when an H-2A crew experiences an outbreak. In this instance, two previously positive workers were not identified until after they had exposed the larger crew, no one was responsible for ensuring that exposed workers were separated or isolated during transportation or at their housing site, and public health officials' recommendations to keep the ill and exposed crew members from working or moving to their next worksite or to notify individuals at that site were not heeded. Importantly, H-2A workers likely lacked the knowledge, capacity, or willingness to alter their working or living conditions and activities to alleviate the situation.

The plight of essential workers during the COVID-10 pandemic has been

highlighted in multiple publications.[8] Serious consideration should be given at the local, state, and national levels to the implementation of public health strategies to protect H-2A and other agricultural workers, particularly in light of their essential role in maintaining the US food supply. AJPH

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The University of Florida institutional review board reviewed this research and declared that it met the definition of public health surveillance activity.

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Allying Public Health and Abolition: Lessons From the Campaign Against Jail Construction in Los Angeles

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An increasing number of medical and public health practitioners are seeking to address the toxic consequences of policing and incarceration, which overwhelmingly affect racial/ethnic minority communities.[1] A few of these efforts have engaged with movements inspired by a vision of abolition, which have long emphasized the incompatibility of public health and the criminal legal system. One of the central ideas inspiring the recent mobilizations led by the Movement for Black Lives, an ecosystem of more than 150 Black-led organizations across the United States fighting for racial justice, is abolition, which seeks to end the use of police and prisons as "catchall solutions to social problems."[2] This vision, we argue, is consonant with medical and public health practitioners seeking to address the harms of policing and incarceration. We use the 2012 to 2019 campaign against jail construction in Los Angeles, California, as a case study to propose that the health community is a natural and needed ally in the movement for abolition.

US CARCERAL STATE

In the 1980s, the United States began building the largest infrastructure for incarceration in the world. This prison-building and jail-expansion project followed two decades in which social movements successfully expanded some claims to citizenship, such as voting rights and prisoners' rights, and unsuccessfully pursued others, such as full employment and universal health care in the United States. The growth of carceral institutions had no clear connection to reported crime rates. It did, however, coincide, not coincidentally, with the flight of industry overseas, as well as shrinking social welfare. The end result is that the United States has the world's highest incarceration rate by a dramatic margin. This statistic is just the surface of a massive criminal legal system with far-reaching effects, some of which can go overlooked (e.g., more than 70 million with criminal records) and others that cannot (e.g., racially targeted police killings).

CAMPAIGN AGAINST LOS ANGELES JAIL EXPANSION

In 2015, Los Angeles County, historically a trailblazer in the turn to extreme policing and incarceration, paused plans for jail expansion for the first time in decades. The Los Angeles jail system, at that time, held approximately 19 000 people, making it the largest in the world. After years of urging by advocacy groups, the Los Angeles Board of Supervisors decided to reevaluate whether expansion was necessary. This perspective was new; until then, elected leaders and reformers were concerned primarily with improving jail conditions, not with the system's overall size.

To guide their decision, the supervisors hired an external consultant group, which listed correctional health as an area of expertise. After just two months, these consultants recommended the same size jail as originally planned. The only differences proposed were to its design, so that it could meet the future population's health needs, which they expected would grow in medical and psychiatric complexity. Their reasoning provoked disbelief from advocates against jail expansion: how could health be a reason to build a jail?

Five years later, Los Angeles abandoned the expansion plan altogether and in July 2020 passed a motion to

close its largest jail without adding new jail beds elsewhere. In these decisions, the Los Angeles Board of Supervisors frequently invoked health but this time as a rationale for reducing jail capacity. Los Angeles County, the supervisors decreed, was overdue for a paradigm change toward care, not punishment, and a budget that reflected that commitment to "care first, jail last."[3]

This unprecedented reversal did not happen overnight. A broad alliance of community organizations across Los Angeles, which united as the "JusticeLA Coalition," had shifted the political landscape. Formed in tandem with the Movement for Black Lives, this coalition flipped the jail plan's notion of health on its head. Through campaign slogans, "Care, Not Cages" and "Can't Get Well in a Cell," JusticeLA argued that rather than build a jail that meets the health needs of its future population, Los Angeles should not build a jail because jails can never meet the health needs of incarcerated people and their wider communities. The consultants had accepted as a given that the Los Angeles jail population would continue to grow; JusticeLA argued that such a trend represented a health crisis.

Early on, health professionals' voices were mostly silent. In 2016, Mark-Anthony Clayton-Johnson, one of JusticeLA's leaders, founded the Frontline Wellness Network to disrupt that silence. The network pointed to the tradition of health professional engagement in movements for racial and economic justice. Medical students, nurses, psychiatrists, emergency physicians, social workers, and others responded, supporting JusticeLA's claim that policing and incarceration are health crises. They wrote letters, signed petitions, submitted public comments, organized and attended demonstrations, and met with supervisors. They elaborated the many services needed by their patients, instead of incarceration. In a county with a shortage of affordable housing, substance use treatment, and psychiatric facilities, they had plenty of ideas. Their voices contributed to the transformation in Los Angeles, where 8000 fewer people were incarcerated in July 2020 compared with 2012.

MOVEMENT FOR ABOLITION

Abolition has been the central idea animating JusticeLA's organizing. As a framework, abolition offers two interrelated insights. First, abolition rejects anything less than a reduction in the size and scope of the criminal legal system. In this regard, abolition overcomes a dilemma particular to carceral institutions. Efforts to reform practices of punishment have, historically, tended to have the effect of strengthening and expanding their overall power; in fact, prisons, themselves, were once the reform to corporeal punishment. Many reforms in recent years, for example, led to the expansion of electronic community supervision.

Second, abolition challenges institutions (police, jails, and prisons) that many take for granted as a natural part of the social landscape.[4] This provocation focuses attention on why these institutions have become catchall solutions to social problems. The framework puts the criminal legal system into its wider context. Abolition, thus, also makes clear its affirmative commitment to building alternative institutions that could solve social problems rather than police and prisons. In this commitment—to building what is needed for police and prisons to be absent—health professionals have a critical role to play.

Some health professionals may be wary about embracing abolition. They might defer to what legal authorities decide regarding innocence, guilt, and sentencing. By ceding so much ground to legal and political authorities, we argue, health professionals may, wittingly or unwittingly, abdicate their responsibility to righteously decry the US practice of extreme punishment. The US massive criminal legal system is deadly, especially since the arrival of coronavirus disease 2019.[5] Permitting this system to proceed unchallenged undermines what health professionals seek to promote: long, healthy, and meaningful lives.

A position of passivity also may prevent health professionals from realizing the opportunity that is now before them. The Movement for Black Lives, by challenging the legitimacy of this prison system, has created new possibilities to demand resources for vulnerable patients, within and outside the prison walls. The reversal in Los Angeles demonstrates this unique responsibility and opportunity.

In characterizing places where governments do not invest so deeply in policing and incarceration, scholar Ruth Wilson Gilmore concluded, "where life is precious, life *is* precious."[6(p1)] For health professionals, this phrase should have immediate resonance: the struggles of patients and the tireless work of health care workers are testaments to just how precious life is. Yet it should also recall the uprisings that have swept the United States, formed in response to the callous disregard for Black life. Health professionals must listen to and participate in long-standing movements for racial and economic justice. They should add their voices to local policy and budget debates on the criminal justice system and help build social institutions

in place of police and prisons. If recent history in Los Angeles is any guide, there is a lot to lose with inaction—and so much to gain in struggle. AJPH

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Preparing for SARS-CoV-2 Vaccines in US Immigrant Communities: Strategies for Allocation, Distribution, and Communication

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Widely administered efficacious severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) vaccines are the safest and most efficient way to achieve individual- and population-level immunity, making SARS-CoV-2 vaccination the most viable strategy for controlling the coronavirus disease 2019 (COVID-19) pandemic in the United States. To this end, the US government has invested more than $10 billion in "Operation Warp Speed," a public-private partnership including the Centers for Disease Control and Prevention (CDC), the US Food and Drug Administration (FDA), and the US Department of Defense. Operation Warp Speed funded the development of several SARS-CoV-2 vaccines and aimed to deliver 300 million doses of a vaccine by the ambitious date of January 2021.

Broad vaccine uptake (i.e., an estimated 55% to 82% of the population) is necessary to achieve population-level immunity.[1] However, the advent of safe and efficacious vaccines alone will not guarantee their acceptability or uptake within US communities. Surveys of the US population indicate that a large proportion of Americans may choose not to undergo SARS-CoV-2 vaccination; 20% of Americans do not plan to get the SARS-CoV-2 vaccine, and another 31% are unsure if they will get it, according to an Associated Press poll conducted in May 2020. Another survey published in August 2020 found that 67% of those surveyed would accept a SARS-CoV-2 vaccine "if it is recommended for them," but results showed significant geographic and demographic differences in vaccine acceptance.[2] Such data suggest that SARS-CoV-2 vaccine hesitancy among the general public is largely a result of concerns about possible vaccine side effects, misconceptions about contracting SARS-CoV-2 from the vaccine, and indifference to SARS-CoV-2 infection risk. It is essential to confront the barriers to vaccination now—before SARS-CoV-2 vaccines are distributed—to achieve broad vaccine acceptance.

Specific challenges related to the acceptance of SARS-CoV-2 vaccines are exacerbated by obstacles to vaccination that already exist for underserved populations in the United States. Unfortunately, experience in both routine and outbreak contexts has shown that entrenched socioeconomic disparities often preclude equal access to vaccines. This is evidenced by suboptimal vaccination rates in many US immigrant communities, despite their overwhelmingly positive attitudes toward routine vaccination.[3] For example, CDC data indicate that adult Latinx routine vaccination rates are below the national average in many states with large immigrant populations, including Texas, California, Florida, and New York.[4] Additionally, although routine immunizations are generally well received in immigrant communities, acceptance of a new vaccine may be low because of concerns about vaccine safety and discrimination based on race or immigration status. Historical data from the H1N1 influenza pandemic of 2009 to 2010 showed that immunization rates for the new H1N1 vaccine were low for all ethnic groups, but they were significantly lower in Latinx than in non-Hispanic White individuals.[5]

EFFECT OF SARS-COV-2 ON US IMMIGRANT GROUPS

Underserved US immigrant communities are among those most affected by

SARS-CoV-2. This is largely because of structural injustices within the United States, compounded by a pervasive culture of fear and mistrust among immigrants that has only worsened in the current political climate. Limited access to health care has contributed to an increased prevalence of chronic medical conditions among many US immigrant populations, putting them at higher risk for developing severe COVID-19. Additionally, many immigrants are less able to adhere to recommendations for physical distancing because of their employment as essential workers outside the home and the multigenerational composition of their households. Although no published studies detail SARS-CoV-2 infection and COVID-19 hospitalization and mortality rates specifically for US immigrant communities, a plethora of data indicate that these rates are higher in people of color.[6] As a case in point, although Latinx individuals represent only approximately 18% of the US population,[7] they constitute more than 35% of the COVID-19 deaths documented to date.[8] Data compiled by the California Institute for Rural Studies showed that California's Monterey County agricultural workers—who are predominantly foreign-born—were three times more likely to develop SARS-CoV-2 infection than were nonagricultural employees.[9] From yet another perspective, people living in the confined conditions of federal immigration detention facilities are unable to practice physical distancing procedures to protect themselves from SARS-CoV-2,[10] and as of December 3, 2020, more than 7500 detained immigrants had tested positive for SARS-CoV-2.[11]

With the relatively high burden of SARS-CoV-2 infection and disease in communities of color, it is of critical importance not to overlook the immigrant population in efforts to achieve optimal distribution and acceptance of SARS-CoV-2 vaccines. Maximizing uptake of these vaccines will be the most effective way to stop viral transmission within the community and reduce morbidity and mortality from SARS-CoV-2 in this often neglected and vulnerable segment of the population.

VACCINE BARRIERS IN US IMMIGRANT COMMUNITIES

Although immigrant families typically express positive attitudes toward routine vaccination,[3] their vaccination rates tend to be low for a multitude of reasons, including lack of health insurance, poor local vaccine availability, vaccine cost, low health literacy, language differences, transportation challenges, and immigration status. Moreover, underrepresented groups in the United States are traditionally more skeptical of the safety and efficacy of new products of medical research, including vaccines. Misinformation and antivaccine messaging on the Internet and social media sites worsen vaccine hesitancy across the board.[12]

Long-standing socioeconomic disparities continue to impede vaccine access within US immigrant communities. Approximately 15% of the more than 40 million US immigrants live below the poverty level.[13] Among the nonelderly immigrant population, 23% of documented and more than 45% of undocumented immigrants are uninsured (compared with 9% of immigrants who are US citizens) and, therefore, have limited options to meet their medical needs.[14] Rising unemployment rates caused by the economic strain of the COVID-19 pandemic have led to further loss of health insurance among US immigrant families.[15] Whether insured, underinsured, or uninsured, many racial/ethnic minority community members do not have a regular primary care provider or a medical home, thus limiting their access to vaccinations.[16]

Compounding the medical obstacles that have historically challenged vaccine access in immigrant communities, the current political environment has exacerbated another substantial barrier to vaccination: fear. The two main types of fear that US immigrants experience are (1) fear of deportation and (2) fear of being labeled a "public charge." Regarding the former, undocumented immigrants may fear that they will be apprehended by US Immigration and Customs Enforcement or that their personal data will be reported to the government.[17] Regarding the latter, immigrants may fear that the receipt of any type of assistance, including free or reduced-cost vaccines, will preclude them from obtaining lawful permanent residence and future US citizenship.[18]

OPTIMIZING SARS-COV-2 VACCINE DISTRIBUTION

Timely development and implementation of a multifaceted, nationally coordinated strategy is crucial to achieve rapid population-level immunity via SARS-CoV-2 vaccination. Keeping in mind the unique set of challenges faced by immigrants, how can we ensure that SARS-CoV-2 vaccines are fairly distributed to and accessible for US immigrants?

During the H1N1 influenza pandemic, the US government provided guidance on vaccine allocation,[19] and they likely will provide similar guidance for the distribution of SARS-CoV-2 vaccines. The CDC released preliminary recommendations for which groups should be vaccinated during the initial phase of the COVID-19 vaccination program ("Phase 1a") on December 1, 2020. These early recommendations focused on ensuring

CORE COMPONENTS OF SEVERE ACUTE RESPIRATORY SYNDROME CORONAVIRUS 2 (SARS-COV-2) VACCINATION PLANNING TO PROMOTE EQUITY AND SOLIDARITY OF VACCINE UPTAKE IN US IMMIGRANT COMMUNITIES

Allocation strategies

- National political advocacy for immigrant communities
- Explicit involvement of immigrant communities in vaccine allocation decisions

Distribution strategies

- Free or low-cost vaccine made available to all
- Easy access to vaccine within immigrant communities via mobile clinics
- Vaccine-friendly protocols in health care provider offices

Communication strategies

- Clear and accurate messaging in language(s) of immigrant community
- Widespread vaccine education campaigns via print, electronic, and spoken media
- Health care providers educating families about and recommending vaccines

vaccination of health care personnel, other essential workers, adults with high-risk medical conditions, and older adults (≥ 65 years) but do not mention prioritizing disproportionately affected racial/ethnic minority groups. Going forward, it is critical that federal SARS-CoV-2 vaccine guidance explicitly consider the underserved segments of the US population, irrespective of immigration status. To this end, several independent working groups have released recommendations regarding national preparation for the SARS-CoV-2 vaccines, including the Johns Hopkins Center for Health Security and Texas State University[20] and, more recently, the National Academies of Sciences, Engineering, and Medicine.[21] Collectively, the frameworks put forth by such groups identify three core components of SARS-CoV-2 vaccination planning, with the goal of promoting equity and solidarity of vaccine uptake: (1) allocation, (2) distribution, and (3) communication. We apply these considerations specifically to the underserved US immigrant population (see the box on this page).

Allocation

Because access to SARS-CoV-2 vaccines inevitably will be limited at first, the needs of vulnerable US immigrant communities already hit hard by COVID-19 must be considered during the careful and transparent deliberation regarding which groups will be prioritized. Representatives from US immigrant communities should be explicitly solicited for their input on vaccine allocation. Such direct community involvement will likely lead to innovative solutions for many of the anticipated SARS-CoV-2 vaccine distribution problems, greater trust in government authorities, and higher rates of community vaccine acceptance. Direct community involvement also will increase the likelihood that US immigrant communities will understand and embrace a vaccine allocation plan, as well as help identify and educate the community members who would benefit most from SARS-CoV-2 vaccination during its phased rollout.

Because many immigrant communities are home to a large proportion of essential workers as well as individuals at high risk for severe SARS-CoV-2 sequelae because of chronic medical conditions, a significant amount of political advocacy is necessary to ensure that these communities are not overlooked. This is particularly important for the disenfranchised individuals in immigration detention, where conditions are not conducive to physical distancing, and protective personal equipment and cleaning supplies are not always available.

Distribution

As the United States develops the capacity to conduct a mass SARS-CoV-2 vaccination campaign, the most efficient and effective ways to get vaccines to and dispersed within US immigrant communities must be studied. Critically, the SARS-CoV-2 vaccines must be free or very low cost for all recipients. Judicious consideration of where to provide vaccination services is critical to avoid the scheduling and transportation barriers faced by many US immigrant families. For example, school-based clinics are traditionally an efficient way to provide routine vaccinations because children (and their families) are already present regularly. However, because many schools have transitioned to virtual classes during the COVID-19 pandemic, the United States must devise new strategies for making vaccines—including the SARS-CoV-2 vaccines—easily accessible. Drive-through vaccine clinics and mobile clinics are two options that have been successful thus far in the pandemic for provision of routine vaccinations and hold promise for distribution of the SARS-CoV-2 vaccines. In addition to innovative solutions such as these, steps must be taken to ensure that a large proportion of SARS-CoV-2 vaccination can easily occur in health care provider offices. Simple clinic interventions such as standing vaccine orders, automated vaccine reminders, and rapid vaccination services have already been shown to improve vaccination rates in other contexts and should be part of every clinic's SARS-CoV-2 vaccine preparedness plan.

Communication

Setting appropriate expectations and providing accurate and timely information to US immigrant communities—before SARS-CoV-2 vaccines become available—are of the utmost importance. Although it may seem obvious, simply providing adequate, clear, and accessible information to families in their preferred language can reduce concerns and misconceptions about vaccines. Along with strong educational public health campaigns targeting these communities, individual health care providers' recommendations are crucial in influencing US immigrant families' decisions about whether to vaccinate. Thus, all health care providers, especially those practicing in immigrant communities, should receive training on how to educate families about SARS-CoV-2 vaccines, common vaccine misconceptions, and the varied health beliefs among immigrant groups.

Because media is another influential factor in the vaccine decision-making process for many immigrant (and nonimmigrant) families, a widespread, coordinated, and sustained effort to provide clear and accurate media messages about the SARS-CoV-2 vaccines is necessary to fight misinformation and antivaccine rhetoric. These important messages must be provided in the preferred languages of immigrant communities. Both physical (e.g., printed materials) and electronic (e.g., television, radio, and Internet) messaging should be customized to address culturally relevant vaccine beliefs, misconceptions, and fears. It is of critical importance that official vaccine promotional materials are created in partnership with and revised by individuals from the target communities to ensure that the messages are easily understandable and culturally appropriate. Printed material should be accompanied by physically distanced in-person or virtual dialogue (again, in the community's preferred languages) to reach those who are not literate and to answer questions not covered in the available printed documents.

CONCLUSIONS

SARS-CoV-2 infection has had a significant global effect, leading to more than 1.5 million deaths and survivors with long-term morbidity, particularly in vulnerable communities. The ability to control the COVID-19 pandemic rests heavily on the widespread use of SARS-CoV-2 vaccines to induce large-scale, highly protective immunity, including in historically hard-to-reach populations such as those who have more recently immigrated to the United States. As national vaccine allocation, distribution, and communication plans are made, it is important to include creative, inclusive approaches to equitable vaccine access based on input from representatives of immigrant communities. Steps to ensure that US immigrants will accept and have access to SARS-CoV-2 vaccines must be taken now, to quickly and equitably implement state and federal vaccine distribution policies as soon as safe and effective SARS-CoV-2 vaccines become available. AJPH

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CONFLICTS OF INTEREST

M. Elena Bottazzi develops vaccines for neglected tropical diseases and emerging pathogens, including coronavirus vaccines.

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Pandemic Privilege: A Student's Perspective

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Throughout this pandemic, I have learned much about the system we live in by observing the consequences of obedience, civil disobedience, and poor leadership within our society. In California, we have experienced three separate shutdowns since Spring 2020 as a result of positive cases that continue to rise despite an already overworked health care system, and the obscure reopening of nonessential businesses. The unique profile of COVID-19 cast a Dunning–Kruger effect over experts in health and policy, who reported updates on the virus every day but still uncovered very little.[1] This annoying dance of two steps forward and five steps back is orchestrated by the noise of conspiracy theorists, those who are experiencing pandemic fatigue, and those who refuse to acknowledge that COVID-19 is, in fact, real. This noise can force someone into labyrinths of confusion and desperation for something other than the expected. For some, this was this end; for others like me, it was another chance. While this pandemic has centered itself on every personal, community, and global stage, it has simultaneously provided some down time for those of different levels of privilege to reconcile, reprioritize, and remember.

NEW CULTURAL BOUNDARIES OF LOVE

Admitting that I am 30 and still live at home with my family has always been detrimental to my pride and estimated value as an adult. And yet, it is a privilege to share this space together with my parents and grandparents through this difficult time. In Filipino culture, love and respect are communicated through physical embrace as it is customary to greet your elders with a kiss on the cheek and a blessing of their hand to your forehead. With the rapid spread of COVID-19, our cultural routines have quickly ceased, causing my only acknowledgment and affection for my parents and grandparents to seem cold and empty when it is really filled with concern and caution.

This choice of refraining from risky behavior is a choice that many Americans are privileged to have. In an effort to slow the spread of COVID-19, public health measures such as mandatory mask wearing and social distancing have become notoriously political as they were quickly interpreted as threats to an individual's autonomy, which, to some people, seems to be more important than the greater good. While less fortunate people around the world, including the United States, are fighting to afford simple necessities such as housing and health care for their survival, some Americans are fiercely protesting against safety protocols that slow the spread of COVID-19 as it infringes on their privilege to live freely despite a global pandemic. From the start of this pandemic in March 2020, it has become clear to me, as confirmed cases and the demand for personal protective equipment has drastically increased, the only thing the United States could consistently provide its citizens was choice. Compared with our global counterparts, rights to choose how your life is lived is a privilege that still not all Americans have.

THE WORKING DILEMMA

For what is considered a privilege can also be a boon. Jobs and regular income provide people with financial stability and access to resources. Within the context of operating during a global pandemic, some jobs present higher risks and do not always outweigh their benefits. Restaurants that have survived up until this point are not working for profit, but for staying in business. Hospitality and service industries are in business but are eating costs by operating at minimal capacity. Frontline health care workers carry the burden of treating helpless patients and bearing bad news to distraught loved ones. Although there are specific pandemic restrictions to observe public health and safety, the burden still falls on the tired shoulders of a depleted health care system that continues to be a bandage for what could have been better contained—not because we did not have the resources, but because we did not have the cohesive support from legislature at all levels.

My perspective on public health has forever changed to first acknowledge the privilege we, as public health professionals, have to assess and evaluate situations and implementations. Taking shelter under the shades of privilege during the pandemic is the younger sibling who learns from an older sibling's stupid mistakes. Privilege here represents a range of advantages that contribute to one's well-being and likelihood of safety and security.[2] After one semester of my graduate career in public health, social determinants and health inequities had finally come alive through the entanglements of 2020. Under shelter-in-place orders, the attention to mental capacity to acknowledge these misfortunate events still require a way to get on with life without going out. People living within this pandemic have resorted to different types of you-only-live-once philosophies in either the wrong, complete, or incomplete context, because our reality has become infinitely shorter and less certain.

A PROMISING FUTURE IF YOU LET US

The future of public health relies less on health and more on the external factors and circumstances that support not only an individual's behavior but also the triggers that influence stress and shape perception. I envision public health to grow and always include multi- and interdisciplinary experts who may not be directly involved with health but recognize that their efforts most certainly support the sustainability of life and its fulfillment.[3] Bringing self-care to the public requires interdisciplinary teamwork and communication to bridge connecting ideas over gaps in the scope of practice. While each person has unique needs, it is also an amazing time to see how different kinds of stimuli and attention can improve one's mood and quality of life. Moving forward, public health is the common good that keeps the pulse of the people alive and well. Without acknowledging the expansion and positive effects that public health brings, we are choosing to ignore the potential of our greatest good, the general public. As we continue through this pandemic in place, we most certainly need the art, music, science, and advocacy to keep our minds open and free when our world is shut down.

I am inclined to be more hopeful that my fellow public health colleagues and I, along with multisectoral community partners and experts, see the value in protecting people over businesses, property, and money through the prioritization of public health, life, and safety.[4] This includes experts in art, wellness, public health, and even music, to create innovative channels that best express our emotions and preserve our spirit by finding peace through nature and human connections. Public health calls for not only health experts but also for community organizers, peacemakers, cunning communicators, countless creatives, and technology innovators to catch those who fall between the cracks of loneliness, denial, conspiracy theory, or stubbornness. To come out of this stronger than our past deceived mistakes, our American society will have to learn how to let go of the individual ego and adapt to be a part of the thriving collective. The only solace I have as a public health graduate is that I will be continuing in this world with a full toolkit, complete with references on how the United States has handled the 2020 pandemic, instances of consequential outcomes from being unprepared, lessons from being oblivious to professional advice, and the moral compass pointing in the direction on how to move forward. AJPH

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CONFLICTS OF INTEREST

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Post–COVID-19 Public–Private Public Health Partnerships: A Student's Perspective

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In March 2020, many students were studying public health with no foreknowledge of what would soon unravel on the global stage. These students saw firsthand the state of our complex, fragmented US health care and public health systems and witnessed the rationing of test kits, masks, and ventilators. Local, state, and federal governments' scramble to obtain resources to mitigate the transmission of the virus precipitated reactionary efforts by our public health and health care systems. The US response to this pandemic compared with that of some other countries (e.g., South Korea, Taiwan, New Zealand) has not only exposed the state of the US public health and health care systems but also provided insights into how they can be improved going forward.

The same pandemic ravaged South Korea but with a different response. The South Korean government took measures that involved aggressive contact tracing and early testing. For example, residents were required to download a government-issued cell phone app that notified residents when there was a COVID-19–positive individual within their vicinity (https://go.nature.com/3a2GiOh). The app also tracked the location of infected individuals to ensure their adherence to the mandated 14-day quarantine. Under the stringent Personal Information Protection Law, South Korea used their digital infrastructure, including their centralized data collection platform, which collects data that includes smartphone location history, credit card transactions, immigration records, video surveillance footage, and travel logs (http://bit.ly/2YfRDF8). These successful, streamlined efforts encompassing early detection, containment, and treatment resulted from the lessons learned after South Korea had unsuccessfully dealt with the 2015 MERS (Middle East respiratory system) outbreak (http://bit.ly/3sYiPX1).

As part of South Korea's infectious disease management revamping efforts, biotechnology companies proliferated following the years between the MERS and the COVID-19 outbreaks, which allowed public–private partnerships to scale up disease testing capacities. The rapid deployment of digital technologies to strengthen public health measures during COVID-19 was also seen in Taiwan, where they dealt with the SARS (severe acute respiratory syndrome) outbreak in 2004, and in West Africa, where they experienced an Ebola outbreak in 2014 through 2016.

In a similar trajectory in the United States, COVID-19 revealed the efficacy and value of the private sector in outbreak and transmission management for infectious diseases. Despite the growth of the private sector tapping into health by providing services such as telehealth, symptom management, and contact tracing, public health is often reluctant to fully embrace the private sector. Nevertheless, with COVID-19 revealing the fragmentation of our health care and public health systems, private industries have found more opportunities to increase their role in these fields.

Although the public health sector has made great scientific strides in epidemiology and outbreak management, it often lacks the speed, technical ability, and jurisdiction to use the broad range of data that industries have collected. Because they have extensive user data, such as location and behaviors, technology companies can automate rigorous contact-tracing measures with mobile applications, wearable devices, and tracking technologies. Partnering with private industries that have large-scale data collections and can innovate rapidly can be efficient and complementary to public health efforts, particularly when individuals are wary of providing private information to the government. Further, it can augment the traditional efforts of epidemiologists, such as contact tracing. This partnership can also provide more incentives for public health and health care systems to embrace the private sector for the sake

of efficiency, greater data access, and innovations that strengthen testing, containment, and treatment capabilities.

Since March, many cell phone applications and Web sites emerged for digital contact tracing and diagnosis. With COVID-19 cases increasing again, large technology corporations are racing to develop technical tools to combat the disease. This year, Apple and Google announced their collaboration to develop privacy-preserving contact tracing (now called "exposure notification"; http://apple.co/39g2zsB). This opt-in feature (developed and supported by health authorities), now being explored in 22 countries, is a decentralized reporting-based protocol using Bluetooth to facilitate digital contact tracing by logging COVID-19 encounters with other notification system users (http://apple.co/39g2zsB). Despite this collaboration with public health authorities, Apple and Google own the hardware and governments can use it only on the companies' conditions and terms.

The need for increased epidemiological surveillance may warrant greater surveillance technologies to collect personal data, which can, conversely, have deleterious consequences. Understanding infection transmission requires personal information and a range of digital data sources, including time, place, person, and identifying risk factors for the disease. Nonetheless, such information gathered in the name of public health can be used to surveil communities disproportionately and mimic the usual fault lines of social distinction. As more public–private collaborations in public health emerge, particularly with large technology corporations such as Facebook, Amazon, Apple, Microsoft, and Google, more discourse on and training in public health are needed. Discussions must include data privacy and ownership, applied technology ethics, and surveillance. Training on implicit bias, data transparency, and big data as well as discourse on algorithmic manipulation, bias, and equitable distribution (i.e., understanding barriers to access) are important to address in public health as more students consider pursuing careers as data scientists in biotechnology and technology firms. This is salient especially in light of the recent congressional hearings of these companies on issues of data protection, algorithmic biases, and infringement violations.

For public health students, the realities of COVID-19 and responses to it in real time have been an invaluable lesson that cannot be taught in class. Long-standing issues in our public health and health care systems have been brought to light and amplified and new problems have arisen. Many public health students enter graduate school with the anticipation of working in the public sector upon graduation. However, this pandemic demonstrated that health cannot be achieved in a vacuum; it affects and is affected by every sector. COVID-19 revealed the evolving nature of public health as it is becoming more interdisciplinary and adaptational, thus blurring the long-standing separation between the public and private sectors.

Public health will motivate private companies to invest more in digital health technologies. It will also foster public–private partnerships, innovations, and discourse on ethics and data privacy. It will also incentivize more public health students to enter the private sector as data scientists, user experience researchers, user experience designers creating digital health applications, project managers, and consultants. Further, with the increase of public–private partnerships, more students in the public sector will work with private companies as public health advisors, epidemiologists, and health directors. It is vital to train students to become familiar with the private sector and to advance the discourse on ethics and data protections as a core part of public health at the same speed with which technological advancements are occurring. This is essential for ensuring that we pursue equitable health for all. AJPH

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Overcoming Barriers to COVID-19 Vaccination in African Americans: The Need for Cultural Humility

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See also Benjamin, p. 542, and Rodenberg, p. 588.

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> "Rescue work by helicopter was slow. That stopped at dark about 7 o'clock . . . people began to panic. I told Kenneth and Keith and those around me that we may as well make the best of it, for no one knows we are here . . . help won't come until morning. The rain fell so hard that I had to take off my glasses & hide my head. . . . The water, still slowly rising, had two more inches to go before it reached the rooftop. We learned: that communication [and] cooperation are necessary factors for survival in a disaster."
>
> *—Letter from Inola Copelin Ferdinand to her sister, Narvalee, after our family and others spent days amid the drowning death of my paternal grandfather and many of her neighbors, abandoned on rooftops in the Lower Ninth Ward, New Orleans, LA, during Hurricane Betsy, September 9, 1965*

Racial/ethnic minorities suffer disproportionately from US COVID-19–associated deaths.[1] The tragically higher COVID-19 mortality among African Americans from multiple conditions, including cardiovascular diseases (CVD) and certain cancers, highlights deep-rooted, unacceptable failures in US health care. The social determinants of health (limited finances, healthy food, education, health care coverage, job flexibility) make disadvantaged communities more vulnerable to COVID-19 infectivity and mortality and amplify higher comorbid conditions.[2] The Healthy People 2020 Social Determinants of Health include the Economic Stability domain, with employment as a key issue. Suboptimal job benefits such as health insurance, paid sick leave, and parental leave can affect the health of employed individuals, and African Americans are more likely to work in blue-collar service jobs.[3] This toxic gumbo of suboptimal health and adverse environments profoundly diminishes overall African American longevity, fueling a decades-long White–Black death gap, with African American men having the shortest life expectancy.[2] Although December 2020 Pew Research data note that a growing share of Americans report they probably or definitely will accept COVID-19 vaccination, African Americans continue to stand out as less inclined to get vaccinated: 42% would do so, compared with 63% of Hispanic and 61% of White adults.[4]

MISTRUST: A CRITICAL BARRIER TO OVERCOME

Effective public health messaging and mitigation efforts are required to optimize acceptance of COVID-19 vaccination and minimize subsequent mortality. Unfortunately, mistrust in orthodox health care is a substantial barrier to COVID-19 vaccine acceptance, and without widespread uptake, the societal benefits of immunization, even with very effective, safe vaccines, will not be realized. Despite recent attention to the impact of structural racism across a wide range of health conditions in the United States, the COVID-19 pandemic further unmasks these inequities. The scandalous history of orthodox medicine and public health toward African Americans demands recognition or will remain a formidable obstacle to acceptance of vaccination.

HISTORICAL RACISM IN US HEALTH CARE AND PUBLIC HEALTH

The multigenerational African American mistrust reflects a legacy of real-life experiences and the shameful historical racism in medicine and public health. Since the mid-19th century, and well into the 20th century, physicians and public health officials were apologists, and even advocates, for the less-than-humanistic care and racist theories that supported the subjugation and

dehumanization of African slaves and, later, Black US citizens.

In 1851, Samuel Cartwright, a leading medical authority, maintained that a slave must be submissive to his master. He identified drapetomania, the "disease" of running away, with specific remedies: removal of both big toes and "whipping the devil out of them."[5] The extensive history of Blacks receiving violent medical treatment and experimentation includes medical schools utilizing enslaved Black bodies as "anatomical material," early gynecologists experimenting on enslaved women, compulsory sterilization, and the saga of Henrietta Lacks, whose cancerous cells, taken in the segregated Johns Hopkins ward, were experimented on, reproduced, and disseminated without her knowledge or consent.[6]

Most prominently, the infamous "Tuskegee Study of Untreated Syphilis in the Negro Male" remains a symbol of African American mistreatment, deceit, conspiracy, malpractice, and neglect by the medical establishment. Social scientists and medical researchers have repeatedly pointed to this unethical study as a reason many African Americans remain wary of mainstream medicine and participation in clinical trials, and why there are fewer physician interactions among African Americans and increased mortality for older African American men, as has been consistently documented.[7]

GOVERNMENTAL PROGRAMS FOR EQUITY IN COVID-19

Organized government initiatives are essential to link scientific understanding of SARS-CoV-2 to public health policy and social justice. Institutionalized strategies at a national level include the National Institutes of Health's Community Engagement Alliance (CEAL) against COVID-19 disparities, which targets African Americans, Hispanics/Latinos, and American Indians/Alaska Natives, who account for over half of all reported US cases.[8] Specifically, CEAL's community outreach efforts are designed to increase clinical trial diversity and to overcome misinformation and mistrust regarding treatments, diagnostics, and vaccines.[8] This ongoing program seeks to identify and connect with some of the hardest-hit communities.

Furthermore, state, territorial, and tribal perspectives may swiftly identify disparities and problem areas in COVID-19 incidence, burden, and vaccination and more precisely deliver culturally appropriate messaging. One example, Louisiana's COVID-19 Health Equity Task Force (www.sus.edu/lacovidhealthequity), was initiated after an alarmingly high African American mortality rate was identified in the state. It has reported to the governor multiple recommendations for testing, monitoring COVID-19's impact, and policy changes aimed to reduce inequities for multiple statewide racial/ethnic communities.

CULTURAL HUMILITY

The best path forward to controlling the pandemic and achieving health equity will require specific, targeted programs and public health engagement promulgated with the spirit of "cultural humility."[9] More than traditional "cultural competency," a detached mastery of a theoretically finite body of knowledge, cultural humility is a communication imperative, originally described as an ongoing process requiring physicians to engage in conversations with patients, communities, colleagues, and themselves. Notable aspects of cultural humility include self-reflection and self-critique, learning from patients (avoiding cultural stereotyping), developing and maintaining respectful partnerships, and actively continuing these positive relationships.

Consequently, vaccination concerns in communities of color must be addressed with cultural humility, as opposed to simply deeming reluctant individuals as solely uninformed, foolishly recalcitrant, or merely antivaxxers. Identifying and overcoming vaccination hesitancy in a multicultural America is not simply a social nicety, but rather an essential action to achieve national levels of immunity and eventually eliminate disparate outcomes among diverse cultures and racial/ethnic backgrounds.

To communicate the risk–benefit of COVID-19 vaccines, it is essential to have input from the mass media, public health services, policymakers, and "trusted messengers" (individuals with a prior history of service and goodwill in the underserved and minority communities). According to established international law, the United States must ensure equality and nondiscrimination in its dissemination of new COVID-19 vaccines. Individual decisions about accepting vaccination are not simply technical calculations, but value decisions that this particular intervention is intended to help and not harm themselves and their loved ones. Culturally sensitive, literacy-level appropriate education, delivered with cultural humility, is optimally respectful communication, with feedback and evaluation of the messaging.

CONCLUSION

The best path forward to overcoming the COVID-19 pandemic in the United States requires specific, targeted programs and

public health engagement that promote diversity in clinical research and partnerships with communities of color. The unacceptable devastating death and disability from COVID-19 will be eliminated only by effectively and respectfully delivering mitigation, prevention, early diagnosis, effective acute care, and, finally, immunization to the increasingly diverse US populations. Inherent in this challenge, culturally humility is a crucial component. AJPH

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To Work With Marginalized Populations, Empathy Is Key

Howard Rodenberg, MD, MPH

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See also Benjamin, p. 542, and Ferdinand, p. 586.

Many years ago, I was told never to follow a great speaker, as there's no way to look good in comparison. So I'm hesitant to add an opinion to Keith Ferdinand's moving account of his family's rooftop rescue from their flooded New Orleans home. The tale reveals the fear we have when confronted with uncontrollable circumstances, such as natural disasters or pandemics. It also encapsulates the hopelessness and desperation we might feel when we don't have the ability to care for our friends, our families, and ourselves. Many of us have likely felt this way during the COVID-19 crisis; more still within disadvantaged communities.

Incidents of racist thought and practice within the House of Medicine have been well documented, and the negative impact of adverse social determinants of health has become clear. These factors complicate public health programming within marginalized populations, especially when public health products or services come from outside rather than originating within the community itself. Given the chronic distrust that results when policymakers seem unwilling or unable to correct these ills, is it any wonder there's skepticism about a government-backed coronavirus vaccine?

It has been noted that people of color have a right to be suspicious of public health professionals. We can argue among ourselves how many of today's current health disparities within minority populations are related to centuries of institutional racism or contemporary

public health engagement that promote diversity in clinical research and partnerships with communities of color. The unacceptable devastating death and disability from COVID-19 will be eliminated only by effectively and respectfully delivering mitigation, prevention, early diagnosis, effective acute care, and, finally, immunization to the increasingly diverse US populations. Inherent in this challenge, culturally humility is a crucial component. AJPH

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Many years ago, I was told never to follow a great speaker, as there's no way to look good in comparison. So I'm hesitant to add an opinion to Keith Ferdinand's moving account of his family's rooftop rescue from their flooded New Orleans home. The tale reveals the fear we have when confronted with uncontrollable circumstances, such as natural disasters or pandemics. It also encapsulates the hopelessness and desperation we might feel when we don't have the ability to care for our friends, our families, and ourselves. Many of us have likely felt this way during the COVID-19 crisis; more still within disadvantaged communities.

Incidents of racist thought and practice within the House of Medicine have been well documented, and the negative impact of adverse social determinants of health has become clear. These factors complicate public health programming within marginalized populations, especially when public health products or services come from outside rather than originating within the community itself. Given the chronic distrust that results when policymakers seem unwilling or unable to correct these ills, is it any wonder there's skepticism about a government-backed coronavirus vaccine?

It has been noted that people of color have a right to be suspicious of public health professionals. We can argue among ourselves how many of today's current health disparities within minority populations are related to centuries of institutional racism or contemporary

active neglect, but wading into that minefield and making the issue a contest (as some invariably do) about who is more or less racist misses the point. The real issue here is how do we move beyond this problem and communicate public health messages—specifically, those about COVID-19 vaccine—in a positive and effective way to those who need it most.

However, words themselves can be a trap that inadvertently prevent progress. Although I wholeheartedly agree with the concept of cultural humility, the term plays directly into the culture wars of political correctness. We might do better in communicating the same concept through the word empathy, which is ethically positive but politically neutral. True empathy encompasses not only the ability to put oneself in the shoes of others, but it demands meaningful interaction, learning, and self-reflection to appreciate another's lived experience without mandating shame for your own.

Empathy means nothing without action, and an empathic response demands relief. If we hope to use the coronavirus vaccine as a tool to lessen COVID-19's impact upon people of color, resolution starts with convincing people to get the vaccine.

There are two sets of barriers here. One set of problems are attitudinal, as well described by Ferdinand. We must use an empathetic stance to find ways to acknowledge the sins of the past while providing reassurance (through action) of a positive way forward. Enlisting cultural leaders within marginalized populations and recognizing the interactive nature of contemporary communications through smartphones and social media are key to this effort.

There are also institutional barriers, many of which are related to the social determinants of health. Ensuring that vaccine is available for all who are in high-risk groups by removing financial obstacles to vaccine accessibility and promoting widespread distribution within communities of color are concrete demonstrations of investment in the health of marginalized populations. These efforts not only accomplish the immediate goal of COVID-19 immunization purpose, but they also build trust for future public health messages.

I agree with Ferdinand: we have a unique opportunity to save others with the COVID vaccine. But we won't be able to help those who need it most unless we try to walk—and talk—in their shoes. AJPH

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Understanding the Likely Motivations Behind Opposition to Public Health Measures in Times of Pandemic

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See also Benjamin, p. 542, and Ferdinand, p. 592.

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This past Christmas, I worked some emergency department (ED) shifts in Montana. Working the holiday is not new to me: Christmas is known as "the Official Shift of the American Jew." One of my best friends in the business is Cherokee and follows Native American spirituality. If the two of us were together in the morning, you knew it was either Easter or Christmas.

The Upper Midwest saw a large spike in the COVID-19 case load at the onset of the pandemic's second wave. Where I worked was near the border of North Dakota, and the effects of COVID-19 on patient care were clear: dozens of people coming in for testing, admitting older folks with COVID-19 who do not meet "admission criteria" but for whom no home care is available, walling off part of the ED with plastic sheeting, nurses spending hours in full protective gear, placing patients with strokes and heart failure in obstetric beds because there is no other option that is COVID-19–free. Don't even think about transfers, because everything within 300 miles is full.

The community where I work is full of good, solid people who generally take care of themselves. (They say that when an old rancher shows up in the ED, get worried.) And they are street smart, thriving on the High Plains in a tough economy. They are fiercely proud of their resourcefulness and independence and do not like to be told what to do—like wearing masks—by anybody.

What puzzled me was how can some of these folks not get it? Coronavirus is real, rural communities are devasted, mask mandates work. But then I realized that this question presumes that people are either mentally challenged or willfully ignorant, an elitist view echoed throughout the media and, I suspect, the public health community.

The better question is how do we get people to listen. This is a critical need during times of pandemic, to be sure. But there is no mistaking that the COVID-19 experience has highlighted chasms in the system as we know it and must result in radical changes to public health structures, roles, and responsibilities. The only way to survive and grow from that upheaval, and to maintain our role as trusted authorities in health emergencies, will be a communications strategy that builds on an acceptance and acknowledgment of public fears and concerns.

A communications strategy for growth and empowerment beyond the traditional advocacy of facts begins with introspection. Many in the public health community simply do not understand the reality of those most affected by the pandemic, especially in the contexts of cultural values and economic harm. Public health advocates may work in state and local governments, academia, or foundations in which job cuts and furloughs are uncommon. These professionals may well weather the storm without major consequence. Friends, families, and neighbors often share a similar level of job security, academic achievement, religious affiliation, and political preference. It is hard to exhibit empathy when you cannot recognize your protected experience.

Let's try to imagine life as a hospitality worker, a minimum wage earner, or perhaps the owner of a small business. Your income depends completely on volume, whether you are referring to patrons, customers, or clients. With no volume, there is no income. Hours are cut, jobs are lost, small businesses fail. For policymakers and the media, you are simply a statistic.

For you, however, this is devastating. You are likely already living paycheck to paycheck, and now you face the prospect of not being able to pay rent, buy groceries, or afford transportation. With schools closed, the need for childcare may stop you from seeking other work. Your mind conjures up images of your family homeless, starving, living on the streets.

And there is a social cost as well. People who have taken pride in making a living and providing for their loved ones are reduced to seeking unemployment checks and begging for favors. Self-worth tumbles, and the usual social comforts such as worship services, sporting events, time out with friends, and even extended family gatherings are gone. Problems in community mental health, substance abuse, and domestic violence proliferate in the absence of hope. And distrust in institutions contributes to the despair, as the government—of which public health is a component—seems unwilling or unable to ensure health, safety, and economic security.

The individual is thus presented with a choice: continue to work in an open economy and risk infection or stay locked down, ensuring poverty and despair for yourself and your family. Wouldn't you resist the lockdown, too?

Autonomy also comes into play. Public health has rightfully urged members of the public to have agency over their own health but does not appear to hold that same value when advocating policies that supersede individual choice. Personal autonomy is hard won, and once won it is to be preserved. No wonder that many respond negatively to mandates, and the more intimate the mandate, the more difficult the compliance.

Immediacy also affects reception of public health messages. An adolescent cannot see beyond the next few weeks and resists any kind of long-range planning. As we age, we begin to see time, but we still cannot see space. If the pandemic is not in your neighborhood, for you it does not exist. Trying to convince you otherwise is difficult, and the more pressure applied to change minds, the more hostility builds to the message.

It is also important to recognize that the public is not some kind of separate, independent entity. This is not an "us" versus "them" scenario. The public is all of us. Health professionals, policymakers, members of the media, and the man in the street all bring their own biases and concerns to the table. Failure to recognize and acknowledge these differing views is a recipe for disaster.

A communications strategy that emphasizes empathy and understanding, and not simply an accounting of the facts, is critical to the survival of contemporary public health. The pages of *AJPH* rightfully stress the need for increased public health funding and infrastructure. But none of this will be forthcoming unless our message is in congruence with the concerns of policymakers and the public and offers an optimistic way forward. This can be done with full reference to the facts and does not imply that the truth should be massaged or obscured in any way. But hopefully we have learned through this pandemic that simply dismissing opposing views without attempting to understand or acknowledge their origins and implications is destined to fail.

Empathetic communication and collaboration must extend within our own house as well. Public health advocates often share goals but may have honest differences of opinion about underlying philosophies, motivations, and mechanisms. There is an intuitive sense that a significant segment of our community has become intolerant of those who may not adhere to a particular orthodoxy. That practice must stop. We cannot hold ourselves out as professionals focused on the wellness of all if we exclude those with differing views from our communion.

I believe that by understanding the likely motivations behind opposition to public health measures in times of pandemic, we can realign our communications strategies to reassert the continuing importance of public health in the welfare of our nation.

And you should still worry when the old rancher comes to the ED. AJPH

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COVID-19 Mitigation: Individual Freedom Should Not Impede Public Health

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See also Benjamin, p. 542, and Rodenberg, p. 590.

The commentary by Howard Rodenberg, "Understanding the Likely Motivations Behind Opposition to Public Health Measures in Times of Pandemic" (p. 590), highlights the unfortunate conundrum of successful public health messaging without disrespecting individual self-worth. Rodenberg notes that many "good, solid" people he cares for resist mandates, such as mask wearing, but individual attitudes toward public health recommendations are not formed in a vacuum; they are affected by misinformation, which is often promulgated by partisan leadership.

Despite multiple clinical presentations, coronavirus transmission may occur before or even without symptoms, necessitating mitigation, including masking and avoiding congregate settings.[1] Although unpopular among what Rodenberg describes as "fiercely proud," independent-minded citizens, public health mandates are often necessary, such as wearing seatbelts and avoiding driving while intoxicated. Mary Mallon, pejoratively known as Typhoid Mary, was asymptomatic but infected at least 122 people, including five who died.[2] She was, unfortunately, eventually confined in isolation.

Punitive measures are indeed self-defeating, but clinicians and health officials must educate and lead to overcome the widespread misinformation. It is disingenuous to suggest, as does Rodenberg, that the media or public health leadership are elitist or people who simply presume others are "stupid or willfully ignorant." No thoughtful professional, as he suggests, sees others as "simply a statistic." If misinformation is not curtailed, death, disability, and further dreaded economic calamity will be unavoidable. The premature call by some elected officials to "open up" has fueled even more economic and social distress. Furthermore, this proposed dichotomy is not necessary because the United States has the resources to lend appropriate social support to those with marginal finances.

Overwhelmed hospitals and horrendous mortality rates are real manifestations of suboptimal US mitigation. It is a spurious argument that our less-advantaged citizens must choose an open economy and infection or lockdowns, poverty, and despair. Although empathetic communication is a must, social media influencers and politicians who propose that mitigation equals slavery are doing their followers and constituents a disservice. The path to successful control of the COVID-19 pandemic is greatly hampered by widespread inaccuracies and conspiracies, which are fueled by social media, rumor, and uneven local and national official governmental messaging. While recognizing the high social and economic costs of the pandemic, the most effective solution to overcome this uncertainty crisis and to fight panic, confusion, anxiety, and polarization is public understanding and acceptance of trustworthy information, including public data and peer-reviewed research.[3]

The COVID-19 pandemic arrived during a time of extreme polarization and partisan political conflicts that distort and confound public health measures. Negative views of public measures are often exploited by cynical politicians, hampering our mutual successful path forward. Despite published pleas to leave politics out of medicine, partisan activities may have impeded the nation's readiness and preparedness for early diagnosis, prevention, and treatment.[4] The extreme impact of this pandemic on health, economic standing ,and psychological well-being demands exceptional and often uncomfortable public health measures.[5]

Robust, culturally sensitive educational campaigns, policy initiatives, and novel approaches must be considered to build trust in the general public, including diverse US communities, to accept mitigation and eventually COVID-19 vaccination.[6] Half-truths and untruths are dangerous, and there is a greater threat when scientific and medical professionals tolerate them. Antiscience

rhetoric in the United States, unfortunately, fuels beliefs that deny or minimize COVID-19 and leads to protest and rejection of public health measures.[7] For instance, in 2019 the World Health Organization listed overcoming growing vaccine hesitancy as a global health priority.[7] The public demands and should receive the respect of our scientific leaders, but our respect for individual personal freedoms should not facilitate more death and disability. AJPH

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Leading the World Again: Creating a 21st-Century Public Health Agency

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See also Benjamin, p. 542, and Gerberding, p. 596.

America's failure to adequately respond to COVID-19 was abetted by political obstruction coupled with failures of science and public health response practices and a chronically underfinanced public health system.[1–4] A robust public health system is critical to the prevention of catastrophic public health failures, health promotion, and elimination of health inequities. A roadmap for public health reform to prevent the next pandemic requires modern data infrastructure; improved federal, state, and local partnered governance; and proper financing.

DATA INFRASTRUCTURE

It is no longer tenable that Google knows more about the health of an individual or, collectively, a community than our public health system. Disease monitoring is a support function at the Centers for Disease Control and Prevention (CDC), currently with more than 100 stand-alone proprietary systems scattered across the agency and into 3000 state, tribal, local, and territorial jurisdictions. The CDC lacks a biosurveillance system that can collect, analyze, and share data in real time for public health action. The agency has admitted that if it had such a modern data infrastructure, it would have more quickly and effectively contained the spread of the coronavirus.[5,6]

The United States should expand traditional surveillance activities and strive to permit access to the right information to influence action by the right person at the right level at the right time. These data could be federated with multiple layers of identity management, service-level agreements, and contractual definitions to maintain security and privacy protections. Individual-level geocoded data from case-based surveillance tied to a national patient identifier[7] could be used to expand event-based and community-based surveillance. This identifier would be linked to health care utilization data including nontraditional data sources such as social media, commercial databases, and individual and community data on social determinants of health. These data need to be coupled with modern analytic techniques such as computational intelligence and automated rule-based expert systems to derive information that can rapidly trigger notification of new health threats.

If such a system had existed, the CDC and the nation would not have been surprised by the opioid epidemic or the COVID-19 pandemic. These data could be used in a proactive manner to create a better understanding of the financial benefits of improving health, which could encourage longer term investments in or solicitation of health impact bonds.

Public health surveillance is the core of public health, and the CDC should lead surveillance efforts. The National Center for Health Statistics should have data sets populated with health care and cost data from agencies such as the Centers for Medicare and Medicaid Services, the Agency for Healthcare Research and Quality, and the Office of the Assistant Secretary for Preparedness and Response. This system would rapidly move hospital data to the forefront as needed and be the data source driving and monitoring public health programmatic activities.

Organizationally, the CDC would create a position of chief health data scientist. This individual, in partnership with representatives from other agencies, could help to create a holistic picture of people and communities. The CDC should lead efforts to bring together diverse data sets from social services, workforce agencies, and public safety to help build a comprehensive picture of both medical and social vulnerabilities and help align social services and sources of medical support to achieve optimum and equitable health. With these comprehensive data, communities, health systems, and public health officials at the state, tribal, local, and territorial levels will have a holistic view of the drivers of poor health and be better equipped to address them.

STATE, TRIBAL, LOCAL, AND FEDERAL PARTNERSHIPS

Recent national failures in public health were not only mirrored but magnified at the state, tribal, local, and territorial levels. Most state, tribal, local, and territorial health departments are underequipped to properly respond to public health emergencies. A set of essential functions, capabilities, and capacities at all levels of public health must be codified and properly resourced for the future.

The administrative burden on states (and the CDC) could be eased by eliminating separate fiefdoms within each congressional program while maintaining accountability for impact and streamlining emergency authorities for grants. Additional and unique CDC health officers should be assigned as advisors to each state and large tribal, local, and territorial health departments. These health officers would be charged with facilitating federal assistance and would help guide the use of federal funds to enhance health protection, prevention, and promotion efforts across jurisdictions. Health protection should concentrate not only on mitigation of threats from novel pathogens but also on provision of safe water, food, and air; healthy building codes; and workplace safety.

Cross training of scientists and mandatory rotations, scientific reviews, and external reviews should be implemented to modernize the public health workforce. Existing public health staff can be augmented by revitalizing the Commissioned Corps of the Public Health Service, expanding the Epidemic Intelligence Service, and resourcing other fellowships in public health, informatics, and data and laboratory sciences. Groups such as a noncommissioned public health corps of community health workers and a ready reserve corps could be established for rapid scale-up during an emergency.

A new formal public health governance model analogous to the Federal Communications Commission should be created. This national public health commission should be an independent government agency overseen by Congress and chaired by the CDC, populated with individuals appointed by the secretary of health and human services, and including members from states and localities that serve across administrations. This commission would create and fund America's national protection, prevention, and health promotion strategy. The commission would support activities that cut across national, state, and local levels; ensure accountability of state, tribal, local, and territorial entities and intrastate coordination; and review proposed spending from the new public health trust fund proposed in the next section.

FINANCING MODEL

The United States spends $3.5 trillion annually on health care but less than 3% of that total on public health, as compared with 10% spent on public health by many other wealthy countries.[8] A possible model to adequately fund public health would be a check-off or tax on all health care spending, including a surcharge on private insurance and an appropriation of a portion of Medicaid and Medicare funds to the CDC.[9] This new trust fund would replace the current Prevention and Public Health Fund and fund national priorities outlined in the national protection, prevention, and health promotion strategy and the Healthy People 2030 plan.

In addition, nonprofit hospitals need to be more accountable for community benefit dollars they "spend" to maintain their nonprofit status. Community benefit dollars should have measurable and tangible linkages to community needs and be spent in alignment with local priorities currently identified by community health assessments, with a defined minimum floor of dollars that need to be spent on community benefit to qualify for tax-exempt status and much clearer guidelines on how these dollars should be allocated.

CONCLUSIONS

A well-funded and strong public health infrastructure, with actionable data and robust partnerships, is essential to strengthening our country's physical and fiscal health. We must restore public trust and reengineer the role of public health as central to a well-functioning health care system and essential to achieving optimum health. If properly funded and staffed and armed with proper data, solid partnerships, and the best technologies available, public health agencies can effectively protect against future health threats and build a foundation for achieving the optimal and equitable health of every person in our nation. AJPH

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Back to the Future of Public Health

Julie Louise Gerberding, MD, MPH

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See also Benjamin, p. 542, and Gee and Khan, p. 594.

> "Public health in the United States is never static. It must be sensitive enough to signal a new health threat. It must be specific enough to pinpoint problems and focus resources. It must be flexible and connected enough to protect people locally, nationally, and globally. That means public health surveillance in the United States must be responsive to change—and so must we."
>
> —*Centers for Disease Control and Prevention*[1]

The SARS-CoV-2 pandemic has created unprecedented challenges for our nation's public health system. The Centers for Disease Control and Prevention (CDC) alone has engaged more than 8100 employees, conducted deployments to more than 250 communities around the world, created more than 4400 guidance documents, and supported more than 2.2 billion hits to its pandemic Web sites. Together with partners across the state, local, tribal, and territorial public health networks, our entire public health system has been orchestrating a massive response, one that promises to become even more heroic as vaccine launches expand and the virus itself evolves. Despite these achievements, the CDC's performance, the visibility and scientific independence of its leadership, and the adequacy of overall public health and health care system preparedness have created concerns that must be addressed.

Ongoing "Team B" review (systematic external expert review and input) of the pandemic response to correct deficiencies is certainly critical. Gee and Khan (p. 594) have outlined a more sweeping agenda for structural, operational, and financing changes to modernize the CDC, and some of their ideas likely have merit. However, the acute phase of a pandemic is probably not the best time to implement long-term and far-reaching changes to the CDC and our public health system, at least not without thorough assessment and thoughtful deliberation, perhaps via a mechanism akin to that successfully employed in the congressionally authorized Base Realignment and Closure process.[2]

Regardless of the mechanism or timing, undertaking a significant evolution of our public health system might be framed in the context of a few core principles, as follows:

1 People focus: Individuals and local communities are the front line of health protection, and their customized health needs and priorities should be the foundation for planning and resource allocation, as is the intent of community

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1 People focus: Individuals and local communities are the front line of health protection, and their customized health needs and priorities should be the foundation for planning and resource allocation, as is the intent of community

health assessments. Of course, local planning also has to be prioritized, integrated, and in most cases supported across state and federal jurisdictions, but it must not be undermined by top-down mandates.

2. Integrated health protection strategy: One of the painful lessons from the current pandemic is that optimizing health and health equity is a prerequisite to ensuring health security in the context of emerging threats, and vice versa. The inextricable linkage between these dual imperatives requires their strategic and programmatic integration within the CDC and throughout the entire health system.
3. Science and technology leadership: Public health must be powered by leading-edge science and emergent technologies—and the expert workforce to exploit their value. Gee and Khan highlight data sciences as one major domain of need, and the CDC has already articulated the comprehensive Data Modernization Initiative.[3] Many other investments are needed to support the health protection research agenda, including predictive geospatial modeling, advanced molecular diagnostics, environmental sciences, behavioral economics, communication science, and so forth. Because no single agency or institute can achieve excellence in all of these areas, provision for expanded research alliances with academia and the private sector should be prominent in future CDC strategies.
4. Multisector networks: Gee and Khan place appropriate emphasis on the importance of partnerships with state governments in achieving public health modernization, but as the coronavirus pandemic has taught us, government efforts will never be enough. Much broader multisector networks must be developed, aligned, and empowered to achieve the scale, reach, and influence necessary to solve the complex public health challenges that lie ahead.
5. Political independence and financing: Implicit in Gee and Khan's discussion of governance and financing is the recognition that the CDC's pandemic performance has suffered from political interference and long-standing and severe resource constraints. Ameliorating the former will be challenging and controversial but is essential. Improving the latter is equally important and must be an immediate as well as a long-term strategic national security priority.

Crises can create crucibles for otherwise difficult-to-accomplish change, and this pandemic is no exception. At the very least, it has revealed some serious weaknesses in our current system and highlighted the tight coupling between underlying health disparities and vulnerability to new threats. Our challenge now is to learn from this experience and evolve an even stronger, more equitable, and more resilient health protection front line for all. AJPH

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The "10 Essential Public Health Services" Is the Common Framework Needed to Communicate About Public Health

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See also Benjamin, p. 542, and Atchison, p. 600.

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Studies, polls, and focus groups conducted over decades repeatedly have found that leaders and professionals in other sectors, elected officials, and the public do not understand what is meant by the term "public health."[1–3] When asked, many have a hard time responding at all.[1] Those who can offer up an attempted definition often confuse public health with health care, incorrectly equating public health practice with medical care for the poor or indigent or overemphasizing individual behavior rather than community-level change.[1]

Our inability to communicate effectively about public health has consequences. Leaders working in education, health care, housing, and business are largely unclear about what public health professionals do and about their potential to add value to their work.[1] This has made it more difficult to form partnerships and secure necessary funding. If we are to successfully communicate about public health, we must establish a common understanding.[4] That needs to start with a universal framework that is used consistently throughout the field to establish a common set of ideas before discussing more specific dimensions of public health practice. The "10 Essential Public Health Services" is that common framework.

For more than 25 years, the "10 Essential Public Health Services" (Essential Services) has provided a common set of ideas that everyone in the field can use, while simultaneously being responsive and flexible. Originally developed in 1994 by a federal working group, the Essential Services served as a description of the activities that public health systems should undertake in all communities. Organized around three core functions of public health—assessment, policy development, and assurance—the Essential Services provides a set of concepts that collectively define what public health does and how that work differs from other roles in the health field, specifically health care.

However, although they were innovative in 1994, the Essential Services grew increasingly out of touch with current public health practice. The original framework has persisted as part of nearly all public health curricula and as the basis of the Public Health Accreditation Board domains. Given its widespread acceptance, it was critical to reinvigorate the Essential Services framework to reflect new realities facing the field of public health.

In 2019, the de Beaumont Foundation and the Public Health National Center for Innovation partnered with many leading public health organizations to begin the long-overdue update. Through the revision process, we collected real-time feedback through polling at meetings and events, an online survey, and discussions with more than 1300 practitioners across all areas of public health and at all stages of their careers. This process allowed for more diverse participation than was possible when the framework was initially written and should serve as a template for developing future models and frameworks. This input was complemented by a task force that included experts from federal agencies, national public health organizations, state and local public health officials, tribal representatives, academics, and nonprofit groups.

Released in September 2020, the revised framework capitalizes on the strong Essential Services brand while ensuring that it is closely aligned with the current and future responsibilities and functions of public health.[5] It has reinvigorated the framework as a tool to define and explain public health's vital role in different contexts and with multiple audiences. With this update, the revised Essential Services can be the primary framework used to explain what a comprehensive public health system should deliver.

A significant part of the updated Essential Services is the explicit focus on equity. Health disparities have existed from long before we measured health outcomes.[6] The injustice of slavery perpetuated by systemic policies that disproportionately affected people of color has had a direct and undeniable impact on health.[7] Placing equity at the core of the framework is a powerful visual representation of public health's obligation to help all people achieve good health and serves as a reminder of how public health must center on communities that have been historically marginalized in their work. The emphasis on equity also recognizes the emergence of social justice movements that are intertwined with public health values.

The new Essential Services framework also provides a universal lens through which we can assess public health system readiness and communicate public health funding needs. Many public health system challenges experienced during the COVID-19 pandemic—archaic data systems, neglected social policies exacerbating spread, needed partnerships, communications missteps, and a workforce starved for resources—can be tied to an inability to deliver on one or more of the Essential Services. Advocates for the resources necessary to rebuild the nation's public health system can point to the Essential Services as a guide when developing new legislation to fund public health infrastructure.

For communicating about public health, the Essential Services framework remains one of the best tools available to practitioners, and 80% agree that the framework is useful for this purpose.[5] Public health systems and specialized fields around the world use and tailor the framework for their own needs, but its themes are overarching. Having a common framework that prioritizes three themes (assessment, policy development, and assurance), defined by 10 widely accepted responsibilities, allows practitioners from all corners of the field to communicate the same core aspects of public health. Whether one is speaking with community members about local health promotion initiatives or advocating for investments in public health to policymakers, the Essential Services provides a consistent framework for messaging. The Essential Services has been thoughtfully crafted to be accessible to people from all backgrounds, in both language and design, which can help practitioners make connections across sectors.

At a time when public health is in crisis and the effects of decades of neglect are visible, it is necessary to breathe new life into the Essential Services. Now, more than ever, it is time for the field to embrace this new, refreshed framework and use it to ground and shape conversations about public health to garner sustained investments, partnerships, and appreciation. The 10 Essential Public Health Services framework will continue to evolve to meet the needs of public health. The more we use the Essential Services to talk about public health, the stronger and more influential our collective voice will be. AJPH

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Revisions in the 10 Essential Services Deserve a Comprehensive Implementation Strategy

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See also Benjamin, p. 542, and Castrucci, p. 598.

As the nation contemplates lessons from the COVID-19 pandemic, the role of public health is facing scrutiny. Unfortunately, as Brian Castrucci relates in this issue of *AJPH* (p. 598), surveys show a fundamental lack of agreement on what public health is. As a partial solution, Castrucci highlights the September 2020 release of a revised set of 1994's 10 Essential Services (TES) titled the "Common Framework Needed to Communicate About Public Health." The goal this title offers is consistent with the intentions of the original set: "(1) explain what public health is; (2) clarify the essential role of public health in the overall health system; and (3) provide accountability by linking public health performance to health outcomes."[1]

Castrucci states that an update is needed because the 1994 TES have grown "increasingly out of touch with current public health practice" and should "reflect new realities facing the field of public health" (p. 598). However, reforming the TES is only a first step in resolving these challenges.

Conflicts regarding the nature of public health go back at least to the 1915 Welch–Rose Report, which, like its medical counterpart the Flexner Report, established a framework for public health education. Debate was then between those who argued for biomedical research and those who argued for prioritizing administration.[2] Ironically, the recent amendments to the TES, which add a category addressing governance and appear to reduce the focus on research, seem reminiscent of this century-old debate.

Unfortunately, over the years the division between research and practice has become institutionalized. For example, the National Institutes of Health carries out research, frequently in collaboration with academic institutions, whereas the Centers for Disease Control and Prevention focuses on practice activities, including disease control, through a federal system reliant on state and local government public health agencies.

Herein lies the challenge. Although public health suffers from popular misunderstanding, this misunderstanding is reinforced by multiple constituencies that have institutionalized their own interpretation of public health. Academic tenure and promotion are tied to the Welch–Rose research model. Categorical funding and federalism promote the view that public health is a bureaucratic governmental system. Thus, in addition to amending the TES, public health leaders must institutionalize an inclusive approach to achieving the vision of another update, 2003's The Future of the Public's Health.[3]

Strategic examples already exist. Castrucci highlights the accreditation of health departments, and the state of Ohio has adopted this policy.[4] An approach to linking the academy to practice could be funding academic health departments so faculty can work with practitioners whom they might not otherwise have met. The inclusion of the TES in community health improvement planning through strategies like Accountable Communities for Health could also help institutionalize the TES.[5]

I was the director of the Iowa Department of Public Health when the TES were released and used them in policymaking. In the early 2000s, I directed our school's academic health department project that linked faculty with practitioners. I currently sit on the Public Health Accreditation Board. From these perspectives, I offer the concern that an update of the TES will not succeed better than its predecessor without complementary implementation across the entire spectrum of the population health enterprise. AJPH

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Is Being a Health Officer Still a Noble Endeavor?

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From the fall of 2018 to 2020, I had the pleasure of serving as the commissioner of health of my hometown of Milwaukee, Wisconsin. Thanks to an internship at the City of Milwaukee Health Department (MHD), I knew that I always wanted to be the chief health officer and strategist of this diverse, midsized city. I believed that there was a sense of pride, reverence, and accomplishment in being a health officer; for I believed that it was the pinnacle of public health roles.

Aside from wanting to be a health officer, I was very deliberate about my educational pursuits and research focus. My dissertation examined job satisfaction and diversity of the public health workforce in Milwaukee County. At that time (roughly 10 years ago), there were 14 local health departments serving 19 jurisdictions in the county. Now there are 12 because of mergers. Through my work experience, education, and research, I realized that public health was wildly underfunded and resourced. Regardless of this reality, my research revealed that people entered and remained in public health mainly for the intrinsic value and reward.

Fast forward to my time as a health officer. We were already in public health emergency preparedness mode, so we had a slight advantage. Since late 2019, we were paying attention to Wuhan, China, but abiding by the Wisconsin Public Health Department's request to lead on all matters related to COVID-19. We were also at the halfway mark of preparing for the 2020 Democratic National Convention, which would be the City of Milwaukee's first shot at hosting an event of this magnitude and significance. We had public health emergency preparedness plans. All we had to do was prepare, exercise, and execute them without additional funding. We knew that we would not receive funds for the Democratic National Convention, as federal grant monies would go to the police department. Despite this, we were excited about the opportunity to be in the emergency operations center. We were going to make it work as we always do in public health.

As fate would have it, we detected our first case in Milwaukee on Friday, March 13, 2020. COVID-19 spread rapidly from that point on. We quickly moved into our city–county unified emergency operations structure over the weekend, which meant that I became responsible for decision making for not only my city but also the entire county of one million people. It is important to note that Milwaukee does not have a countywide health department, which would prove to be challenging as each jurisdiction would need to draft, approve, execute, and enforce orders for its residents after the statewide orders were abolished. The order drafting process was daunting. This evolved over time as the state's role was diminished after the Wisconsin Supreme Court struck down the statewide orders. Therefore, municipal leaders and legal counsel developed varying philosophies about public health and management of the pandemic. Some fared better than others because of the socioeconomic statuses of their residents.

The City of Milwaukee is a majority–minority city and has the highest rate of poverty in the county. Sheltering in place was not easy for essential workers and was impossible for individuals experiencing homelessness. The City of Milwaukee was obligated to care for those who did not have the means to protect themselves from the virus, so we were committed to issuing and enforcing orders while the surrounding jurisdictions issued nonenforceable guidelines.

I truly did not feel the weight of decades of disinvestment in public health until I led a health department, especially the largest one in the state. There was a strong sentiment that it was the City of Milwaukee versus everyone else, as our collective funding was reduced via a shared revenue model from the state capitol over time. The MHD was grossly out of date and in repair mode before the pandemic. The list of deficiencies was long and existed before my tenure. I prioritized what I could to stabilize the MHD. I categorized several of these shortcomings to provide a snapshot of the circumstances in the City of Milwaukee:

1. *Funding*. The $12 to $14 million annual budget was and is insufficient for what is needed for a city of the size of Milwaukee (approximately 600 000 people). Note that this is 2% of the city budget.
2. *Structure*. We reorganized in 2019 to improve efficiency, including office space reconfigurations. We were still in the process of filling many vacancies, which is arduous in government. Although we no longer had union contracts, we were still bound by civil service rules, which added time to hiring processes. Pay was a big issue as well. We had to request special rate approvals for competitive salaries to recruit and retain talent, barring that no one could make more than the mayor ($147 000), exceptions were not allowed for a medical director or a health commissioner.
3. *Policies and practices*. We were in dire need of updates and development across the board. Professional development plans and training would follow to standardize the process, which is vital because of turnover. Thankfully, we had a telework policy that I implemented before the pandemic and the city declared racism as a public health crisis in summer 2019.
4. *Board of Health*. We finally reassembled this body in fall 2019, but the process of filling vacancies required mayoral appointment and alderperson confirmation—another time-consuming process.
5. *Technology*. An electronic health record system was needed, but the multimillion dollar investment was not up for funding until 2021. The lab was in need of equipment and heating, ventilation, and air conditioning updates, but they were delayed because of legal issues and funding. An agency-wide performance management system was lacking, so this impeded accountability practices and reporting measures.
6. *The five-year community health improvement plan*. This plan, called MKE Elevate (named for Milwaukee's General Mitchell International Airport), was released in late 2017 but stalled because of the department being in crisis and inactive for two years. This was a major setback for the MHD's ability to support and develop authentic community partnerships, which would have been helpful during pandemic response.
7. *Essential functions*. Lastly, there were many other essential functions of the health department that were in the process of being rebooted; these included relationship building with the community and funders. Many of these programs were affected by the pandemic response, and project deliverables were paused or converted to virtual engagements.

In 2020, the pandemic generated an influx of grant funding that helped address some of the deficiencies, such as procurement of an electronic health record, performance management system, staffing, communications, and outreach needs. Considering that this funding was not available at the beginning of the pandemic, we lost valuable time to meet the needs of our health department and community, one that was already in dire straits because of inequities for Black people, Indigenous people, and people of color. Early in the pandemic, testing was scarce, personal protective equipment was barely available, and we lacked a public information officer, communications resources, and funding for other basic community needs, such as food and shelter. The lack of a community needs fund or an emergency public health fund was notable and could have served as a bridge while we waited for federal grant monies.

I still believe being a health officer is a noble endeavor, but even the most seasoned professionals must admit that our experiences before the pandemic and compounding backlash against common sense and science during the most historic event of our lifetime is heartbreaking. We were already operating at a deficit before the pandemic. Who will be willing to stay around for the next one? AJPH

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Are Health Departments Outdated?

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See also Benjamin, p. 542, and Kowalik, p. 602.

The summer of 2020 was to be Jacksonville, Florida's spotlight moment. The Bold New City of the South had been selected as the alternate site of the Republican National Convention. This was going to be fun; the last time Northeast Florida hosted a large event (Super Bowl 2005), cruise ships were anchored in the St. John's River for extra hotel rooms, restaurants, and nightclubs.[1] But just like Milwaukee, Wisconsin's plans for the Democrats, COVID-19 shut us down.

Looking from the outside, it is hard to know what obstacles the Florida Department of Health in Duval County might have faced as they prepared for the GOP. But it is likely that their challenges, both before and in the midst of the pandemic, were similar to those described by Jeanette Kowalik in the City of Milwaukee. I suspect that our two cities are not isolated cases. The challenges of disinvestment so well described in her editorial (p. 602)—fractured jurisdictions, inert organizational structures, outdated technology, inadequate funding—are similar to those that plague public health everywhere. Where local problems differ, it is not by nature but by degree.

Kowalik's description of what has been drives consideration of two larger thoughts. First, we need to identify what public health will look like in the wake of the pandemic. This is not an original idea; the November 2020 issue of *AJPH* devoted a special section to this very topic.[2] But there will be no unanimous "gold standard" vision, as what public health looks like in each community will differ with that community's interests and needs. To resolve issues such as those highlighted by the Wisconsin experience, it is key to focus our national advocacy on the benefits of a robust public health infrastructure and not on a specific format or system. Hopefully, we have learned that such advocacy must encompass an empathetic appreciation for concerns other than those of strictly scientific value.

But even if we are able to advocate effectively on our behalf, who is left to take up the cause? While our professional mojo may be flowing in response to the acute need, this is not a good time to be a health official. Some health agencies have been silenced; and when we speak, our advice may be ridiculed or stapled to the conspiracy of the day. State and local health officers themselves have been subject to withering criticism and physical threat simply for doing their jobs. Lee Norman, the Kansas State health officer occupying my former seat, has been assigned a security detail.[3] (Kansans disagree, of course, but we generally do so with a healthy dose of "Midwestern nice.") Outside the pandemic, health officials are being subject to criminal prosecution for public health incidents that may be beyond their control.[4]

Given all this, who would want the job? Perhaps a few brave (or foolhardy) souls will continue to venture into the shark-infested waters. But they will do so with a lack of institutional knowledge. Since the start of the pandemic, in Kansas alone 27 health officials have left their posts, and one in eight Americans lives in a community that has lost the leader of its local department of public health.[5,6] It seems clear that experience and expertise are no longer the primary requirements for public health leaders. The ability to build relationships with policymakers, the media, and the public to secure one's relevance and resilience may be more predictive of success.

It has been said that in life, it is not what you know but who you know. Our community must quickly identify those who will take up the challenge of guiding public health into the new decade. AJPH

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Is There a Future for Primary Care?

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See also Benjamin, p. 542, and Fine, p. 608.

As we reflect on the stunning success of applied biomedical research in developing a SARS-CoV-2 vaccine less than a year from the virus's emergence, we are also sobered by how quickly the pandemic overwhelmed our capacity to take care of sick people and how public health departments have struggled to respond at scale with core disease control strategies such as testing and contract tracing. The COVID-19 pandemic has shown us the existing weakness in our clinical systems and highlights the fragile state of our public health infrastructure. COVID has also revealed preexisting social inequities that have led to shocking disparities in health outcomes. Public health, primary care, and equity have emerged as three key themes in the pandemic, and aligning the efforts of public health with primary care and with community-based organizations should be a major part of our efforts to emerge from this disaster stronger.[1]

In the highly competitive Hobbesian marketplace of health care, neither primary care nor public health are large revenue sources and, thus, they are chronically underfunded. Primary care is struggling within an economic system that values procedural and specialty care over cognitive and preventive care. It is being squeezed by workforce shortages, the emergence of concierge and direct care models, the proliferation of retail convenient care clinics, and the emergence of direct-to-consumer telehealth platforms. As we look to a post-pandemic world, will our current primary care system be up to the task of improving population health outcomes and addressing health disparities in an impactful way?

The value of primary care in improving population health outcomes and reducing disparities has been extensively documented.[2] However, to make a difference at the population level, more needs to be done and at a larger scale. Given how little clinical care contributes to the health of a population,[3] does it make sense to continue to focus scarce resources on a population's medical needs rather than on social needs such as early childhood education, nutrition, and housing? If we were to de novo design the ideal health system, the answer is likely not. Medicine would be optimally designed for the care of sick individuals, social and human services providers would attend to individual social needs, and public health would look to population-level interventions. Yet, in this current economic climate, it is unlikely that significant new funding will be appropriated to address systematic social needs. Absent the political will to invest in a moonshot to achieve equity or large-scale community development initiatives, we must leverage existing resources within health care, the largest sector in the US economy, and incrementally redirect resources toward an integrated response.

There is an emerging consensus among policymakers that true health improvement can only be achieved by addressing the underlying causes of poor health. Public health and human services practitioners are trained to think upstream to identify and address the root causes of poor health. But social determinants also resonate with primary care clinicians who see firsthand the role of environmental, behavioral, and social factors in the health of their patients. Many health care providers realize that they must deal with a patient's most pressing issues, whether that is abnormal glucose, or eviction, or racism. There can be real power in aligning primary care with public health, social services, and population-based approaches within communities.

RECENT IMPROVEMENTS

Catalyzed by the Centers for Medicare and Medicaid Services (CMS) Innovation Center and other innovative payers, we are seeing a growing effort to pay for population services delivered in clinical settings and pass resources through health care systems to engage and leverage community-based organizations.[4] While alternative payment models are intended to hold health care systems accountable for population outcomes, early results have been mixed.

There is evidence that by providing financial incentives and focusing on practice transformation, primary care practices can improve quality, focus on

prevention, and better coordinate care for patients with complex psychosocial needs.[5] But only a small proportion of US primary care practices are certified as primary care medical homes, and their results have been of insufficient magnitude to improve outcomes for populations. Three large-scale demonstrations by the CMS have shown limited impact on cost, quality, or patient outcomes.[6–8]

BACK TO THE FUTURE

To be relevant, primary care needs to reinvent itself and accelerate the types of transformative changes alternative payment models hoped to catalyze. Looking back to the 1960s' Community-Oriented Primary Care Movement may show us the way forward. This blended model of primary care and community public health not only treats individuals who present for medical care but also assumes responsibility for such public health activities as conducting basic epidemiological surveys and planning and implementing community interventions—all in collaboration with local authorities.[9]

Perhaps the best example of community-oriented primary care in the United States is the extensive network of federally qualified health centers (FQHCs), which provide comprehensive primary care and preventive services to all residents in their service area, regardless of ability to pay. Established in 1964, the community health center model was explicitly developed to target the underlying issues of poverty and equity by combining the resources of local communities with federal funds to establish neighborhood clinics in both rural and urban underserved areas. FQHCs provide robust primary care but also include referrals to community-based psychosocial services and enhanced access to care, and explicitly address social needs via case management, translation, and transportation. To assure a community-driven collaborative approach, the majority of FQHCs' governing boards are community residents and patients of the health center. With recent funding from the Affordable Care Act, community health centers have seen significant expansion.

A second model worth noting is the Accountable Health Community (AHC). By aligning clinical and community partners and embracing shared responsibility for population health outcomes, AHCs bring together providers, payers, businesses, and governmental health and human services agencies. These nascent multisectoral collaborations hold promise, but like the FQHC model, require a primary care system capable of expanding beyond sick care. For primary care to substantively contribute to population health gains, it must incorporate an integrated approach to social determinants.[10] The primary care model of the future must look more like an FQHC or AHC than the idealized Marcus Welby practices of the last century.

Primary care needs to move from a physician-centric to a multidisciplinary team in which care is primarily delivered by other members of the team. True integrated care requires an expanded workforce of social workers, care coordinators, nutritionists, behavioral health providers, community health workers, and others. Primary care must also embrace technology, data, and analytics. Health care delivery systems have invested in health information technologies to manage their operational complexities and improve accountability to payers for cost and quality. An integrated primary care practice must have similar infrastructure to understand local epidemiology, assess community health needs, measure disparities, and effectively target resources to address both gaps in care for individuals and outreach to critical underserved populations.

CONCLUSION

COVID-19 has exposed the deep faults in our health care and public health systems. Public health has been challenged to control the outbreak, manage the surge, maintain core services, and balance the competing needs of protecting health and opening up the economy. Similarly, primary care is struggling to meet the needs of patients during the pandemic.

One way forward is to align efforts. On the surface, it may seem daunting to reconcile individual and population perspectives within the two balkanized and underresourced systems. But the planned integration of public health practice with the delivery of primary care services is needed precisely because neither of these sectors can do it alone. Engaging with the community is the third practice necessary to achieve equity. Low-income and minority groups face barriers to accessing primary care in part because of affordability and additionally because of systemic racism. Without including underrepresented and marginalized groups in the decision-making process, there will be no confidence in the policies and programs to reduce disparities.

Looking toward recovery, this may be a once-in-a-generation opportunity to engage in a broad dialogue about the value of public health and primary care, and the type of system we want to build to meet the essential challenge of our times—how to achieve health for all. AJPH

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Primary Care Is Dead. Long Live Primary Care

Michael Fine, MD

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Michael Fine is with City of Central Falls, Rhode Island.

See also Benjamin, p. 542, and Kassler, p. 606.

Kassler is correct, of course (p. 606). The nation would be well served if we provided robust primary care to all Americans. The association between primary care supply, public health outcomes, and lower costs is well known.[1–3] Primary care practices and clinicians are also well positioned to bear witness to the impact of social determinants on population health and to help fire the mobilization needed to change that.

But primary care has been deep trouble for years, trouble that only deepened during the pandemic. Only about 45% of US adults had a meaningful primary care relationship before the pandemic.[4] The market share and population health impact of primary care is falling.[5,6] The pandemic caused most primary care practices to move the bulk of their "encounters" to telephonic care, a change that fractured primary care relationships, replacing the intimacy of the primary care bond with a phone or video call between a person and a "provider" who could be miles away and not necessarily a part of the person's community. Many primary care clinicians, already weary of "strangers at the bedside"—Centers for Medicare and Medicaid Services, insurance companies, their employers, and their electronic medical record systems—quit when the pandemic hit. Many more are burned out and disheartened.[7]

And few primary care practices have realized their potential in protecting the public's health. Too tired or timid to resist third-party demands, too individualistic to organize, and too restrained by the golden handcuffs of a business model that stopped serving the public years ago, primary care clinicians failed to make care accessible to people when and how they needed it and failed to think about the health of the populations they purport to serve, providing

- too few options for same-day care;
- too little use of telephonic care when that was actually appropriate;
- too little integration of mental and behavioral health, use of community health workers, physical therapy and other functionally focused modalities; and
- far too little building of enough capacity to serve entire communities.

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- too little integration of mental and behavioral health, use of community health workers, physical therapy and other functionally focused modalities; and
- far too little building of enough capacity to serve entire communities.

They were also beset by a fee-for-service payment system that incentivized all the wrong behavior.

Primary care clinicians and community health centers alike circled the wagons, focused on what they were well paid to do, and did only that, instead of organizing to make sure that the public's health was protected and the public purpose of primary care was emphasized, encouraged, incentivized, and maximized.

The marketplace happily stepped into this breech. Immunizations are given at retail pharmacies, without any thought of the need for continuity of relationship and prevention planning over time—but perhaps someone is now building an "app" for that. Episodic care is provided in big-box stores and in retail pharmacies. New market players are consolidating primary care practices vertically and horizontally, often carving out profitable market niches—people with Medicare who need chronic care management, people with complex behavioral or substance use disorder needs, and so forth. We now have market segments, not a coherent public for those few primary care practices that think about the public's health to engage.

The pallid attempts to transform primary care over the past 10 years or to integrate primary care into public health were too weak-wristed and have come too late to be meaningful.

It is just too late for dialogue. The United States has chosen marketplace medicine over a primary care–based not-for-profit health care system that serves all Americans. Primary care is likely dead as a public health tool, unless primary care clinicians and the public organize and build a health care system that serves all Americans. We have already lost more than 476 000 lives and will likely lose 250 000 more before this pandemic comes under control. Without a meaningful primary care delivery system that serves all Americans, we remain woefully unprepared for the next one. AJPH

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A Pathway to Equitable Health Care in America

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See also Benjamin, p. 542, and Glied, p. 612.

The COVID-19 experience has underscored the inequities, silos, and disjointed nature of our health system. The double whammy of a job loss and the consequential loss of coverage exposed the precarious nature of employment-based health coverage, especially for lower-paid workers and their families. By June 2020, layoffs meant that as many as 7.7 million workers and 6.9 million dependents[1] lost their insurance. It should be impossible today for anyone to ignore the disgraceful gaps and inherent inequities in the system, with uncertain coverage for millions and poorer coverage and health for Black and Hispanic Americans.

Addressing these structural issues is no easy task in a political system that is so riven with discord. For the foreseeable political future, neither the Left nor the Right is likely to achieve its vision of a redesigned system that addresses today's structural flaws. Americans are also, by nature, suspicious of radical change in health care. So, if we are to reach the goal of an adequate level of affordable and accessible care for all, the Biden Administration and health reformers would be wise to adopt an approach that can be built gradually from what we have, and that draws on ideas that can appeal to both sides of the aisle.

One potential approach would have three elements: it would provide a strong community health system in every neighborhood, achieve equity in financial assistance to afford coverage wherever a person works, and permit states to adapt and innovate within national goals and a national framework.[2]

CREATE EFFECTIVE GRASSROOTS HEALTH SERVICES

Community health centers serve approximately one in every 12 US residents. Funded by Medicare, Medicaid, private insurance, and direct federal and local support, they are the basic health delivery system for millions of modest income and minority households, including undocumented residents and families that have lost employer coverage. Importantly, they have a long history of bipartisan support, and, through local partnerships, they often are action hubs for tackling some of the housing, transportation, and other needs of their patients that are referred to as social determinants of health.

Significantly expanding support for community clinics would help build a much stronger foundation of affordable, accessible care for families that fall through eligibility gaps for many programs and plans and otherwise could not afford care. In tandem with this expansion, further increasing the flexibility of Medicaid and Medicare to pay for nonclinical services related to health, such as housing, transportation, and nutrition, would help address factors that contribute to poor health in many communities and demographic groups.

TRANSITION TO MEDICARE ADVANTAGE FOR ALL

In an economy with many high employee-turnover sectors, tying health coverage to the place of work makes little sense. The practice continues because the compensation earmarked for health insurance is tax free to the worker, a break known as a tax exclusion. That can be a good deal to a well-paid employee with long-term job security (who receives the biggest tax break). For lower-paid workers, however, the tax benefit is small. And for many part-time employees, service and gig-economy workers, and employees in small firms, employer-sponsored insurance and the tax break are not even available. Unless these workers qualify for Medicaid or for subsidies to purchase health exchange plans, they are on their own.

The regressive subsidies and coverage in employer-sponsored insurance is a major contribution to inequities in the health system. These need to be replaced gradually with a subsidy system based on the principle of "horizontal equity." That means households with the same income and insurance needs would receive the same tax benefit or direct subsidy to purchase insurance.

They could keep that insurance wherever or however they are employed.

Converting the tax exclusion into a progressive, refundable income tax credit related to income would rearrange a roughly $270 billion annual federal tax break to achieve much greater equity and consistency. A refundable credit means those below the tax threshold would receive the equivalent of a tax credit to pay for insurance. By also adjusting the subsidy structure for exchange plans to make it consistent with the proposed credit system and allowing credits to be used for health exchange plans, the federal support for working households to obtain coverage would be the same regardless of place and type of work.

The exclusion–credit conversion has a long history of support even among Republicans; the main Republican alternative to President Clinton's reform in the 1990s took this progressive approach, and a variety of tax credit proposals have come from that side of the aisle since then. So, there is a basis of support to build on. Moreover, as managed care plans are increasingly common in Medicare, Medicaid, and private coverage, the result of workers utilizing credits would likely look much like a version of Medicare Advantage plans—the regulated private plans that are increasingly popular with seniors. Thus, we could see the system for working-age Americans evolving into what might best be characterized as "Medicare Advantage for All." It is worth noting that Medicare Advantage has enjoyed bipartisan support, and so progressives would be far more likely to achieve this form of Medicare for All than a disruptive version based on sweeping away private insurance.

CREATE A NATIONAL SYSTEM WITH STATE VARIATION

While the appeal of a "national" health system is that everyone, everywhere, can be assured the same level of affordable and accessible care, that does not mean the system has to be organized in the same way throughout the country. Moreover, the US system of federalism and state variation makes it easier for us to achieve an equitable national system.

One reason federalism helps is by allowing contentious features to be tried first at the state level using waivers. This can pave the way for more consensus by giving reformers with different philosophies the opportunity to showcase their ideas at the state level. To build bipartisan support for reform, the Biden Administration thus should make use of the waiver authority under Medicaid and the Affordable Care Act (ACA) to test both conservative and progressive concepts. Waivers could allow variations in ACA subsidies and benefit design, for instance, and allow more flexible Medicaid payment rules to explore the health benefits of addressing social determinants.

Federalism also allows states to adopt a more politically acceptable pathway to the same goal. That could help bring on board the states that have so far refused to accept federal funds to expand Medicaid. These nonexpansion states could be offered the same federal funds if they created their own programs that achieved the equivalent extent and quality of Medicaid coverage.

To be sure, the political devil is in the details for each of these elements, and much needs to be done to restore more trust among lawmakers before the reforms can be accomplished. But by seeking gradual rather than radical change, by strengthening the community clinic system, by making progress toward horizontal equity in subsides for coverage, and by recognizing that federalism is a tool for building acceptance of reform, we would have a bipartisan pathway to reach the goal of an equitable and comprehensive health system. AJPH

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Continue Moving Forward on the Affordable Care Act Path

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See also Benjamin, p. 542, and Butler, p. 610.

For more than 30 years, Stuart Butler has been one of a small band of market-oriented health policy analysts advocating for a universal health care system in the United States. In our deeply divided country, health reform is unlikely to progress without engagement from such committed conservative thinkers. Butler's enduring vision, a coherent program grounded in health economics, calls for replacement of the current tax exclusion for employer-sponsored insurance premium payments with a sliding-scale tax credit; a marketplace of competing private insurers selling plans covering a federally prescribed basic set of benefits; and a mandate requiring all individuals to purchase health insurance.[1,2] It has been strikingly influential; many of its core elements are—or were—reflected in features of the Affordable Care Act (ACA).

In his editorial (p. 610), Butler lays out a proposal that similarly has as its centerpiece the replacement of the current tax exclusion with progressive subsidies for a system of competing private insurers purchased by individuals—Medicare Advantage for All. It's not a radical idea—in many respects, this plan comports with universal health insurance systems that operate quite effectively in Germany, Israel, the Netherlands, and Switzerland. But in its singular focus on dismantling the US employer-based health insurance system, it misses today's mark.

Rather than auguring an end to our current coverage system, the COVID-19 experience has, surprisingly, highlighted the sturdiness of our current framework of employment-based coverage supplemented by the ACA's Medicaid expansion and marketplaces. Despite massive layoffs and job losses, employer-sponsored insurance declined only about 1.5% through September 2020, and enrollment in Medicaid and the marketplaces has replaced most if not all of that lost coverage.[3] The principal policy challenge today is not the disappearance of job-based coverage, but that both in the marketplaces and in employment-based coverage, premiums and cost sharing are too high. Incremental steps—increasing the generosity of subsidies in the marketplaces, offering marketplace coverage to a larger share of those with costly employer-based coverage, and promoting expansion of Medicaid in the 12 states that have not yet done so, all of which are components of the Biden health plan—would go a long way toward addressing these immediate concerns.[4]

Fundamentally, however, these problems stem from the fact that US health care costs are excessive, and a growing consensus finds they are excessive because prices in our health care system are excessive.[5] Liberal health policy analysts suggest that some form of direct government intervention in pricing is needed—either in the form of establishing backstop prices, as the Medicare fee-for-service program does for Medicare Advantage; through direct regulation or negotiation, as in other countries with market-based systems; or through public health insurance programs. If conservative policy analysts are to have real influence today, they too need to offer solutions to this problem.

Both liberal and conservative options are needed because, as the odyssey of Butler's earlier efforts suggests, containing costs in any manner will be a tough lift for Congress. In its original incarnation, the ACA took a significant step in the direction of Butler's proposal to eliminate the tax exclusion for health insurance; its Cadillac tax repurposed billions toward income-related subsidies for the purchase of marketplace plans. But in 2019, large, bipartisan majorities in the House and Senate, with support from the president, eliminated the measure altogether. The individual mandate penalty, a linchpin of Butler's individual-based insurance system, was similarly eliminated by Republican lawmakers in 2017.

Unlike Butler's vision, the ACA's many strands may not make up a unified plan. But it has proven robust. What we need now are both liberal and conservative

solutions to the politically complex challenges that remain. AJPH

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COVID-19 Surveillance Data: A Primer for Epidemiology and Data Science

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Our primary objective is to improve COVID-19 metrics to enhance the quality of COVID-19 surveillance—an urgent need raised by several authors in professional and general media.[1–5] We offer specific suggestions on how pandemic surveillance metrics can be better reported to improve the quality of analytical epidemiology. Health care providers and public health practitioners may find these criteria useful when conducting analyses, and students may be able to self-correct mistakes in written work. Data scientists may treat this as a primer for selecting and reporting metrics for dashboards.

We treat our recommendations as a work in progress, as different data emerge, and new information is needed to drive planning and inform policy directions and political decisions. We also hope to encourage more transparency when epidemiological data are reported in news media and nontechnical publications.

Useful guidance has been published by various national, regional, and global public health authorities to improve the quality of descriptive epidemiological data, but these are inconsistently interpreted and followed.[6–8] We add to these valuable guidance documents by providing examples of interpretation and misinterpretation of epidemiological data and ways to improve reporting accuracy.

When it comes to pandemic statistics, in transparency begins interpretability.

The box on pages 615 and 616 presents a summary of descriptive epidemiological data that have been widely disseminated, questions that can be raised about their validity, and ways to improve interpretation and reporting.

THE NEED FOR BETTER COVID-19 DATA

Since the emergence of the SARS-CoV-2 virus in late 2019 and the increase in resulting COVID-19 cases and deaths worldwide since early 2020, we have witnessed a staggering volume of scientific, public, and social media presenting pandemic data. We are alarmed at the extreme and invisible heterogeneity that permeates even the most basic metrics, with varying measurement validity between cases, between locations, and over time. Rarely before have health-related data reached the world population through such a vast array of communication channels, refreshed daily or even hourly. Yet, some of the limitations in these presentations have precedent: the conflation of the virus (SARS-CoV-2) and the resulting disease (COVID-19) is akin to semantic confusion between HIV and AIDS.

In the current pandemic, surveillance data distributed by state health departments are used to produce rapid observations of the burden and distribution of disease in terms of person, place, and time. Specific metrics include the number and proportion of positive tests, hospitalizations, viral reproduction numbers, and deaths. In analytical studies, these data are recast to allow comparisons between groups. To reveal underlying probability about the spread of coronavirus, pandemic metrics are often linked to external information by personal, social, structural, and environmental determinants. Other uses of coronavirus data are simulations to model possible interventions and forecasting models that predict the future course of incidence. During the COVID-19 pandemic, these studies have reached an audience well beyond public health professionals.[9] Despite eye-popping sample sizes, the underlying data as currently reported have fundamental limitations that constrain our ability to make valid epidemiological inferences. Fundamentally, common public COVID-19 metrics are drawn from convenient or haphazard population aggregates and thus are neither internally valid not externally representative.

Improving the Validity and Interpretation of COVID-19 Data

Issues	(Fictitious) Examples of Misleading Statements	How to Improve Data
1. Cases of COVID-19 are reported as crude numbers with little differentiation between new cases during a given period and cumulative cases.	"There have been 100 000 cases in Europe and last week 300 new cases in Italy."	Cases should be provided according to standard period (e.g., by week number or starting and ending date), and data sources should be included in statement. Ranges and confidence intervals of means should be shown.
2. Reported new cases are interpreted as transmission without considering conditionality on testing.	"This intervention resulted in a decline in coronavirus infections in Michigan."	Report testing-penetration numbers as gross marker, but even these are hard to interpret because of repeat testing. Note changes to test eligibility nationally and locally. Specify "diagnosed cases" every time when reporting results. Also consider the implications of rows 3, 7, and 10.
	"There were more coronavirus infections in April than March."	
3. The definition of cases may change over time and across reporting entities. Reports should differentiate between positive tests and case definitions that use clinical criteria. Patients meeting presumptive and confirmed case definitions should be reported separately.	"The number of diagnosed cases in Singapore and South Korea has risen over the past month."	Show epidemic curve over time and by specific geographic areas (states, counties, postal codes? minority populations?); flag dates when case definition changed and draw trends of number of individuals tested, differentiating positive and negative test results; note April 1, 2020, as when SARS-CoV-2 *ICD-10* code was added (U07.1); add comments on who was tested (health workers? patients only? patients and contacts? any person demanding a test or mandatorily tested? others?) and, if available, testing coverage for each subpopulation in the chosen geographic area.
4. Crude case numbers should be adjusted and presented as population ratios with a fixed period.	"The US and Brazil have reported more cases than in France."	Population-based ratios should be systematically provided along with crude numbers, and ratios should be of the same period or observation time. (This is the attack rate over a specific period of time.)
5. Mortality is reported as whole population total mortality, not discounting expected seasonal mortality. Excess mortality attributable to COVID-19 is seldom reported.	"Since the beginning of the pandemic, 29 000 deaths were reported, mostly affecting the elderly."	Overall reported mortality or estimated mortality, excess mortality, COVID-19–attributable excess mortality and case fatality should be analyzed. Comments should be added on the estimated completeness of reported data or methods of estimation and data sources. Cases and deaths that have become known to data managers with significant delay should be reassigned according to the date of their likely occurrence. Autopsy reporting delays on cause of death from medical examiners and coroners are likely to be location specific and should be acknowledged.
6. Hospital and ICU admission numbers are commonly used to describe trends, but criteria for admissions are not provided and may have changed over time as treatment protocols improved, more beds became free, and more ICU units became operational.	"The numbers of admissions to care facilities has declined from 500/day in March to 200/day in April and admissions to ICUs from 60 to 40 during the same period."	Indicate if criteria for admission to care facilities have changed and if so how. Currently, asymptomatic cases and mild cases can be referred by testing sites to general practitioners.
		Further, where and when ICUs are confronted with patient overload, patients may be referred to other ICUs outside their own catchment area and their follow-up may be lost to reporting. In several situations, triage of patients on the initiative of the treating physicians has been performed to match the local, maximum capacity of admissions to ICU. In such situations, triage may depend on one or more criteria such as prognosis, comorbidities, advanced age, or economic factors.
7. Test performed and their results, clinical presentations of cases, degree of severity of illness, and most other variables are described by country, state, county, city, or occasionally zip codes for whole populations without disaggregation by ethnicity or gender.	"As of November 26, 2020, Mebster County reported 5634 COVID-19 confirmed and probable cumulative cases and 600 deaths; 599 COVID-19 were currently hospitalized, including 52 in ICUs."	In accordance with the May 2020 updated reporting guidelines, (https://www.cdc.gov/coronavirus/2019-ncov/downloads/pui-form.pdf), records and descriptive epidemiological reports should present disaggregation of these crude numbers by ethnicity, gender, age, and any other attributes that would eventually lend themselves to analyses of the distribution of infection rates, access and use of health care services, disease burden, and excess mortality within each subpopulation.

Continued

Continued

Issues	(Fictitious) Examples of Misleading Statements	How to Improve Data
8. Gender differentials in new cases, incidence rates, prevalence, mortality, and case fatality rates are often missing.	"In this population, more cases of COVID-19 were diagnosed among males than females, suggesting a higher susceptibility of women to SARS-CoV-2." Is such a statement supported by strong evidence? Is it adjusted to take into account gender differentials in the elderly population and in homes for the aged? Have men and women had the same access to testing and to health care services?	Specific reporting by age, gender, ethnicity (where legal), and location should become the norm. The issues with the assessment of COVID-19 cases and of COVID-19 deaths need to be acknowledged (see nos. 4 and 9).
9. The results of RT-PCR, rapid detection antigen tests, or antibody tests are presented with no mention of the testing strategy, the sensitivity, specificity, and predictive values of the tests been used or consideration to the intensity of infection in the population tested.	"In Montgomery County, the 14-day average percentage of tests resulting in positive results fell from 18.0% mid-May to 2.5% mid-October."	Population-based testing strategies should be described, and the test brand should be recorded and mentioned in the report for further analysis.
10. Target populations eligible for, or subjected to, mandatory or compulsory testing are not differentiated.	"In this county, in September 2020, 12 000 COVID-19 diagnostic tests were performed among travelers arriving at the local airport, patients admitted to the county hospital, and suspected contacts, and 2.5% of these were found positive." In a growing number of countries, testing is mandatory; in some cases it is only so under specific conditions. Voluntary testing with informed consent is a secondary form of testing, if at all. There is confusion between mandatory and compulsory testing. Gaps in the legislation and lack of preparedness of health service providers do not receive sufficient attention.	Recognize the differences between voluntary testing, mandatory testing (e.g., for before boarding or when getting off a commercial airplane or joining a particular workforce where refusal of a test may imply denial of employment), and compulsory testing where the law imposes a test with no opting out or opting-out alternative with penalty). Take into account repeat testing, as certain populations are tested more than once and COVID-19 survivors are tested at least twice until their test becomes negative. Also consider the relative predictive value of currently available and used test kits.
11. Proportion of the population diagnosed with past or present infection with SARS-CoV-2 does not factor in person, time, space, or testing method.	"In September 2020, combined testing revealed that 20% of the population in this city is currently or has been infected with SARS-CoV-2, suggesting that herd immunity is gradually building up."	Needs to be based on random population sample, otherwise uninterpretable.
		Needs to acknowledge the accuracy of the tests and whether these tests were intended to detect previous or current infections. The proportion of false positive will be the main issue at the beginning of the epidemic and the proportion of false negative becomes the main issue when the curve starts to decline.
12. Viral reproduction numbers are derived from community-level public surveillance data without consideration for completeness of sampling. Semantic confusion between R_0, R_e, and R_t make interpretation difficult.	"The R [reproductive] number for California has dipped below 1.0, suggesting that the outbreak is waning."	R_0 denotes the average number of infections transmitted per person in a naive population. It is generally a fixed number of a virus.
		R_e takes into account vaccination, immunity, and interventions by multiplying R_0 by the proportion of susceptible individuals. At the onset of an outbreak, R_e and R_0 will be the same because everyone is theoretically susceptible and no interventions have been enacted. R_e is generally reported retrospectively over a defined period on the scale of months or years.
		R_t is the instantaneous value of R_e at a given point of time. In practice this is being reported on a scale of days or weeks.
		R numbers are most reliable when derived from population-based sampling and contact tracing. R_e and R_t assume complete ascertainment of transmission and accurate estimation of the proportion of susceptible, which should be stated when reporting. In the absence of these conditions, statistical methods can be used for approximation with additional assumptions, the strengths, and limitations of which should be discussed.

Note. ICD-10 = International Statistical Classification of Diseases and Related Health Problems, Tenth Revision. Geneva, Switzerland: World Health Organization; 2011. ICU = intensive care unit; RT-PCR = reverse transcription–polymerase chain reaction.

The solution to the inference vacuum relies on large-scale population-based sampling to reliably establish disease incidence or impacts.[4] Sadly, this class of studies has been starkly missing in the current pandemic, although some subnational efforts are under way. We are therefore driven to rely on unadjusted numbers derived from surveillance systems that draw on primary data that do not withstand scrutiny in terms of validity and comparability across subpopulations specifically.

We have observed that many analyses make untenable and unstated assumptions about the representativeness of positive SARS-CoV-2 tests and COVID-19 deaths on a given date. Yet, these unadjusted metrics do not account for who is being tested or why. For example, essential workers may be required to be tested repeatedly, resulting in enriched case detection among these individuals, who also likely incur a greater risk of exposure; current major public metrics do not allow adjustments for repeated testing of the same individual over time. Other subpopulations may have poor access to testing, for example because of rurality or historical mistreatment in health care settings.[10] In a fundamental violation of epidemiological principles, the pretest probabilities of infection are not equal between groups tested, nor is enough information recorded to make statistical adjustments. When comparing such groups or locations, the absence of uniform test populations is a serious threat to validity.[11]

Critically, these approaches all rely on inputs reported from local to state to national entities. However, the ability to "democratize data" using electronic syndication tools allows the circumvention of legacy systems of control.[12] Although they hold great promise to make information available more quickly and broadly, these data pipe technologies are not engineered to retain standards in the field of epidemiology, even when it comes to the basic reporting of rates.[13] Similarly, corporate data providers publish an array of mobility metrics derived from mobile phone use, geolocated pedestrian traffic, social media posts, and consumer spending, with little formal ethical oversight or precedent.[14] As with COVID-19 metrics, methodological descriptions are scant and uniformly disassociated with the tech approaches that make the data easily sharable. Unvetted corporate data have led to ruptures of trust during the pandemic.[15]

The profusion of data visualizations is fueled by influential open public data sets and application programming interfaces published by academics and news organizations, which are updated at least daily. The coyly termed "dashboard pandemic"[16] arises from a historical martial orientation to pandemic response but has limited capacity to deliver public health information that is actionable. Although easy to download and display, these data sets do not have built-in controls for epidemiological principles that strongly influence interpretation. Yet, the same application programming interface architecture could be used to deliver standardized text on methodology and guides for interpretation. Although the most downstream data provider is often acknowledged (e.g., academic or news media application programming interfaces), considerably less emphasis is placed on justifying decisions about data transformation, categorization, and visualization. When reported, these critical details are buried on separate Web pages or relegated to miniscule font sizes

We are not insisting that postgraduate qualification in epidemiology is required to analyze or interpret surveillance data, nor do we aim to inhibit creative new ways to look at the data. Yet, the foundational principles of how epidemiological data are rigorously collected and analyzed are worth remembering with renewed interest in the field.

IMPROVING DATA VALIDITY AND INTERPRETATION

At the core, what is needed is a shift in emphasis. Perpetually increasing cumulative counts of infection make for dramatic infographics, but the traditional incidence-based "epidemiological curve" has more direct utility to outbreak decision-making because ordering cases by date of infection reveals transmission patterns with greater accuracy. As alarming as they are, cumulative counts of cases widely reported in news media and through social networks disassociate previous peaks from the current situation and underlying demographics.[17] Similarly, incidence and prevalence statistics too rarely consider the susceptible populations from which they are drawn; relevant outbreaks in prisons and nursing homes are overshadowed by total population denominators. Although moving averages are a welcome smoothing technique to noisy cumulative count data, we should advocate collecting data that our collective experience says really matter, not only what is convenient or intended to produce news breakers and capture readers' attention.

Testing for SARS-CoV-2 is widely misunderstood. Summing antibody and viral RNA-positive test results to construct "percentage of positive tests" fails to consider the implications of the two types of tests (one to diagnose the likely

presence of SARS-CoV-2, the other to determine the presence of a humoral immune response to it). Other concerns are variability in the predictive value of specific tests, changes in testing eligibility and coverage, differences between presumptive and confirmed case definitions, and repeated testing. Although these metrics can provide a quick sketch of the absolute public health burden of viral infection or COVID-19, we caution that they may not be appropriate for analytic studies as outcomes in the absence of standardized methods for collection, initial recording accuracy, reporting efficiency, and adjustment methods.

Aligned with the best intentions of open science informatics, the urgency of COVID-19 has prompted public health practitioners from around the world to collect, compile, report, and publish data rapidly.[18] Intense professional demands arising from an unpredicted pandemic strain the collective scrutiny of how pandemic data are measured and analyzed; much of what is being published consists of descriptive associations using existing public data. These were critical in the early phases, but now that we are more than a year into the pandemic it is time to emphasize experiments, enacted interventions and their impact evaluation, and causal inference.

During a pandemic, we bear heightened responsibility for clear communication with general audiences. Consider the now common phrasing "100 new cases of coronavirus were reported on Friday." The phrase is semantically correct, and it is valid to communicate that a health authority reported these numbers on this day. But is this what the reader expects? This is not the number of new infections that were transmitted that day, but rather a measurement that is filtered through who presents for testing, what stage of disease they are in, the backlog of tests at the lab, technology-related reporting lags, and other meta factors. When reported daily, the assumption is that these factors do not change over time, which is clearly unsubstantiated. When these same numbers are used uncritically in analytic epidemiology studies, we inadvertently perpetuate these misinterpretations and risk the integrity of our analyses.

LOOKING AHEAD

As vaccines and therapeutics become available, the pantheon of pandemic metrics will soon accommodate the number and timing of administered doses and side effects. With two-dose vaccines, the measurement of immunization coverage stands to be even more complex. When the cumulative reporting is applied to pharmacovigilance, steadily increasing adverse event counts will inevitably incite alarm. There is little preexisting awareness of the arcane vaccine safety surveillance apparatus that will make or break public trust. Because of the complicated nature of underlying conditions and polypharmacy, responsible descriptions of adverse events following the administration of vaccines and therapeutics require causality assessment beyond initial reports.[19] Furthermore, a fair and phased allocation of proven vaccines in the United States and globally requires a more refined assessments of vulnerabilities to SARS-CoV-2, COVID-19, and their outcomes.[20] Current surveillance systems must be ready to handle this level of complexity.

CONCLUSIONS

Although our proclivity to use tools is part of what it means to be human, indiscriminate use of pandemic data hampers our ability to help humanity. The past two centuries have been marked by important contributions of epidemiology to public health. Evidence-based allied disciplines have made it possible for the world to eradicate smallpox and control many infectious diseases of potential or actual global spread (e.g., SARS, influenza H5N1, and an ever-expanding array of childhood vaccine-preventable infections) while mitigating the effects of HIV and old or emerging (e.g., malaria, dengue, Zika, Ebola) and noncommunicable diseases. In its response to COVID-19, it is crucial that epidemiology remain at the center of the assessment of its nature, determinants, potential of spread, and health, social, and economic impacts. Progress toward this aim calls for improved surveillance methods and data borne through the application of epidemiological principles, norms, and standards. Instead of metric paralysis, a return to human-centric design demands that we measure what matters in the most accurate way possible. Then only can we ensure that they enhance trust in information sharing and analysis, while feeding into analytical research, public health policy and practices, and political decisions. AJPH

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A Data-Informed Approach to Targeting Social Determinants of Health as the Root Causes of COVID-19 Disparities

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See also Erwin et al., p. 540, and the Fixing US Health Policy section, pp. 620–657.

Racial disparities in COVID-19 outcomes have called renewed attention to addressing systemic racism and health inequities in the United States. The drivers of these inequities have been debated but include social determinants of health (SDOH) such as poverty, employment in low-wage but essential worker occupations, crowded housing, and lack of access to regular medical care.[1] For those in the public health community, the importance of addressing both upstream and midstream SDOH to achieve health equity has been long recognized and discussed.

Yet the COVID-19 pandemic has highlighted longstanding stark underinvestment in employment opportunities, education, housing, and other critical SDOH in the nation's socially disadvantaged communities. The subsequent economic downturn has further exacerbated social risks that drive COVID-19 transmission and its downstream health effects, which may include functional impairment and cognitive issues. Much like previous pandemics, including the 1918 influenza and 2009 H1N1 influenza pandemics, COVID-19 is a "syndemic" in which inequalities in social and medical risk factors disproportionately burden historically disadvantaged communities with negative health and economic effects, creating a vicious cycle of cumulative disadvantage.[2] Because of constrained state and federal government budgets, there is likely to be marked declines in SDOH investment if there is not careful and strategic planning to address COVID-19 inequities.

SOCIAL FACTORS DRIVE THE COVID-19 SYNDEMIC

Emerging evidence demonstrates that population-level SDOH are associated with COVID-19 burden. Khazanchi et al. found that US counties with greater overall social risks, as measured by the Centers for Disease Control and Prevention's (CDC's) Social Vulnerability Index, had higher numbers of COVID-19 cases and deaths.[3] Experts have also discussed the need to improve housing stability and food security to prevent rising homelessness, hunger, and displacement, as many continue to lose employment and associated financial security during the pandemic-associated economic downturn.[4,5]

PROMISING INTERVENTIONS FROM EARLY HOTSPOTS

So how can states and cities tackle these causes and consequences of COVID-19 disparities? We can first look to promising ideas from early hotspots in the country.

Michigan was one of the first states to be hit hard by the pandemic and also one of the first to publicly report COVID-19 data by race. Early on it was clear that Black residents were experiencing disparate impacts of the disease: although Blacks represent only 15% of the state's population, they represented almost 30% of COVID-19 cases. The governor quickly convened a task force on racial disparities to identify and address these disparities. The state health department then used the CDC Social Vulnerability Index to identify census tracts with communities at risk, in addition to examining the clustering of outbreaks by high-risk occupational exposures or industries. These data were used to target areas in need of increased COVID-19 testing sites and industries in need of more personal protective equipment and other infection prevention strategies. Overall, through these efforts to increase access to testing, protective equipment, and strategic communication to communities of color, the state government has been able to

significantly diminish disparities in COVID-19 cases and deaths.[6]

As the early epicenter of the country's outbreak, New York City's response also offers a valuable model. Similar to Michigan, neighborhoods with greater proportions of racial minorities were the hardest hit by the pandemic. New York City hospitals took leadership in working with previously established teams of community health workers to address social needs in collaboration with community-based organizations.[7] In addition to assisting patients with navigating access to health care, community health workers have been working to identify and address social needs that drive the syndemic. For example, they have connected patients with housing instability to rent assistance and patients with food insecurity to food pantries and enrollment in the Supplemental Nutrition Assistance Program (SNAP). In this way, community health workers have acted as an important action arm for addressing social risks—such as crowded housing when families are forced to "double up" because of financial insecurity—that drive the pandemic and that are also growing in prevalence.

A FRAMEWORK FOR PROMOTING HEALTH EQUITY

These examples provide inspiration for a framework to incorporate data and community engagement into a targeted approach to not only promoting equitable testing and treatment of COVID-19 but also addressing underlying SDOH risks that disproportionately burden racial minority communities.[1] To promote health equity, a targeted rather than a universal approach to COVID-19 screening, testing, and prevention in communities may be needed.

First, publicly available data on SDOH risk in communities may be used to target specific communities already experiencing or at risk for COVID-19 disparities. Several composite measures of social risk based on census data are readily available, including the CDC's Social Vulnerability Index (http://bit.ly/2KWQtvb) and the Area Deprivation Index, which is available through the University of Wisconsin's Neighborhood Atlas (http://bit.ly/3hErclc). As Michigan has done, local and state health departments can use such measures to target at-risk communities for increased COVID-19 testing and prevention, as well as greater investment in underlying SDOH risks that contribute to COVID-19 transmission.

Second, coordination and collaboration between government agencies and community-based organizations are needed to address SDOH risks in identified communities. At the state level, close coordination between the health department, housing authority, SNAP program, and unemployment agencies is crucial to directing multiple modes of resources to address SDOH risks that may drive COVID-19 transmission in communities. Likewise, partnering with relevant organizations at the community and county levels allows delivery of needed social services by people and organizations that racial minority populations better know and trust. Some states and localities have already built strong partnerships to link government and community resources that address SDOH; others have not. The COVID-19 syndemic should ideally drive the formation of these types of important partnerships and strategic coordination.

Third, as has been seen in New York City and other cities, community health workers can serve as a powerful link between health care and community settings to communicate key health messages as trusted sources that reside in at-risk communities. This important workforce is optimally suited to help individuals with COVID-19 or at risk for COVID-19 transmission navigate testing, treatment, and service agencies dedicated to assisting with social needs.

THE ROLE OF US FEDERALISM

Of course financial resources are needed to fuel a public health response that promotes equity. In the United States, public health work is financed through a combination of federal grants, state funding, and other sources, but the largest proportion of funding comes from federal sources.[8] The Coronavirus Aid, Relief, and Economic Security (CARES) Act, passed by Congress in March 2020, enhanced funding to state and local governments. The CARES Act and other potential future federal funding could be directed toward addressing SDOH in communities most at risk using the approach I have outlined. Given our nation's system of federalism, guidance directing the use of these funds may come from either state or federal government leaders. To date, it has fallen mainly to state governors to direct their public health responses and decide whether to emphasize tackling COVID-19 disparities and SDOH risks. But that does not preclude federal leadership in this arena.

IMPLICATIONS OF THE PRESIDENTIAL ELECTION

With the election of Joe Biden as the next US president, the federal role in guiding pandemic response is likely to grow

substantially. President-elect Biden's plan includes working to increase federal funding of state and local public health efforts, especially to areas that have been disproportionately burdened by COVID-19. He has emphasized working with health experts to target areas at the highest risk of infection. This targeting of pandemic response could be informed by zip code–linked data on SDOH risks. In addition, the inclusion of health equity thought leaders on the president-elect's recently appointed COVID-19 task force and his plans to establish a COVID-19 Racial and Ethnic Disparities Task Force underscore the new administration's emphasis on addressing inequities in the pandemic's impact.

Ultimately, addressing inequities in COVID-19 outcomes should involve coordinated efforts by federal and state partners to employ local data and community engagement to tackle longstanding SDOH risks that may continue to drive the pandemic and its severity. AJPH

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We Must Fix US Health and Public Health Policy

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See also Erwin et al., p. 540, and the Fixing US Health Policy section, pp. 620–657.

Despite a history of public health progress and the most expensive health care system in the world, the United States failed in its initial response to COVID-19. Much of this failure resulted from a presidential administration that sidelined, undermined, and maligned public health. But the roots of failure are deeper. Recovering from the pandemic and building health and public health back better will require recognizing the roots of failure and working persistently to achieve the progress that the country needs—especially among the most underserved communities. This must begin with recognizing the shortcomings in the US health system response to the pandemic, but the multiple overlapping failures laid bare by this crisis demonstrate the need for a systemic, multifaceted, sustained approach to reform that goes beyond pandemic preparedness.

Over the past 40 years, the United States has gone from having a life expectancy near the average for upper-income countries and average per capita health care costs to being a negative outlier (Figures A and B [available as a supplement to the online version of this article at http://www.ajph.org]). This does not have to be. The current moment affords us the opportunity to examine and address the fundamental structural defects that underly these failures. We can improve both healthy life expectancy and the efficiency of our health system if we (1) strengthen our public health systems, (2) reorient health care delivery to reward providers for preventing illness and managing the overall health of populations efficiently (a reversal of current incentives), and (3) empower individuals to make healthier decisions by addressing the preventable root causes of poor health.

STRENGTHEN OUR PUBLIC HEALTH SYSTEMS

The first responsibility of public health is to protect people from outbreaks and other health risks. Yet the COVID-19 pandemic showed how fragmented, insufficient, and marginalized public health departments have become. At the national, state, and local levels, we need a public health renaissance. From the trauma and failure of the response to COVID-19, we must build a resilient, effectively interconnected system that addresses the full range of health threats facing communities throughout the country. A reinvigorated federalist approach must create a common framework, leaving room for local innovation and action. For this, we need better information, better funding, and better action.

To improve information, the US public health informatics infrastructure must be dramatically improved to make real-time, accurate, consistently presented information available from national, state, and local public health departments, with inputs from laboratories and health care providers. Lack of accurate, real-time information was one of the greatest failures of the US response to the COVID-19 pandemic. As a result of investments sparked by the 2009 stimulus spending (with funding as part of the American Recovery and Reinvestment Act [Pub L. No. 111-5]), health care interactions are now supported by electronic information systems, but public health informatics has not kept pace.

The elements are in place for a transformational, nationwide approach to public health informatics with data from all providers and reporting and public dissemination at local, state, and national levels.[1] This will require full protection of privacy within the broad authorities granted to public health. To achieve this goal, it will be necessary to attract data-driven and tech savvy public health workers.

This investment—unlike past efforts—must be implemented with modern, agile informatics approaches. Federal funding for state and local public health should be predictable and sustained and should offer local and state health departments the flexibility to strengthen the information infrastructure for evidence-based policy

adoption, in addition to categorical and disease-based funding streams.[2] Practically, this means both increasing funding and exercising existing authority to fund public health informatics in addition to disease-specific surveillance systems, and ensuring a coordinated approach to mandating that providers and laboratories report to this system in an efficient, complete, and timely way and supporting them as they do so.

For better action, we must address the chasms between federal and state and, in most states, between state and local public health agencies. A greatly expanded Centers for Disease Control and Prevention program to embed thousands of epidemiologists and public health implementation specialists in state, city, and local public health departments, with regular rotation of staff back to the Atlanta, Georgia, headquarters after two to five years, would help build a common culture and forge a way forward to take practical action to confront the full range of health threats facing the country. These embedded specialists and experts should focus on reducing preventable illness, injury, and death, especially in underserved and Black, Latinx, and Native American/American Indian communities.

REORIENT OUR HEALTH CARE DELIVERY SYSTEM

The United States has a health care industry that costs far more money but allows higher rates of preventable hospitalizations and avoidable deaths than most other countries of the Organisation for Economic Co-operation and Development.[3] Too many people do not have access to affordable, high-quality health care, and too many people get sick and die early from preventable disease. We must reorient our health care financing and delivery systems to reward providers for prevention, improve efficiency, and further reduce barriers patients face to receiving care and preventing illness.

The COVID-19 pandemic created a financial crisis for primary care providers (PCPs) that laid bare the irrationality of the dominant fee-for-service payment model for health care. Primary care practices are laying off staff, reducing hours, and preparing to close their doors in the midst of an emergency that demands more frontline diagnosis, testing, treatment, and vaccination.[4] But this crisis has also generated a new openness in providers to better ways of financing health care. We must not lose this moment.

In the short term, we must save family doctors and local health centers by reorienting compensation to prevent illness. This can be done by launching a program under existing Centers for Medicare and Medicaid Services (CMS) Innovation Center authority to protect primary care practices and ensure that they remain open while creating a pathway to a more financially secure future for PCPs. Under Innovation Center authority, CMS can test at national scale—and scientifically evaluate—payment models that aim to improve health care quality and reduce total cost of care. There is already evidence suggesting that participants in the CMS Accountable Care Organization programs, as a whole, have lower total cost of care and significant gains in health care quality. We propose to test a model that combines the best elements of these programs with capitated payments for primary care for patients in fee-for-service Medicare. This model would be national in scope but voluntary for providers.

In the long term, we need to make primary care the center of our health care system. We can do this through a compensation model that offers primary care practices substantial financial incentives to improve disease prevention and reduce the total cost of health care. A risk-adjusted capitated payment system for primary care, in which doctors and medical practices are paid per patient, not per visit or procedure, coupled with entry into an Accountable Care Organization model, with payment substantially dependent on improved health outcomes, will provide practices more income stability—especially in a public health crisis such as a pandemic—while reducing insurance-related administrative burdens.

This compensation model would incentivize primary care practices to employ multidisciplinary teams and provide care in person, virtually, by phone, by e-mail, and even by text message. More nonphysician health workers could provide care appropriate to their skills and training, leaving physicians to use their skills where needed most. Mental health treatment, pain and addiction management services, and programs to better address noncommunicable disease could also be more fully incorporated into routine care.

This compensation approach must also reform the current quality measurement paradigm that has failed to focus on a handful of measures that matter. To the greatest extent possible, quality measurement should be aligned across all payers, and quality measurement should be both simple and focused on critical national priorities. Blood pressure control is a good place to start. Improved treatment of hypertension can save more lives and achieve larger reductions in health inequalities

than any other clinical intervention, and it should be the initial guiding indicator to track the improvement in value we get for our health dollar.[5,6]

This approach would transform primary care and improve the health of Medicare beneficiaries with a two-part process; these are fundamental reforms, quite distinct from what has been tried in pilot programs so far, and would change the crucial component of how physicians and other providers are paid. First, provide all fee-for-service Medicare beneficiaries with a primary care clinician while preserving the right of all beneficiaries to see any provider who accepts Medicare. The foundation of good health care is a one-to-one, long-term relationship between a beneficiary and a PCP. Understanding which patients a provider is responsible for is the basis for the accountability needed to change the way we pay for health care. Within this national test, the innovation center could evaluate the impact of additional benefits for Medicare beneficiaries with a selected accountable PCP, possibly including the following: (1) no copayments when using their PCP; (2) no copayments when using preferred specialists upon referral from their PCP; (3) no copayments for core, designated preventive medications prescribed by their PCP; and (4) a Part B (outpatient medical coverage) premium discount.

Second, provide these PCPs with payment and regulatory flexibility and accountability to provide high-quality, person-centered health care. PCPs would receive a risk-adjusted monthly payment per patient to cover all costs associated with primary care visits for the beneficiaries who select them. PCPs would not have to submit claims for services. Medicare would provide claims information to these practices so they would see all Medicare-reimbursed services received by their patients from all providers. Hospitals would be required to provide these practices with timely event notifications (admissions, emergency visits) for their patients.

In exchange for flexibilities, and to guard against stinting on care, CMS would evaluate practices on, initially, the three highest-impact indicators: risk-adjusted total cost of care, survey-based patient satisfaction, and blood pressure control. CMS would tie PCP capitation rate increases to performance on these measures, with practice income ranging, for example, from −10% to +25%, based on performance. Consistently poor performers would not be able to enroll new patients, and their patients would be informed of the performance problem and invited and supported to change PCPs.

Primary care practices receiving capitated payments would enter a CMS Accountable Care Organization program—a network of primary care practices that join to increase quality and reduce cost of care. Practices would be able to choose a program appropriate to their size and risk tolerance. Practices willing to accept greater risk sharing could receive higher rewards. A similar approach must be promoted for all payers, including Medicaid, commercial insurance, and public health care services such as the Federal Employees Health Benefits Program, Tricare, the Veterans' Administration, and the Indian Health Service.

EMPOWER INDIVIDUALS TO MAKE HEALTHIER CHOICES

The COVID-19 pandemic has highlighted the pivotal role of individual behavior in affecting population outcomes, but also the structural and environmental drivers of this behavior. We must support individuals in making healthier decisions every day and address the preventable root causes of ill health by structuring the environment and health care systems to support healthy behavior so the healthiest choice is the easiest, default option. This will not only reduce avoidable illness, injury, disability, and death and counter continuing unacceptable health disparities but also increase resilience to reduce risk and harm of health emergencies. When it comes to the environment within which people make decisions—and with a particular focus on children, disadvantaged populations, and other vulnerable populations—we must take the following actions, which can also prevent up to half of all cancers—a major priority for the current presidential administration.

- *End the tobacco epidemic* by taxing, increasing tax enforcement with a track and trace approach, fully funding comprehensive tobacco control, and regulating the nicotine content in combustible tobacco down to nonaddictive levels and allowing use of controlled-dose noncombustible nicotine as this is done.[7] Banning menthol and other flavored cigarettes, which the Food and Drug Administration has the authority to do, would greatly reduce smoking among African Americans in the United States.
- *Reduce the heavy burden of harmful alcohol use* by following evidence-based recommendations,[8] particularly taxation, limitations on time and place of sale, and server liability laws for drunk driving. The concentration of alcohol sales in poor and minority neighborhoods can be addressed through zoning and other initiatives.

- *Protect Americans from unhealthy food* and promote wholesome, sustainable, farmer-supportive food production and distribution policies, particularly in underserved areas. Correcting food deserts; implementing a two-cent per ounce tax on sugar-sweetened beverages or a tax on the amount of sugar[9]; changing supplemental nutrition and school food policies so unhealthy food cannot be purchased with these supports; restricting the marketing, promotion, and sponsorship of unhealthy food; and implementing front-of-pack warnings on food that exceeds healthy levels, as Chile[10] and other countries have done, would protect all children, especially those in underserved communities. Long-delayed action to establish mandatory limits on sodium in food should be implemented and include mandatory upper limits, with the first level coming into force within 18 months and the second, lower level within two years after that.
- *Promote healthy physical activity*, including by redesigning communities to promote walking and cycling to reduce infectious disease risk and air pollution and to increase personal and community resilience. Safer communities with ample opportunities for physical activity will reduce health disparities and contribute to community renewal.
- *Reduce air pollution, with a focus on communities subject to disproportionate risk*, regulating particulate matter, increasing fuel efficiency standards, and reducing dependence on polluting fuels to reduce the risk of heart attacks, lung disease, and cancer. Addressing environmental racism be reducing air, water, and surface pollution is particularly important.
- *Protect our children from addiction* to tobacco, alcohol, and drugs and from predatory marketing by junk food companies, with the vision that every child will reach adulthood free of addiction, at a healthy weight, and with no health or mental health impediment to achieving their full potential.

When it comes to empowering individuals through health care, we must remove all barriers to primary care and prevention. Building on the successful waiver of patient costs for preventive services under the Affordable Care Act, beneficiaries who opt in to a family clinician should have zero copayments for diagnosis, treatment, and core medications for common causes of death and disability, including at least hypertension, diabetes, high cholesterol, depression, and nicotine addiction. Through legislative action, if necessary, we must fix the anomaly in patient copayments for cancer screening and prevention so that there is no copayment for breast biopsy, as was recently done for removal of colonic polyps discovered during covered colonoscopy procedures; reverse the opiate epidemic with far-reaching policies to improve management of pain and addiction; and empower women, including through full access to reproductive health and family-planning services with no out-of-pocket cost.

We must reconfigure public health and health care through action at federal, state, and local levels. Adopting a unified approach with the overarching goal of saving as many lives as possible will provide the direction and focus that is all too often lacking. Healthier people means healthier communities and a healthier economy better able to weather the inevitable next health emergency. The United States also needs to lead global initiatives to make the world safer from pandemics. The world cannot afford another multitrillion-dollar pandemic that kills millions of people around the world—but we *can* afford to invest in health security to prevent it.

President Biden will have the unprecedented opportunity to be the public health president. In addition to controlling COVID-19, he can reverse the long-standing relative decline in the performance of the US health system. Instead of a laggard, the United States can be a leader, becoming the first country in the world to regulate nicotine out of combustible tobacco; to implement best-practice policies on alcohol, nutrition, physical activity, and environmental health; and to greatly increase the health value we receive for our health care dollars.

Given the likelihood of continued sharp divisions in Congress and the courts, the new presidential administration will need to work quickly and strategically to implement programs, issue regulations, and perform enforcement as legally allowed, particularly through the Food and Drug Administration and CMS. Quick wins will be essential to establish the foundation for long-term, sustained progress. In addition to these health-specific measures, broader societal action is needed to address discrimination and improve access to stable and well-paying employment, financial resources, educational opportunities, and more. Sustainable societal changes can improve health, increase life expectancy, eliminate health disparities, reduce health care costs, and strengthen resilience against pandemics and other threats to health. A public health

renaissance and a primary care reorientation will take years; we must start now as we confront the COVID-19 pandemic. AJPH

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CONFLICTS OF INTEREST

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Health Equity and the Allocation of COVID-19 Provider Relief Funds

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When the COVID-19 pandemic landed in the United States, and particularly once cases began to grow substantially in March, the entire health care system suffered, but the safety net was exceptionally hard hit. The "health care safety net," an ill-defined term that encompasses public and some nonprofit hospitals that take care of the poor and uninsured, was on the front lines of taking care of the bulk of individuals who had contracted COVID-19. These hospitals tended to suffer from a lack of adequate supplies and relatively low reimbursement in a system that was already financially weak.

For example, the public hospital system in New York City ([NYC], i.e., NYC Health and Hospitals), which was the first epicenter of the outbreak in the United States, has experienced financial hardship for years. In 2019, an increase in patient revenues helped the system close 65% of a $1.8 billion structural budget gap, but the pandemic created even more financial stress.[1] As for all US safety net hospitals, the financial health of the NYC public hospital system reflects its patient mix. About one third of the patients who receive care at NYC Health and Hospital facilities are uninsured, and nearly 40% are in the Medicaid program.[2] Consequently, these and other safety net hospitals serve the very populations who have suffered the most from COVID-19: people of color, the uninsured, and those living in socially inequitable communities.

The financially precarious situation of NYC's public hospital system is not unique. According to one recent study, the poorest 25% of all US hospitals (including public, nonprofit, and for-profit hospitals) have only enough cash on hand to pay for their operating expenses for 7.6 days.[3] By contrast, the median US hospital has more than 53 days' cash on hand. During the COVID-19 outbreak, the "have" hospitals have suffered financially because their most profitable procedures, which are elective, have been postponed. The American Hospital Association estimated that during the four-month period between March 1 and June 30, 2020, US hospitals and health systems lost $202.6 billion.[4]

In contrast to most other health care systems in the world, there is very little government planning or oversight on how the health care infrastructure should be built and services distributed. Most of the planning and regulatory policies enacted under the 1946 Hill–Burton Act (Pub L No. 79-725) through the 1974 National Health Planning and Resources Development Act (Pub L No. 93-641) were largely abandoned in the 1980s, when the United States embraced market-oriented policies under the so-called competitive approach.[5] Today, although the Federal Trade Commission weighs in on antitrust cases that are especially related to mergers and acquisitions, the United States relies on a heavily subsidized market-driven health care sector to determine which hospitals survive. Thus, although many thought the US hospital system would have a planned, coordinated response to the pandemic, it did not. Instead, the hospital market responded as one would expect given its emphasis on profit making activities. Despite the repeated rhetoric that the US hospital system relies on competition, several studies report that rapid consolidation over the past decade in the US hospital industry has created large health systems that are able to command high prices, similar to monopolies.[6]

SHORT-TERM IMPACT ON THE HOSPITAL INDUSTRY

Hundreds of hospitals across the United States responded to COVID-19 by announcing furloughs and temporary layoffs of clinical and nonclinical staff since the start of the pandemic.[7,8] In March 2020, 42 000 health care workers lost their jobs; another 1.4 million lost their jobs in April, of whom 134 000 had

worked in hospitals.[9] At the height of the pandemic, hospitals closed in many parts of the country. Between January and July 2020, 42 hospitals closed or filed for bankruptcy. This was part of a long-term trend—especially in rural areas, where 120 hospitals have closed since 2010—but it was striking for hospitals to continue to close during the height of the pandemic, when there was a great need for hospital beds. It is important to point out that this reaction is unique to the United States. As in the United States, European health systems postponed elective procedures; however, unlike the United States, staff and resources in Europe that had been used for these procedures were redirected toward increasing the capacity of hospitals to treat patients with COVID-19. England ordered the military to build seven additional hospitals, and the French government increased the number of intensive care units in hospitals.[10]

PROVIDER RELIEF FUNDS UNDER THE CARES ACT

The US federal government responded by passing the CARES (Coronavirus Aid, Relief, and Economic Security) Act on March 27, 2020 (Pub L No. 116–136). As part of CARES, $100 billion was allocated for provider relief funding, and on April 24, 2020, the Paycheck Protection Program and Health Care Enhancement Act provided an additional $75 billion for hospitals and physicians. The expressed intent of the provider relief funding was, as written in the legislation, "to reimburse, through grants or other mechanisms, eligible health care providers for health care related expenses or lost revenues that are attributable to coronavirus."[11]

Congress empowered the US Department of Health and Human Services (HHS) to determine how provider relief funding would be allocated. HHS policymakers divided the funding into four main categories with different amounts and different eligibility rules, and it is distributed at different points in time. The most important differences are that the first allocation—the general distribution—was the largest ($50 billion distributed in April) and focused on reimbursing hospitals based on revenues lost; by contrast, the second allocation—the high-impact (also called the "hotspot") distribution—was substantially lower ($12 billion), was distributed later (May 7), and focused on COVID-19 need. Finally, the last two targeted allocations were also lower and distributed later and focused on hospitals in financial distress according to their location in rural areas ($10 billion on May 6) or designation as safety net providers ($10.2 billion on June 9).[12]

Members of Congress raised several concerns about the fairness of these allocative decisions. Letters were sent from members of the House and Senate (Representative Frank Pallone Jr. [D, NJ], chair of the House Committee on Energy and Commerce; Representative Richard Neal [D, MA], chair of the Committee on Ways and Means; Senator Charles Grassley [R, -IA], chair of the Senate Finance Committee; Senator Ron Wyden [D, OR], ranking member on the Senate Finance Committee) to Alex Azar, the secretary of HHS, and Seema Verma, the administrator of the Centers for Medicare and Medicaid Services, arguing:

> The level of funding appears to be completely disconnected from [COVID-19] need.[13]

and

> The delay in disbursing funds. . . [to] Medicaid-dependent providers could result in long term financial hardship for providers who serve some of our most vulnerable populations. It could also severely hamper their ability to continue to serve as essential providers amid the COVID-19 pandemic and beyond.[14]

Using HHS data on payments allocated to providers, we analyzed the *actual* distribution of provider relief funding for the general and high-impact distributions to hospitals. We estimated payments to hospitals for the rural and safety net distributions based on the formulas detailed by HHS. To determine how relief funds were distributed according to hospitals' financial status, we used number of days of cash on hand from the 2018 Medicare cost reports (https://www.hospitaldatasets.org). This measure is a good indication of a hospital's financial health because it determines how long a hospital is able to pay for operating expenses with current cash reserves. To adjust for differences in hospital size, we used provider relief payments per bed.

The general distribution awarded more provider relief funds, on average, to the most financially well-off hospitals. In particular, hospitals with more days of cash on hand were given, on average, higher relief payments per bed (Figure 1). The high-impact distribution based on COVID-19 need (number of COVID-19 patients) awarded slightly higher on average payments per bed to hospitals with fewer days of cash on hand. The rural distribution is significantly less across all rural hospitals; however, similar to the general distribution, higher on average payments per bed go to rural hospitals with more days of cash on hand. As expected, the safety net distribution allocated more average

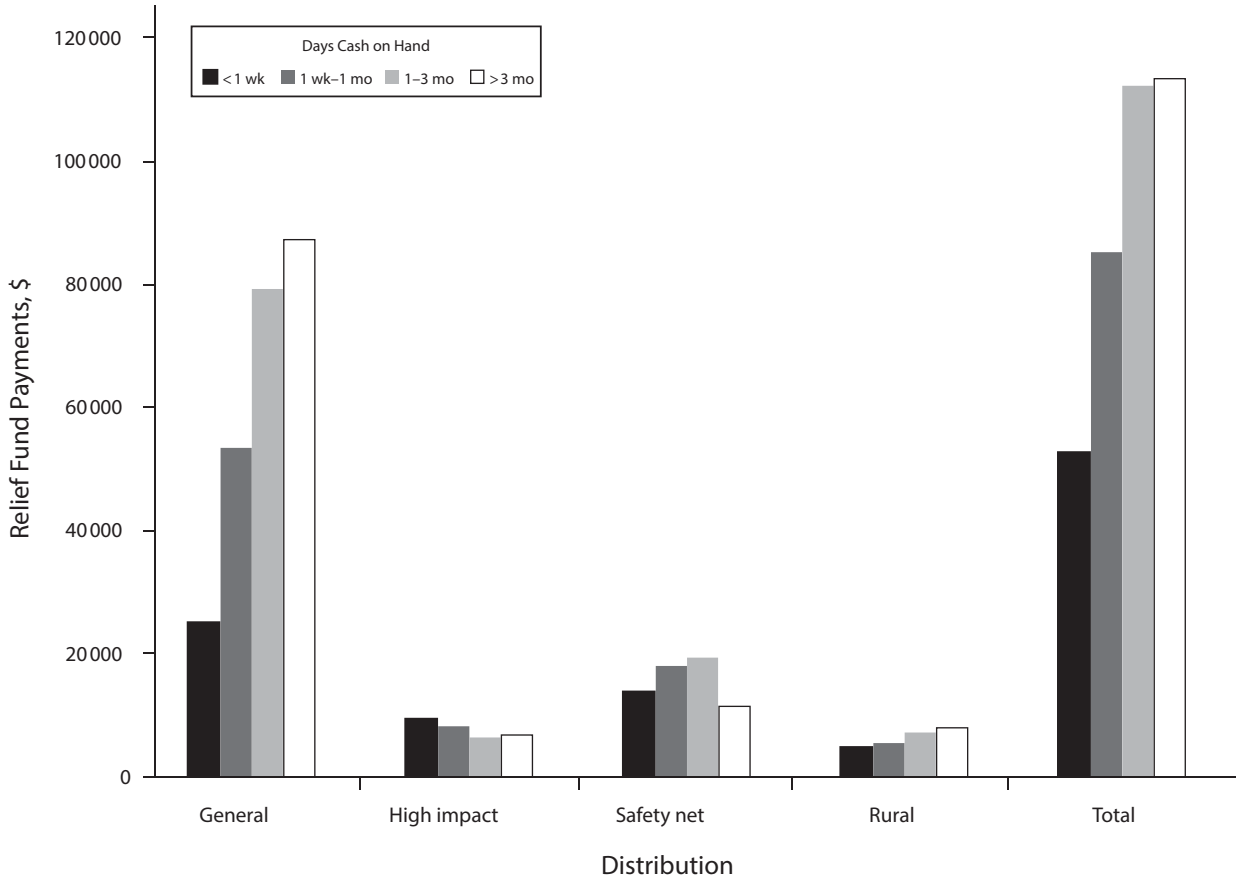

FIGURE 1— Average Provider Relief Fund Payment per Bed: United States, 2020

Source. CARES (Coronavirus Aid, Relief, and Economic Security) Act Provider Relief Fund Payments accessed from US Department of Health and Human Services Web site: https://www.hhs.gov/coronavirus/cares-act-provider-relief-fund/data. Medicare cost report data accessed from RAND Corporation Healthcare Provider Cost Reporting Information System (HCRIS).

payments per bed to hospitals in the weakest financial position. Finally, when we combined all four distributions, it is clear that relief payments to individual hospitals did not even out among hospitals with different levels of financial well-being. Instead, hospitals that were the most financially well-off before the pandemic were the same hospitals that received the largest payments per bed from the federal government.

IMPLICATIONS OF ALLOCATION DECISIONS

During the initial months of the pandemic in the United States, financially vulnerable safety net hospitals treated a disproportionate share of COVID-19 patients coming from more vulnerable Black and Brown communities, but federal payments did not make these hospitals a priority. The HHS formula could have focused on helping public and nonprofit safety net hospitals first, and more generously, based on knowledge that many of these hospitals not only are more financially vulnerable but are also serving patients who have been harmed disproportionately by the pandemic. Instead, the initial allocation of funds from the federal government offered greater support to hospitals that were in a better financial situation before the pandemic and that arguably were most able to withstand the financial shock of COVID-19. Even though the safety net distribution was more progressive, the amounts were much lower and were provided much later than the other allocations, given the urgency of the situation. Most importantly, the total allocation of funding (the sum of all four distributions) did not even out payment levels across hospitals. Instead, the federal response to the pandemic has exacerbated existing inequalities among hospitals.

WILL HOSPITAL INEQUITIES BE RECTIFIED?

It is too late to alter the impact of the provider relief payments, which have

already been distributed. However, perhaps going forward in terms of federal funding to safety net hospitals and providers, the Biden administration may shift funding priorities. If the Biden administration is able to strengthen the Affordable Care Act and create a new public option (as specified in the Biden–Harris Democratic Party platform), these changes would increase coverage of the currently uninsured and therefore also increase the volume of payments, especially to safety net hospitals. With Democratic control of both houses, the passage of these policies will be difficult but is possible. Moreover, if the volume of public coverage increases for most hospitals, this could lead to increased pressure to adopt higher public (especially Medicaid and new public option) payment rates to hospitals, although increasing Medicaid payments was something that the Obama administration failed to achieve.[15] Most importantly, the major inequities in financial strength across US hospitals is a much bigger problem than small increases in public payment rates would be able to address. The US hospital financing system requires more substantial reform and yet is not discussed on either political party's platform and remains absent from the federal policy agenda. AJPH

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Improving the Fate of Nursing Homes During the COVID-19 Pandemic: The Need for Policy

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See also Erwin et al., p. 540, and the Fixing US Health Policy section, pp. 620–657.

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Approximately 40% of all COVID-19 deaths in the United States have been linked to long-term care facilities.[1] Early in the pandemic, as the scope of the problem became apparent, the nursing home sector generated significant media attention and public alarm. A *New York Times* article in mid-April referred to nursing homes as "death pits"[2] because of the seemingly uncontrollable spread of the virus through these facilities. This devastation continued during subsequent surges,[3] but there is a role for policy to change this trajectory.

The circumstances that led to this tragedy, often referred to as a "perfect storm,"[4] started with the attributes of the novel coronavirus itself. The coronavirus that causes COVID-19 is airborne, can be spread asymptomatically, and is particularly risky for older adults with underlying health conditions. It is therefore no surprise that nursing home residents, who fit that risk profile almost by definition, are at high risk for serious complications from COVID-19. Rapid spread of the virus is difficult to control owing to features of the nursing home setting. Nursing homes house, in close quarters, large numbers of residents needing hours of hands-on care on a daily basis. Rooms are often shared by two or more residents. The congregate nature of the setting combined with the need for care make social isolation impossible. Finally, asymptomatic spread means that residents and staff can cause an outbreak without knowing it. This was especially lethal early in the pandemic, when there was less known about asymptomatic transmission.

INFECTION CONTROL AND NURSING HOME QUALITY

Is it inevitable, then, that nursing homes will continue to experience a disheartening number of pandemic-related deaths? This is a key question for formulating federal and state policy moving forward. Policymakers and researchers alike have focused on attributes of nursing homes associated with better and worse outcomes from the pandemic, looking for clues for organizational best practices, warning signs, and where to assess blame. A commonly cited statistic is that before the pandemic, 40% of nursing homes were cited with deficiencies in their infection-control practices, making it the most frequently cited regulatory deficiency.[5] However, research has revealed no significant correlation between previous infection-control citations and COVID-19 cases or deaths.[6,7]

Beyond infection control, researchers have studied the role of nursing home quality more generally, measured by the Nursing Home Compare five-star rating system and baseline staff to resident ratios. Numerous studies using multistate or national data with rigorous research designs found no relationship between nursing home quality and COVID-19 outcomes.[6–8] Instead, by far the strongest predictor of COVID-19 cases and deaths in nursing homes is the prevalence of cases in the surrounding county. Higher baseline staffing ratios appear to be helpful in stemming an outbreak once the virus is in a facility, but the effects of staffing are dwarfed by the effects of community spread.[8] In other words, even high-quality nursing homes in virus hotspots are at risk. The enormous challenge presented to nursing homes is substantiated by the fact that almost all nursing homes nationwide have now had at least one COVID-19 case.

THE INSUFFICIENT FEDERAL POLICY RESPONSE

The federal policy response to the COVID-19 crisis in nursing homes has been slow, misguided, and mostly absent. In part, these failures are not specific to nursing homes; despite the national nature of the crisis and the unique power of the federal

government to force production, the Trump administration failed to secure the necessary supply chains for personal protective equipment (PPE) and testing. In the nursing home setting, fighting the pandemic without access to appropriate PPE and rapid, accurate testing is futile. Policies specific to nursing homes are focused on issuing guidance, increasing inspections, and increasing fines, guidance that is of little use without access to supplies and technical assistance. Punitive measures not only are inconsistent with the evidence that low nursing home quality is not driving outbreaks but also exacerbate the challenge of fighting the pandemic in poorly resourced facilities. The administration has been slow to disburse the money Congress allocated for assistance to nursing homes as well as other health care providers in the March 2020 CARES Act (Pub L. No. 116–136), and additional assistance has stalled. States have filled the gap in inconsistent ways, hampered by the supply chain problem but sometimes facilitating helpful assistance such as "strike teams" of additional workers to compensate for staff shortages during an outbreak.

In an implicit acknowledgment that states and nursing homes cannot solve the supply chain issues themselves, in summer 2020 the federal government began shipping PPE and testing supplies directly to nursing homes. Although a move in the right direction, the shipments were fraught with problems: much of the PPE was of poor or unusable quality, additional testing supplies were hard to come by once the initial shipment was used, and the reliability of the tests was poor. The biggest problem is that these shipments are meant to be stopgaps. After initial supplies run out, nursing homes are expected to obtain supplies on their own, although there are still no guarantees of availability or reasonable pricing.

AMBIVALENCE TOWARD ASSISTING NURSING HOMES

The federal mishandling of the pandemic affects all health care sectors. Yet, in subtle ways, the policy, media, and public responses to nursing homes have been unique. Even as there was an outpouring of support for hospital workers early in the pandemic and outrage over the lack of PPE, nursing home workers were largely ignored. And even as people saw the lack of equipment and staff in hospitals as beyond the control of hospital leaders, nursing homes were criticized for their lack of preparation. These double standards have roots in several key features of the nursing home sector. First, the quality of nursing home care has been a long-standing challenge. Although many high-quality nursing homes exist, low quality and understaffing remain endemic. Second, the majority of nursing homes are for-profit entities, often assumed to value profits over quality. The result is that policymakers feel reluctant to give nursing home operators a pass and offer sufficient assistance, even in the face of a crisis that few anticipated.

PRIORITIZE POLICY ACTION NOW, LEAVE THE BLAME

In the short run, there is an urgent and clear role for better policy. The COVID-19 pandemic in nursing homes has to be treated as the crisis it still is, and policymakers need to focus on the well-being of residents. This means setting aside issues of blame and, yes, giving assistance to low-quality providers. It also means allocating resources to ensure adequate PPE, testing, staffing, and technical assistance to implement best practices—not just on a temporary basis but as long as the pandemic lasts.

In the long run, there is also a role for better policy, not only in addressing infectious disease but in improving the quality of long-term care generally. The long-term care sector suffers from a fragmented payment system and chronic underfunding. Nursing home services are usually delivered in large, medicalized buildings that provide little opportunity for a good quality of life, while staff endure challenging working conditions for minimum wage and no or few benefits. For decades, policymakers have been tinkering with small ways to make incremental improvements to quality. Unless we find the political will to fundamentally change the way we pay for and deliver long-term care, we will never make meaningful improvements and cannot be prepared for the next pandemic.

WILL THE FATE OF NURSING HOMES CHANGE?

A new administration brings the prospect of hope for dramatic shifts in policy. Much of the damage from the pandemic may have already been done, but even with the emergence of effective vaccines it remains unclear how long the pandemic will last. Effective policy change starting with the Biden–Harris administration could still save tens of thousands of lives in nursing homes.

Some of the Biden–Harris plans for addressing the COVID-19 crisis in nursing homes directly address key failures of the Trump administration. According to a published policy statement,[9] the

new administration plans to use the Defense Production Act (Pub L. No. 81–774) to secure supply chains for PPE and rapid-response testing so that nursing homes can follow recommended protocols without heroic procurement efforts. The plan also includes ensuring that each facility has adequate staffing and that staff are properly trained in infection-control procedures. More importantly, the new administration plans to implement systematic public health measures to try to control community spread of the novel coronavirus; it is almost impossible to protect nursing home residents without doing so.

In other ways, the Biden–Harris plans for controlling COVID-19 in nursing homes are less promising. Like policies under the Trump administration, the Biden–Harris plans reflect an ambivalence toward providing assistance to nursing homes and may even amplify the potentially counterproductive effects of current policy. The policy plan is silent on resources to obtain sufficient PPE, testing, and staffing, and rather than increasing technical assistance, punitive measures will be expanded. Inspections will be stepped up, fines for noncompliance with regulations will be increased, more data audits will be required, and pandemic-related limitations on liability will be rescinded. Although these may seem like necessary tools for consumer protection in an industry known for quality problems, the research does not support that bad quality is the reason for COVID-19 cases and deaths. For nursing homes experiencing COVID-19 outbreaks, fining them for it, threatening them with litigation, and diverting staff attention to inspections and audits are all likely to impede their ability to implement the recommended protocols for fighting the outbreak. These measures may be most harmful to poorly resourced facilities serving residents of racial and ethnic minority groups who have already borne a disproportionate toll from the pandemic.

As long as the pandemic lasts, the short-term goal for nursing homes needs to be the prevention of additional COVID-19 cases and deaths. Short-term accountability and transparency can be enhanced by reopening nursing homes to limited, safely conducted visits from family and ombudsmen as well as quality improvement assistance. However, long-run issues of nursing home quality need to take a back seat temporarily; the pandemic needs to be treated as the crisis it continues to be. The single most important thing the Biden–Harris administration can do to advance the short-term goal of preventing nursing home deaths is to effectively use public health measures to stem community spread of the virus. If that fails, nursing home residents and staff are at risk and need our collective help. AJPH

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The Pandemic and the Supply Chain: Gaps in Pharmaceutical Production and Distribution

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The acute stress of the COVID-19 pandemic has laid bare a series of long-term weaknesses in the US public health system, including the fragility of our supply of essential medications.[1] The virus produced unprecedented shifts in demand for old as well as new drugs, while simultaneously introducing new uncertainties about the production and distribution of pharmaceutical products. COVID-19–related shortages extended beyond antivirals to include a range of drugs broadly used in intensive care and in general hospital management (Table 1). These shortages point to serious vulnerabilities in the pharmaceutical supply chain that compromise readiness for new waves of the current pandemic and crises that are yet to come.

PANDEMIC-RELATED DRUG SHORTAGES: MAIN DRIVERS

Drug shortages had become a visible threat to US public health well before the COVID-19 pandemic. At the onset of the COVID-19 emergency in January 2020, more than 100 drugs were in shortage according to the US Food and Drug Administration (FDA).[2] Most non-crisis shortages typically begin as manufacturing problems. Shortages triggered by the COVID-19 pandemic, however, have been driven by unexpected sharp increases in demand, exceeding manufacturers' production capacity. Many life-supporting drugs needed to treat COVID-19 patients are generic, low-cost products that were already at risk or had previously been in shortage.[2]

The globalization of pharmaceutical production over the past few decades complicates this challenge. Although drug manufacturing was once a primarily domestic industry, the United States now relies on a global supply chain for pharmaceuticals, with China, India, and Europe as the main suppliers.[2–5] These flows have been especially vulnerable during the COVID-19 pandemic, as national and international responses have disrupted the production and shipping of pharmaceuticals around the world because of lockdowns, understaffing, and travel and export bans.[2,4,6–8] At the same time, travel restrictions have limited the FDA's capacity to inspect drug-manufacturing plants overseas, reducing its ability to authorize new sources of medications.[9]

INCREASING SUPPLY CHAIN RESILIENCE

The FDA monitors and tracks nationwide drug shortages that are attributable to production problems, relying on information from manufacturers.[10] The COVID-19 experience underscores the importance of expanding the federal drug shortage surveillance system to capture shortages caused by demand surges, which can be regional or local. Doing so requires collecting, in times of crisis, information provided by drug purchasers such as hospitals and pharmacies on the week-to-week challenges procuring drugs at state and local levels. Several state proposals to address price gouging underscore the importance of local surveillance for potential scarcity.[11] Early identification of potential shortages at state and local levels would enable the FDA to more quickly deploy strategies to increase drug supply—such as expedited review of manufacturing changes, assistance in establishing new lines of production, and extended expiration dating—which may help prevent nationwide shortages.

The FDA has proposed establishing publicly available quality metrics for manufacturing practices, with higher scores for facilities that have a robust and resilient capacity.[12] With congressional authorization, the FDA could

TABLE 1— US Food and Drug Administration–Reported Drug Shortages During the COVID-19 Pandemic: January 31–August 31, 2020

Name	Therapeutic Category	Day Posted	COVID-19 Relation
Pindolol tablets	Cardiovascular	Feb 21, 2020	Relation unknown
AVYCAZ (ceftazidime and avibactam) for injection, 2 g/0.5 g	Anti-infective	Feb 26, 2020	ICU care
Amoxapine tablets	Psychiatry	Mar 9, 2020	Relation unknown
Rifapentine tablets	Anti-infective	Mar 25, 2020	Relation unknown
Nizatidine capsules	Gastroenterology	Mar 27, 2020	Relation unknown
Chloroquine phosphate tablets	Anti-infective	Mar 31, 2020	COVID-19 treatment
Hydroxychloroquine sulfate tablets	Anti-infective; other; rheumatology	Mar 31, 2020	COVID-19 treatment
Hydrocortisone tablets, USP	Endocrinology/metabolism	Apr 2, 2020	Indirect
Midazolam injection, USP	Anesthesia; neurology	Apr 2, 2020	ICU care
Furosemide injection, USP	Cardiovascular	Apr 7, 2020	ICU care
Cisatracurium besylate injection	Anesthesia	Feb 4–8, 2020	ICU care
Dexmedetomidine injection	Anesthesia	Apr 10, 2020	ICU care
Etomidate injection	Anesthesia	Apr 10, 2020	ICU care
Propofol injectable emulsion	Anesthesia	Apr 10, 2020	ICU care
Azithromycin tablets	Anti-infective	Apr 14, 2020	COVID-19 treatment
Continuous renal replacement therapy solutions	Renal	Apr 22, 2020	ICU care
Sulfasalazine tablets	Gastroenterology	Apr 24, 2020	Relation unknown
Hydroxypropyl (Lacrisert) cellulose ophthalmic insert	Ophthalmology	May 1, 2020	Indirect
Famotidine tablets	Gastroenterology	May 4, 2020	ICU care
Famotidine injection	Gastroenterology	May 5, 2020	ICU care
Lithium oral solution	Psychiatry	May 6, 2020	Relation unknown
Vecuronium bromide for injection	Anesthesia	May 6, 2020	ICU care
Dimercaprol (BAL in Oil) injection USP	Hematology; other	May 11, 2020	Relation unknown
Amifostine injection	Oncology	May 21, 2020	Relation unknown
Sertraline hydrochloride oral solution, USP	Psychiatry	May 26, 2020	Indirect
Sertraline hydrochloride tablets	Pediatric; psychiatry	May 29, 2020	Indirect
Timolol maleate ophthalmic gel-forming solution	Ophthalmology	May 29, 2020	Indirect
Timolol maleate ophthalmic solution	Ophthalmology	May 29, 2020	Relation unknown
Doxycycline hyclate injection	Anti-infective	Jul 10, 2020	ICU care
Leuprolide acetate injection	Endocrinology/metabolism; oncology	Jul 24, 2020	Relation unknown
Chlorothiazide (Diuril) oral suspension	Cardiovascular; pediatric	Aug 12, 2020	Relation unknown
Tobramycin lyophilized powder for injection	Anti-infective; pediatric	Aug 24, 2020	ICU care
Hydralazine hydrochloride injection, USP	Cardiovascular	Sep 8, 2020	ICU care

Note. FDA = US Food and Drug Administration; ICU = intensive care unit; USP = US Pharmacopeia. COVID-19 treatment = a drug that can be used in the direct treatment of COVID-19 infection; indirect = a drug whose shortage has been described as triggered or related to the COVID-19 pandemic, although not because of the direct treatment of COVID-19 infection; ICU care = a drug commonly used in treatment of critically ill patients, such as patients with severe COVID-19 illness; relation unknown = drugs that were listed by the FDA on the shortage list during the COVID-19 pandemic but that lack clear evidence attributing this shortage to the pandemic itself.

Source. Information extracted from the FDA Drug Shortages Database (https://www.accessdata.fda.gov/scripts/drugshortages/default.cfm) on August 31, 2020.

develop and publicize such metrics, allowing drug purchasers such as pharmacies and wholesalers to choose manufacturers that are less likely to experience shortages. Additionally, competitor manufacturers may choose to enter the market if all available products have poor quality ratings. A quality metrics system would create

incentives for manufacturers to self-correct and would help improve product quality, reducing shortage risks.

An additional strategy to strengthen production capacity would be to expand a mutual recognition agreement that allows the FDA and European regulators to recognize each other's inspections of manufacturing facilities within each other's borders.[13] Given the supply chain's high reliance on China and India, the agreement should be revised to cover inspections of global manufacturing facilities conducted by either European regulators or the FDA and to cover inspections of manufacturing plants that produce active pharmaceutical ingredients (APIs) as well as those that produce finished products. Alternatively, new agreements with countries with capable inspectorates, such as Australia and Japan, could be sought.

The FDA could also be charged with maintaining an evolving list of approved API sources of generic drugs. Most generic manufacturers purchase APIs for their finished products from an equally globalized web of producers; when these products experience sudden increase in demand, it can be difficult for manufacturers to quickly find alternative API sources. A list of approved API suppliers could accelerate the process of identifying new API sources and help the generic supply chain be more flexible and resilient without sacrificing quality. Such a list should be API and drug specific and should reflect the latest updates in FDA inspections, approvals, and manufacturing changes.

INCREASING DOMESTIC PHARMACEUTICAL PRODUCTION

Expanding domestic production of pharmaceuticals has been the focus of multiple policy initiatives during the COVID-19 pandemic. However, the "Made in the USA" stamp alone will not solve the US drug shortage crisis; it is not realistic to relocate all pharmaceutical production. Instead, it is in the best interests of US public health to focus domestic investments where they will produce the greatest benefit while maintaining a robust global supply chain for essential pharmaceuticals, such as those on the essential medicines list of the World Health Organization.

Congress should establish a legislative framework to define and sustain the activities to increase domestic production of critical medications. Such a framework could specify the characteristics of eligible drugs, applicable circumstances, and eligible institutions for contracts with domestic manufacturers, especially when emergencies threaten further shortages. Importantly, this framework should contain provisions to address safety failures, effectiveness, and target product supply. A payment structure to avoid price gouging should also be an important component of this framework. Support for facilities that can pivot to making a number of different medications based on national needs should be considered.

California recently passed a law aiming to have the first state-sponsored generic drugs label.[14] This initiative would allow California to establish its own drug-manufacturing capability. The initiative aims to increase competition in constrained markets, reduce drug costs, and improve public health. California's initiative would also increase the state's supply chain resilience, helping mitigate drug shortages, including in public health crises. Crucial to the success of state-sponsored drug manufacturing is the establishment of robust potential markets. Congress could support such initiatives by providing tax credits for state-sponsored drug-manufacturing programs, and federal agencies such as the US Department of Health and Human Services could help create new markets for these products, for example by prioritizing drugs of state-sponsored manufacturing in federal purchasing commitments.

FACILITATING DRUG SUPPLY REALLOCATION

The COVID-19 pandemic has revealed that the US health care system has no functional means to coordinate and direct sharing drug supplies across institutions in different regions facing different burdens of disease. Rather, the distribution of limited medical supplies has relied largely on pharmaceutical wholesalers that use proprietary algorithms to allocate supplies according to their contracts with hospitals and other purchasers. Because drug inventories are confidential, it is not possible to ascertain whether scarce resources are being distributed equitably and to prioritize areas and facilities of higher demand. COVID-19 has exposed a US health care system that has placed individual states and cities in competition with each other for scarce medical supplies.

To avoid this type of competition, the federal government should lead a comprehensive effort to assess and manage the US pharmaceutical supply chain during an emergency, including measuring the adequacy of available supplies, purchasing additional supplies and distributing them from a government stockpile, and allocating supplies across markets based on levels of need. Such an effort could defer to regional solutions where possible or assume the principal responsibility of ensuring

access to critical supplies when necessary. Congress should make clear that these activities should largely be restricted to declared emergencies but could be used in extraordinary circumstances in the setting of life-threatening drug shortages.

To prepare for an emergency system of distributing medical products, competing hospital systems in the same state or region could create joint allocation frameworks on the model of Maryland's framework for allocation of ventilators and other medical resources.[15] In this model, a central triage center would collect information on hospitals' inventory for scarce medications and would develop a ranking system that determines which facilities and patients should receive the limited drugs first.

CONCLUSIONS: SURVIVING THE NEXT STRESS TEST

Like a stress test of the human cardiovascular system, the COVID-19 pandemic can be seen as challenging the US pharmaceutical supply chain, accentuating the critical spots of strain, the mismatches of supply and demand, and the risks of failure and collapse. This acute stress reveals a series of chronic weaknesses in pharmaceutical production, distribution, regulation, and oversight, which need to be remedied—and remedied soon—if the United States is to emerge from the present pandemic and the divisive 2020 election prepared to face the waves to come.

Ideally, the new administration and Congress can come together to learn the lessons of the COVID-19 pandemic for the supply chain. With only a slim majority in both houses of Congress, successful policy efforts will likely emphasize the areas where the executive branch can act on its own authority through rulemaking and the areas where bipartisan agreement on pharmaceutical supply as a matter of national security can be achieved. Importantly, the federal government must meet the crucial challenge of balancing the need to improve the quality of the global pharmaceutical supply chain while incentivizing domestic drug-manufacturing capabilities as well as developing systems to improve transparency in the pharmaceutical supply chain in the United States and abroad. AJPH

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Insuring the Population During National Emergencies Leveraging Both Medicaid and the Marketplace

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See also Erwin et al., p. 540, and the Fixing US Health Policy section, pp. 620–657.

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No event in modern history has brought the US health system's flaws into sharp relief like the COVID-19 pandemic. Whether the focus is on insurance coverage, public health, or health disparities, the novel coronavirus is forcing the United States to confront a remarkable set of problems.[1] Given the fierce urgency of these challenges, we do not have years to solve these problems or implement promising solutions.

CURRENT EFFORTS TO EXPAND COVERAGE

The consequences of the pandemic should encourage policymakers to pursue—as an initial step—reforms that expand access to health insurance during national emergencies. The Families First Coronavirus Response Act (FFCRA) takes a very modest step toward this aim through the creation of a fully federally funded state option for coverage of COVID-19 testing for the uninsured. The Health and Economic Recovery Omnibus Emergency Solutions (HEROES) Act, passed by the House of Representatives in mid-May, would carry this reform further by expanding coverage to include treatment of COVID-19 as well as health conditions that complicate treatment and recovery.

Existing US national policy currently includes a modest but important law that creates health care flexibilities during declared emergencies. Section 1135 of the Social Security Act[2] authorizes the US Department of Health and Human Services (HHS) secretary to waive numerous provisions of Medicare, Medicaid, and the Children's Health Insurance Program (CHIP) during an emergency to improve the flow of insurance resources and reduce barriers to care. Under section 1135, the HHS secretary can relax program compliance rules, ease requirements that participating providers must satisfy (including in-state licensure requirements), expand the range of covered services in health care settings, and use strategies such as telehealth. During the current pandemic, the presidential administration has used these powers to expand Medicare and has encouraged states to adopt parallel Medicaid and CHIP reforms.[3]

EXPANDING MEDICAID MITIGATES EMERGENCIES

As important as these flexibilities are, they do not provide coverage. As Louisiana's secretary of health, one of the authors oversaw the development and implementation of Medicaid expansion in Louisiana. Louisiana's 2016 Medicaid expansion through the Patient Protection and Affordable Care Act (ACA) played a critical role in providing health care during the pandemic.[4] In the four years since adoption, the state's decision to fundamentally redesign Medicaid has reduced its uninsured population by more than half, with more than 500 000 people gaining coverage by 2018. Expansion has enabled Louisiana to become a national leader in testing, its contact tracing program is robust, and ensuring equity in access to care and health system performance has been formalized as a pandemic priority.

USING THE AFFORDABLE CARE ACT

The COVID-19 emergency has coincided with national recognition of the achievements and limitations of the ACA, now in its 10th year. Even before the

pandemic, a chief limitation was the unaffordability of health care: one third of those who visit the health insurance marketplace do not buy coverage,[5] and millions remain uninsured because they live in a state refusing to expand Medicaid (a problem created by the Supreme Court's 2012 decision, not by the ACA) and have income that is too low to qualify for marketplace subsidies.[6] Although the FFCRA and the HEROES Act are a beginning to interim reforms to strengthen insurance, a holistic response is imperative, one that addresses public health emergencies more broadly, not one illness or event at a time.

OPTIONS FOR EMERGENCY INSURANCE REFORM

Lawmakers have two basic options where emergency insurance reform is concerned. The first strategy is to use Medicaid, which over decades has become the nation's largest public health first responder. For example, Louisiana employed Medicaid in the wake of Hurricane Katrina to provide emergency uninsured coverage under a Medicaid expansion operating under the authority of section 1115, a special federal experimental statute. A Medicaid strategy could provide full federal funding for coverage, without cost sharing, for preventive, diagnostic, treatment, and recovery care and to treat preexisting conditions that could be complicated by the public health emergency. Medicaid coverage, as was done under the FFCRA, could be designed to remain in place throughout the emergency, without a lapse in coverage. Consistent with Supreme Court principles, emergency Medicaid would be designed to operate as a state option. Whether full federal funding would be sufficient to ensure state adoption is unclear; indeed, to date 13 states have resisted the ACA expansion despite enhanced funding. To promote state participation, the emergency option could be combined with incentives, such as supplemental grants, to participating states to help offset emergency-related health needs such as emergency housing assistance and nutrition.

A second option would be to establish a federally administered program operated through state health insurance marketplaces. Under this approach, the federal government would fully subsidize the purchase of qualified health plans operating under special emergency coverage rules that waive cost sharing for covered services. To ensure enrollment, the marketplaces would remain open throughout the emergency in recognition of continually changing employment and family circumstances triggering the need for public coverage. Unlike Medicaid, which allows people to enroll at any time, the marketplace is open for only a few weeks annually, and access is otherwise limited to designated special enrollment periods. Residents of states that opt not to adopt the special Medicaid emergency program would have access to emergency marketplace qualified health plans.

CONCLUSIONS

Infectious diseases such as COVID-19 remind us that the health of every individual is inextricably linked to the health of the community, and the health of the community is the foundation of a healthy economy. Among the system failings revealed by COVID-19, the lack of health insurance is, in many ways, the easiest to fix. The ACA has given us two highly useful pathways—one through Medicaid, the other through the marketplace. Medicaid has the benefit of being less costly than commercial insurance, and states are highly experienced health insurance managers, as evidenced by the speed with which they implemented the ACA Medicaid expansion. A national system, by contrast, offers the benefit of uniformity, although the cost likely would be somewhat higher because commercial insurers pay at a higher rate. Either approach (or the two combined) could work, and there is reason to believe such approaches may be adopted by the Biden administration.

Mitigating the COVID-19 pandemic is the top health priority of the Biden administration, and using existing options in Medicaid waivers and the marketplace has been expressed as a part of this strategy. As was stated in the Biden–Sanders Unity Task Force Recommendations, a key plank in the Democratic policy platform will be using innovation waivers to enable innovation in coverage expansion. Given this commitment and the overwhelming need, the options we have presented may be implemented in the near future. All the nation needs to do is select one and start moving. AJPH

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Politics, Pandemic, and Racial Justice Through the Lens of Medicaid

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See also Erwin et al., p. 540, and the Fixing US Health Policy section, pp. 620–657.

Medicaid is the largest health care coverage program in the United States and serves as a core institution that shapes—and is shaped by—public health crises, racial injustice, and electoral politics. As such, Medicaid played a central role in 2020—a monumental year in American history—when COVID, extraordinary uprisings against racial violence, and a historic presidential election all strikingly converged. Examining Medicaid's pivotal positioning at this nexus of politics, pandemic, and racial justice highlights fundamental constraints and possibilities in US health policy and underscores potentially fruitful directions for change under the incoming Biden administration.

MEDICAID AND COVID-19

Medicaid has played a vital role in responding to COVID-19. As the pandemic spread, the Centers for Medicare and Medicaid Services issued emergency directives that made it easier for states to adapt Medicaid to emerging needs. As a result, every state in the nation altered its Medicaid program.[1] States' strategies for leveraging Medicaid to secure public health during the pandemic included adjusting eligibility requirements, streamlining enrollment procedures, expanding telehealth, increasing fee-for-service rates, and other steps to improve program accessibility, cost, and safety.[2]

Beyond these changes directly related to health care, Medicaid also functioned as a work support, making health coverage available to millions of low-wage essential workers who were at increased risk for exposure to the coronavirus. Even further, Medicaid offered critical countercyclical risk protection for people who experienced job loss during a floundering pandemic economy. Altogether, COVID-19 made Medicaid even more imperative for both the physical and economic health of the country.

MEDICAID AND RACIAL JUSTICE

COVID-19 also rendered Medicaid a more salient component of racial justice in the United States. This interrelationship has been amplified by the co-occurrence of a deeply unequal pandemic and a historic mass movement against racial violence. Heightened emphasis on racism in the context of COVID-19 magnified Medicaid's standing as a racialized institution.[3] Racialization involves "the extension of racial meaning to a previously racially unclassified relationship."[4(p13)] Medicaid is racialized, despite being facially color-blind, because race has been a central factor shaping policies, discourse, design, implementation, and perceptions of it. So, even though racially neutral on paper, Medicaid is imbued with racial meaning and repercussions in practice.

Beneficiary disproportionality (i.e., racial imbalances in the composition of the populations that benefit from a policy) is one basic indicator of racialization. Disproportionality implies an "extension of racial meaning" because it can affect how policy is constructed by political elites, understood in the public imagination, implemented by bureaucrats, experienced by beneficiaries, and portrayed by media.[5]

Consider Medicaid's striking disproportionality. Nationwide, 20% of (nonelderly) Medicaid beneficiaries are Black, nearly 30% are Latinx, and almost 10% make up additional non-White racial and ethnic groups (4.3% Asian/Native Hawaiian, 1.1% American Indian/Alaska Native, 4.2% multiracial).[6] As shown in Figure 1, Black, Latinx, Asian, Native, and multiracial Americans (comprehensively labeled as "people of color") represent the majority of Medicaid beneficiaries in 25 states and sizeable portions of the beneficiary population in most of the remaining states. Only eight states have Medicaid populations with less than 30% people of color.

The racial disproportionality of Medicaid gives an important context for understanding its political limits. Medicaid has faced consistent political resistance via refusals to expand, calls

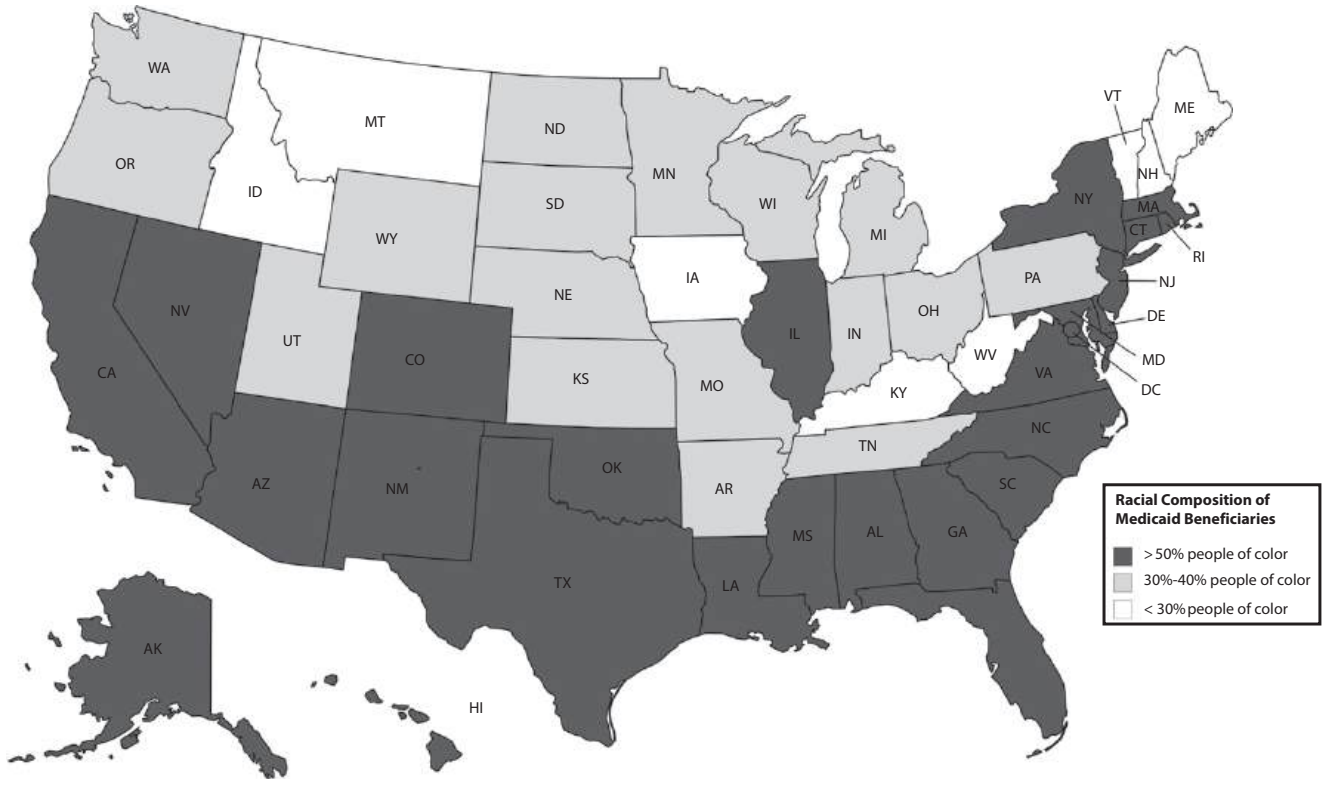

FIGURE 1— The Racial Composition of Medicaid Beneficiaries: 2019

for retrenchment, and attempts to implement punitive practices within the program. This resistance reflects a fraught politics that is also racialized—infused with racial meanings that shape its trajectory and contours.[7] State opposition to Medicaid expansion is a foremost example. Existing evidence demonstrates that the Medicaid expansion prompted by the Affordable Care Act has narrowed racial disparities in access to care, health insurance coverage, and health care utilization (https://tinyurl.com/y62sxgzz). Yet, 12 states have not adopted the expansion. Seven of those states have Medicaid populations composed of more than 50% Black and Latinx beneficiaries (Texas, Mississippi, Alabama, Georgia, South Carolina, North Carolina, and Florida). Even in the five remaining nonexpansion states (Wyoming, South Dakota, Wisconsin, Kansas, and Tennessee), Medicaid populations are substantially composed of people of color, ranging from 36% in Wyoming to 47% in South Dakota. In such places, expanding Medicaid is a decision akin to giving more resources to communities of color. Notwithstanding a pandemic that has saliently devastated those communities, states have steadfastly refused to commit such resources.

Even if facially neutral, such decisions reflect processes of racialization because they are influenced by racial attitudes, preferences, and demographics. Numerous studies confirm this. Racial divides in health care opinions widened dramatically as a result of President Obama being associated with the Affordable Care Act.[8] Medicaid expansion decisions are correlated with state-level racial attitudes—lower racial sympathy and higher racial resentment are associated with stronger resistance to expansion.[9] Medicaid also has variable public support on the basis of race, with Whites much less likely to support expansion and actual expansion outcomes positively correlated with White opinion, while uncorrelated with non-White attitudes.[10] Governors who expand Medicaid are more likely to be rewarded politically when state Medicaid populations are more heavily composed of White beneficiaries.[11] All of these patterns point to ways that racialized Medicaid politics has proven a consistent barrier to advancing and expanding Medicaid policy.

MEDICAID, VOTING, AND ELECTIONS

Even more broadly, Medicaid has crucial consequences for democracy. Medicaid expansion is associated with short-term boosts in voter turnout,[12] whereas Medicaid retrenchment is associated

with significant declines in rates of voting.[13] More generally, Medicaid beneficiaries' experiences with the program affect whether and how they participate in politics.[14]

The repercussions of the relationships between Medicaid, race, and politics were on prominent display during the 2020 election. Survey data show strong support for Medicaid expansion in swing states that have not yet expanded such as Georgia, Florida, North Carolina, Texas, and Wisconsin (https://tinyurl.com/y5dxfdaw). However, that support is strikingly divided along partisan lines, with Republicans much more likely to oppose expansion. Significant racial chasms underlie these partisan divides. People of color make up roughly 40% of Democratic voters but only 19% of Republican voters (https://tinyurl.com/yy35wbf5). Overwhelmingly, White Republican constituents drive opposition to Medicaid expansion.

Recognizing this dynamic creates opportunities for anticipating potential policy windows. Take Georgia, for instance. Though Georgia is typically considered a "red" state, Stacy Abrams—a Black woman and Democrat—only narrowly lost the state's gubernatorial election in 2018. Then, in 2020 and early 2021, Georgia voters made history by selecting a Democratic presidential candidate (Joe Biden) and two Democratic senators, one of whom (Raphael Warnock) is now the South's first Black Democratic senator. While these wins are not likely the harbinger of a new progressive majority, they do signal the possibility of a shift in Medicaid politics and indicate prospects for political coalitions that move the needle on Medicaid expansion. Georgia is just one example. The larger point is that Medicaid politics are inextricably linked to electoral politics and democracy—and those linkages are racialized.

POLITICS, PANDEMIC, AND RACIAL JUSTICE

The nexus of politics, pandemic, and racial (in)justice points to the importance of viewing Medicaid capaciously—not only as a policy mechanism for improving health outcomes among vulnerable populations but also as a constrained product of racialized politics and as an often-overlooked producer of such politics. Only by understanding all of these facets of Medicaid can we adequately grapple with how to improve health policy and advance racial justice.

As a new presidential administration takes hold, making progress on health policy will require attentiveness to Medicaid politics and its racialized contours. In this vein, a first-order priority for the incoming administration should be to reverse the suite of punitive Medicaid waivers that have emerged in the last four years. The most salient waivers include work reporting requirements, lockout penalties that prevent beneficiaries from accessing care, delays to the start of coverage until after premiums are paid, elimination of retroactive coverage, and loss of presumptive eligibility. These provisions undermine both political participation and health equity.

Punitive waivers lead to disenrollment, which is associated with decreased rates of voting. Political demobilization can also occur as a consequence of the negative experiences engendered by burdensome and stigmatizing administrative processes. Even further, waivers have racially disparate outcomes. Work requirements, for example, affect Black policy beneficiaries more negatively.[15] Federal intervention to eliminate onerous and racially unequal work reporting requirements is especially crucial because Black women—those most affected—are among the most engaged voting population in a number of the states that are implementing work requirements.

Beyond waivers, the larger takeaway is that attentiveness to both racial justice and politics will be critical for expanding and enhancing Medicaid. This is especially true in the context of COVID-19. In the coming months, the Biden administration will face essential decisions about how to distribute health resources (like vaccines), how to strengthen health infrastructure (like the public health workforce), and how to best leverage executive agencies (like the Centers for Medicare and Medicaid Services and the Centers for Disease Control and Prevention). These and many other health policy decisions will directly and indirectly affect Medicaid. The dynamics highlighted in this essay underscore the imperative to remain attuned to racialized political realities and to intentionally prioritize racial equity. AJPH

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Different Responses to COVID-19 in Four US States: Washington, New York, Missouri, and Alabama

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See also Erwin et al., p. 540, and the Fixing US Health Policy section, pp. 620–657.

In the United States, public health is largely the responsibility of state governments' implementing authority specified in their constitutions or reserved to states under the 10th Amendment to the US Constitution. The public health–related powers granted to the federal government are substantially less and derive primarily from the Commerce Clause (Article 1, Section 8) of the US Constitution. In public health emergencies over the past several decades, however, the Centers for Disease Control and Prevention (CDC) has played a major role in providing guidance, resources, and other support to state and local public health departments, for example, in large foodborne disease outbreaks, in response to major natural disasters, and especially in response to large-scale infectious disease threats (e.g., West Nile virus, severe acute respiratory syndrome, and H1N1 influenza).[1]

The CDC's role in response to COVID-19 has been atypical relative to its historical role in large-scale outbreaks, leaving states and cities to take much more prominent roles. As has been well documented, instead of the CDC leading, the federal response has been ineffectively managed directly from the White House (for a good summary, see Gostin[2]). We explore state responses to COVID-19 through brief examples from four states—Washington, New York, Missouri, and Alabama—to better understand the timing, range, breadth, and depth of state actions. We selected these states for several reasons, including differing timelines for when COVID-19 first appeared; geographic, demographic, and political diversity; the scope of the policy responses; and apparently different patterns in case numbers, hospitalizations, and deaths. Although we hope these cases will illuminate the range of experiences, we make no claim about generalizability to all 50 states. Important milestones in the COVID-19 experience for each state are listed in Table 1, for data through November 4, 2020. We include additional state-specific information in the subsequent sections. All dates are for the year 2020, unless otherwise noted.

WASHINGTON

The first confirmed case of COVID-19 in the United States occurred in Washington State in a 35-year-old man who had returned from Wuhan, China, on January 15, went to an urgent care center on January 19, and was tested and confirmed positive on January 20. The first state-level action took place on February 29, when Governor Jay Inslee (D) declared a state of emergency after the first US death attributable to COVID-19 occurred in Washington State.[3] After peaking in early April, daily new cases of COVID-19 began to decline and then plateaued in May. On May 1, Governor Inslee announced a four-phased plan (Safe Start Washington) to reopen the state based on a set of well-defined metrics, with county-level applications reviewed and approved by the secretary of health for the Washington State Department of Health.[7]

The four phases began with limited reopening in phase 1 to greater and greater lifting of restrictions to essentially pre-COVID-19 status for phase 4. By late June, because of a surge in COVID-19 cases, the governor suspended the movement of counties from

TABLE 1— Timeline of Important Milestones in the COVID-19 Pandemic: Washington State, New York State, Missouri, and Alabama, 2020

Milestone	Washington[3]	New York[4]	Missouri[5]	Alabama[6]
First confirmed COVID-19 case reported	Jan 20	Mar 1	Mar 6	Mar 13
First COVID-19 death	Feb 29	Mar 14	Mar 18	Mar 18
School closure	Mar 12	Mar 12[a] and Mar 15[b]	Mar 19	Mar 13
Business closures	Mar 15	Mar 22	Ap 6	Mar 27
Lifting restrictions and closures	May 1	May 15	May 4	Ap 30
Mask mandate[c]	Jun 26	Apr 15	none	Jul 15
Reported cumulative case rate (as of November 4)[3]	1518/100 000	2665/100 000	3230/100 000	3996/100 000
Reported positivity rate (as of November 4),[d,6] %	6.0	1.6	12.1	18.9
Shape of the "epi curve" of reported cases	Peaks in spring, summer, and fall	One peak in Apr–May, rising again in late fall	Increasing numbers since Jun	Peaks in the summer and fall

[a]State University of New York campuses.
[b]New York City Schools.
[c]Mask mandates that were statewide.
[d]Percentage of tests performed that were positive.

phases 3 and 4, and on July 28, extended the pause indefinitely in counties moving ahead in the Safe Start Washington plan. By that time, five counties had achieved phase 1 reopening, 17 were in phase 2, and 17 in phase 3; no county has yet achieved phase 4 reopening. As of November 4, there was an average of 949 cases per day over the previous week, with a total of 115 608 cases (1518/100 000) and 2507 deaths in Washington State since the beginning of the pandemic, according to the *New York Times* database.[8]

NEW YORK

The COVID-19 experience in New York State was driven by the early high numbers of cases and hospitalizations occurring in New York City. On March 8, Governor Andrew Cuomo (D) announced guidelines for commuting—asking sick individuals to stay off the public transportation system and encouraging citizens to stay away from densely populated transportation.[4] The governor established the first containment zone on March 10, ordering public gatherings stopped within one mile of a New Rochelle synagogue in Westchester County because of a cluster of COVID-19 cases.[4] The governor signed an executive order for New York residents to wear face masks or coverings in public places when they are unable to socially distance, effective April 17, making New York State one of the earliest states to have a statewide mask mandate (the first had been in New Jersey on April 8).[9]

A four-phase plan for reopening (New York Forward) was implemented on May 15, with each successive phase in two-week increments, automatically allowing more and more restrictions to be lifted.[10] All regions of the state had achieved phase 4 reopening by late July. During the summer, Governor Cuomo imposed a 14-day quarantine on visitors to New York from states that were experiencing a 10% or higher test positivity rate. During the first week of November, this order was replaced by mandatory testing of travelers within three days of departure from a state with 10% or higher test positivity rate.[11] As of November 4, there was an average of 2149 cases per day over the previous week, with a total of 518 431 cases (2665/100 000) and 33 198 deaths in New York State since the beginning of the pandemic.[8]

MISSOURI

Although in late March Governor Mike Parson (R) announced there would be no plans to issue a stay-at-home order, several days later he issued such an order that would be in effect for Missouri from April 6 through 24 (later until May 3).[5] On April 22, Missouri attorney general Eric Schmitt filed a lawsuit in US federal court against the Chinese government for "causing a global pandemic that was unnecessary and preventable"; the lawsuit was the first of its kind[5] (and as of November 4, Mississippi was the only other state to file suit[12]).

A two-phase plan for reopening began May 4, and no state-level restrictions

have been reimposed[13]; any restrictions have been left to cities and counties. There has been no state-level requirement for wearing a mask; instead, the state health officer has emphasized personal responsibility. On June 23, the governor was asked at a press briefing if he takes responsibility for COVID-19 deaths, and he responded, "That's no different than the flu virus or do I feel guilty because we have car accidents and people die every day? No, I don't feel guilty about that."[14] New cases statewide began surging in late June. On September 23, the governor and his wife were both confirmed to be COVID-19–positive. As of November 4, there was an average of 2686 cases per day over the previous week, with a total of 198 252 cases (3230/100 000) and 3136 deaths in Missouri since the beginning of the pandemic.[8]

ALABAMA

Initial state-level actions began in early March, with the formation of the Alabama Coronavirus Task Force on March 6.[6] One week later, after the first confirmed cases, Governor Kay Ivey (R) declared a state of emergency. On April 3, Governor Ivey issued a statewide stay-at-home order until April 30.[15] Effective April 30, a Safer at Home statewide order allowed businesses to reopen with restrictions (e.g., retail stores reopened at 50% capacity), reopened Alabama's beaches, and allowed elective medical procedures to begin again.[16]

Educational institutions could open June 1 with proper social-distancing procedures. Beginning the second week of June, the seven-day average of new cases increased sharply, from approximately 400 per day to more than 1700 per day by mid-July.[8] On July 15, Governor Ivey announced that face masks would be mandatory statewide in public spaces; the order has been extended several times and is in place through January 22, 2021.[6] As of November 4, there was an average of 1299 cases per day over the previous week, with a total of 195 929 cases (3996/100 000) and 2987 deaths in Alabama since the beginning of the pandemic.[8]

DIFFERENT SETTINGS, ACTIONS, AND EXPERIENCES

How do we make sense of these different responses and perceived different epidemiological patterns across these four states? First, it is clear that even in examining only four states, we see how differently states have reacted to and experienced the pandemic. Washington experienced the first cases in the United States, and after an initial first peak of cases in April, the epidemic curve remained relatively flat until a new wave of cases began being reported during the summer. New York experienced a massive outbreak in New York City but has seen a sharp decline to very low levels of daily new cases and one of the lowest positivity rates through the first week of November. After the initial outbreak, Missouri's reported cases plateaued until mid-July and then cases rose steeply. Alabama began experiencing a significant rise after the Memorial Day weekend (May 22–25), peaked in late July, and declined through August and September. All four states began experiencing an increase in cases after Labor Day weekend (September 4–7), continuing through October and into the first week of November, paralleling the surge in cases across the entire United States. By December, all four states had reached new records for daily cases, higher than at any previous time since the beginning of the pandemic.

Second, regarding subsequent policy enactment, governors in Washington and New York were early to mandate wearing a mask and limit businesses and were slow to reopen, whereas Missouri and Alabama reopened earlier, before meeting the White House gating criteria. Of the four states, Washington and New York have the most comprehensive, data-driven reopening plans. The positivity rates (percentage of COVID-19 tests that are positive) provide insights into the differential impact of planning and implementation: as of November 3, the seven-day average positivity rates were as follows: New York (1.6%), Washington (6.0%), Missouri (12.1%), and Alabama (18.9%).[17]

Third, policy responses to how the epidemic was evolving over time have differed. Although Washington State announced its four-phase reopening on May 1, in response to a surge in cases in June, the governor suspended the movement of counties from phase 3 and 4 and later extended the pause indefinitely. Although all regions in New York State achieved phase 4 reopening, an increase in cases in New York City in September and October led to new restrictions on schools and businesses in specific hotspots. The reopening of businesses and beaches in Alabama was followed by a surge in cases in June, but a statewide mandate to wear masks was not issued until mid-July. Despite a surge in cases in the summer with no sustained decline since, Missouri's governor has maintained that a statewide action such as a mask mandate could not be used in a state with diverse local-level COVID-19 experiences.

EXPERIENCES ACROSS ALL 50 STATES

Without suggesting these four states represent a typology of state responses but rather examples of different states'

experiences with COVID-19, we highlight several recent articles that examine response characteristics across all 50 states. Adolph et al. examined the timing of five social-distancing interventions across all 50 states, including recommendations and restrictions against public gatherings, school closures, restrictions on restaurants, closures of nonessential businesses, and statewide stay-at-home orders.[18] Focusing on the first few weeks of the pandemic (February 26–April 6), the authors noted the criticality of the timing of the interventions, given that doubling times for COVID-19 in the first few weeks had been estimated by several investigators to be as short as three days. The authors found that the political party of the governor was the most important predictor of early adoption of social-distancing policies—with Republican governors adopting and implementing more slowly. Although intriguing, the article does not examine subsequent reopening policies, nor does it attempt to make any associations between the timing of social-distancing policies and pandemic outcomes (i.e., subsequent caseload, hospitalizations, or deaths).

In a recent policy brief for the Urban Institute, Treskon and Docter examined both state- and local-level COVID-19–related policymaking, finding that states that tended to preempt local laws more often tended to have passed fewer COVID-19 state-level policies.[19] These policies included both restrictive policies (e.g., bans on large gatherings) and supportive policies (e.g., mandatory paid sick leave). In their analyses, Missouri and Alabama were among the states with the highest level of state preemption, whereas New York was among states with the lowest level of preemption, with Washington intermediate. Given their findings, the authors surmised that "preemption may be less about a belief that states are a more appropriate venue for some sorts of policymaking and more about a general reluctance to legislate and desire to stop local actions to do so."[19(p8)]

Finally, in a recent *Foreign Affairs* article, Jha posited that states that "embraced" science have been much more successful in managing the pandemic, with responses and outcomes that more closely resembled European success, compared with those states that have been antiscience, whose responses and outcomes have more closely paralleled Brazil's.[20] Although the author does not clearly define the criteria by which states were categorized as science versus antiscience, the article merits attention if only for its examination of state COVID-19 actions in contrast to the historical leanings toward federalism versus national government. Essentially all the science-driven states are led by Democratic governors, the antiscience states by Republican governors. There is at least irony in the author's view that more liberal state governments, historically more supportive of national governmental approaches, took matters into their own hands, with earlier and more comprehensive measures to combat COVID-19, whereas conservative state governments, historically more inclined to federalism, followed the president's lead, which has frequently presented an antiscience perspective. Although constitutionally backed, the states' go-it-alone approach to COVID-19 meant that efforts were inefficient and led to misinformation, and because there was no coordination between states, states fell into competition with one another for scarce resources.

The findings from these articles on all 50 states lead us to the following insights on what has mattered in the four states of our focus in the absence of a clear, coordinated federal response: (1) early interventions; (2) local decision-making, especially for large urban areas; and (3) state-level policies and practices driven by science. Causal inferences, though, must be avoided. The potential confounders are myriad: testing and reporting of cases and deaths vary across states and are not immediately comparable, states that experienced COVID-19 earliest were states with Democratic governors, states that are less densely populated and experienced COVID-19 later are predominately led by Republican governors; and the current political categorization of these states is a point in time along a complex historical evolution.

THE IMPACT OF THE NOVEMBER ELECTIONS

For the four states we focused on, the November elections resulted in few changes at the state level, likely indicating that there would not be a significantly different policy approach to the pandemic. The new presidential administration, however, will likely have a more coordinated, science-based federal approach and a return to the usual lead role that CDC has had in previous epidemics. Within days of being declared the president-elect, Joseph Biden announced his Coronavirus Task Force, which includes highly reputable medical and public health experts with relevant experiences and expertise.[21] Further studies may produce clearer evidence of how and why specific state responses could have directly or indirectly affected the pandemic, which can provide additional policy options for states to consider. AJPH

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

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The Role of Advance Purchasing Commitments in Government Drug Price Negotiations: Lessons From the COVID-19 Response

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See also Erwin et al., p. 540, and the Fixing US Health Policy section, pp. 620–657.

Among the various approaches to address rising prescription drug costs, one option is to allow the federal government to negotiate prices directly with drug manufacturers. Debates over the appropriate negotiating approach have occurred on several dimensions,[1] including the number of drugs eligible for negotiation, the levers that would be implemented to obtain lower prices, the incentives necessary to ensure that all parties negotiate in good faith, and what specific populations should have access to the negotiated price. In 2019, the US House of Representatives passed the most recent proposal to allow the federal government to negotiate prices—H.R.3, The Elijah E. Cummings Lower Drug Costs Now Act—reflecting policy decisions on many of these issues.[2]

Underlying most of the debate around policies to allow the federal government to negotiate drug prices was a concern, most notably expressed by the Congressional Budget Office (CBO), that the federal government may be unwilling or lack the necessary mechanisms to obtain discounts greater than what insurers and pharmacy benefit managers can already negotiate. According to the CBO, without mechanisms to effectively exert "some source of pressure" or issue "credible threats" on drug manufacturers, providing negotiating authority to the federal government by itself would be unlikely to have any significant effect on federal spending.[3]

To satisfy these concerns, in H.R.3, Congress used a combination of external reference pricing and an excise tax to generate savings. We suggest that an alternative mechanism, which could be added to H.R.3 or other future proposals, is to have negotiations involving both price and quantity, for example, through advance purchasing commitments. Such negotiations can provide manufacturers with an incentive rather than a penalty to negotiate by guaranteeing a certain total revenue through the negotiation. We make this recommendation based on recent experiences, having observed the federal government's response to the COVID-19 pandemic.

RECENT PRICE NEGOTIATIONS IN THE COVID-19 RESPONSE

In response to the COVID-19 pandemic, the federal government has been able to establish several agreements to purchase predetermined quantities of products for negotiated amounts (Table 1). Five different COVID-19 vaccine deals were announced, at prices varying between $4 and $20 per dose.[4–8] A purchasing agreement for a COVID-19 antibody, at prices estimated at $1500 to $6429 per dose, was also announced.[9] The price variation across these agreements is the result of many different factors specific to each negotiation. All vaccine-purchasing agreements, as well as the agreement to purchase the COVID-19 antibody, were established at the drug development phase, with actual payment depending on whether—and when—each product obtained Food and Drug Administration (FDA) approval.[10] The varying levels of federal investment in many of these products could explain some of the price differentials. There is also the public relations reality of the drug company being perceived as profiteering in a pandemic.

TABLE 1— COVID-19 Purchasing Agreements Between the Federal Government and Pharmaceutical Manufacturers: May 21–August 11, 2020

COVID-19 Therapy	Manufacturer	Total Price, $	Total Quantity (No. of Doses)	Price per Dose, $
Vaccine	AstraZeneca	1.2 billion	300 million	4
	Novavax	1.6 billion	100 million	16
	Pfizer–BioNTech	1.95 billion	100 million	19.50
	Sanofi–GlaxoSmithKline	2 billion	100 million	20
	Moderna	1.5 billion	100 million	15
Antibody	Regeneron	450 million	70 000–300 000	6429–1500[a]
Antiviral remdesivir	Gilead	1.56 billion–2.86 billion[b]	500 000 treatment courses	520[c]

Source. Authors' analysis of press releases from the Department of Health and Human Services between May 21 and August 11, 2020, for pharmaceutical purchasing agreements. Excludes purchases of nondrug products, such as personal protective equipment (PPE) and ventilators.

[a]The price per dose was calculated on the basis of the range of number of doses expected to be delivered by the drug manufacturer; the minimum and maximum prices reflect scenarios where the manufacturer delivers 300 000 and 70 000 treatment doses, respectively.
[b]The purchasing agreement announced the number of treatment courses to be delivered by the manufacturer without specifying treatment duration. The price per dose was calculated assuming scenarios where all treatment courses are 5-day regimens (6 doses—minimum price) or 10-day regimens (11 doses—maximum price).
[c]Price per dose for US private purchasers as announced by the drug manufacturer (Gilead).

Although some negotiations involved products that were still under development, the purchase of the antiviral drug remdesivir involved a product that had been previously developed and had demonstrated some clinical effectiveness against the COVID-19 infection when the negotiation occurred—namely, to reduce hospitalization time.[11] In this agreement, the Department of Health and Human Services (HHS) secured more than 500 000 treatment courses of remdesivir, representing 100% of the drug manufacturer's production for the month of July 2020 and 90% for the months of August and September.[12]

Although the federal government negotiated the agreement, it also announced that US hospitals would be in charge of actually purchasing the drug.[12] The federal government allocated quotas of the remdesivir supply to states and territories based on their respective COVID-19 disease burden, with states and territories allocating quantities to specific hospitals.[12] Insurers reimbursed the hospitals, not the federal government. The key is that the government was not actually buying the drug for the private sector, but instead negotiating a maximum price. If the private purchaser could obtain a lower price, then that would become the purchaser's price.

It was announced that government purchasers such as the Veterans Health Administration and the Department of Defense would pay $390 per vial of remdesivir, the same list price that the drug manufacturer offered to governments of other developed countries.[13] US hospitals would pay a 33% higher list price: $520 per vial (Table 2).[13] The remdesivir price negotiations also occurred under special considerations. Gilead, the drug manufacturer, received considerable government support to develop and test remdesivir, and the federal government may have rights to its core patents.[14] The HHS secretary also had the option to utilize Section 1498, a provision of patent law that allows the federal government to procure a patented product from other manufacturers as long as the government provides reasonable compensation to the original patent holder. This approach was proposed in the negotiations with Bayer, the manufacturer of ciprofloxacin, during the anthrax emergency after the 9-11 attacks.[15]

There may also have been commercial reasons incentivizing the manufacturer's willingness to negotiate. At the time of the agreement, remdesivir was not approved by the FDA and was marketed under an emergency use authorization. Unless it received FDA approval, it could only be commercialized as long as the government kept the COVID-19 emergency status in place. The demand for remdesivir was also likely to diminish substantially if other drugs were found to be more effective and once a successful vaccine became available.

DETERMINING THE APPROPRIATE PRICE

Each of these negotiations occurred under tremendous public scrutiny and in a very short time. There has been public concern that the government was

TABLE 2— A Comparison of Pricing Benchmarks for the COVID-19 Antiviral Remdesivir: May–June 2020

Price per 10-d Treatment, $[a]	Description
Based on manufacturing costs[b]	
10	Estimated cost of raw materials for the drug[c]
600	Estimated cost of generics produced overseas
1005–1600	Cost-recovery price[d]
Based on cost-effectiveness analyses[b]	
4580–5080	Traditional cost-effectiveness model assuming reduced hospitalization time plus reduced mortality[e]
2520–2800	Model assuming dexamethasone as standard of treatment, with reduced mortality from dexamethasone
310	Model accounting for reducing hospitalization time but no effect on mortality
External reference pricing[f]	
4290	Price set by the manufacturer for governments of all developed countries
US price determined by the manufacturer[f]	
4290	US government purchasers
5720	US hospitals

[a]Calculated over a 10-day treatment course, which represents a total of 11 vials of remdesivir for an adult.
[b]Source: Institute for Clinical and Economic Review (ICER).[21] The estimates published by ICER have since been updated. The table reflects the estimated prices at the time that remdesivir price negotiations were taking place.
[c]Estimate assumes that research and development costs have already been recouped.
[d]Estimate assumes that new, COVID-19–related research and development cost (announced by Gilead to be about $1 billion) would need to be recouped.
[e]Remdesivir's benefit on mortality has not been confirmed.
[f]Source: O'Day.[13]

paying too much for some of these products.[16] On the other hand, the investment community has suggested that the negotiated prices were too low.[17]

For remdesivir, there was considerable controversy over the negotiated price (Table 2).[18] It has been suggested that a price as low as $10 per treatment might have been sufficient to offset its direct manufacturing costs.[19] The manufacturer had developed remdesivir originally as a treatment of hepatitis C and later successfully launched other drugs to treat this condition; therefore, the "sunk cost" of drug development had likely already been realized long before the COVID-19 pandemic.[20] However, the manufacturer committed to making COVID-19–specific investments on research and manufacturing, announced at about $1 billion.[13] Including those costs into the calculation might have justified a price as high as $1600 per course of treatment.[21] Industry experts have suggested that a price as high as $12 000 per course of treatment might be justifiable because remdesivir reduced some days of hospitalization time.[13] However, it is debatable if the drug manufacturer should receive all of the savings from reduced hospitalization spending.

The pricing of remdesivir was occurring when there was uncertainty whether the drug was effective and whether it reduced mortality. An independent evaluation estimated the cost-effectiveness price benchmark for remdesivir at $5080 per treatment, assuming that the drug would decrease both hospitalization time and mortality and assuming a value of $50 000 per each quality-adjusted life year saved.[21] Further studies found no benefit from remdesivir on mortality, however.[22] Without such benefit, remdesivir's cost-effectiveness price benchmark was estimated at about $310, reflecting the low incremental change to quality of life from a median four-day reduction in hospital stay.[21]

The final announced price of remdesivir to US government purchasers such as the Veterans Administration and Department of Defense was similar to the price to other developed countries and the announced price to US hospitals was 33% above international rates. The United States has a long history of paying, on average, three to four times what other industrialized countries pay for brand-name drugs.[23] Therefore, relative to other industrialized countries, the negotiated price of remdesivir was lower than what price negotiations for branded drugs by US private insurers have typically been able to achieve. If negotiated under H.R.3 provisions, the maximum price would have been set at 20% above the external reference price, which would be slightly higher than the average price obtained if the public and private sector were to use equal amounts of remdesivir.

In addition, the negotiated price of remdesivir was likely substantially lower than what the drug manufacturer could have charged if the company went to market with a profit-maximizing price. A profit-maximizing price would likely result in many people not having access to remdesivir. In 2013, the same drug

manufacturer chose to set the list price for its hepatitis C drug Solvaldi at about $84 000 for the course of treatment and made billions of dollars in profit, recognizing that many people with hepatitis C would not be able to afford the drug.[20]

MAIN LESSONS FOR GOVERNMENT DRUG PRICE NEGOTIATIONS

The experiences with drug purchasing agreements in response to the COVID-19 pandemic have demonstrated that simultaneously negotiating both the price and the quantity of a drug may provide an incentive for drug manufacturers to participate in the negotiations and to offer price concessions in exchange for increased revenue certainty. By agreeing to obtain a large supply of remdesivir, the United States was able to negotiate a lower price than what US private purchasers typically pay for branded drugs compared with other industrialized countries.[23] This experience also shows that the government does not have to actually purchase the drug but can simply guarantee a certain volume of sales. If the committed quantity were not to be realized over the defined time period, the federal government could pay for the remaining negotiated quantity and utilize the leftover amount to provide care for specific programs or populations—such as uninsured patients or the prison system—or to stockpile it for future use. Finally, it allows everyone to have access to the drug at the negotiated price.

Advanced purchasing commitments have been extensively used in other sectors. This model is how large retailers like Walmart are able to obtain lower prices from their suppliers when they guarantee a certain volume of sales. In the pharmaceutical sector, having hospitals guarantee a certain purchasing volume was instrumental in making the nonprofit drug manufacturer Civica Rx viable.[24] States have also implemented similar volume agreements in recent initiatives, such as the purchase of hepatitis C drugs by the states of Washington and Louisiana.[25] In this case, also called the "subscription" model, manufacturers have agreed to continue supplying drugs in exchange for a certain total revenue.

Advance purchasing commitments could be incorporated into government drug price negotiations. These could be a useful negotiation incentive for drugs without any therapeutic competition—for example, new gene therapies for rare conditions—which are typically the most expensive drugs. Drugs that lack therapeutic alternatives cannot be feasibly excluded from a drug formulary and often cannot be substituted for another drug or therapy. Therefore, the model of using formularies to negotiate with drug manufacturers currently employed by health plans, pharmacy benefit managers, and Medicare Part D prescription drug plans is less viable in these circumstances. A price-and-quantity negotiation could represent an incentive that would motivate manufacturers to provide price concessions on these drugs.

Advance purchasing commitments could also be useful for negotiating prices of drugs with high public health relevance. Such negotiations would provide drug manufacturers with guaranteed levels of revenue and expand patient access. For drugs of public health relevance, this model is preferable to having manufacturers being able to price discriminate and set prices that essentially limit access to certain drugs, or have states and municipalities bid against each other for scarce resources.

The COVID-19 negotiation experiences showed that the federal government does not need to purchase the drugs directly or have a formulary to negotiate a drug's price. In the COVID-19 response, the federal government showed that it can offer advance purchasing commitments regardless of whether the government will directly buy the drug or the drug will be purchased by the private sector. Advance purchasing commitments could also incorporate provisions that would protect the agreements against failures in the effectiveness, safety, or supply of the drug.

Because the federal government was able to negotiate for COVID-19 vaccines, antibodies, and drugs without a specific legal framework defining the structure of these negotiations, it could be argued that legislation allowing the government to negotiate drug prices is not necessary in the first place. However, the set of circumstances surrounding the recent COVID-19 agreements is extraordinary, and drug manufacturers will want greater certainty to project their research and development plans into the future. Having a sustainable legislative framework that clarifies which negotiation levers will be used, which drugs will be eligible for such negotiations, and which populations will be eligible to access the negotiated prices would increase certainty in the pharmaceutical market and help drug manufacturers make informed choices of where and how to invest their research and development budgets. The focus should be on drugs without competition and those with high public health relevance. Having a defined set of institutional processes would also be important for clarifying administrative and budgetary needs to the federal agencies involved.

Although specific policies have not been announced to date, the Biden administration could incorporate such provisions in a proposal such as H.R.3, which would allow the federal government to still have external pricing benchmarks and excise tax provisions, but would also include an incentive for drug companies to negotiate over price and quantity together. This could be applied to COVID-19 and other conditions of high public health relevance, where, most importantly, it would expand patient access to needed drugs.

CONCLUSION

The COVID-19 experience demonstrates that the federal government can negotiate drug prices in the most extraordinary circumstances, for drugs with high visibility and in situations where limiting drug availability is not a politically viable option. The agreements accomplished a lower price than what the United States typically pays for branded drugs compared with other industrialized countries. Negotiations over both price and quantity guaranteed that the drugs would be available for everyone at the negotiated price. AJPH

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Establishing a SARS-CoV-2 (COVID-19) Drive-Through Collection Site: A Community-Based Participatory Research Partnership With a Federally Qualified Health Center

LaPrincess C. Brewer, MD, MPH, Cynthia Woods, DO, Aarti Patel, MA, Jennifer Weis, MHS, Clarence Jones, MEd, Adeline Abbenyi, MS, Tabetha A. Brockman, MA, Irene G. Sia, MD, MSc, Elie Berbari, MD, Sarah Crane, MD, Chyke A. Doubeni, MBBS, MPH, for the FAITH! Community Steering Committee COVID-19 Task Force

The COVID-19 pandemic has disproportionately affected underserved and minority populations in the United States. This is partially attributable to limited access to diagnostic testing from deeply rooted structural inequities precipitating higher infection and mortality rates. We describe the process of establishing a drive-through collection site by leveraging an academic–community partnership between a medical institution and a federally qualified health center in Minnesota. Over 10 weeks, 2006 COVID-19 tests were provided to a socioeconomically disadvantaged population of racial/ethnic minorities and low-income essential workers. (*Am J Public Health*. 2021;111:658–662. https://doi.org/10.2105/AJPH.2020.306097)

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FAITH! (Fostering African American Improvement in Total Health) is a community-based participatory research program on health and wellness within African American (AA) communities in Minnesota. FAITH! is a partnership with federally qualified health centers (FQHCs) and AA churches that is governed by a Community Steering Committee of diverse community stakeholders.[1,2] Concerns about disproportionately high COVID-19 cases among AAs in Minnesota and lack of accessible testing prompted the FAITH! Community Steering Committee to partner with Open Cities Health Center (OCHC), an FQHC serving socioeconomically disadvantaged populations,[3] to establish a drive-through severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) collection site. OCHC has an established academic–community research partnership with FAITH! on projects focused on health equity.

INTERVENTION

The FAITH!–OCHC partnership aimed to provide easily accessible COVID-19 testing to medically underserved populations and to mitigate community spread. The partnership established a community drive-through specimen collection site in St Paul, Minnesota. The intervention leveraged Mayo Clinic Laboratories–developed rapid, real-time polymerase chain reaction assays for SARS-CoV-2 and a Mayo Clinic (hereafter Mayo) drive-through collection protocol.[4] The analytical sensitivity and specificity of the assay were 35 copies per milliliter and 100%, respectively, although there is currently no consensus "gold standard" diagnostic test for COVID-19.

PLACE AND TIME

This project was initiated in May 2020 at the OCHC medical facility in the Rondo neighborhood of St Paul. OCHC began in 1967 at St James African Methodist Episcopal Church in St Paul and was established as an FQHC in 1972 to expand its services. It provides culturally sensitive primary care to residents of seven counties in the Minneapolis–St Paul metropolitan area.[5]

PERSON

OCHC provides care for over 10 000 patients annually. The patient population

is racially and ethnically diverse, predominantly low income (99% at or below 200% of the federal poverty level, according to the Health Resources and Services Administration, Uniform Data System) and underinsured or uninsured (81%).[5] A large proportion are AA (47%), of low English proficiency (17%), and immigrants or refugees. A majority are essential workers in public and service sector occupations (long-term care facility workers, grocery store clerks, delivery drivers) and reside in overcrowded neighborhoods with multigenerational households.

PURPOSE

After the first diagnosis of COVID-19 in Minnesota in March 2020, OCHC observed a steady increase in cases in April 2020, especially among essential workers. A needs assessment with OCHC medical leadership revealed difficulties in providing convenient SARS-CoV-2 testing and delays in test turnaround time of seven to 10 days by their preestablished laboratory processing company. A shared decision was made to launch a drive-through COVID-19 collection site to proactively address testing inequities for the patients.

IMPLEMENTATION

A multidisciplinary team of FAITH!, Mayo, and OCHC staff (including physicians, nurses, laboratory managers, and information technology specialists) met to outline a strategic implementation plan for a community-based COVID-19 collection site. The Mayo model of drive-through collection was adopted to meet the needs and capabilities of OCHC.[4] The OCHC medical director toured a recently established Mayo testing site in Rochester, Minnesota with the Mayo COVID-19 Task Force to better understand best practices for sample collection and processes to organize an OCHC collection site. Mayo staff also toured the OCHC facility to provide logistics and human participant research training support to OCHC staff.

Next, an OCHC command center team was established, with corresponding roles aligned with a collection site flow process and screening algorithm (Figure 1). The roles of the command center team mirrored those within the Mayo model but on a smaller scale, with fewer staff dedicated to each role given limited staff availability at OCHC. Community-driven, culturally tailored messages on COVID-19 symptoms and preventive measures (Appendix A, available as a supplement to the online version of this article at www.ajph.org) and about the availability of OCHC drive-through testing were disseminated to patients via a one-time multimodal communication by both text and mail (depending on availability in the OCHC electronic medical record). Information regarding the availability of testing at OCHC was also posted to the OCHC Web site. Patients were encouraged to contact the clinic via a dedicated triage line if they had symptoms consistent with SARS-CoV-2 infection (e.g., fever, cough, or shortness of breath). The triage team, staffed by seven clinicians, screened patients on symptoms and potential community exposure and contacts. Patients meeting testing criteria were scheduled to a daily calendar.

A one-lane, covered, drive-through specimen collection site with an accompanying tent was erected adjacent to the OCHC building to accommodate patients arriving in automobiles and for pedestrians (Appendix B, available as a supplement to the online version of this article at www.ajph.org). This particular site was also selected because it was conveniently located near a local public transportation bus line. Signage with clear directions and instructions was placed ahead of the registration site for prescreened patients with appointments. Patients without appointments ("walk-ins") were directed to a separate designated area for symptom screening and, when appropriate, were scheduled to be tested later that same day in allocated walk-in appointment blocks. OCHC security directed traffic to minimize crowding and adhere to physical and social distancing. Patient registration staff in full personal protective equipment (facemask, eye shield, and gloves) approached automobiles upon arrival to confirm appointments. A preprepared registration packet (patient specimen label, specimen container, and COVID-19 patient education materials) was provided to collection staff, who verified patient information and collected specimens according to Centers for Disease Control and Prevention (CDC) guidelines. Patients were provided with the COVID-19 education materials. All collected samples were stored in laboratory designated refrigerators and shipped daily by courier to Mayo Clinic Laboratories at prearranged times for sample processing. The OCHC collection site operated on weekdays from 9 AM to 4 PM. Iterative changes to the algorithm were made on the basis of updated epidemiological and CDC guidelines. In addition, a community-engaged approach was used by Mayo and OCHC staff to refine the process with real-time patient input at the collection site.

EVALUATION

Assessment of data over a 10-week period from the collection site launch (May 11–July 16, 2020) shows that 2006

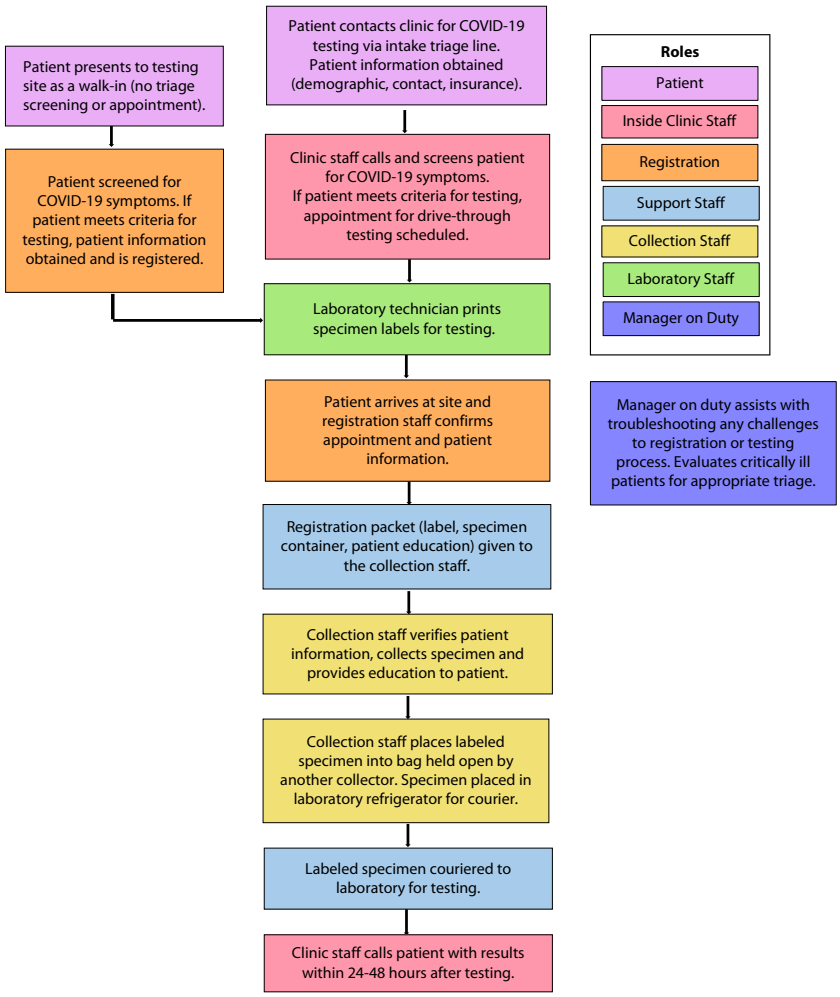

FIGURE 1— COVID-19 Drive-Through Collection Site Workflow and Staffing Roles: Open Cities Health Center (OCHC), St Paul, MN, May–July 2020

patients were tested for COVID-19 (Figure 2). Approximately 200 patients were tested per week, with the highest testing performed during week 10. Early in implementation, there was a high positivity rate, which peaked at 46% at week 4 (nearly 19 times the state rate of 2.5%).[6] This positivity rate declined at week 10 to 8.5%. Regarding quality outcomes, test results were returned to OCHC electronically within 24 hours of receipt by Mayo Clinic Laboratories and patients received notification of test results within 24 to 48 hours from collection. Patients with positive tests were instructed by OCHC staff to follow CDC guidelines for appropriate isolation and precautions to prevent transmission of SARS-CoV-2 to others. Additionally, patients without appointments were not denied testing if they met screening eligibility, demonstrating a commitment of OCHC to serve its surrounding community.

ADVERSE EFFECTS

The death of George Floyd at the end of May devastated and demoralized communities of color in Minneapolis–St Paul.[7] The protests the following week throughout Minneapolis–St Paul led to the unplanned closing of the collection site for one day. It also closed for one day in honor of Floyd's memorial service. The protests resulted in an influx of unestablished patients, largely protesters, seeking COVID-19 testing at OCHC. As a result, OCHC medical leadership rapidly adjusted the workflow to accommodate the surge in testing. A revised plan was enacted to increase staff designated to the command center team roles. Furthermore, the criteria for testing eligibility were extended to include individuals involved in recent mass gatherings regardless of presence of symptoms.

SUSTAINABILITY

The collaborative design and implementation process between an academic medical center and FQHC to address the needs of an underresourced community is novel and presents opportunities for replication. OCHC was also able to provide medical services (through virtual video or telephone visits). There was an upward trend in demand for testing over the course of the intervention, underscoring the value of this resource. The corresponding downtrend in positivity rates over time demonstrates the effectiveness of testing in flattening the pandemic curve in this high-risk population. The success of the FAITH!–OCHC partnership garnered attention, resulting in institutional, state, and national funding awards to sustain and expand the collection site.

PUBLIC HEALTH SIGNIFICANCE

Access to COVID-19 testing for socioeconomically disadvantaged populations is urgently needed.[8] Our rapid

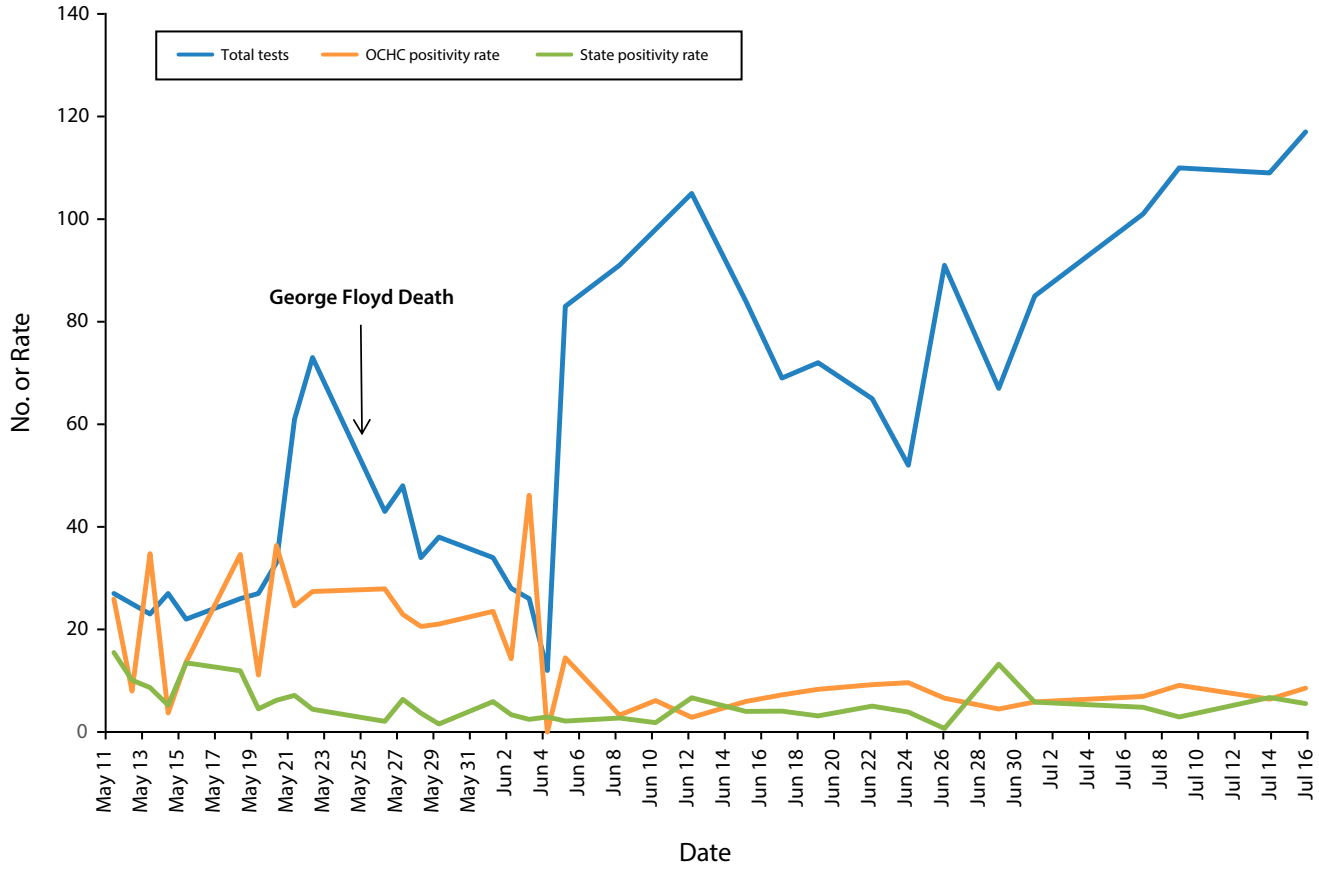

FIGURE 2— COVID-19 Drive-Through Collection Site Volumes and Positivity Rates Over Time: Open Cities Health Center (OCHC), St Paul, MN, May–July 2020

implementation intervention to improve access to COVID-19 testing is a model for others to rapidly provide emergency health services to communities that are underresourced and medically underserved during emergencies and crises. It is scalable, feasible, acceptable, and adaptable to meet the capacity needs of the community. This model could also be replicated for vaccine distribution to a similar population. Furthermore, this intervention demonstrates the potential for existing strong academic–community partnerships to rapidly respond to community health emergencies. The merging of resources from well-equipped medical institutions with culture-rich, community-centered organizations to jointly address structural and systemic inequities is key to cultivating health equity. Our society owes this to those putting their safety and lives on the line to keep our nation strong and thriving during this relentless COVID-19 pandemic. AJPH

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L. C. Brewer wrote the first draft of the article. All authors contributed to the conceptualization and implementation of the intervention to which this

article refers, and also reviewed and edited the finalized article for submission.

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All authors declare no conflicts of interest.

HUMAN PARTICIPANT PROTECTION

This study was reviewed and approved by the institutional review board at Mayo Clinic, Rochester, MN.

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Nourishing Underserved Populations Despite Scarcer Resources: Adaptations of an Urban Safety Net Hospital During the COVID-19 Pandemic

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A safety-net hospital in Boston, Massachusetts, made adaptations to its Nourishing Our Community Program to accommodate restrictions brought on by the COVID-19 pandemic to continue providing food and education to patients. While participation in programs decreased overall, some of the adaptations made, including virtual classes and food pantry home delivery, were well received and are planned to be maintained after the pandemic subsides. By making adjustments to operational procedures, the Nourishing Our Community Program continued to reach its underserved population despite pandemic challenges. (*Am J Public Health*. 2021;111:663–666. https://doi.org/10.2105/AJPH.2020.306132)

This article describes the adaptations made by Boston Medical Center's Nourishing Our Community Program (NOCP) in response to COVID-19 and the mandated social isolation requirements. These operational changes were made in order to continue to provide access to food and nutrition education.

INTERVENTION

To improve its population's health, a large urban hospital established the NOCP, a three-pronged approach to combat food insecurity. This award-winning program comprises (1) fresh produce from the rooftop farm, (2) culturally and nutritionally appropriate food from the food pantry, and (3) culinary and nutrition education from the teaching kitchen.[1] Because of the changing safety regulations and community needs brought on by the COVID-19 pandemic, the NOCP adapted programing to continue providing access to healthy food and nutrition education, critical resources needed to combat food insecurity augmented by the virus. Changes made included extending resources to staff and the general community, altering food distribution channels, and transitioning to virtual education.

PLACE AND TIME

The hospital is located in the center of Boston, Massachusetts, and is the largest safety-net hospital in the Northeast. This article describes the changes made at the onset of the COVID-19 pandemic in March through August 2020.

PERSON

The hospital serves a racially diverse community (47% non-Hispanic White or other, 23% Black, 20% Latino, 10% Asian) experiencing disproportionately high rates of poverty, with 72% of patients classified as underserved and 33% speaking English as a second language.[2] Research suggests that this demographic may be disproportionally affected by COVID-19.[3] The Centers for Disease Control and Prevention reports that non-Hispanic Blacks, Hispanics and Latinos, and American Indians/Alaska Natives experience hospitalization and death from COVID-19 at more than four times the rate of their non-Hispanic White counterparts.[4] In addition, high levels of poverty are associated with more severe symptoms and complications of COVID-19.[5] This higher risk may be because most low-wage jobs cannot be performed at home, leading to lost wages, unemployment, or continued work with increased risk of disease exposure.[6]

PURPOSE

The purpose of this intervention was to adapt the NOCP to continue providing essential food and nutrition resources to its vulnerable patient population, staff, and the greater community during the COVID-19 pandemic.

IMPLEMENTATION

This section describes the adaptions made by each department of the NOCP.

The Rooftop Farm

In previous years, the farm was maintained by a full-time farmer, part-time assistant, and a variety of staff and patient volunteers. In response to COVID-19, the farm pivoted from rotating volunteers to utilizing two part-time paid interns trained for autonomy and required to follow social distancing protocols. All farm events were canceled, including camp, tours, and farmers market. A series of videos were offered virtually to assist home gardeners, and the farmer cotaught a weekly teaching kitchen class virtually from the farm. As restrictions on hospital patients, visitors, and in-person staff led to decreased hospital food sales, produce distribution shifted away from the hospital cafeteria and more toward the food pantry.

The Food Pantry

Operations were redesigned to accommodate the community's evolving needs and reduce disease spread (Table 1). The patient prescription-only model was expanded to include hospital staff (438 families), walk-ins (66 families), and general community members (62 families). Hours of operation were extended, waiting room capacity was capped at eight (previously 25), and curbside pickup was offered (Table 1). Home deliveries were provided to patients suffering from or recovering from COVID-19 infections (50 families) and those whose immigration status caused unease (eight families per week). Deliveries were made by medical student volunteers and the hospital's postal department. Additional deliveries were coordinated through specific clinics, including obstetrics and gynecology, the Grow Clinic (serving pediatric patients with impaired growth), and the pediatric mobile vaccine program (another response to COVID-19).

The Teaching Kitchen

Classes were shifted to an entirely remote model, including both live and prerecorded formats, and were offered free to patients, staff, and the general community. Weekly Instagram Stories entitled "Thursdays in My Home Kitchen" were launched to reach the wider community. Recipes continued to focus on limiting total calories, emphasizing lean and plant-based protein sources, and using whole-food ingredients. Meal ideas centered around staple foods provided by the food pantry and nonperishable foods to help families reduce trips to the grocery store. Services were

TABLE 1— Daily Operations Compared With COVID-19 Response in the Therapeutic Food Pantry in Boston, MA, Between the Months of March 2019 and August 2020

The Food Pantry		
	Before COVID-19	**Response to COVID-19**
Recruitment and participation	Prescription-based enrollment for patients	Prescriptions and walk-ins for patients, staff, and general community members
		Services were marketed through employee communication networks, newsletters, and by providers
Staffing	Four staff members and two or three volunteers per day	Four staff members but volunteers prohibited
Hours of operation	10:00 AM–4:00 PM	Flexible 8:00 AM–5:00 PM
	Monday–Friday	Monday–Friday
Workflow	25-person waiting room	Maximum eight-person waiting room
	Serve two recipients at a time	Serve one recipient at a time
	Patients pick up biweekly (twice a month)	Patients can pick up, curbside pickup, or receive home delivery biweekly (twice a month)
Procurement of resources	Order weekly from the Greater Boston Food Bank	Order biweekly from the Greater Boston Food Bank
	Receive donations from private donors	Receive produce donations
	Produce grown from the rooftop farm	Produce grown from the rooftop farm
	Bring in 15,000 pounds of food per week	Bring in 10,000 pounds of food a week

TABLE 2— Number of Families Accessing the Food Pantry in Boston, MA, Per Month Between the Months of March 2019 and August 2020

Food Pantry - Families Served	2019	2020	% Change
March			
Total	2002	1445	–28
Pickup type			
In-person and curbside pickup	2002	1436	
Home delivery	0	9	
April			
Total	2005	1003	–50
Pickup type			
In-person and curbside pickup	2005	819	
Home delivery	0	184	
May			
Total	2071	996	–52
Pickup type			
In-person and curbside pickup	2071	811	
Home delivery	0	185	
June			
Total	1906	1016	–47
Pickup type			
In-person and curbside pickup	1906	863	
Home delivery	0	153	
July			
Total	2123	1191	–44
Pickup type			
In-person and curbside pickup	2123	1074	
Home delivery	0	117	
August			
Total	2166	1223	–44
Pickup type			
In-person and curbside pickup	2166	1132	
Home delivery	0	91	
Average families served	2046	1146	–44

Note. This table shows the number of families accessing the therapeutic food pantry in the months of March–August 2019 and 2020, and the total average during these months.

marketed through digital and printed newsletters and social media.

EVALUATION

Information was gathered through interviews with program managers and senior directors. Third-party services, including VCita and Survey Monkey, were used to assess participation rates and obtain quality improvement feedback. Surveys were delivered through the teaching kitchen staff and were a combination of multiple-choice and open-ended questions to assess both qualitative and quantitative data. When applicable, collected data were compared with 2019 data (Tables 1 and 2).

The Rooftop Farm

Although the growing season started later, there was no significant change in food volume compared with previous years. Operations were not significantly affected, but community exposure was dramatically decreased.

The Food Pantry

Year over year comparisons revealed that, on average, families served per month decreased by 44% (Table 2). Though fewer families were served, pounds of food per family increased from 15 to 22 pounds to help families extend time before next food acquisition, thereby increasing social distancing capability (Table 1). In addition, services were extended to staff, walk-in patients, and walk-in community members resulting in a greater variety of recipients served compared with the previous year. As operational strategies evolved, home deliveries increased from nine in March to 185 in May. However, after the surge ended, delivery numbers decreased and were continued primarily by the hospital's postal service. No additional funding was needed to support this intervention.

The Teaching Kitchen

Compared with the previous year, the number of classes offered decreased initially from an average of 28 per month to an average of seven per month during April and May. However, as classes were redesigned to accommodate the virtual format, the number per month steadily increased to 17 by August. Participation rates increased from an average of eight

participants to an average of 15 participants per class. Participants reported preferring remote learning for convenience factors (including childcare and transportation) and found the home-cook atmosphere more relatable in an informal quality improvement survey. However, only about 40% of participants reported cooking along with the instructor as opposed to in-person classes where almost everyone participates in cooking. Reasons cited for not cooking along included not having a specific ingredient(s) and tuning in to watch while on a break at work.

Overall, home deliveries, curbside pickup, and virtual teaching have helped overcome the challenges presented by social distancing requirements.

ADVERSE EFFECTS

Patients receiving home deliveries were unable to swap out foods for preferred items as they were required to accept the full delivery to help prevent disease spread. The transition to remote learning limited participation to those with access to the Internet and a device. The decrease in hands-on learning offered on the farm and in teaching kitchen may affect the overall impact of these experiences.

SUSTAINABILITY

The described operational changes will continue until COVID-19 is resolved. However, home deliveries for vulnerable patients executed by the hospital's postal service and remote learning will be continued long after because of the positive impact they have had on community members. No significant changes in the budget are necessary to maintain these changes.

PUBLIC HEALTH SIGNIFICANCE

Continuing to provide nutritious food and education is crucial to supporting underserved communities, especially given the disproportionate way they are affected by COVID-19. Strong partnerships with private and industry donors have supported NOCP and are critical in its continued success. Adaptations to ensure continued operation during the pandemic were feasible and did not require additional funding. We welcome other hospitals that wish to observe our services to start their programs. AJPH

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CONTRIBUTORS

All authors contributed to the design and implementation of the programs, to the analysis of the results, and to the writing of the article.

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C. M. Apovian reports receiving personal fees from Nutrisystem, Zafgen, Sanofi-Aventis, Orexigen, EnteroMedics, GI Dynamics, Scientific Intake, Gelesis, Novo Nordisk, SetPoint Health, Xeno Biosciences, Rhythm Pharmaceuticals, Eisai, and Takeda outside of the funded work. C. M. Apovian reports receiving grant funding from Aspire Bariatrics, GI Dynamics, Orexigen, Takeda, the Vela Foundation, Gelesis, Energesis, Coherence Lab, and Novo Nordisk outside of the funded work. C. M. Apovian reports past equity interest in ScienceSmart LLC.

HUMAN PARTICIPANT PROTECTION

Data presented are not human participant research.

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NEXT Harm Reduction: An Online, Mail-Based Naloxone Distribution and Harm-Reduction Program

Carol Yang, BA, Jamie Favaro, MSW, and Meredith C. Meacham, PhD, MPH

Needle EXchange Technology (NEXT) Harm Reduction is an online, mail-based platform designed for sending (1) naloxone kits to people at risk for overdose and (2) sterile syringes and other equipment directly to people who otherwise cannot access safe supplies. From its inception in 2017 through the end of 2019, NEXT Harm Reduction sent naloxone kits to 3609 individuals and 1230 packages of sterile syringes and supplies and received 335 reports of overdose reversals using naloxone provided by NEXT Harm Reduction and its affiliates. (*Am J Public Health*. 2021;111:667–671. https://doi.org/10.2105/AJPH.2020.306124)

In this article, we describe the purpose, implementation, impact, and public health significance of Needle EXchange Technology (NEXT) Harm Reduction and outline challenges and opportunities to inform other organizations who may be interested in expanding or integrating online, mail-based harm-reduction services in their communities.

INTERVENTION

NEXT Harm Reduction is an online, mail-based platform designed to reduce opioid overdose deaths; prevent injection-related transmission of conditions including HIV, hepatitis C, and soft tissue bacterial infections; and improve the lives of people who use drugs and their loved ones.[1] It is a 501(c)(3) organization originally sponsored by the Harm Reduction Coalition.

NEXT Harm Reduction runs two programs: NEXT Naloxone, which provides online overdose prevention education and mail-delivered naloxone kits to the loved ones of people at risk for overdose, and NEXT Distro, which mails sterile syringes and other drug use equipment, as well as naloxone, directly to people who otherwise cannot access safe supplies. Both programs are accessible via https://nextdistro.org. (Before October 2020, NEXT Naloxone's Web page was https://www.naloxoneforall.org, which now redirects to https://nextdistro.org.)

PLACE AND TIME

Through a network of harm-reduction agencies and health departments, NEXT serves participants in all 50 states; Washington, District of Columbia; and Puerto Rico. It is based in New York City, where it is a registered New York State Opioid Overdose Prevention Program and Syringe Exchange Program. NEXT Distro began services in February 2018 and NEXT Naloxone began services in November 2018. It was inspired by the work of Tracey Helton and conversations at the 2016 National Harm Reduction Coalition Conference in San Diego, California.

PERSON

NEXT targets people who use drugs and their loved ones who are not able to access naloxone or sterile syringes and other resources for safer drug use in their local communities.

PURPOSE

Many people in the United States still have little or no access to naloxone (brand name: Narcan), the Food and Drug Administration–approved medication that prevents opioid overdose death by reversing opioid-induced respiratory depression.[2] Furthermore, people who use drugs still face physical, legal, and societal barriers to supplies for safer drug use. Stigma against and criminalization of drug use continues to prevent many people from accessing lifesaving resources even when they are available.[3] As smartphone and Internet use becomes more accessible, people are increasingly using the Internet to obtain health information, medications, and supplies.[4]

IMPLEMENTATION

Program participants typically learn about NEXT Naloxone through social media (48%) and personal connections (23%; Table 1). This information was not systematically collected from NEXT Distro participants to reduce program and participant burden.

Along with mailing supplies, NEXT programs include a handwritten note and informational materials in each package. Web pages and other written materials are offered in English and Spanish. Participants can also request referrals to other support services in their area, including buprenorphine providers, harm reduction–oriented physicians, and mental health services.

Postage for NEXT is paid for through grant funding and donations. NEXT sends packages through the US Postal Service priority mail, which typically take two to four days to arrive to participants.

NEXT Naloxone

Upon arriving on the NEXT Naloxone Web page, participants select which state they reside in and are directed to a state-specific resource page. If they are unable to access resources in their state, participants can watch a training video on overdose recognition and naloxone use, then fill out a secure online form to request naloxone via mail. In states where NEXT Naloxone has a partner affiliate (typically a local harm-reduction organization that already distributes naloxone within their state), NEXT forwards the request to the affiliate to coordinate and fulfill the delivery. Partner affiliates have signed memoranda of understanding with NEXT, which include terms of participant confidentiality and expected turnaround times for requests to be mailed out.

NEXT offers both intramuscular naloxone vials with syringes and intranasal Narcan-brand naloxone. The type and amount of naloxone sent to each participant depends on their request, level of overdose risk, state of

TABLE 1— Demographics and Overdose Experiences of NEXT Naloxone Requesters: United States and Puerto Rico: November 2018–December 2019

	New Requests, No. (%)
Age, y	
<26	848 (22)
26–45	2352 (60)
46–65	677 (17)
>65	43 (1)
Gender identity[a]	
Male	1334 (34)
Female	2390 (61)
Gender nonconforming or nonbinary	141 (4)
Transgender	43 (1)
Racial/ethnic identity[a]	
White or Caucasian	3448 (88)
Black or African American	119 (3)
Hispanic or Latinx	278 (7)
Asian	104 (3)
American Indian or Alaska Native	67 (2)
Native Hawaiian or Pacific Islander	24 (1)
Overdose experience in past year	
Witnessed	2162 (55)
Has overdosed	344 (9)
Region: Northeast[b]	
Total requests	771 (20)
Filled (% of total)	672 (87)
Diverted to local programs (% of total)	53 (7)
Region: Midwest[c]	
Total requests	1132 (29)
Filled (% of total)	1046 (92)
Diverted to local programs (% of total)	34 (3)
Region: South and Puerto Rico[d]	
Total requests	1349 (34)
Filled (% of total)	1262 (94)
Diverted to local programs (% of total)	31 (2)
Region: West[e]	
Total requests	674 (17)
Filled (% of total)	629 (93)
Diverted to local programs (% of total)	31 (5)

Continued

TABLE 1— Continued

	New Requests, No. (%)
How requester heard about NEXT Naloxone[f]	
Social media	1889 (48)
Personal connection	910 (23)
Online search or Web site	680 (17)
Recovery or support group	178 (5)

Note. The sample size was 3926.

[a]People could select more than one response option for racial/ethnic and gender identity.
[b]Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.
[c]Midwest: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.
[d]South and Puerto Rico: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, Puerto Rico, South Carolina, Tennessee, Texas, Virginia, and West Virginia.
[e]West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.
[f]Based on free text responses to the question "How did you hear about NEXT Naloxone?"; response categories are not mutually exclusive (e.g., "Facebook friend" would count as social media and personal connection).

TABLE 2— Naloxone Use Reports to NEXT Harm Reduction: United States and Puerto Rico, November 2018–December 2019

	Naloxone Use Reports,[a] No. (%)
Did the person who overdosed survive?	
Yes	335 (95)
No	9 (3)
Not sure	9 (3)
Relationship of person who reported overdose to person who overdosed	
Friend or acquaintance	161 (46)
Family member or partner	84 (24)
Patient or client	6 (2)
Stranger	72 (20)
Unknown or prefer not to answer	30 (8)
Location of overdose	
Home or apartment	238 (67)
Public - inside	21 (6)
Public - outside	58 (16)
Shelter or supportive housing	4 (1)
Other or unknown	32 (9)
Region	
Northeast[b]	62 (18)
Midwest[c]	63 (18)

Continued

residence, and available inventory (typically two to four doses, or more for individuals at higher risk for overdose).

NEXT Distro

To access NEXT Distro services, people connect via the program Web site (https://nextdistro.org) or reach out directly via e-mail, text message, or social media (Instagram: @nextdistro; Reddit: u/nextdistro). NEXT Distro then sends participants a link to the enrollment request form. Depending on what participants request, packages mailed to them contain supplies typically available at in-person harm-reduction programs: packs of syringes available in multiple sizes, hazardous material bins, cookers and cotton, and safer smoking, safer sex, and wound care supplies.

EVALUATION

From November 2018 through December 2019, NEXT Naloxone received 3926 new requests via https://www.naloxoneforall.org (Table 1). Of these, 3609 (92%) were filled by NEXT Naloxone (1812 directly, 1797 via affiliates), 149 (4%) were diverted to local programs, and 168 (4%) were undeliverable. From February 2018 to December 2019, NEXT Distro sent 1230 packages containing syringes and other supplies.

Each naloxone kit and package includes reminders with the link to an online form for participants to report back to the program if they have used the naloxone from NEXT to respond to an overdose and whether the reversal attempt of the overdose was successful. NEXT also e-mails periodic reminders to all participants who have received kits to report back to the

TABLE 2— Continued

	Naloxone Use Reports,[a] No. (%)
South and Puerto Rico[d]	188 (53)
West[e]	40 (11)
Demographics of person who overdosed	
Age, y	
<26	91 (26)
26–45	216 (61)
46–65	21 (6)
>65	0 (0)
Unknown	25 (7)
Gender identity	
Male	227 (64)
Female	100 (28)
Gender nonconforming or nonbinary	2 (1)
Transgender	3 (1)
Not reported	21 (6)
Racial/ethnic Identity	
White or Caucasian	262 (74)
Black or African American	32 (9)
Hispanic or Latinx	21 (6)
Asian	5 (1)
American Indian or Alaska Native	8 (2)
Native Hawaiian or Pacific Islander	0 (0)
Previously experienced overdose	
Yes	188 (53)
No or not sure	165 (47)

Note. The sample size was 353.

[a]Some people reported multiple naloxone use reports.
[b]Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.
[c]Midwest: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.
[d]South and Puerto Rico: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, Puerto Rico, South Carolina, Tennessee, Texas, Virginia, and West Virginia.
[e]West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

program if they use their naloxone and may need refills. During this period, there were 353 participant reports of naloxone used to respond to an overdose, of which 335 (95%) were successful in reviving the person overdosing (Table 2). This is likely an underestimate as lay person overdose reversals are often underreported.[5]

A central limitation and concern of NEXT is that it is primarily reaching individuals who have a dependable mailing address and reliable access to the Internet, creating barriers for participants who are unhoused, unstably housed, or without Internet access.[6] Furthermore, as program participant demographic data show, NEXT has had limited reach in communities of color at higher risk of experiencing or witnessing an overdose.[7]

ADVERSE EFFECTS

While NEXT has not received reports of adverse effects or unintended consequences, a primary concern is the confidentiality of participant information related to admission of substance use or interception of packages. To guard against this, NEXT does not connect participant enrollment data (i.e., names, addresses) with potentially sensitive substance use information. The processes of enrolling and requesting supplies are separated and connected through a participant-chosen "handle." Furthermore, NEXT encourages participants to use encrypted messaging applications to communicate with the program. Nevertheless, many program participants report more concern about scarcity of syringes and naloxone than about potential privacy risks.

SUSTAINABILITY

The sustainability of NEXT is largely driven by affiliate partnerships based in communities where participants are requesting supplies. Affiliate partners are able to tailor delivery of supplies to local circumstances and can develop more direct supportive relationships with participants.

One concern of expansion via government partnerships is whether formalization will create barriers that prevent participants from electing to share their information. Government partners should be aware of this concern and ensure that identifying participant information is not used or distributed for any purpose beyond provision of supplies.

PUBLIC HEALTH SIGNIFICANCE

In the context of the opioid overdose crisis and ongoing HIV and hepatitis C epidemics, as well as active political opposition to local syringe access programs in many parts of the country, NEXT Harm Reduction provides an innovative platform for people who use drugs and others in their community to connect with low-barrier access to information, support, and life-saving medication and supplies. AJPH

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CONTRIBUTORS

C. Yang is the former program director for NEXT Harm Reduction and contributed to the writing and editing of the article. J. Favaro is the founder and executive director of NEXT Harm Reduction and contributed to the editing of the article. M. Meacham performed the data analyses and contributed to the writing and editing of the article.

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The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

Institutional review board approval was not required for this study because the data were collected for program evaluation purposes and presented in aggregate.

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Prevention of Unwanted Sexual Contact Among Cadets at the United States Air Force Academy: A Brief Small-Group Intervention

Kenneth W. Griffin, PhD, MPH, Christopher Williams, PhD, Wendy Travis, PhD, and Andra Tharp, PhD

This study tested the effectiveness of a small-group preventive intervention designed to prevent unwanted sexual contact among cadets at the US Air Force Academy. Among cadets in the incoming class of 2021, unwanted sexual contact was cut by nearly half in the intervention group relative to the control group. This study is one of the first rigorously designed trials to demonstrate a significant impact on unwanted sexual contact among students attending a US military service academy.

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Sexual assault and sexual harassment are major problems in military service academies in the United States. In 2018, 15.8% of female and 2.4% of male cadets and midshipmen across the military service academies reported unwanted sexual contact in the past year, up from 12.2% for women and 1.7% for men in 2016.[1] Sexual assault in the military contributes to a variety of negative outcomes, such as increased alcohol and drug dependence, depression, anxiety, and suicidal thoughts and attempts.[2]

In 2005, the Department of Defense required sexual assault and prevention staff at all military installations, including the five military service academies. Since then, the military service academies have implemented multiple sexual assault prevention programs and social marketing campaigns to improve awareness of and response to sexual assault. However, the effectiveness of these initiatives is unknown because there has been little rigorous evaluation.[3]

This study tested the effectiveness of a six-session small-group preventive intervention designed to enhance personal resilience, develop healthy personal relationships, and prevent unwanted sexual contact among incoming cadets at the United States Air Force Academy (USAFA).

INTERVENTION

The Cadet Healthy Personal Skills (CHiPS) primary prevention program[4] was designed to positively change social norms and bystander intervention behaviors surrounding sexual violence; increase knowledge and skills regarding obtaining consent for sexual activities; address the relationship between sexual violence and alcohol and substance abuse; and build social, self-regulation, and healthy relationship skills through interactive learning and behavioral rehearsal scenarios. Following published recommendations for preventing sexual assault and harassment,[5] we adapted an evidence-based prevention program, Life Skills Training, for incoming cadets at USAFA. Life Skills Training is a theory-based substance abuse and violence prevention program that has been found in a series of randomized controlled trials to prevent substance abuse, violence and aggression, and risky sexual behaviors, with findings reported in over 35 peer-reviewed publications.[6]

PLACE AND TIME

We implemented the CHiPS intervention in the summer of 2018 at USAFA, located in Colorado Springs, Colorado.

PERSON

All incoming cadets who were members of the class of 2021 at USAFA were eli-

gible to participate. The sample was predominantly male (70%), and most participants were 18 years old (range = 17–22 years). The sample was 80% White, 9% Asian, and 7% African American; the remainder were of other or multiple races. The evaluation sample (n = 832) consisted of cadets who consented to participate and provided matched and completed pretest and posttest surveys.

PURPOSE

The goals of the CHiPS intervention are to enhance personal resilience, develop healthy personal relationships, and prevent unwanted sexual contact among incoming cadets at USAFA.

IMPLEMENTATION

We provided the program to groups of 15 to 20 cadets, and one or two trained facilitators led each group. The intervention was 7.5 hours in duration and was delivered in three or four time blocks, depending on cadet schedules. More than 98% of consenting cadets attended the program, and more than 95% of the program learning objectives were covered by facilitators. The control group participants received the standard health education normally provided at USAFA.

EVALUATION

USAFA assigns incoming cadets to eight basic cadet training units using a selection algorithm designed to create highly similar units. For the present study, we randomly assigned four units containing 404 cadets to the prevention program and four units containing 428 cadets to the control condition.

Following a research protocol and informed consent procedure reviewed and approved by the institutional review board at USAFA, we administered self-report surveys[7] to all consenting cadets at a pretest and posttest assessment. We collected pretest data in an auditorium at USAFA, and posttest data using an online survey four months after the completion of the program. Data collection procedures were identical for the intervention and control groups. The only link between the confidential ID codes and cadet names was on a master list held in a locked filing cabinet off campus.

We measured the primary outcome variable of unwanted sexual contact using a composite index of three items: "Someone kissed or sexually touched you without your active consent," "Someone initiated contact with you involving penetration or oral sex without your active consent," and "You had sexual intercourse when you didn't want to because you were too intoxicated to resist." Response options included never, more than a year ago, in the past year, in the past month, and in the past week. Because of differences in methodology, this measure of unwanted sexual contact is not comparable to that used in the Workplace and Gender Relations Surveys. We measured alcohol use with a composite index consisting of three items assessing the frequency of alcohol use, the amount consumed on a typical drinking day, and the largest number of drinks per occasion. Prior to data analysis, we checked for data entry errors, response inconsistencies, and outliers, following standardized data screening protocols.

Pretest Equivalence

There were no differences between intervention and control groups at pretest for gender, race, age, or unwanted sexual contact. However, intervention group cadets reported higher lifetime rates of alcohol use at baseline (28.3%) relative to control cadets (21.6%). To control for this difference, we used the alcohol use composite score as a covariate in analyses testing for intervention effects.

Attrition Analysis

There was a 79.2% sample retention rate from pretest to posttest, and this was the same across conditions. Analysis of attrition using χ^2 tests and *t* tests indicated that there were no significant pretest differences by condition for cadets for whom posttest data were or were not available. There also were no differences across conditions in attrition of higher-risk cadets, as defined by baseline substance use or unwanted sexual contact.

Outcome Analysis

We conducted outcome analyses using generalized linear models to compare the rate of unwanted sexual contact in the intervention and control groups at posttest, using pretest values of unwanted sexual contact, gender, and alcohol use as covariates. There was a significant effect of the intervention on unwanted sexual contact, with 4.4% of intervention cadets reporting at the posttest that one or more of the three unwanted sexual contact items occurred in the past year, compared with 7.4% of control group cadets, controlling for baseline rates of unwanted sexual contact, alcohol use, and gender (Wald χ^2 [1] = 3.87; P = .049).

ADVERSE EFFECTS

There were no adverse effects or unintended consequences reported by participants in the study.

SUSTAINABILITY

The CHiPS program has been sustained at USAFA and has been implemented with the incoming classes of cadets each summer since the conclusion of this study.

PUBLIC HEALTH SIGNIFICANCE

The present study tested an intervention designed to prevent unwanted sexual contact among incoming cadets at USAFA. Findings indicated that there was a significant effect of the intervention on unwanted sexual contact, with cadets who participated in the program reporting significantly lower rates than the control group. Strengths of the present study include a rigorous evaluation design, confidential self-report surveys with high response rates, an approach adapted from an evidence-based model extensively tested in previous prevention research, and the application of theory and methods derived from over three decades of research in the field of prevention science. Limitations include the possibility of underreporting of sensitive behaviors, our inability to identify offenders, the possibility of contamination across conditions, and lower statistical power at the posttest. AJPH

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K. W. Griffin contributed to the study design, data analysis and interpretation, and writing of the manuscript. C. Williams contributed to the study design, data interpretation, and writing of the manuscript. W. Travis and A. Tharp contributed to the study design, data interpretation, and review and revision of the manuscript.

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CONFLICTS OF INTEREST

K. W. Griffin was previously an employee of National Health Promotion Associates (NHPA), which markets the program adapted and tested in this project; he currently serves as a consultant to NHPA. C. Williams is an employee of NHPA.

HUMAN PARTICIPANT PROTECTION

The research protocol was reviewed and approved by the institutional review board at the United States Air Force Academy. All participants gave written informed consent before the baseline assessment.

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State Preemption: An Emerging Threat to Local Sugar-Sweetened Beverage Taxation

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See also Falbe et al., p. 546.

We sought to examine the strategies promoting and countering state preemption of local sugar-sweetened beverage (SSB) taxes in the United States. Using Crosbie and Schmidt's tobacco preemption framework, we analyzed key tactics used by the SSB industry to achieve state preemption of local taxes identified in news sources, industry Web sites, government reports, and public documents.

Starting in 2017, 4 states rejected and 4 passed laws preempting local SSB taxes. The beverage industry attempted to secure state preemption through front groups and trade associations, lobbying key policymakers, inserting preemptive language into other legislation, and issuing legal threats and challenges. The public health community's response is in the early stages of engaging in media advocacy, educating policymakers, mobilizing national collaboration, and expanding legal networks.

State preemption of local SSB taxes is in the early stages but will likely scale up as local tax proposals increase. The public health community has a substantial role in proactively working to prevent preemption concurrent with health policy activity and using additional strategies successfully used in tobacco control to stop preemption diffusion. (*Am J Public Health*. 2021;111:677–686. https://doi.org/10.2105/AJPH.2020.306062)

Sugar-sweetened beverages (SSBs) include calorically sweetened sodas, energy and sports drinks, coffees, teas, and fruit drinks. SSBs are the primary source of added sugars in the US diet, increasing the risk of cardiometabolic diseases.[1] Governments can levy sales and excise taxes (e.g., 1 cent per ounce) to discourage SSB consumption[2] while generating revenue to fund health-related programs.[3] Early evidence shows that SSB taxes (or "soda taxes") are associated with reductions in purchases of taxed beverages.[4] Momentum is growing for soda taxes globally: as of August 2020, at least 40 countries had introduced national soda taxes.[5]

Between 2014 and 2017, excise taxes on SSBs were enacted by the Navajo Nation and 7 US cities (Albany, CA; Berkeley, CA; Boulder, CO; Oakland, CA; Philadelphia, PA; San Francisco CA; and Seattle, WA); Washington, District of Columbia, enacted an SSB sales tax. Since 2017, however, political momentum has stalled because of beverage industry opposition; central to this opposition is the strategy of state preemption. Preemption occurs when a higher level of government (e.g., a state) limits the authority of lower levels (e.g., municipalities) to enact laws.[6] State preemption can sometimes limit local laws that support health inequities (e.g., exclusionary zoning laws)[7] and, in rare cases, can be appropriate nationally (e.g., the US federal airline smoking ban).[8] However, preemption is increasingly being used in favor of commercial interests to inhibit local governments from responding to community-specific needs through health policy.[9] In 2011, the Institute of Medicine concluded that federal and state governments should avoid preemption because it suppresses local innovation. Higher levels of government should primarily set minimum standards, allowing localities to enact more restrictive health policies as needed.[10]

The tobacco industry weaponized preemption in the 1980s,[11] followed by the firearm industry in the 1990s.[6] Since 2000, state preemption has had an impact on a growing range of policy innovations: the preemption of local plastic bag and bottle laws,

LGBTQ+ rights protections, minimum wage, and sick leave standards, as well as local efforts to control the spread of COVID-19 (e.g., through business closures).[6,8,12–19] Since at least 2008, the food and beverage industry has championed state preemption to quell local innovation in nutritional labeling laws[14,18] as well as soda taxes.[16–18]

Previous research has documented the process of passing preemption laws while debunking industry arguments in its favor.[20] Studies have shown how preemption obstructs local authority[21–23] as well as other adverse consequences.[24] Researchers have developed preemption frameworks for decision-makers[8] and health advocates[25] and have classified industry strategies for achieving preemption.[11] Researchers have also called upon public health advocates and policymakers to mount a more proactive response to the SSB industry's preemption use to slow the spread of local soda taxes.[12,18,26]

Crosbie and Schmidt previously developed a framework for understanding successful industry tactics and health advocate responses in state tobacco preemption debates, which started in the 1980s.[11] We applied this framework to understand beverage industry efforts to preempt local soda tax policies in the United States. Using publicly available sources, we conducted qualitative analyses of the tactics used by SSB industry stakeholders to preempt local soda taxes. We found that the beverage industry uses the full range of preemption tactics cultivated by the tobacco industry and that soda tax advocates have been forced to take a reactive rather than proactive response to this threat.

METHODS

Case selection sought to capture all significant state-level efforts to preempt local soda taxes in the United States. We used a combination of searches online, including resources provided by Grassroots Change Preemption Watch and the American Heart Association (AHA), and in the legal database LexisNexis to identify both successful and unsuccessful preemption attempts. The final sample was confined to all US states in which preemption was (1) successfully enacted, or (2) not enacted following an attempt that lasted for at least 6 months. We excluded unsuccessful attempts lasting less than 6 months because of difficulties with identifying all such cases. Short-term preemption attempts often occur behind the scenes and may therefore be unidentifiable.[18,27] Using these inclusion criteria, we identified 8 eligible cases: 4 states that passed preemption and 4 that were rejected by voters or withdrawn by policymakers following a debate of at least 6 months (Table 1).

Between August 2019 and February 2020, we compiled publicly available sources on the 8 cases of state preemption using Google searches and state legislation Web sites, including Ballotpedia. We located 81 documents, including government documents, reports, news media, and legislation (see Appendix, available as a supplement to the online version of this article at http://www.ajph.org, for a complete list). We applied standard snowball search methods,[28] beginning with keyword searches including "preemption," "preempt," "nutrition," "sugar sweetened beverages," "taxes," "Coca-Cola," "Pepsi," and "American Beverage Association." Documents were reviewed by E. C., K. E. W., and S. H. through multiple iterations, yielding analytic memos, timelines, and tables. Utilizing Crosbie and Schmidt's tobacco preemption framework, we analyzed cases with respect to the 4 types of industry tactics and 4 public health responses constituting the framework.

RESULTS

Since 2017, Arizona, California, Michigan, and Washington State have passed laws preempting local SSB tax policies (Table 1). In 3 of these states, it took an average of only 29 days from the policy's

TABLE 1— Attempts to Secure State Preemption of Local Sugar-Sweetened Beverage Taxes in the United States: 2017–2018

State	Bill or Measure Name	Date Introduced	Date Effective	Timeframe
Arizona	HB 2484	Jan 30, 2018	Mar 16, 2018	46 d
California	AB 1838	Jun 24, 2018	Jun 28, 2018	5 d[a]
Illinois	HB 4082	Aug 15, 2017	Jan 8, 2019 (W)	511 d
	HB 4083			
Michigan	HB 4999 and SB 0583	Sep 20, 2017	Oct 26, 2017	37 d
New Mexico	HB 2045	Feb 14, 2017	Nov 2, 2017 (W)	290 d
Oregon[b]	Measure 103	Jun 18, 2018	Nov 6, 2018 (R)	141 d
Pennsylvania	HB 2241	Apr 8, 2018	Oct 25, 2018 (W)	201 d
Washington[b]	Initiative 1634	Jul 6, 2018	Nov 6, 2018	124 d

Note. AB = Assembly Bill; HB = House Bill; R = rejected by voters; SB = Senate Bill; W = withdrawn.

[a]Initial ballot attempt was dropped in favor of this bill that was in the legislature for 5 d.
[b]Ballot measure.

introduction to its passage: Arizona (46 days), California (5 days), and Michigan (37 days). In Washington, preemption passed through a ballot measure. Preemptive laws in 2 of these states allow cities with preexisting SSB taxes to remain in place. In California, the cities of Berkeley, Albany, Oakland, and San Francisco had soda taxes grandfathered in, and in Washington, Seattle retained its soda tax. In Arizona and Michigan, preemption passed before any localities adopted a soda tax.

Since 2017, 4 states—Illinois, New Mexico, Oregon, and Pennsylvania—had policymakers withdraw preemption proposals or had them rejected by voters. Oregon voters rejected an industry-sponsored ballot initiative. In the other states, preemption bills made their way through the legislature, taking an average of 334 days from introduction to withdrawal (Table 1). Two states had localities with existing SSB taxes: Philadelphia, which retained its soda tax, and Cook County, Illinois, which repealed it for reasons unrelated to the preemptive bill. Localities in the other 2 states (Multnomah County, OR, and Santa Fe, NM) proposed SSB taxes when state preemption was being discussed.

We found specific instances in which successful and even unsuccessful state preemption attempts led local decisionmakers to abandon existing efforts to pursue soda taxes in their jurisdictions. Localities in California, including Santa Cruz, Davis, and Marin County, had proposed ballot initiatives for SSB taxes but withdrew these initiatives following statewide preemption.[29] Multnomah County had proposed an SSB tax ballot initiative, but momentum dwindled following the introduction of a preemption initiative on that state's ballot.[30]

Industry Efforts to Secure Preemption

We applied Crosbie and Schmidt's tobacco preemption framework to consider if and how the beverage industry used its 4 key tactics to promote preemption.

Promoting Preemption Through Front Groups

The first tactic in the tobacco preemption framework is to use front groups and trade associations to promote preemption by framing unified messages in the media and with policymakers. Using an identical strategy to tobacco corporations, US-based SSB companies (e.g., Coca-Cola, Pepsi, Dr. Pepper–Snapple) have funded front groups and trade associations to promote state soda tax preemption laws. Acting through state chapters in all 8 states, the American Beverage Association (ABA), the beverage industry's principal trade association, served as a mouthpiece for the industry. Targets of ABA outreach were similar across states: the ABA forged alliances for preemption with grocer associations, restaurant and bar owners, trade and labor groups, and retail merchants.

Part of the beverage industry's preemption efforts included the use of front groups (e.g., "Yes to Affordable Groceries") and slogans to obscure its role in backing preemption laws. Front groups attempted to promote preemption by reframing soda taxes as unfair "grocery taxes" that financially burdened working families. Front groups argued that preemption was necessary to protect "affordable groceries," establish "uniform" policies to promote fairness among businesses free of government interference, and eliminate a "patchwork" of inconsistent local laws. Trade associations and front groups produced brochures and editorials demanding uniform standards to create a "level playing field"—slogans later echoed in legal justifications for statewide preemption.

Across states, the beverage industry spent at least US $50 million through the ABA to support front-group campaigns to secure state preemption of local SSB taxes (Table 2). Existing regulations require funding disclosures on campaign materials, but the beverage industry typically did so in small font, often hidden in a footnote beneath lengthy lists of supporters and slogans. Front groups often had misleading names, such as "Yes to Affordable Groceries," "Citizens for a More Affordable Cook County," and "Yes! Keep Our Groceries Tax Free!" (Figure 1). Campaign Web sites across states featured similar slogans along with testimonial videos. One video featured a woman in Chicago, Illinois, stating, "We're being taxed out of Cook County. I'm a single mom. I can't afford this tax!" The campaign in Oregon argued for a constitutional amendment to make soda taxes illegal because "we need to permanently protect groceries from being taxed."

Lobbying Policymakers

The tobacco preemption framework shows that another successful industry tactic is the strategic industry lobbying of state policymakers in key positions to promote preemption. Our analyses found that beverage companies have followed suit, making campaign contributions and donations to state legislators and governors, on top of indirect contributions via front groups (Table 3). Beverage companies targeted chairs and members of state health

TABLE 2— Beverage Industry State Preemption of Local Sugar-Sweetened Beverage Taxes Funded Campaigns in the United States: 2015–2018

State	Front Group Messages	Funded by	Amount, $	Supporting Groups
Arizona	Yes on 126!	Citizens for Fair Tax Policy	9.16 million	Arizona Association of Realtors
		Realtors Issues Mobilization Fund	8 million	American Institute of Architects–Arizona
				Arizona Retailers Association
				Arizona Small Business Association
California	Keep Groceries Affordable Act of 2018	American Beverage Association California PAC-Two-Thirds Vote for State and Local Revenue Increases Initiative (2018)	7 million	Californians for Accountability
				Transparency in Government Spending, a Coalition of California
				Businesses, taxpayer groups
				Business property owners
				Beverage companies
Illinois	Citizens for a More Affordable Cook County	American Beverage Association	44 000	NA
		Ardagh Metal Beverage USA Inc	32 200	
		Monster Energy Company	22 200	
		Corn Refiners Association	22 200	
		Amcor Rigid Plastics USA LLC		
Michigan	NA	National Federation of Independent Business	NA	NA
Oregon	Vote Yes on 103: Yes! Keep Our Groceries Tax Free	American Beverage Association	3 295 346	Parents Education Association
		Coca-Cola	1.4 million	
		PepsiCo	1.1 million	
		Dr. Pepper–Snapple Group Inc	440 000	
		Red Bull	35 000	
		Kroger	200 000	
Pennsylvania	NA	NA	NA	NA
Washington	Yes to Affordable Groceries	American Beverage Association	8 484	Teamsters Local 174
		Coca-Cola	10.7 million	Joint Council of Teamsters No. 28
		PepsiCo	8 million	
		Dr. Pepper–Snapple Group Inc	911 021	

Note. NA = not applicable or not available; PAC = political action committee.

committees to access policymakers positioned to move preemption proposals out of relevant committees in time for full floor votes. The beverage industry also donated to governors, including California's Governor Jerry Brown, to assure executive sign-off (see online Appendix).

Inserting Preemption Through Varied Avenues

The tobacco preemption framework found that tobacco companies succeeded by deploying various legislative avenues, including bills, ballot initiatives, and riders. Beverage companies have used the same approach to preempt local soda taxes. In Arizona, Illinois, Michigan, New Mexico, and Pennsylvania, beverage companies lobbied policymakers to introduce preemption in legislative bills. In New Mexico, preemption language was added at the last minute to a 300-page substitute bill addressing a variety of unrelated tax issues; many legislators were unaware that soda tax preemption language had been added. In California, Oregon, and Washington, beverage companies sponsored ballot initiatives, often using ambiguous language likely meant to confuse voters. In Oregon and Washington, the beverage industry promoted a "yes" vote as a vote for "affordable groceries." This was confusing because voting "yes" actually meant "yes" to preemption and "no" to soda taxes. Adding to the confusion was the fact that local taxes were for SSBs, not all groceries.

FIGURE 1— Beverage Industry Front Group Ads to Support State Preemption of Local Sugar-Sweetened Beverage Taxes in Oregon and Washington: 2017–2018

The successful play for preemption in California took a particularly circuitous path into law. Early in the election cycle, the state's ABA chapter financed a signature-gathering campaign for a November ballot initiative that would have crippled local governments by requiring a two thirds vote on all new taxes, including library fees, public safety, and government services, as well as any soda taxes. One week before the registration deadline for ballot initiatives, ABA lobbyists coerced state representatives to support an 11th-hour bill (Assembly Bill 1838) preempting local soda taxes through the year 2030. If state legislators failed to pass the soda tax preemption bill, the ABA threatened to register its draconian tax initiative for the November ballot. Legislators voted for soda tax preemption as the lesser evil.

Issuing Legal Threats and Challenges

The tobacco preemption framework found that the industry successfully used litigation threats that leveraged state preemption to deter municipalities from moving forward with tobacco control policies. The SSB industry similarly issued legal threats and challenges to create a chilling effect on the diffusion of soda taxes at the local level. A coalition of consumers, retailers, distributors, and trade associations, including the ABA, sued the City of Philadelphia over its soda tax, arguing that it violated and was preempted by state law. In 2018, the Pennsylvania Supreme Court ruled in favor of the city in a 4-to-2 decision, upholding its soda tax.

The tobacco preemption framework defines 4 counterstrategies cultivated by tobacco control advocates to successfully resist preemption attempts or reverse them after the fact.

Media Advocacy

Tobacco control advocates successfully fended off preemption attempts by educating the public and policymakers by framing preemption as a threat to local control. We found that, since 2017, a nucleus of soda tax advocates have begun to adopt media advocacy, spearheaded by the AHA, often with support from state medical and dental societies, public health policy advocates, and other civil society groups such as the Praxis Project.

Media advocacy included press conferences, public service announcements, press releases, flyers and brochures, media reports, opinion-editorials, media interviews, podcasts, debates, and social media (see online Appendix). Public health framing varied across states, with many narratives emphasizing the positive aspects of "local choice" and "local authority" in contrast to "state-only control." Health advocates in several states used earned media to educate the public and policymakers about behind-the-scenes attempts to slip preemption into legislation, expose the industry ties of front groups, and shed light on deceptive practices. In Washington, health advocates pushed back against attempts to reframe soda taxes as grocery

TABLE 3— Industry Contributions and Political Support of State Preemption of Local Sugar-Sweetened Beverage Taxes in the United States: 2015–2018

State	Government Official	Position	Amount Received, $	Preemption Action
Arizona	T.J. Shope	Member of Arizona House of Representatives	1 050 "food industry"	Primary sponsor HB 2484
			1 500 Coca-Cola	
			1 000 National Grocers' Association	
			750 Arizona Restaurant and Hospitality Association	
			500 Kroger Co	
	Doug Ducey	Governor	13 500 Coca-Cola	Signed HB 2484
California	Jerry Brown	Governor	54 400 ABA	Signed preemption legislation
	Chad Mayes	Vice chair of House Health Committee	4 700 PepsiCo	Voted "yes" on AB 1838
	Frank Bigelow	Member of House Health Committee	3 000 California Grocers Association	Voted "yes" on AB 1838
			2 000 ABA	
	Rob Bonta	Member of House Health Committee	5 000 Food and Commercial Workers Region 8 Golden State Council	Voted "yes" on AB 1838
	Autumn Burke	Member of House Health Committee	6 500 California Grocers Association	Voted "yes" on AB 1838
			2 500 Coca-Cola	
	Wendy Carrillo	Member of House Health Committee	4 700 Coca-Cola	Voted "yes" on AB 1838
			4 200 PepsiCo	
	Kevin McCarthy	Member of House Health Committee	4 700 Food and Commercial Workers Region 8 Golden State Council	Voted "yes" on AB 1838
	Freddie Rodriguez	Member of House Health Committee	9 400 PepsiCo	Voted "yes" on AB 1838
			4 700 California Teamsters Joint Council 42	
			4 700 Food and Commercial Workers Local 1 167	
			2 500 Coca-Cola North America Company	
			2 000 United Food and Commercial Workers International Union	
			2 000 Food and Commercial Workers Local 770	
			1 500 California Restaurant Association	
			1 500 Food and Commercial Workers Local 324	
	Miguel Santiago	Member of House Health Committee	3 500 United Food and Commercial Workers International Union	Voted "yes" on AB 1838
			3 000 PepsiCo	
	Marie Waldron	Member of House Health Committee	4 700 California Restaurant Association	Voted "yes" on AB 1838
			2 000 PepsiCo	
Illinois	John Fritchey	Representative of Illinois General Assembly	85 000 ABA	Voted against sales and soda tax
			54 000 Citizens for a More Affordable Cook County	Cosponsored measure to repeal soda tax in Cook County
			18 143.42 Teamsters Local Union No. 727	
	Richard Boykin	Former member of Cook County Board of Commissioners (2014–2018)	64 000 Citizens for a More Affordable Cook County	Cosponsored measure to repeal soda tax in Cook County
			123 000 ABA	
	Michael McAuliffe	Member of Illinois House of Representatives (1997–2019)	250 Illinois vendors PAC	Sponsored HB 4082
			500 Illinois Food Distribution	
			250 PepsiCo	

Continued

TABLE 3— Continued

State	Government Official	Position	Amount Received, $	Preemption Action
Michigan	Rob VerHeulen	Michigan House of Representatives; previous mayor of Walker, MI	250 PepsiCo 2016 Concerned Citizens Fund	Sponsored and introduced HB 4999
			5000 Michigan Beer and Wine Wholesalers Association	
			2 500 Meijer Inc	
			2 000 Michigan Retailers Association	
			550 Michigan Distributors and Vendors Association	
	Pete MacGregor	State Senator	3 200 Michigan Retailers Association	Sponsored Senate version of preemption bill
			3 050 Meijer Inc	
			1 600 Michigan Restaurant Association	
			1 350 Michigan Distributors and Vendors Association	
New Mexico	Sarah Maestas Barnes	Legislator	1 000 Admiral Beverage Corp	Introduced preemption measure
Oregon	Bruce Hanna	Cospeaker of the Oregon House of Representatives; president of Roseburg Coca-Cola Bottling Plant	35 000 ABA (2010)	NA
			35 000 ABA (2012)	
Pennsylvania	Mark Mustio	Pennsylvania House of Representatives (Legislative Budget and Finance Committee)	1 650 Pennsylvania Licensed Beverage Association	Sponsor of HB 2241

Note. AB = Assembly Bill; ABA = American Beverage Association; HB = House Bill; NA = not applicable or not available; PAC = political action committee.

taxes despite the industry having outspent their campaign by 178 to 1 ($22 442 233.51 to $125,943.69). Health advocates in Oregon received a private philanthropic donation of $2.1 million that contributed to the success. However, in Arizona and Michigan, state preemption passed quickly through the legislature, leaving no time for opposition from the public health community. In California, stealth efforts to slip preemption into law over 5 legislative days left no time for media advocacy. Still, it is unclear whether this would have made a difference given policymakers' difficult choice.

Educating Policymakers

The tobacco framework shows that, by educating policymakers, advocates can counter industry lobbying efforts. While soda tax advocates in several states have begun educating prominent government officials about preemption's impact on local control, these efforts remain nascent, with no formal national strategy. Similar to efforts to combat preemption attempts in tobacco,[11] the AHA has led efforts alongside local grassroots organizations to build relationships with political champions. AHA leaders have written letters to government officials, testified during public hearings, and have issued public comments. Financial support by Bloomberg Philanthropies has supported efforts to educate policymakers about preemption threats to local policymaking in Oregon and Illinois.

Mobilizing National Opposition

The creation of the National Tobacco Preemption Task Force, used to coordinate strategy and evolve best practices across states, marked a turning point in the resistance to state preemption in tobacco control. We found evidence that health organizations have mobilized grassroots movements within states but have not fully unified nationally. Lack of unity within states has affected outcomes. In California, for example, health advocates fell prey to the ABA's divide-and-conquer strategy, which forced unions to break against public health because not doing so would have had worse consequences for labor.

The AHA led early efforts to build an interconnected network of grassroots groups and statewide health advocacy organizations, thus setting the foundation for a national network. In March 2017, Grassroots Change published a toolkit of preemption myths and facts

and advocacy training resources. The AHA and Grassroots Change partnered on a messaging toolkit that was successfully used in Oregon and Pennsylvania. In October 2018, the Local Solutions Support Center joined efforts to build a national antipreemption movement to publish handbooks defining best practices for countering preemption and model campaign materials that were used at national health conferences holding sessions on preemption. In August 2019, the AHA, in partnership with the Robert Wood Johnson Foundation, created the Voices for Healthy Kids initiative and developed a preemption fact sheet for use in advocacy campaigns.

Expanding Legal Networks

The expansion of coordinated efforts by a national network of legal experts was key to the tobacco control movement's ability to withstand preemption attacks. Our analysis found a small, loosely coupled network of attorneys providing technical assistance to soda tax advocates but no single, nationwide organization providing centralized resources. In March 2017, Grassroots Change published a model soda tax law with provisions to withstand industry preemption challenges in the courts. In October 2018, legal experts advocated for more proactive efforts to build antipreemption "savings clauses" into state law that shield local soda taxes from court challenges by expressly reserving authority for local governments.

DISCUSSION

We applied a framework based on the history of tobacco control preemption to understand beverage industry efforts to preempt local soda tax policies in the United States. We found that the SSB industry, operating through its trade organization the ABA, has made full use of tactics cultivated by the tobacco companies to promote state preemption. The beverage industry obscured its agency in preemption attempts with front groups that present as locally grown, grassroots citizen activist groups, such as "Californians for Accountability and Transparency in Government Spending," "Joint Council of Teamsters No. 28," and "Citizens for a More Affordable Cook County." Industry stakeholders used donations and lobbying to strategically target decisionmakers positioned to quickly move preemption legislation. All told, the beverage industry spent at least $50 million between 2016 and 2018 on preemption attempts in 8 US states. Beverage companies have tried multiple avenues for achieving soda tax preemption: legislative bills, ballot initiatives, and riders added to unrelated bills. They have also used litigation to subdue local governments seeking autonomy in nutrition policy, including a lengthy court battle in Pennsylvania that went all the way to the state's Supreme Court.

While the beverage industry has built upon the tobacco industry's preemption strategy, it has introduced some novel tactics of its own. With varied success, it has framed soda taxes as "grocery taxes" to confuse voters. It has promoted ballot measures for which the meaning of a "yes" vote was not transparent. And although beverage companies, like tobacco companies, have urged legislators to push through 11th-hour preemption bills, in 2018, the ABA used an unprecedented degree of pressure to compel California legislators opposed to preemption to nonetheless vote in favor of it.

Our findings suggest that the public health community's response to preemption has mainly been reactive because of lack of funding and resources and the need to address misleading frameworks, which detracted from their ability to counter preemption directly. Public health groups have, at times, been caught off guard because of behind-the-scenes behavior of the industry and, thus, were unable to mount a strong countervailing force.[12] Soda tax advocates in the United States are using many tactics spearheaded by tobacco control advocates, including media advocacy and educating state policymakers. However, the movement lacks a robust formal national infrastructure supported by a legal adviser network.

Advocates can learn from the history of tobacco preemption[11] to bring antipreemption activities to the forefront of their policy activity, scaling up a national effort to proactively prevent industry attempts to spread state preemption laws further.[31] An essential lesson from state preemption in tobacco control is that, once preemption laws are enacted, they create a chilling effect that severely cripples local progress, and they are challenging to repeal. The repeal of state laws preempting local smoke-free air laws—one of only a few public health policy topics ever repealed across the country—took, on average, 12 years.[11] State preemption for SSB taxes has already created a chilling effect by forcing localities to withdraw local SSB tax initiatives.[29] Efforts to repeal preemption presented particular challenges in California, where health advocates have struggled to gather consensus on whether to repeal state preemption or overturn it with a statewide tax.[32] Preventing and repealing state preemption provides crucial opportunities for public education, stimulating debate, and shifting social norms.[31] For example, in 2019, the repeal of state preemption of

local tobacco control in Colorado led to the launching of 40 local government tobacco regulation campaigns, including 9 tax proposals that passed with solid majorities in ballot initiatives.[33] State preemption does away with these opportunities.

Limitations

This study's strength is its use of an empirically validated conceptual framework for predicting tactics that are likely to be deployed by the SSB industry in pursuing state preemption. This is offset by limitations in the availability of public information to comprehensively identify preemption attempts that did not rise to the level of open public debate and the lack of research to identify the use of litigation to argue implied preemption. Additional research is needed to develop more comprehensive approaches for capturing the universe of state preemption attempts, including those that are not elevated to the public record. Another limitation is the absence of key informant interviews with policymakers and advocates; future research should include such interviews to better understand the SSB tax policy and preemption landscape.

Conclusions

Eight US states have experienced sustained debates over soda tax preemption, and the beverage industry has succeeded at suppressing local autonomy in half. State preemption has had the industry's intended effect of chilling innovation at the local level: between 2015 and 2017, 7 local governments passed soda taxes, but none have since. While the beverage industry's use of state preemption to halt diffusion in local soda taxes is limited so far, the beverage industry uses time-tested strategies cultivated by the tobacco industry. Public health opposition to SSB tax preemption is nascent but generally uses tactics that mirror those successfully pioneered by tobacco control advocates. Findings from this research point to the need for a robust national network of advocates, supported by national panels of legal experts, that can shift from a reactive to a proactive approach that halts the spread of preemption and begins the task of overturning existing statutes. AJPH

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Neurotoxicity of Ortho-Phthalates: Recommendations for Critical Policy Reforms to Protect Brain Development in Children

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See also Birnbaum and Bornehag, p. 551.

Robust data from longitudinal birth cohort studies and experimental studies of perinatally exposed animals indicate that exposure to ortho-phthalates can impair brain development and increase risks for learning, attention, and behavioral disorders in childhood. This growing body of evidence, along with known adverse effects on male reproductive tract development, calls for immediate action.

Exposures are ubiquitous; the majority of people are exposed to multiple ortho-phthalates simultaneously. We thus recommend that a class approach be used in assessing health impacts as has been done with other chemical classes. We propose critically needed policy reforms to eliminate ortho-phthalates from products that lead to exposure of pregnant women, women of reproductive age, infants, and children. Specific attention should be focused on reducing exposures among socially vulnerable populations such as communities of color, who frequently experience higher exposures.

Ortho-phthalates are used in a vast array of products and elimination will thus necessitate a multipronged regulatory approach at federal and state levels. The fact that manufacturers and retailers have already voluntarily removed ortho-phthalates from a wide range of products indicates that this goal is feasible. (*Am J Public Health*. 2021;111:687–695. https://doi.org/10.2105/AJPH.2020.306014)

As experts in toxic chemicals and neurodevelopment who are members of Project TENDR (Targeting Environmental Neuro-Development Risks), we have determined that exposure to ortho-phthalates can impair child brain development and increase children's risks for learning, attention, and behavioral disorders. There are robust data from longitudinal birth cohort studies conducted over the last decade that have shown associations between prenatal exposures to ortho-phthalates and attention-deficit hyperactivity disorder (ADHD), other behavioral problems, adverse cognitive development including lower IQ, poorer psychomotor development, and impaired social communication.

This growing body of evidence, along with the known adverse effects on male reproductive tract development of ortho-phthalates, calls for immediate action. Given that general population exposure is ubiquitous and is to a mixture of multiple ortho-phthalates simultaneously, we recommend that assessment of hazard use a class approach, as has been done for a number of other chemical classes. To protect child brain development, ortho-phthalates need to be removed from consumer products that contribute to exposure of pregnant women, women of reproductive age, infants, and children. We summarize the epidemiological evidence on adverse neurodevelopmental effects following prenatal exposure to ortho-phthalates, discuss sources of exposure and what is known about potential mechanisms, and propose urgently needed reforms to substantially reduce exposures to ortho-phthalates over critical periods of child brain development.

WHAT ARE PHTHALATES?

Ortho-phthalates are diesters of phthalic acid and are the predominate

type of phthalate used in commerce. (For simplicity, we will refer to them as phthalates.) They are high-production-volume chemicals used most often as a plasticizer in polyvinyl chloride (PVC) and other plastics. Phthalates are used in numerous consumer products, including food production materials and packaging; medical supplies and coatings of medicines; flooring, wall coverings, and other home materials; and cosmetics and other personal care products.[1] Approximately 4.9 million metric tons are produced annually worldwide (reviewed in Ejaredar et al.[2]). The highest-production phthalates are di-2-ethylhexyl phthalate (DEHP), diisononyl phthalate (DiNP), butylbenzyl phthalate (BBzP), dibutyl phthalates (DBPs), and diethyl phthalate (DEP).[3]

Diet is a particularly important exposure pathway for some phthalates, including DEHP and DiNP.[4] Phthalates have been shown to leach into food from plastic equipment like tubing used in commercial dairy operations, lid gaskets, food preparation gloves, conveyor belts, and food packaging materials.[5] As such, consumption of fast food and other dining-out sources,[5] as well as lipophilic foods such as dairy,[4] can be important dietary sources of phthalate exposures.

Building products containing phthalates, such as vinyl flooring and wall coverings, have a large surface area from which phthalates can migrate into the indoor air and household dust, also resulting in human exposure.[6] Historically, phthalates were added to children's toys, although use of multiple phthalates in toys has been banned by the Consumer Product Safety Commission (CPSC; see the box on page 689).[1,7]

Phthalates including DEP and DBPs are commonly used in cosmetics and other personal care products, and are sometimes used as excipients in medications and supplements (see the box on page 689).[2] For example, DEP and DBPs are used in a wide range of personal care products including nail polish, lotions, fragrances, and hair-styling products.[41] Numerous studies have found correlations between personal care product use and the concentrations of phthalate metabolites in urine.[41] Overall, women have higher exposure to phthalates found in personal care products than men, and Black and Latina women have higher exposure to certain phthalates compared with White women, independent of socioeconomic status.[42] Phthalates are readily transferred from mother to fetus during pregnancy.[2]

US population exposure to phthalates has changed in the last decade.[7] Exposures to di-*n*-butyl phthalate (DnBP), BBzP, and DEHP have declined, while exposures to replacement phthalates such as DiNP and diisobutyl phthalate (DiBP) have increased. The observed temporal trends are likely a reflection of legislative activity and advocacy efforts of nongovernmental organizations, as well as changes by manufacturers and retailers in response to consumer preference (see the box on page 689).[7]

EPIDEMIOLOGICAL EVIDENCE OF NEUROTOXICITY

Historically, most of the health concerns and regulations pertaining to phthalates were motivated by strong toxicological evidence showing adverse antiandrogenic effects on male reproductive tract development.[1] More recently, an increasing number of prospective epidemiological studies have found associations between prenatal exposure to phthalates and adverse neurodevelopment in offspring.[43] A recent systematic review of the human data concluded that prenatal exposure to DEHP, DBPs, DEP, and BBzP has an adverse impact on cognitive and psychomotor development, internalizing and externalizing behaviors, attention, gender-related play behaviors, social responsiveness, and visual spatial abilities of children.[43] As of 2019, there were more than 30 published studies that have measured prenatal exposure to phthalates using validated exposure biomarkers[43–49] or environmental estimates of prenatal exposure[50,51] in longitudinal cohorts assembled from 11 different countries or territories around the globe. Children have been followed for altered neonatal behavior or infant visual recognition memory, cognitive development, behavior, executive function, reciprocal social behavior, gender-related play behaviors, and for symptoms of, or clinical diagnosis with, developmental disabilities including autism and ADHD. Examples of key findings from this extensive literature base are discussed in the following paragraphs.

The most consistent pattern across multiple studies is associations with behaviors commonly associated with ADHD (including hyperactivity, aggression/defiance, and emotional reactivity),[43] deficits in executive function,[52,53] or ADHD clinical diagnosis.[54] For example, a 2018 study nested within the Norwegian Mother and Child Cohort leveraged a linkage between this cohort and the Norwegian National Patient Registry, which collects all outpatient diagnoses from specialty clinics. Engel et al. measured second-trimester urinary phthalates and found that children of mothers that fell in the highest quintile of prenatal exposure to DEHP metabolites had almost 3 times the odds of being diagnosed with ADHD as those with mothers in the lowest quintile (odds ratio [OR] = 2.99; 95% confidence interval [CI] = 1.47, 5.49).[54]

Federal Regulatory, Manufacturer, and Retailer Action on Phthalates

I. Federal Regulatory Action

A. US Environmental Protection Agency (EPA)

- Set a drinking water standard for DEHP (6 ppb).[8]
- Listed DEHP and DBP as hazardous air pollutants and as substances on the Toxic Release Inventory that must be reported to EPA if released into any media.[8]
- Listed phthalates as hazardous waste if discarded as commercial chemical products under the Resource Conservation and Recovery Act.[8]
- Recently designated 5 phthalates (DnBP, DiBP, BBzP, DEHP, and DCHP) as high-priority substances for risk evaluation under the Toxic Substances Control Act.[9]

B. US Consumer Product Safety Commission

- Banned 8 ortho-phthalates from use in children's toys and childcare articles: DEHP, DBP, BBzP, DINP, DiBP, DPENP, DHEXP, and DCHP.[10] The regulation is under legal challenge by the National Association of Manufacturers, the American Chemistry Council, and other industry groups.[11]

C. US Food and Drug Administration (FDA)

- Set maximum concentration of DEHP in bottled water at the same concentration that EPA had set in drinking water.[12]
- Issued guidelines (but not regulation) recommending that DBP and DEHP be avoided as excipients in prescription and nonprescription products,[13] advised manufacturers to label medical devices that contain DEHP,[14] and concluded that exposure to DEHP received by some infants from medical device–related sources could be substantially greater than the agency's estimate of the Tolerable Intake.[15]
- Approved use of 28 phthalates as food additives in food contact articles.[16,17] Uses include as plasticizers, binders, coating agents, defoamers, and gasket closures, in materials such as cellophane, paper and paperboard, and plastics.
- Has failed to meet the statutory deadline for final decisions on 3 recently submitted petitions that could substantially reduce dietary exposure to phthalates.[17]
  - o Two were submitted by 11 environmental and public health organizations and requested that FDA strike from its existing regulations its approvals of all 28 phthalates as food additives in food contact articles, as the agency could no longer conclude that such use is safe, as is required by law.[17]
  - o The third petition was submitted by the Flexible Vinyl Alliance and requested that FDA revoke its approval of 24 phthalates that the Alliance claims are no longer used as food additives in food contact applications.[17] The industry petition did not include several approved uses of these phthalates and continued the approval of DEHP, DINP, DCHP, and DIDP as food additives.

II. Examples of Voluntary Action by Retailers and Manufacturers

- Home Depot's safer chemicals policy includes restrictions on phthalates as a class in vinyl flooring and wall-to-wall carpet.[18,19]
- Lowe's, Lumber Liquidators, and Menards have taken action to remove phthalates as a class from vinyl flooring.[19,20]
- Apple has removed phthalates as a class from almost all products.[21]
- Hewlett Packard has removed multiple phthalates from commercial personal computer products and a lesser number from other products.[22]
- IKEA has removed phthalates from a number of its products.[23]
- Mohawk,[24] Tarkett,[24] SC Johnson,[25] and Steelcase[26] have restricted use of phthalates in some products, including household products.
- Ahold Delhaize, the fourth largest grocery chain in the United States (with 2000 stores including Food Lion, Giant Food, Giant/Martin's, Hannaford, and Stop & Shop) recently announced restrictions on phthalates and other chemicals in its own branded products in the following categories: all grocery, baby food and infant formula, and formulated laundry products, as well as personal care, cosmetic, and baby products.[27,28]
- CVS Health,[29] Loblaw,[29] Rite Aid,[30] and Walmart[31] are also reducing the use of phthalates in beauty and personal care products and household products with the goal of elimination.
- Sephora set a goal to reduce high-priority chemicals including 8 phthalates by 50% over the next 3 years.[32,33]
- Panera Bread has replaced vinyl gloves, which must be softened with phthalates or other plasticizers, with safer alternatives such as polyethylene gloves that require no such chemical additives.[33]

III. Examples of Health Care Organization and Medical Supplier Actions

- Dignity Health,[34] Hackensack Meridian Health,[35] and Kaiser Permanente[36] have a stated preference for products made without phthalates.
- Warner Chilcott recently brought a new product to market, Delzicol (mesalamine), which does not contain DBP in the medication coating.[37]

In totality, these examples demonstrate the feasibility of reformulating a vast array of products to remove phthalates. Cited references can help inform steps necessary in selection of safer alternatives when replacing phthalates.[38–40]

Note. BBzP = butylbenzyl phthalate; DBP = dibutyl phthalate; DCHP = dicyclohexl phthalate; DEHP = di-2-ethylhexyl phthalate; DHEXP = di-*n*-hexyl phthalate; DiBP = diisobutyl phthalate; DIDP = di-isodecyl phthalate; DINP = diisononyl phthalate; DnBP = di-*n*-butyl phthalate; DPENP = di-*n*-pentyl phthalate; and ppb = parts per billion.

Phthalates, particularly metabolites of DBP and DEHP, have also been associated with more problem behaviors, as estimated by validated inventory-based behavioral rating scales in these largely subclinical populations. For example, Lien et al. reported that third-trimester urinary concentrations of DnBP and DEHP metabolites were associated with more externalizing problems, more delinquent behaviors, and more aggressive behaviors, as measured by the Child

Behavior Checklist, in a population of 8-year-old children in Taiwan.[55] Also using the Child Behavior Checklist and leveraging a US-based multicenter pregnancy cohort enrolled in California, Minnesota, Missouri, and Iowa, Kobrosly et al. reported that third-trimester urinary DiBP metabolites were associated with more inattention, rule-breaking behavior, aggression, and conduct problems.[56] DEHP and BBzP metabolites were also linked with altered behavior that was in some cases sex-specific. Another recent study found an association between prenatal exposure to the sum of low-molecular-weight phthalates (which includes metabolites of DBPs and DEP) and hyperactivity, attention problems, and anxiety at the age of 16 years.[49]

In addition, phthalates have been associated with altered child executive functions using both rater-based and performance-based assessments. Executive functions are higher-order cognitive processes that support goal-directed behaviors and are typically impaired in children with ADHD. Factor-Litvak et al. reported that prenatal DBP metabolites were associated with poorer working memory in a birth cohort enrolled in New York City and administered the Wechsler Intelligence Scale for Children-IV at age 7 years.[53] Engel et al. reported that prenatal metabolites of DBP were associated with poorer working memory on the Behavior Rating Inventory of Executive Function.[52] Factor-Litvak et al. also found that prenatal metabolites of DBPs were associated with a significant linear reduction in child IQ. Overall, child IQ was 7 points lower in the highest versus lowest quartile of DBP exposure. DBP metabolites were also associated with index-specific decrements in processing speed, perceptual reasoning, and verbal comprehension.[53] Maternal urinary concentrations of BBzP metabolites were also associated with reductions in child perceptual reasoning.[53]

It is important to note that the literature is not entirely consistent, particularly among studies that focus on cognitive development during infancy and early childhood. Among these studies, there is often a lack of overlap in the specific metabolites implicated, the gender most affected, or the direction of the relationship. Even among studies of neurobehavior, not all have found associations,[48,49,57,58] and some have found associations primarily with internalizing domains.[59,60] Some of these differences may be attributable in part to differences in the study designs, including the age of the child at testing, the gestational age at urine sample collection, and the instruments used for assessing neurodevelopmental outcomes measures. In addition, early studies of phthalates and neurobehavior summed phthalate metabolites into low- and high-molecular-weight groupings, which makes it difficult to compare results to those reporting findings on individual phthalates, particularly in light of temporal changes of the contribution of specific phthalates to the overall exposure mixture.

Despite these differences, the weight of evidence strongly supports a relationship between certain phthalates and altered neurobehavioral development. This interpretation is additionally supported by the Chronic Hazard Advisory Panel for the CPSC, which concluded that poorer neurodevelopment test scores are generally associated with higher maternal prenatal urinary concentrations of metabolites of DEHP, DBPs, and DEP, and that human exposure to these phthalates should be reduced.[1] Consistent with the systematic review by Zhang et al.,[43] a 2015 review also concluded that prenatal exposures to DEP, BBzP, DEHP, and DBPs were associated with adverse cognitive and behavioral outcomes in children, including lower IQ and problems with attention, hyperactivity, and poorer social communication.[2]

EXPERIMENTAL EVIDENCE OF NEUROTOXICITY

Studies of gestational and early life exposure in animal models, which have mostly focused on DEHP, are generally consistent with the observations from epidemiological studies. The most consistently observed effects include hyperactivity, anxiety and depressive behaviors, and cognitive impairments including impacts on learning and memory.[61] Disruption of the organization and function of the hypothalamic–pituitary–gonadal axis by phthalates known to inhibit fetal testosterone production is also frequently reported.[61] A particularly compelling study showed that rats perinatally (both before and after birth) exposed to a human-relevant phthalate mixture displayed lower cognitive flexibility in a set-shifting task, an outcome that correlated with fewer synapses in the prefrontal cortex.[62] Sensitive windows of exposure span pre- and postnatal life through adolescence[63] including puberty[64–66] and possibly adulthood,[67–70] which is unsurprising given that complex structures including the prefrontal cortex, hippocampus, and cerebellum undergo significant development well into early adulthood.

Consistent with the epidemiological findings, animal outcomes are frequently sex-specific. It is known that many phthalates are antiandrogenic[1] although antiestrogenic effects have also been reported in vitro.[71] It has been hypothesized that the differential effect of phthalates on neurobehavioral

outcome by sex seen in many studies may result from disrupted fetal testosterone production. Critically, unlike rodents in which testosterone is aromatized to estrogen in the developing brain and then acts via estrogen receptors to masculinize the male brain, in genetically male humans testosterone acts primarily via the androgen receptor.[70] Thus, while the phenomenon of sex-specific effects may be conserved across species, specific effects within sex may vary based on taxonomical differences in steroid hormone function. Phthalates can also modulate aromatase activity in the developing brain, which can interfere with estrogen synthesis.[72,73] This is of concern because estrogen plays a critical role in brain plasticity and other developmental refinements,[74] and there is also growing evidence that estrogen synthesis can be extragonadal, including in the brain.[75]

The hippocampus and, consequently, aspects of neural plasticity, cognitive flexibility, anxiety-like behavior, learning, and memory, are thought to be particularly vulnerable to phthalates. For example, male mice prenatally exposed to DEHP had evidence of oxidative stress, neuronal loss, and neuroinflammation in the hippocampus as adults, along with elevated anxiety behavior and impaired recognition memory.[76,77] Similarly, male rats perinatally exposed to DEHP had impaired dendritic complexity in the hippocampus, particularly in CA1 pyramidal neurons.[78]

A recent review of the phthalate literature discussed several additional potential mechanisms to explain the epidemiological and animal toxicity literature.[3] Disruption of thyroid hormone pathways is one potential mechanism of interest, given that thyroid hormone is essential for brain development. There is also evidence of altered ion homeostasis including calcium signaling, peroxisome proliferator-activated receptors activation, and lipid metabolism, particularly in the hippocampus.

In summary, multiple longitudinal studies of human prenatal phthalate exposure have found evidence of altered neurobehavioral development. These findings are of concern especially in light of the supporting evidence from experimental studies and a growing understanding of the mechanisms whereby phthalates may adversely affect fetal brain development. Given the widespread exposures to phthalates, including among women and children, and the limited existing US regulations, none of which focus on pregnant women, health-protective regulatory actions are required to eliminate these potentially harmful exposures.

RECOMMENDATIONS FOR SENSIBLE POLICY REFORMS

Mounting evidence on the impacts of phthalates on children's brain development compels meaningful actions to eliminate exposure for women of reproductive age, pregnant women, infants, and children. As discussed, human exposure to phthalates ranges from foods to building materials to medical products, pharmaceuticals, cosmetics, and other personal care products. Therefore, reducing human exposure necessitates a multipronged approach through regulations at the federal and state levels, as well as through voluntary action on the part of retailers and manufacturers.

To date, federal regulation of phthalates in the United States has been minimal with several exceptions, including restrictions on 8 phthalates in children's toys and childcare articles (see the box on page 689). We strongly urge both federal and state agencies to move rapidly to eliminate phthalate use. Specific attention should be focused on reducing exposures among socially vulnerable populations such as communities of color, who frequently experience higher exposures.[42] States should not wait for the federal government to act, as state action can galvanize federal regulation. It is encouraging that voluntary action on the part of manufacturers, retailers, and health care organizations has removed phthalates from a wide range of products (see the box on page 689). Consumer pressure is critical to motivate additional manufacturers and retailers to act, as well as to encourage federal and state regulation.

We recommend that the evaluation of hazards of phthalates use a class approach as has been done for other classes of chemicals (e.g., organophosphate pesticides, dioxin-like compounds) and as has recently been recommended by a National Academy of Sciences report on organohalogen flame retardants.[79,80] This approach is appropriate given that general population exposure is to mixtures of phthalates, coupled with the fact that phthalates have similarities in chemical structures, metabolism, and biological activity, including disruption of multiple endocrine systems, and have common health outcomes, including adverse effects on child neurodevelopment and male reproductive tract development, as well as other adverse effects.

Following are 5 critical recommendations for reducing phthalate exposures:

1. to reduce dietary exposure,
2. to reduce exposure from medical supplies and medication,

3 to reduce exposure from personal care products and other household products,
4 to reduce exposure from a broad range of other products including building materials, and
5 to reduce risk of regrettable substitution.

Dietary

The US Food and Drug Administration (FDA) must remove from its existing regulations its approvals of all 28 phthalates for use in food packaging and other materials that come in contact with food. There is no longer any basis for the agency to conclude that there is "reasonable certainty of no harm" from these uses, which is the legal standard for safety of food contact materials under the federal Food, Drug, and Cosmetic Act (see 21 CFR [updated September 19, 2019]), which governs FDA's actions. All of the phthalates that have been associated with adverse child neurodevelopment, discussed previously, are currently approved by FDA for food contact use.

Until the FDA takes action to protect the food supply from phthalates, the food industry, including producers, processors, retailers, and restaurant chains, should investigate, identify, and remove sources of phthalates from their food products.

Medical Supplies and Medication

The use of phthalates in medications and medical devices also falls under FDA jurisdiction. While FDA has published guidelines to address many of these sources (see the box on page 689), the agency must promulgate regulations to eliminate their uses.

Personal Care and Other Household Products

Authority to regulate phthalates in cosmetics (which are defined broadly to include many personal care products) also falls under FDA jurisdiction. However, the agency's authority is much less comprehensive and health protective than its authority to ensure the safety of food or drugs. This needs to be rectified by congressional action.

The CPSC has authority to ensure the safety of consumer products and is to be commended for eliminating a number of phthalates from children's toys. However, the agency must also take action to prohibit the sale of other phthalate-containing products that fall under its jurisdiction.

In addition to federal action, elimination of phthalates from personal care and household products requires action on the part of states, manufacturers, and retailers.

Personal care and household products must be labeled if they contain phthalates so consumers can make informed decisions to avoid these substances if desired.

Building Materials and Other Products

The US Environmental Protection Agency (EPA) must use its authority under the Toxic Substances Control Act (TSCA; 15 USC Ch 53 [2016]) to regulate phthalates. EPA has recently embarked on a multiyear process for evaluating the risk of several phthalates under TSCA. The agency must broaden this effort using a class approach in assessing health impacts. Furthermore, EPA should aggressively exercise its authority to regulate the manufacture, import, processing, distribution in commerce, disposal, and known and reasonably foreseeable uses of phthalates.

Regrettable Substitution

Assessment to identify safer alternatives to phthalates must consider adverse effects to human health and the environment as well as societal impacts along with performance and costs.[80] This is critical given the potential for regrettable substitution and the availability of lower-hazard alternatives (see the box on page 689 for resources on approaches for selecting safer alternatives). No phthalate should be used as a substitute for another phthalate, as has already been done with DiNP for DEHP. In addition, PVC plastics should be replaced with safer materials that do not require plasticizers. The substitution of safer alternatives for phthalates is critical given the risk these chemicals pose to child brain development.

CONCLUSION

Substantial evidence links exposure to phthalates with increased risks for child learning, attention, and behavioral problems. We therefore recommend that phthalates be eliminated from products that may lead to exposure of women of reproductive age, pregnant women, infants, and children. As discussed, this will necessitate a multipronged approach through regulations at the federal and state levels, as well as through voluntary action on the part of retailers and manufacturers. However, given that manufacturers have already successfully

removed phthalates from a wide range of products, including food, medicine and medical supplies, personal care products, and other household and building materials (see the box on page 689), we believe the goal of phthalate elimination is achievable. AJPH

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CONFLICTS OF INTEREST

The authors report no conflicts of interest.

HUMAN PARTICIPANT PROTECTION

This is a review article and, thus, institutional board review was not required.

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Projected All-Cause Deaths Attributable to COVID-19–Related Unemployment in the United States

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Objectives. To project the range of excess deaths potentially associated with COVID-19–related unemployment in the United States and quantify inequities in these estimates by age, race/ethnicity, gender, and education.

Methods. We used previously published meta-analyzed hazard ratios (HRs) for the unemployment–mortality association, unemployment data from the Bureau of Labor Statistics, and mortality data from the National Center for Health Statistics to estimate 1-year age-standardized deaths attributable to COVID-19–related unemployment for US workers aged 25 to 64 years. To accommodate uncertainty, we tested ranges of unemployment and HR scenarios.

Results. Our best estimate is that there will be 30 231 excess deaths attributable to COVID-19–related unemployment between April 2020 and March 2021. Across scenarios, attributable deaths ranged from 8315 to 201 968. Attributable deaths were disproportionately high among Blacks, men, and those with low education.

Conclusions. Deaths attributable to COVID-19–related unemployment will add to those directly associated with the virus and will disproportionately burden groups already experiencing incommensurate COVID-19 mortality.

Public Health Implications. Supportive economic policies and interventions addressing long-standing harmful social structures are essential to mitigate the unequal health harms of COVID-19. (*Am J Public Health*. 2021;111:696–699. https://doi.org/10.2105/AJPH.2020.306095)

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In April 2020, the US unemployment rate peaked at 14.7%, its highest level since the Great Depression. A robust literature has shown that unemployment increases mortality.[1] Unemployment may increase risk of mortality through multiple mechanisms, including elevated risk of suicide, substance abuse, health care deferment, and cardiovascular disease.[2] This has resulted in recent calls to examine excess mortality resulting from unemployment driven by the COVID-19 pandemic.[3] We used existing data to estimate the short-term mortality consequences of the epidemic of corollary illnesses[3] likely to result from the COVID-19 recession.

Our primary objectives were to (1) project the plausible range of excess deaths associated with the March and April 2020 incident unemployment attributable to COVID-19 (hereafter referred to as "COVID-19–related unemployment"), and (2) examine inequities in these estimates by age, race/ethnicity, gender, and educational attainment. This work has important implications for considering the full range of health consequences and health inequities linked to COVID-19.

METHODS

We estimated the 1-year death count attributable to the spring 2020 spike in COVID-19–related unemployment for the US population in the labor force aged 25 to 64 years. We derived hazard ratios (HRs) for all-cause mortality associated with unemployment from a highly cited meta-analysis.[1] We used only the HRs from studies that controlled for baseline health behaviors that

may otherwise confound estimates.[1] We drew seasonally adjusted unemployment prevalence from Bureau of Labor Statistics monthly reports. We defined pre–COVID-19 unemployment as February 2020—immediately before the economic impacts of COVID-19 manifested in US unemployment estimates—and peak of COVID-19–related unemployment as April 2020. We calculated COVID-19–related unemployment as the difference between peak of and pre–COVID-19 unemployment. We derived all-cause mortality counts and rates from the National Center for Health Statistics.

We converted HRs to relative risks (RRs) and calculated the fraction of deaths attributable to COVID-19–related unemployment (the population attributable fraction, or PAF) using the COVID-19–related unemployment prevalence and unemployment–mortality RRs (formulas are in the Appendix [available as a supplement to the online version of this article at http://www.ajph.org]). We multiplied the PAF by total annual prepandemic deaths to calculate the annualized excess deaths expected from COVID-19–related unemployment.

We calculated attributable deaths overall and stratified them by race/ethnicity, gender, and educational attainment. We age-adjusted estimates by using age-specific HRs, unemployment prevalence, and mortality counts and rates for age groups 25 to 34, 35 to 44, 45 to 54, and 55 to 64 years. We calculated total excess deaths as the sum of age-specific–attributable deaths. Inputs aligned imperfectly for exact population groups and periods. For example, unemployment estimates were available only for those aged 55 years and older rather than those aged 55 to 64 years. We used the most recent and rigorous estimates available and aligned them as well as possible (Table A [available as a supplement to the online version of this article at http://www.ajph.org]). Fully adjusted HRs were available by age group and gender but not by age group and education or race/ethnicity; we assumed the overall age group–specific HRs applied to each age group within each subgroup. Unemployment estimates were unavailable by age–education group and by age–race/ethnicity group for the study periods; we assumed that the relative contributions of each group to overall unemployment for the most recent stratified data (2019 for age–education and quarter 1 of 2020 for age–race/ethnicity) held for 2020, and we applied a correction factor.

Finally, because COVID-19–related unemployment levels are uncertain and the mortality effects of COVID-19–related unemployment may vary in magnitude (but are likely consequential under any set of circumstances), we generated estimates for ranges of scenarios. Unemployment ranged from 10% (maximum observed during the Great Recession)[4] to 26.5% (upper bound using alternative definitions of labor force participation).[5] HRs ranged from −2-fold to +3-fold from observed. To project alternative unemployment levels for subgroups, we assumed that the relative disparities in unemployment surges across subgroups from February to April 2020 were constant.

RESULTS

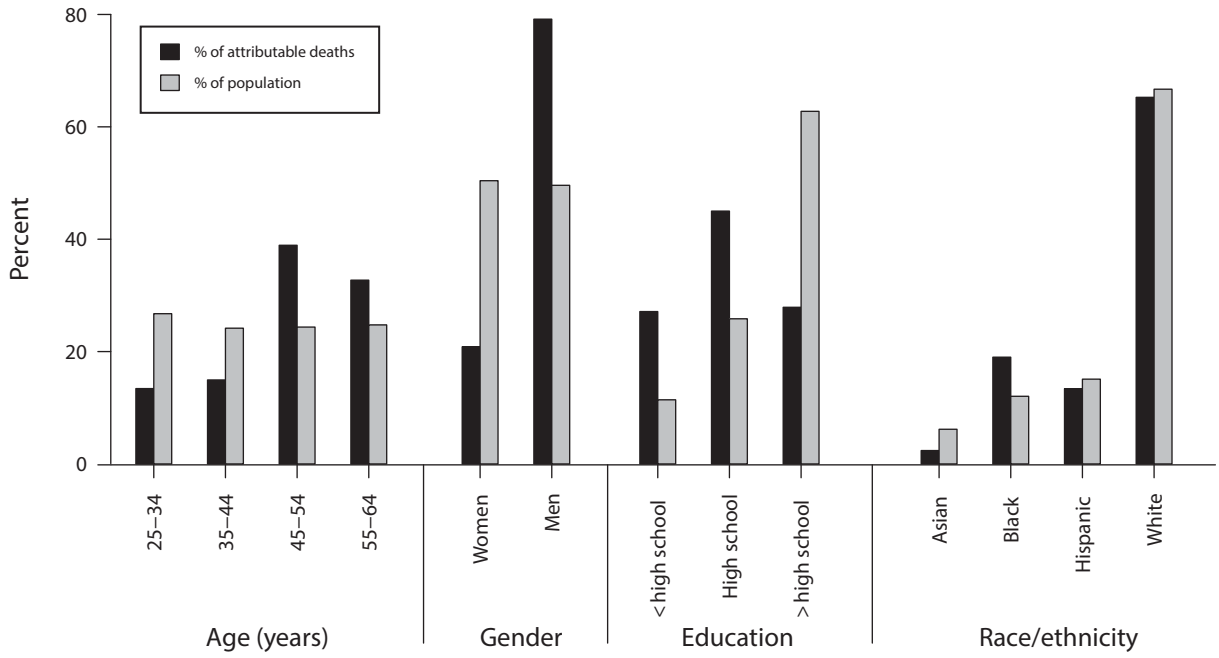
We estimated 30 231 excess deaths attributable to COVID-19–related unemployment among the US population aged 25 to 64 years between April 2020 and March 2021 (Table B [available as a supplement to the online version of this article at http://www.ajph.org]). Attributable deaths varied by age, gender, education, and race/ethnicity, with the burden disproportionately experienced by men, Blacks, those aged 45 years or older, and those with a high school education or less (Figure 1). For example, Blacks made up 12% of the population but 19% of unemployment-related deaths. Similarly, individuals with a high school education or less represented 37% of the population but 72% of unemployment-related deaths.

Attributable deaths varied across unemployment levels and harmfulness of unemployment (Table C [available as a supplement to the online version of this article at http://www.ajph.org]). In the best-case scenario, if April 2020 unemployment was 10% and half as harmful as previously observed, we estimated 8315 attributable deaths. In the worst-case scenario, if April 2020 unemployment was 26.5%[5] and thrice as harmful as previously observed, we estimated 201 968 attributable deaths.

DISCUSSION

Substantial uncertainty remains about the health consequences of the COVID-19 pandemic. We used available evidence to approximate 1-year excess all-cause deaths attributable to unemployment in the US working-age population following the April 2020 COVID-19–related unemployment spike. Our best estimate is 30 231 excess deaths. This estimate is in line with previously published estimates for excess suicide, alcohol, and drug misuse associated with unemployment.[6,7] To put these estimates in context, as of January 18, 2021, there have been 398 838 deaths attributable to the virus itself.[8]

There are 2 key takeaways: first, deaths attributable to COVID-19–related unemployment will add to those directly associated with the virus. Second, COVID-19 unemployment-attributable



	Age, Years				Gender		Education			Race/Ethnicity			
	25–34	35–44	45–54	55–64	Women	Men	< High School	High School	> High School	Asian	Black	Hispanic	White
Deaths	4 055	4 520	11 767	9 888	6 727	25 550	9 198	15 264	9 455	823	6 573	4 626	22 571
% Deaths	13	15	39	33	21	79	27	45	28	2	19	13	65
% Population	27	24	24	25	50	50	11	26	63	6	12	15	67

FIGURE 1— Estimated 1-Year Age-Standardized Death Count Attributable to COVID-19–Related Unemployment for the US Population Aged 25–64 Years, by Race/Ethnicity, Gender, and Educational Attainment: April 2020–March 2021

Note, high school = high school diploma or equivalent; Hispanic = Hispanic or Latinx. Values indicate the attributable death count, percentage of attributable deaths, and percentage of population in each group. All race/ethnicity groups are non-Hispanic/Latinx unless otherwise specified.

deaths will disproportionately burden Black Americans, those aged 45 years or older, men, and those with low education. These disparities are stark and contribute to an unjust double burden[9] whereby the combination of high unemployment and excess COVID-19 deaths will further contribute to unacceptable and preventable deaths, particularly among low-educated and Black Americans.

Limitations

We note several limitations. First, we applied meta-analyzed HRs with a median follow-up of 8 years to annualized death counts; we may have overestimated 1-year deaths if some causes required longer durations to manifest (e.g., alcoholic liver cirrhosis). However, the risk of unemployment-related mortality is highest in the short term.[1] Overestimation may also occur because excess deaths from COVID-19 may preempt some COVID-19–related unemployment deaths. Second, we used standard definitions of unemployment and labor force participation, which may not capture labor force dynamics during a pandemic. Mortality may also result from withdrawal from the labor force. Third, our HRs reflect both incident and cross-sectionally assessed unemployment irrespective of unemployment duration; incident COVID-19–related unemployment may be shorter in duration. Relatedly, the factors that moderate the mortality effects of unemployment are uncertain[10]; heterogeneity in HRs by unmeasured factors is possible. Further, because race- and education-specific HRs were unavailable, the true inequities between groups may be wider than we report.

Our estimates reflect short-term attributable mortality among a hardest-hit group—those who lost their jobs. It is worth noting that recession effects can last far longer than the recession itself.[11] Our data suggest that we can expect excess mortality linked to unemployment that will compound the impact of the pandemic on morbidity and mortality, particularly among

vulnerable groups. These effects will also plausibly extend well beyond the 1-year time window that was the focus of our analysis.

Public Health Implications

Existing data can be used to forecast COVID-19–related health impacts and inform decision making. Adequate responses to pandemics would require adopting specific policies to protect workers and mitigate the harms of unemployment,[12] while intervening in long-standing, unjust social structures. Proactive public policies are needed to prevent further inequitable health and social consequences of the COVID-19 pandemic. AJPH

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CONTRIBUTORS

E. C. Matthay conceptualized the study. E. C. Matthay, K. A. Duchowny, and A. R. Riley acquired the data, completed the analyses, and led the writing. S. Galea assisted with the conceptualization, design, and interpretation of the study and provided critical feedback on the article.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

HUMAN PARTICIPANT PROTECTION

This study was based entirely on publicly available secondary data and was therefore exempt from institutional review board review.

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Seroprevalence of SARS-CoV-2 Antibodies in Rhode Island From a Statewide Random Sample

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Objectives. To characterize statewide seroprevalence and point prevalence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in Rhode Island.

Methods. We conducted a cross-sectional survey of randomly selected households across Rhode Island in May 2020. Antibody-based and polymerase chain reaction (PCR)–based tests for SARS-CoV-2 were offered. Hispanics/Latinos and African Americans/Blacks were oversampled to ensure adequate representation. Seroprevalence estimations accounted for test sensitivity and specificity and were compared according to age, race/ethnicity, gender, housing environment, and transportation mode.

Results. Overall, 1043 individuals from 554 households were tested (1032 antibody tests, 988 PCR tests). The estimated seroprevalence of SARS-CoV-2 antibodies was 2.1% (95% credible interval [CI] = 0.6, 4.1). Seroprevalence was 7.5% (95% CI = 1.3, 17.5) among Hispanics/Latinos, 3.8% (95% CI = 0.0, 15.0) among African Americans/Blacks, and 0.8% (95% CI = 0.0, 2.4) among non-Hispanic Whites. Overall PCR-based prevalence was 1.5% (95% CI = 0.5, 3.1).

Conclusions. Rhode Island had low seroprevalence relative to other settings, but seroprevalence was substantially higher among African Americans/Blacks and Hispanics/Latinos. Rhode Island sits along the highly populated northeast corridor, making our findings broadly relevant to this region of the country. Continued monitoring via population-based sampling is needed to quantify these impacts going forward. (*Am J Public Health*. 2021;111:700–703. https://doi.org/10.2105/AJPH.2020.306115)

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Population-level prevalence estimates of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and assessments of factors that affect prevalence inform public health interventions and guide mitigation efforts. Antibody seroprevalence represents the proportion of individuals who have been previously infected and have developed a measurable antibody response. Point prevalence is the proportion of individuals currently infected.

Studies of seroprevalence in the United States reflect considerable geographic variation. An analysis of blood donors in 10 locations sponsored by the Centers for Disease Control and Prevention yielded estimates ranging from 1.1% (western Washington State) to 6.9% (New York City).[1] A community survey conducted in California's Los Angeles County yielded an estimate of 4.1%.[2] A statewide random sample in Indiana showed 1.1% seroprevalence and a 2.8% overall infection rate (8.3% prevalence among Hispanics/Latinos vs 2.3% among non–Hispanics/Latinos).[3]

Social determinants of health that drive disparities among Black/African American and Hispanic/Latino populations are increasingly being recognized.[4,5] However, few studies have quantified the impact in terms of seroprevalence. Estimates derived from population-based random samples stratified according to age and race/ethnicity, as opposed to convenience samples, are well suited for

characterizing variations across demographic subpopulations.[6]

METHODS

We conducted a statewide cross-sectional household survey from May 5 to 22, 2020, in Rhode Island, which has the second highest population density in the United States and implemented early, aggressive community mitigation consisting of statewide lockdowns, mandatory masking, and testing that, at the time, was consistently among the most widespread in the country. The survey followed the initial peak of SARS-CoV-2 in late April. We randomly sampled 5000 addresses from 50 (of 815) census block groups using a list of 354 262 residential addresses developed for Rhode Island's Enhanced 911 system[7]; we oversampled African Americans/Blacks and Hispanics/Latinos to ensure adequate representation. We assumed that 10% of households would participate in testing and based our sample size of 500 on calculations from the modified Centers for Disease Control and Prevention Community Assessment for Public Health Emergency Response framework.[8]

Respondents were offered both nasopharyngeal polymerase chain reaction (PCR)–based[9] and antibody-based SARS-CoV-2 tests[10] and completed a brief questionnaire on household characteristics, age, gender, race, ethnicity, housing, exposures, and past/current symptoms. A Bayesian method that accounted for test sensitivity and specificity and household clustering was used to generate inferences related to seroprevalence and comparisons between subgroups (see the Appendix, available as a supplement to the online version of this article at http://www.ajph.org).

RESULTS

A total of 1043 individuals from 554 distinct households presented for testing and received at least 1 test (Table 1). Of these individuals, 1032 had an antibody test, 988 had a PCR test, and 977 had both. Among the 21 individuals who had a positive antibody test and also had a PCR test result, 8 were PCR positive (38%); of the 956 who had a negative antibody test, 7 were PCR positive (0.7%; Table A, available as a supplement to the online version of this article at http://www.ajph.org). The overall household response rate was 11%; response rates were lower among men, individuals younger than 35 years, and non-Whites (Table B, available as a supplement to the online version of this article at http://www.ajph.org).

The unweighted overall estimate of seroprevalence of SARS-CoV-2 antibodies was 2.1% (95% credible interval [CI] = 0.6%, 4.1%); PCR-based prevalence was 1.5% (95% CI = 0.5%, 3.1%). Age-weighted seroprevalence was 2.9% (95% CI = 1.0, 6.2), and age-weighted PCR prevalence was 2.2% (95% CI = 0.7, 5.0). Seroprevalence was 7.5% for Hispanics/Latinos, 3.8% for Blacks/African Americans, and 0.8% for Whites. Seroprevalence was 6.6 percentage points higher (95% CI = 0.3%, 16.7%) among Hispanics/Latinos than among Whites and 2.9 percentage points higher (95% CI = –1.3%, 14.1%) among Blacks/African Americans than among Whites. Across age categories, seroprevalence was higher among those aged 0 to 14 years (5.1%) and 15 to 34 years (4.1%) than among those aged 35 to 64 years (1.0%) and 65 years or older (1.7%).

Similar patterns emerged for PCR prevalence, which ranged from a high of 5.0% among those aged 0 to 14 years to a low of 0.4% among those aged 65 years or older. PCR prevalence was 6.2%, 3.9%, and 0.4% for Hispanics/Latinos, Blacks/African Americans, and Whites, respectively, with differences of 5.7% (95% CI = 0.7%, 14.2%) between Hispanics/Latinos and Whites and 3.4% (95% CI = –0.8, 18.0%) between Blacks/African Americans and Whites. Antibody seroprevalence and PCR prevalence were similar between men and women (Table 1).

Seroprevalence varied considerably according to type of housing and primary mode of transportation. Seroprevalence was highest among those living in an apartment or condominium (8.8%; 95% CI = 0.2%, 25.1%) and those whose primary mode of transportation was public transit or carpool (6.0%; 95% CI = 0.1%, 20.5%; an analysis showing that housing disparities persisted after adjustment for race/ethnicity is outlined in the Appendix).

These data were used to generate an estimate of the infection fatality rate (number of deaths divided by total number of individuals infected). As of May 31, Rhode Island had reported 827 cumulative lab-confirmed SARS-CoV-2–involved deaths; 78.5% of these deaths were associated with congregate care facilities. After exclusion of these deaths (and based on a 1.06 million state population), the estimated infection fatality rate corresponding to the unweighted seroprevalence of 2.1% was 7.7 per 1000 (95% CI = 3.9, 26.9); the infection fatality rate corresponding to the age-weighted seroprevalence of 2.9% was 5.6 per 1000 (95% CI = 2.6, 16.1).

DISCUSSION

To our knowledge, this is only the second statewide seroprevalence study

TABLE 1— Antibody and PCR Prevalence by Gender, Age, and Race/Ethnicity: Rhode Island, May 2020

	Respondents, No. (%)	State Population, %	Test Results, Number of Positive Tests/ Number of Tests Administered[a]		Prevalence (95% CI)	
			Antibody	PCR	Antibody	PCR
Overall (unweighted)	1043		24/1032	15/988	2.1 (0.6, 4.1)	1.5 (0.5, 3.1)
Age weighted					2.9 (1.0, 6.2)	2.2 (0.7, 5.0)
Race/ethnicity weighted					2.4 (0.9, 4.6)	1.7 (0.6, 3.2)
Gender						
Male	451 (43)	49	11/445	7/428	2.2 (0.2, 5.5)	1.6 (0.2, 4.2)
Female	592 (57)	51	13/587	8/560	2.0 (0.4, 4.3)	1.4 (0.3, 3.3)
Age, y						
0–14	60 (6)	17	3/57	3/59	5.1 (0.0, 20.2)	5.0 (0.1, 17.5)
15–34	222 (21)	28	9/221	6/209	4.1 (0.6, 9.5)	2.8 (0.2, 7.5)
35–64	515 (49)	39	7/512	5/488	1.0 (0.0, 3.1)	1.0 (0.2, 2.7)
≥ 65	246 (24)	16	5/242	1/232	1.7 (0.0, 5.9)	0.4 (0.0, 2.5)
Race/ethnicity						
Hispanic/Latino	170 (16)	14	12/166	10/158	7.5 (1.3, 17.5)	6.2 (1.2, 14.6)
Black/African American	52 (5)	6	2/52	2/47	3.8 (0.0, 15.0)	3.9 (0.0, 18.5)
White	782 (75)	68	9/776	3/747	0.8 (0.0, 2.4)	0.4 (0.0, 1.3)
Other	39 (4)	12	1/38	0/36	2.5 (0.0, 16.5)	0.6[b] (0.0, 7.0)
Housing[c]						
Apartment or condominium	81 (8)		7/80	5/78	8.8 (0.2, 25.1)	5.9 (0.0, 20.0)
Multifamily home	186 (18)		4/183	2/181	1.9 (0.0, 6.6)	1.1 (0.0, 4.3)
Single-family home	755 (72)		12/748	8/711	1.3 (0.1, 3.1)	1.1 (0.2, 2.6)
Primary transportation[c]						
Own vehicle	928 (89)		20/920	15/882	1.9 (0.4, 4.1)	1.7 (0.5, 3.5)
Public transport/carpool	55 (5)		3/52	0/54	6.0 (0.1, 20.5)	0.4[b] (0.0, 4.6)
Walking/biking	35 (3)		1/34	0/34	2.8 (0.0, 16.7)	0.7[b] (0.0, 7.5)

Note. PCR = polymerase chain reaction. Prevalence is reported as posterior mode and 95% credible interval (CI). Antibody prevalence was adjusted for test sensitivity and specificity. The prior distribution for prevalence was Beta(1/2, 1/2) (Jeffreys' prior).

[a]For antibody testing, the numerator corresponds to test reactivity. Seroprevalence estimates were adjusted for test sensitivity and specificity.
[b]Mode of posterior distribution not equal to 0 because the prior distribution assumed that there was potential for PCR prevalence greater than 0.
[c]Does not include those who refused or reported "other."

conducted in the United States.[3] Seroprevalence in Rhode Island was in the lower range of estimates reported elsewhere during the time period of our investigation.[1–3] Seroprevalence rates among Blacks/African Americans and Hispanics/Latinos were disproportionately higher than those among Whites, whereas response rates were lower in these groups. Taken together, these results may point to disparities related to health care access, knowledge about infection status, and effectiveness of official outreach efforts, and they amplify the need to understand and mitigate social and structural vulnerabilities that perpetuate such disparities.

The main strength of this study was our use of a statewide probability sample that enabled examination of variations across age, gender, and race/ethnicity. Rhode Island has one of the highest population densities in the United States and is situated along the highly populated northeast corridor, making our findings broadly relevant to this region of the country. Among the limitations of our study is the low response rate, not atypical for surveys of this type but potentially a source of bias to the extent that nonresponders were more or less likely to be seropositive. Inferences based on small strata

have high uncertainty and should not be overinterpreted.

An improved focus on vulnerable communities is needed to adequately address COVID-19. Periodic seroprevalence studies based on random samples, including longitudinal follow-up to enable incidence estimation, should be used to characterize, monitor, and respond to population-level trends in the evolving pandemic. AJPH

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CONTRIBUTORS

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The authors declare no conflicts of interest.

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The study protocol was approved by the institutional review board of the Rhode Island Department of Health.

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Analysis of Excess Deaths During the COVID-19 Pandemic in the State of Florida

Moosa Tatar, PhD, Amir Habibdoust, PhD, and Fernando A. Wilson, PhD

Objectives. To determine the number of excess deaths (i.e., those exceeding historical trends after accounting for COVID-19 deaths) occurring in Florida during the COVID-19 pandemic.

Methods. Using seasonal autoregressive integrated moving average time-series modeling and historical mortality trends in Florida, we forecasted monthly deaths from January to September of 2020 in the absence of the pandemic. We compared estimated deaths with monthly recorded total deaths (i.e., all deaths regardless of cause) during the COVID-19 pandemic and deaths only from COVID-19 to measure excess deaths in Florida.

Results. Our results suggest that Florida experienced 19 241 (15.5%) excess deaths above historical trends from March to September 2020, including 14 317 COVID-19 deaths and an additional 4924 all-cause, excluding COVID-19, deaths in that period.

Conclusions. Total deaths are significantly higher than historical trends in Florida even when accounting for COVID-19–related deaths. The impact of COVID-19 on mortality is significantly greater than the official COVID-19 data suggest. (*Am J Public Health*. 2021;111:704–707. https://doi.org/10.2105/AJPH.2020.306130)

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The COVID-19 pandemic has spread rapidly throughout the United States, resulting in more than 26 million cases and 440 000 deaths by January 2021.[1] After initially imposing capacity restrictions on businesses and local mask mandates, Florida became one of the first states to relax these restrictions and ban the enforcement of mask mandates. Florida experienced a resurgence of COVID-19 community spread, and, as of January 2021, there have been nearly 1 690 000 cases and 26 479 deaths officially classified as attributable to COVID-19.[1] However, there is evidence that all-cause mortality substantially increased in Florida. For example, the Centers for Disease Control and Prevention (CDC) estimates between 2712 and 7598 excess deaths were attributed to causes other than COVID-19 in Florida. However, the CDC notes that their estimates were based on provisional and incomplete data.[2]

Although research has focused on officially reported deaths from COVID-19, total deaths caused by the pandemic remain unknown. Therefore, we used COVID-19 mortality data and recorded deaths to compare trends in reported COVID-19–related versus total deaths in Florida using seasonally adjusted time-series modeling.

METHODS

In this retrospective study, we used historical mortality trends to forecast monthly deaths in 2020 in the absence of the pandemic. We estimated excess deaths during the pandemic (MMWR 10–39) by subtracting official reported COVID-19 deaths and forecasted monthly deaths from total all-cause recorded deaths from March to September 2020 in Florida.

We used monthly officially reported COVID-19 death data from January to September 2020 provided by the Johns Hopkins University's Coronavirus Resource Center, which compiles data provided by the State of Florida Department of Health based on decedents who tested positive for COVID-19.[1] We used total all-cause recorded deaths from January 2010 to September 2020 from the State of Florida Department of Health, which had the most updated data.[3]

We used seasonal autoregressive integrated moving average (SARIMA) regression modeling with historical mortality trends from 2010 to 2019 to estimate the number of monthly deaths in Florida in 2020 that would have occurred if there had been no COVID-19 pandemic. The SARIMA model uses past values of a time series to predict future points in the series. We followed the Box–Jenkins methodology to construct our model (Appendix [available as a supplement to the online version of this article at http://www.ajph.org]). We divided the data into 2 data sets for training (2010–2018) and testing (2019) for in-sample forecasting. We selected the SARIMA model because it provided the best fit to the data and had a high level of forecasting accuracy. We used Stata SE, version 15.1 (StataCorp LP, College Station, TX) for all analyses.

RESULTS

We selected a SARIMA(1, 1, (1)(0, 1, 1,)12, as it provided the best fit to the data based on multiple criteria (Tables A and B [available as a supplement to the online version of this article at http://www.ajph.org]) and offered high forecasting accuracy (Tables C and D [available as a supplement to the online version of this article at http://www.ajph.org]). Predicted deaths from SARIMA modeling of historical trends shown in Table 1 suggest that total all-cause deaths were higher than expected for each month from March to September.

In July 2020, recorded deaths (23 958) exceeded predicted counts (17 643) by 6315 excess deaths, of which 3338 (52.9%) were attributed to COVID-19. This implies an undercount of 2977 for publicly reported COVID-19–related deaths in July. In August 2020, recorded deaths (23 537) exceeded predicted counts (17 046) by 6491 excess deaths, of which 4344 (66.9%) were attributed to COVID-19. In other words, 2147 deaths were undercounted compared with publicly reported COVID-19–related deaths in August. In September 2020, 2130 deaths were attributed to COVID-19, and recorded deaths (19 493) exceeded predicted counts (16 573) by 2920 excess deaths. Before July, the estimated change in all-cause, excluding COVID-19, deaths fluctuated between –376 and 394. For the entire period from March to September 2020, we estimated 19 241 (15.5%) excess deaths versus historical, prepandemic deaths. During the pandemic, there have been 14 317 COVID-19 deaths. Our analysis suggests that total deaths increased above historical trends, resulting in an additional 4924 all-cause, excluding COVID-19, deaths (Figure A [available as a supplement to the online version of this article at http://www.ajph.org])

DISCUSSION

We found that Florida experienced 19 241 excess deaths from March to September 2020. Also, in the absence of the pandemic, total deaths in Florida would have been 26.4% (or 6315 deaths) and 27.6% (or 6491 deaths) lower in July and August, respectively. Official COVID-19 deaths account for 14 317 of these deaths; however, approximately 5000 excess deaths are unexplained.

The COVID-19 pandemic has had a major impact on population health, resulting in stay-at-home orders, school and business closures, and other public health policies to mitigate community spread. However, there has been

TABLE 1— SARIMA Model Results for Predicted Deaths, Total Recorded Deaths, and COVID-19–Related Deaths: Florida, 2020

Deaths	March	April	May	June	July	August	September	Total
Total all-cause recorded deaths, no.	19 683	19 209	19 095	18 803	23 958	23 537	19 493	143 778
SARIMA predicted deaths based on Pre–COVID-19 data, no.	19 204	18 402	18 335	17 334	17 643	17 046	16 573	124 537
Excess deaths								
No.	479	807	760	1 469	6 315	6 491	2 920	19 241
%	2.5	4.4	4.1	8.5	35.8	38.1	17.6	15.5
Official reported COVID-19 deaths								
No.	85	1 183	1 183	1 054	3 338	4 344	3 130	14 317
%	17.7	146.6	155.7	71.7	52.9	66.9	107.2	74.4
Estimated change in all-cause, excluding COVID-19, deaths	394	–376	–423	415	2 977	2 147	–210	4 924

Note. SARIMA = seasonal autoregressive integrated moving average.

speculation on whether deaths from non–COVID-19 causes have decreased or increased during the pandemic. It has been reported that deaths from unintentional injury decreased as a result of lockdown measures, but deaths from chronic disease, drug overdoses, and suicides have increased.[4,5]

Florida was chosen for our analysis because COVID-19 disproportionately affected the state's population, and, historically, it has one of the highest numbers of influenza or pneumonia mortalities in the United States.[6,7] On May 4, Florida was among the first states (along with Texas and Arizona) to begin lifting COVID-19–related restrictions.[8] Additionally, local governments were prohibited from imposing fines on individuals for not wearing face coverings. There was also increasing controversy regarding the accuracy of the officially reported number of COVID-19 deaths.[9] Our SARIMA estimates suggest a surge of all-cause, excluding COVID-19, deaths from June to September, averaging 4666 deaths per month compared with a monthly average of 682 deaths from March to May.

Previous research indicates that excess deaths during the pandemic have been substantial.[10–12] In a study of deaths from March 1 to May 30, the authors reported that excess all-cause deaths were 28% higher than official COVID-19 deaths.[11] For Florida, a separate study[12] reported 966 excess deaths from causes other than COVID-19 between March 1 to April 25, and the corresponding CDC estimates ranged from 2712 to 7598 for February through September.[2] This compares to our estimates of –405 excess deaths in March and April, and 4924 excess deaths from March to September from causes other than COVID-19. Thus, our estimates were conservative during the period in Florida when COVID-19 restrictions were implemented but increased substantially after May, when these restrictions were relaxed. Our estimates are within the CDC's range of estimates. However, we used a longer data series for mortality data (2010–2020) than did the CDC (2013–2020). Our SARIMA model adjusted for seasonality in the monthly mortality data (mortality increases in the winter months) and had strong goodness of fit to the data.

This study had some limitations. In January 2018, an exceptionally high number of deaths associated with influenza and pneumonia occurred in Florida. This may have affected the SARIMA model estimates. However, we believe our predictions are likely to be conservative as a result. Second, our analysis was restricted to Florida and may not generalize to other states. Finally, we are unable to stratify excess deaths by cause in our data.

Our findings suggest that all-cause deaths may be higher than the reported COVID-19 deaths and historical deaths in Florida based on mortality data since 2010. Thus, the mortality burden of COVID-19 is significantly higher than what the official tally suggests. Examination of excess deaths during the pandemic requires greater attention to aid efforts to reduce the impact of COVID-19 on population health. AJPH

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CONTRIBUTORS

M. Tatar and A. Habibdoust performed the statistical analyses and had full access to all study data; they take responsibility for data integrity and data analysis accuracy. M. Tatar and F. A. Wilson provided administrative, technical, and material support. All authors contributed to concept and design, provided data acquisition and interpretation, drafted the brief, and critically revised the brief for important intellectual content.

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The authors have no conflicts to declare nor financial disclosures to report.

HUMAN PARTICIPANT PROTECTION

No protocol approval was necessary because no human participants were involved in this study.

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US State Disparities in Life Expectancy, Disability-Free Life Expectancy, and Disabled Life Expectancy Among Adults Aged 25 to 89 Years

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See also Groce, p. 544, and Galea and Vaughan, p. 562.

Objectives. To estimate total life expectancy (TLE), disability-free life expectancy (DFLE), and disabled life expectancy (DLE) by US state for women and men aged 25 to 89 years and examine the cross-state patterns.

Methods. We used data from the 2013–2017 American Community Survey and the 2017 US Mortality Database to calculate state-specific TLE, DFLE, and DLE by gender for US adults and hypothetical worst- and best-case scenarios.

Results. For men and women, DFLEs and DLEs varied widely by state. Among women, DFLE ranged from 45.8 years in West Virginia to 52.5 years in Hawaii, a 6.7-year gap. Men had a similar range. The gap in DLEs across states was 2.4 years for women and 1.6 years for men. The correlation among DFLE, DLE, and TLE was particularly strong in southern states. The South is doubly disadvantaged: residents have shorter lives and spend a greater proportion of those lives with disability.

Conclusions. The stark variation in DFLE and DLE across states highlights the large health inequalities present today across the United States, which have significant implications for individuals' well-being and US states' financial costs and medical care burden. (*Am J Public Health*. 2021;111:708–717. https://doi.org/10.2105/AJPH.2020.306064)

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US state disparities in population health are striking.[1–4] For example, people in North Carolina experience disability about 10 years earlier and die 2 years sooner than people in North Dakota.[5,6] Such stark and growing[2,7,8] disparities have fueled a renewed interest among researchers to investigate the role of US state contexts in shaping population health.[2,3,9–11] Much of that research has examined state disparities in 2 health-related indicators: the risk of disability or death. Less attention has been given to the intersection of those indicators—sometimes referred to as disability-free life expectancy (DFLE), and its complement, disabled life expectancy (DLE)—and their relationship with total life expectancy (TLE). This study addresses that gap to provide a clearer understanding of how the lived experiences of people differ across states, as well as the consequent personal, medical, economic, and social costs.

DFLE is the number of years that an individual can expect to live without disability. Relatedly, DLE is the number of expected years lived with disability. Both are a function of 2 processes: disability and mortality. Importantly, these processes do not necessarily operate in tandem: mortality and disability are far from isomorphic concepts.[12,13] For example, longer TLE in the United States is accompanied by longer DFLE among some subgroups (e.g., non-Hispanic Whites, college-educated individuals) but shorter DFLE among others, such as Hispanic individuals.[12,14,15] That is, non-Hispanic and Hispanic adults live roughly the same number of years, but the latter spend a greater proportion of their lives with disability.

By focusing on DFLE, DLE, and their association with TLE across US states,

this study provides a new dimension for understanding contemporary cross-state disparities in population health. Comparisons of DFLE, DLE, and TLE provide insights into the extent to which processes influencing disability and mortality are similar, which might occur when disability is part of a health "trajectory" ending in death.[15] If states with higher TLE consistently have higher DFLE and lower DLE, this implies that the processes underlying disability and mortality are similar across states, leading to a compressed period of disability. In contrast, the 2 underlying processes may be disjointed in certain states. Residents of states with a long TLE but short DFLE spend a larger proportion of their long lives with disability. In such states, individuals can face significant caregiving costs associated with living with disability for a protracted period,[16] and state budgets can face substantial economic and health care costs.[17]

AIMS

This study extends recent work documenting disparities in health across states in several ways. It uses the most recent and largest data sets on disability and mortality; examines the associations among TLE, DFLE, and DLE; identifies clusters of states where the associations are strongest and weakest; and simulates how much longer or shorter TLE and DFLE for the United States could become, based on best- and worst-case scenarios for disability and mortality drawn from the 50 states. Specifically, the study addresses 3 main questions:

1. How large are disparities in TLE, DFLE, and DLE among US states?
2. To what extent are TLE, DFLE, and DLE associated among states?
3. How long (or short) could TLE and DFLE for the United States be under "best and worst conditions"?

We examined these questions separately for men and women. This is necessary given large differences between men and women in the risks of disability and death[18] and the possibility that state contexts have differential consequences for men and women.[19] To glean additional insights, we also highlight the results for the southern region of the United States compared with the rest of the United States, given the well-established and persistent southern disadvantage.[2,20]

METHODS

The analysis required state-level information on age-specific disability prevalence and mortality rates. We estimated disability prevalence from the 2013–2017 American Community Survey (ACS), which contains representative samples from each state.[21] We obtained mortality rates from the 2017 US Mortality Database (USMD). The 2017 information is the most recent data available. We focused on ages 25 to 89 years because we were interested in adult disability and because the ACS top-codes age at 90 years. The 2013–2017 ACS contains 10 937 852 adults aged 25 to 89 years.

Disability and Mortality

Disability is frequently assessed in terms of difficulties with activities of daily living and instrumental activities of daily living.[3,22] The ACS includes 1 question for each domain. Respondents are asked whether, because of a physical, mental, or emotional condition, they had difficulty dressing or bathing (activities of daily living) or doing errands alone such as visiting a doctor's office or shopping (instrumental activities of daily living). We combined these questions into a single binary measure, in which an affirmative response to either question was designated as having a disability. Analyses using the separate measures provided similar results.

We obtained age-specific mortality risks from the 2017 USMD.[23] This database contains the only published set of complete, single-year life tables for each US state. The tables were created using data from the US vital statistics system (i.e., death counts, birth counts) and data from the US Census Bureau (i.e., census counts, population estimates).

Analysis

We estimated age-specific disability prevalence based on logistic regression models of the form shown in equation 1:

$$\ln(\textit{odds of disability}) = b_0 + b_1 Age_{25-29} + b_2 Age_{30-34} + \ldots + b_{12} Age_{80-84} \quad (1)$$

The model estimates the age-specific log odds of disability for each 5-year age group from 25 to 89 years, with the group aged 85 to 89 years as the omitted reference. Ancillary analyses that used a continuous measure of age provided similar findings. We estimated gender-specific models for each US state and adjusted for the sampling design of the ACS. We performed all analyses with Stata version 15.1 (StataCorp LP, College Station, TX). After estimating each of the 100 state–gender models, we used the Stata *margins* command to convert the log odds of disability for each age group into the probability of disability for each group.

For all state–gender combinations, we merged the probability of disability for

each 5-year age group with mortality data for that group, the latter obtained from the USMD (Appendix Figure A, available as a supplement to the online version of this article at http://www.ajph.org, shows that these 5-year estimates vary markedly across states, especially for disability and younger adults). We then employed the Sullivan-based Life Table Method to estimate DFLE and DLE across ages 25 to 89 years.[24] To estimate DFLE, we first multiplied the probability of not having a disability within an age group (from the ACS) by the total number of years lived within the age group (from the USMD) to obtain the total number of years lived without disability within each age group. We then summed these quantities across the age groups to obtain the total number of years lived without disability between ages 25 and 89 years. To obtain DLE, we subtracted DFLE from TLE for ages 25 to 89 years.

We also calculated the standard errors for DFLE and DLE, following standard procedure.[24] Because of large sample sizes and relatively low prevalence of disability until later life, the standard errors were close to zero. We therefore did not include them in our tables or figures for parsimony.

To answer the second research question, we calculated correlations between TLE and DFLE, and between TLE and DLE. This step allows us to determine whether and by how much greater life expectancy across states is associated with more years without disability and fewer years lived with disability. For example, a positive association between TLE and DFLE would show that greater life expectancy is associated with more years without disability across states, indicating that the additional years of life are not years lived with disability.

To assess our third research question, we created 2 synthetic populations. We created the population reflecting the "best-case disability scenario" by using the lowest disability prevalence from among the 50 states for each 5-year age group. We created the population reflecting the "worst-case disability scenario" by using the highest disability prevalence for each of the 5-year age groups. In a similar fashion, we created best- and worst-case mortality scenarios. We combined all this information into 1 synthetic population that merged the best-case disability and mortality rates, and another that merged the worst-case rates. Again, we implemented the Sullivan-based Life Table Method to estimate TLE, DFLE, and DLE for these synthetic populations.

RESULTS

First, we sought to evaluate state disparities in TLE, DFLE, and DLE. Estimates of TLE, DFLE, and DLE for each sex–state combination are provided in Table 1; a graphical summary is in Figure 1. The Figure 1a shows TLE and DFLE among women for each state while Figure 1b shows TLE and DLE. The dashed lines in the figure represent US average values. Recall that these measures reflect a 25- to 89-year age range; therefore, the maximum possible value for each measure is 65 years. Across the 50 states, TLE for women ranged from 51.6 years in West Virginia to 57.1 years in Hawaii, a 5.5-year gap. DFLE ranged from 45.8 years in West Virginia to 52.5 years in Hawaii, a 6.7-year gap. DLE ranged from 3.8 years in North Dakota to 6.2 years in Mississippi.

The fact that the range of DFLE across states was larger than the range of TLE suggests that cross-state differences in TLE are merely the tip of the population health iceberg. We also report statistical evidence in the Appendix showing greater variation for DLE and DFLE than TLE, which further illustrates the importance of assessing these health markers to understand state disparities. Also important to note, the worst-performing states on both TLE and DFLE tended to be in the South. The 8 worst-performing states on these measures were West Virginia, Mississippi, Kentucky, Alabama, Louisiana, Tennessee, Arkansas, and Oklahoma. Similarly, the South also had some of the greatest DLE for men and women. However, the DLE difference between southern and non-southern states was not as stark the difference in DFLE; California and Maine had greater DLEs than some southern states.

Disparities in TLE, DFLE, and DLE across states were similar in magnitude for men as they were for women. These measures for men are shown in Figure 2 and in the right panel of Table 1. For men, TLE ranged from 47.4 years in West Virginia to 52.9 years in Minnesota, a difference of 5.5 years. DFLE ranged from 43.1 years in Mississippi to 50.0 years in Minnesota, a difference of 6.9 years. The figures also show that the states that performed best (or worst) for women also performed best (or worst) for men. More specifically, the correlation of TLEs and DFLEs for men and women were 0.97 and 0.98, respectively.

Correlations Among States

The association between TLE and DFLE across the 50 states was very strong, with a correlation of $r = 0.97$ for women and $r = 0.99$ for men. People residing in states with longer TLEs also tended to spend more of those years without disability. The correlation between TLE and DLE across the 50 states was not as

TABLE 1— Total Life Expectancy (TLE), Disability-Free Life Expectancy (DFLE), and Disabled Life Expectancy (DLE) by State and Gender for Ages 25–89 Years: United States, 2013–2017

State	Men				Women				South (S)/ Nonsouth (NS)
	TLE, Years	DFLE, Years	DLE, Years	% of Life With Disability	TLE, Years	DFLE, Years	DLE, Years	% of Life With Disability	
Alabama	48.0	44.1	3.9	8.1	52.6	47.0	5.7	10.8	S
Alaska	51.3	48.0	3.3	6.5	54.6	49.6	5.1	9.3	NS
Arizona	51.5	48.3	3.2	6.1	55.5	51.0	4.5	8.1	NS
Arkansas	48.5	44.6	4.0	8.2	52.5	46.7	5.8	11.1	S
California	52.9	49.4	3.6	6.7	56.5	51.2	5.3	9.4	NS
Colorado	52.6	49.7	3.0	5.7	55.8	51.7	4.1	7.3	NS
Connecticut	52.5	49.5	3.0	5.7	56.1	51.8	4.3	7.7	NS
Delaware	50.4	47.6	2.8	5.6	54.6	50.5	4.1	7.5	S
Florida	51.3	48.1	3.2	6.3	55.5	51.0	4.5	8.1	S
Georgia	50.2	46.7	3.4	6.9	54.0	49.0	5.0	9.3	S
Hawaii	52.7	49.4	3.2	6.1	57.1	52.5	4.7	8.2	NS
Idaho	51.9	48.5	3.4	6.5	55.0	50.5	4.5	8.2	NS
Illinois	51.4	48.0	3.3	6.5	55.1	50.5	4.7	8.4	NS
Indiana	49.5	46.1	3.5	7.0	53.4	48.6	4.8	9.0	NS
Iowa	51.6	48.8	2.8	5.5	55.1	51.2	3.9	7.1	NS
Kansas	50.9	47.8	3.1	6.1	54.5	50.0	4.5	8.2	NS
Kentucky	47.9	43.7	4.3	8.9	52.2	46.3	5.9	11.3	S
Louisiana	48.4	44.5	3.9	8.1	52.8	47.3	5.5	10.4	S
Maine	50.7	46.9	3.8	7.5	54.7	50.1	4.6	8.4	NS
Maryland	50.9	48.0	2.9	5.7	55.0	50.7	4.3	7.8	S
Massachusetts	52.0	48.8	3.2	6.2	56.0	51.2	4.8	8.5	NS
Michigan	50.5	46.8	3.7	7.2	54.2	49.2	5.0	9.2	NS
Minnesota	52.9	50.0	2.9	5.6	56.2	52.1	4.1	7.3	NS
Mississippi	47.5	43.1	4.4	9.3	52.1	46.0	6.2	11.8	S
Missouri	49.7	46.1	3.6	7.2	53.9	48.8	5.1	9.4	NS
Montana	51.2	48.1	3.2	6.1	54.6	50.3	4.3	7.8	NS
Nebraska	51.8	49.1	2.8	5.3	55.2	51.4	3.8	6.9	NS
Nevada	50.6	47.5	3.1	6.1	54.3	49.8	4.5	8.3	NS
New Hampshire	51.6	48.7	2.8	5.5	55.4	51.0	4.3	7.8	NS
New Jersey	52.0	48.9	3.0	5.8	55.7	51.4	4.4	7.8	NS
New Mexico	49.8	45.6	4.2	8.5	54.4	48.9	5.5	10.1	NS
New York	52.6	49.2	3.5	6.6	56.3	51.2	5.1	9.0	NS
North Carolina	50.3	46.6	3.7	7.3	54.1	49.0	5.1	9.3	S
North Dakota	52.0	49.3	2.8	5.3	55.3	51.5	3.8	6.9	NS
Ohio	49.2	45.8	3.4	6.8	53.4	48.5	4.9	9.1	NS
Oklahoma	48.8	45.1	3.7	7.5	52.4	47.2	5.2	10.0	S
Oregon	52.0	48.5	3.5	6.7	55.3	50.5	4.8	8.7	NS
Pennsylvania	50.3	46.9	3.4	6.8	54.5	49.6	4.8	8.9	NS
Rhode Island	51.6	48.2	3.4	6.6	55.4	50.1	5.3	9.6	NS
South Carolina	49.2	45.5	3.7	7.5	53.7	48.5	5.2	9.6	S

Continued

TABLE 1— Continued

State	Men				Women				South (S)/ Nonsouth (NS)
	TLE, Years	DFLE, Years	DLE, Years	% of Life With Disability	TLE, Years	DFLE, Years	DLE, Years	% of Life With Disability	
South Dakota	51.3	48.5	2.9	5.6	54.9	50.7	4.2	7.7	NS
Tennessee	48.5	44.7	3.9	8.0	52.7	47.1	5.6	10.6	S
Texas	51.1	47.6	3.5	6.8	54.8	49.7	5.1	9.4	S
Utah	52.5	49.6	2.9	5.5	55.3	51.2	4.2	7.5	NS
Vermont	52.0	48.6	3.3	6.4	55.1	50.7	4.4	8.0	NS
Virginia	51.6	48.4	3.1	6.1	55.0	50.6	4.5	8.1	S
Washington	52.4	49.1	3.3	6.3	55.6	50.8	4.8	8.6	NS
West Virginia	47.4	43.1	4.3	9.0	51.6	45.8	5.8	11.3	S
Wisconsin	51.7	48.8	2.9	5.7	55.4	51.2	4.1	7.5	NS
Wyoming	51.5	48.7	2.8	5.4	54.8	50.9	3.8	7.0	NS
Worst case	46.7	42.1	4.6	9.9	51.4	45.0	6.4	12.5	Synthetic
Best case	53.5	51.2	2.3	4.3	57.5	54.0	3.6	6.2	Synthetic

Note. The worst-case synthetic population consists of the highest disability and mortality rates among the 50 states for each 5-year age group; the best-case synthetic population consists of the lowest 5-year rates.

strong, with $r = -0.75$ for men and $r = -0.67$ for women. This discrepancy can occur when TLE and DFLE move in tandem, with either a stochastic or fairly consistently sized gap between them. As an example, imagine 2 states, 1 with TLE of 55 years and DFLE of 53 years and another with TLE of 60 years and DFLE of 58 years. The TLE and DFLE are perfectly correlated. However, the DLE is 2 years in both states, so DLE is uncorrelated with TLE and DFLE.

When we examined the patterns for southern and nonsouthern states, we found that the correlation between TLE and DFLE was similarly strong in the South ($r = 0.99$ for men and women) as it was in the rest of the country (0.97 for men, 0.90 for women). However, the correlation between TLE and DLE was much stronger in the South (–0.89 for men and women) than the rest of the country (–0.45 for men and −0.15 for women). In fact, women's TLE and DLE were essentially unrelated in the rest of the country; testing the sample correlation against 0 provided a Z statistic of −0.086, with a P value of .38.

We can draw several insights from these patterns. First, for all states, the number of years that one lived with disability was closely tied to the total number lived; DFLE and TLE moved in tandem. Second, the number of years that one lived with disability was smaller and more consistent in size among nonsouthern states than among southern states. As a consequence, the correlation between TLE and DLE was much smaller in nonsouthern states. In fact, the correlation in the nonsouthern states was modest for men and negligible for women. Third, southern states were doubly disadvantaged. They had relatively low TLE combined with relatively high DLE; as a consequence, residents of these states live a higher proportion of their life with disability.

Figures 1 and 2 contain several other interesting patterns. For instance, some contiguous states had notably disparate TLE and DFLE. Take Oklahoma, Kansas, and Texas as an example. Oklahoma is one of the worst-performing states, with a TLE of 52.4 years and DFLE of 47.2 years. It shares its northern border with Kansas, which performs similar to the national average, with a TLE of 54.5 years and DFLE of 50.0 years. Oklahoma shares its southern border with Texas, which also performs better, with a TLE of 54.8 years and DFLE of 49.7 years. Similar discrepancies exist between other contiguous states.

US Life Expectancy Under Current Conditions

For each 5-year age group of women, we identified the state with the lowest disability prevalence and the lowest mortality risk separately (Table 2). We combined these estimates to create a synthetic population who experienced the best-case scenarios. We predicted that this synthetic population would have a TLE of 57.5 years, which is 0.4 years longer than the highest state TLE. This population would also have a DFLE of 54.0 years, which is 1.5 years longer

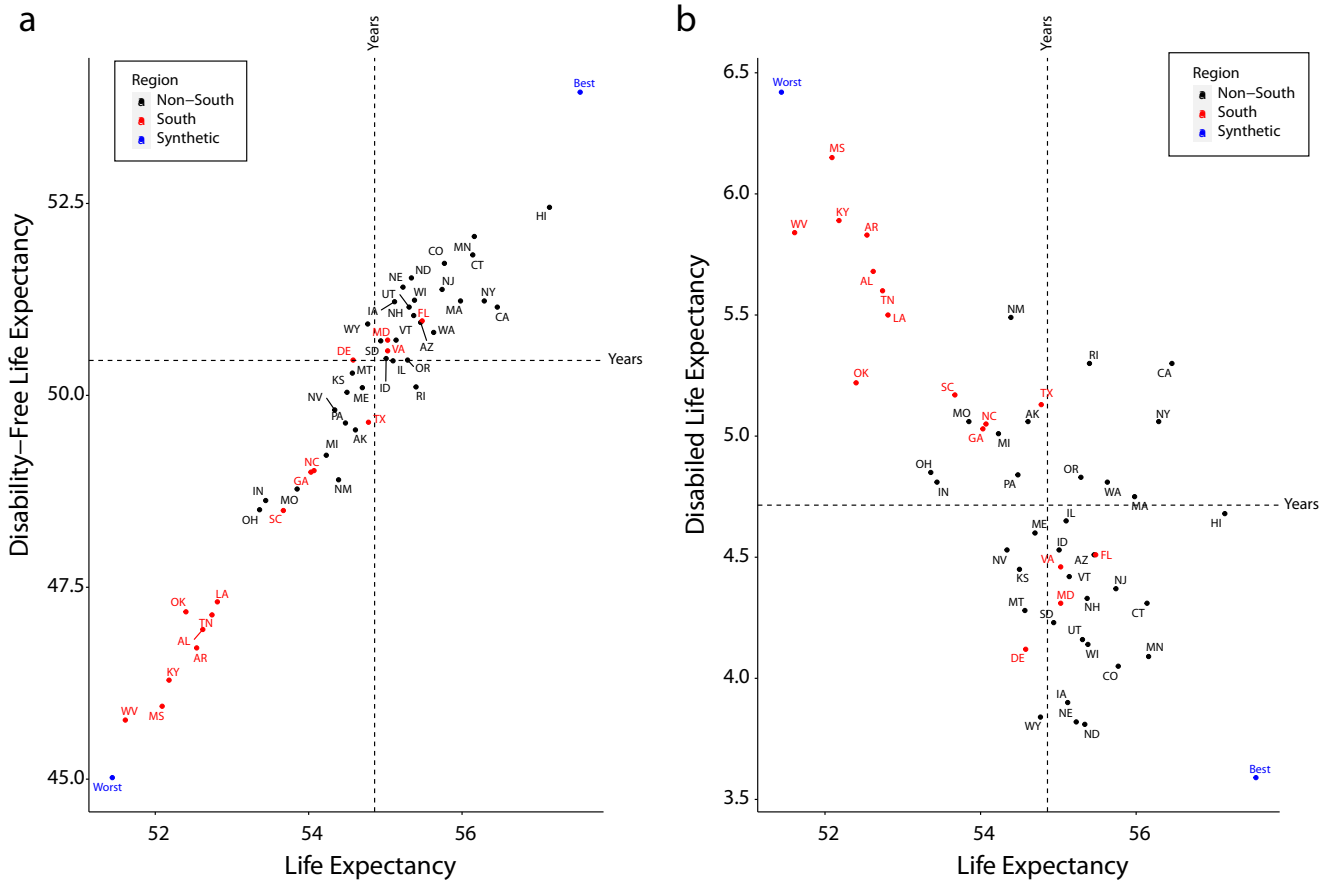

FIGURE 1— Total Life Expectancy by US State for Women by (a) Disability-Free Life Expectancy and (b) Disabled Life Expectancy: 2013–2017

Note. The 2-letter abbreviations within each figure indicate the US state. The dot indicated by "best" represents a hypothetical state that for each 5-year age band takes on the value of an actual state with the lowest disability (and mortality, respectively). Because no actual US state is "best" at every age band, this hypothetical state has lower disability than any actual state. Following the same technique as best, the dot indicated by "worst" represents the hypothetical worst-case scenario.

than the actual DFLE, and a DLE of 3.6 years, which is 0.2 years fewer than the lowest state DLE. On the other extreme, if we used the highest age-specific disability and mortality rates among the states, TLE would fall to 51.4 years, DFLE would fall to 45.0 years, and DLE would rise to 6.4 years.

As illustrated previously, the best-case and worst-case scenarios would produce 2 dramatically different population health environments. There is a 6.1-year gap in TLE and an 8.9-year gap in DFLE between the scenarios. Interestingly, as shown in Table 2, many states contributed to the 2 scenarios. Fourteen states contributed to the best-case scenario. Nine states contributed to the worst-case scenario, with West Virginia and Mississippi contributing the most.

For men, the best-case scenario would produce a TLE as high as 53.5 years, which is 0.57 years above the highest TLE; a DFLE of 51.8 years, which is 1.55 years above the highest state DFLE; and, lastly, a DLE of 2.32 years, which is 0.34 years lower than the lowest state DLE. In contrast, the worst-case scenario would result in a TLE of just 46.7 years, a DFLE of 42.1 years, and a DLE of 4.61 years. The states that contributed to the best- and worst-case scenarios were similar for men and women.

DISCUSSION

Recent research on geographic differences in US health has focused on mortality; however, this study makes clear that mortality differences across geographic areas are a tip of the population health iceberg. We found that DFLE differs greatly across US states, more so than TLE. We also noted substantial variation among DLE across states: the worst-performing state has more than 1.5 times more years of DLE

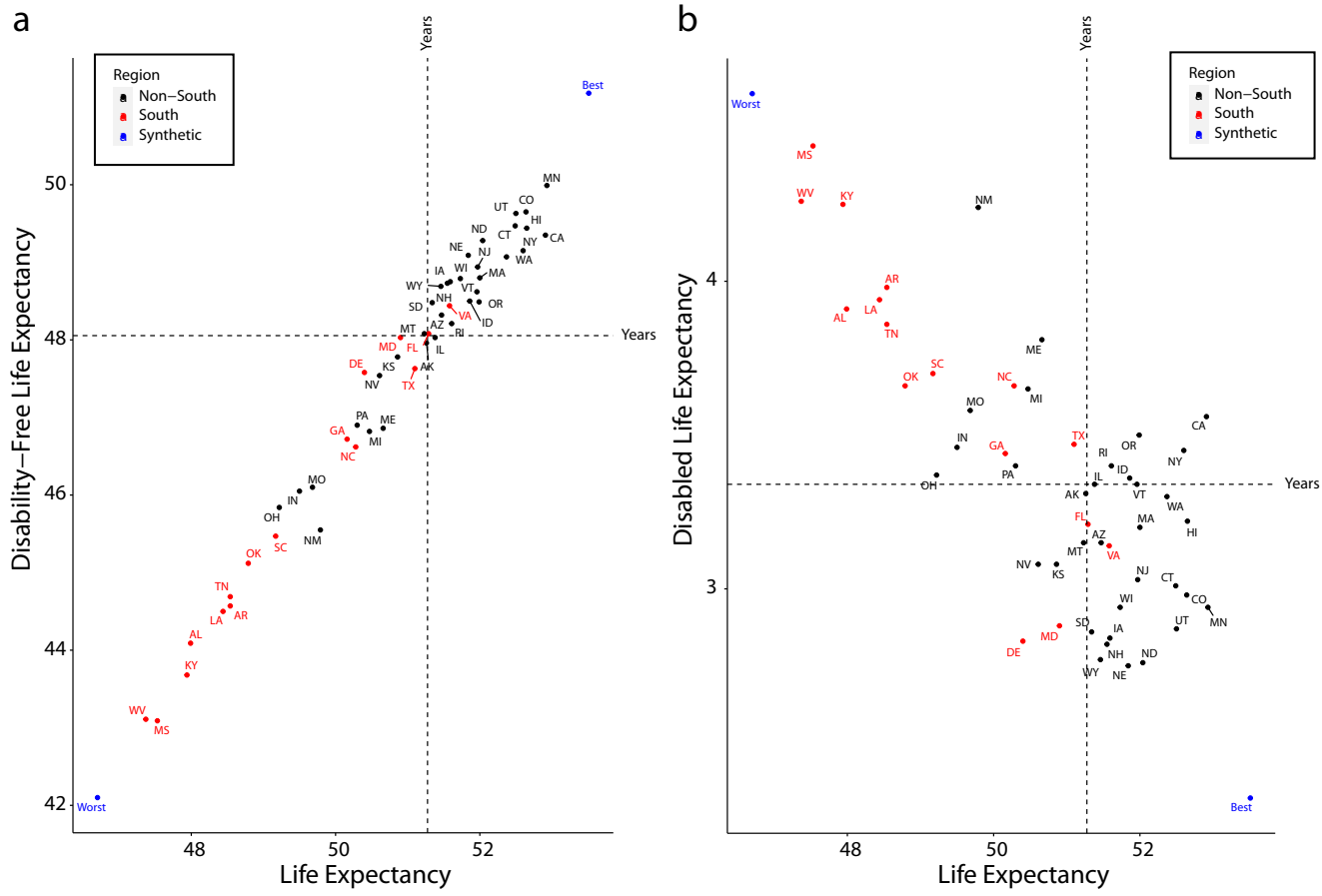

FIGURE 2— Total Life Expectancy by US State for Men by (a) Disability-Free Life Expectancy and (b) Disabled Life Expectancy: 2013–2017

Note. The 2-letter abbreviations within each figure indicate the US state. The dot indicated by "best" represents a hypothetical state that for each 5-year age band takes on the value of an actual state with the lowest disability (and mortality, respectively). Because no actual US state is "best" at every age band, this hypothetical state has lower disability than any actual state. Following the same technique as best, the dot indicated by "worst" represents the hypothetical worst-case scenario.

as the best-performing state. Our results reinforce the idea that US state of residence significantly affects US individuals' health destinies—both life span and years of life with and without disability.

The complexity of the relationship among TLE, DFLE, and DLE among states has implications for how state contexts shape disability and mortality. We posed several questions to understand how these associations may be affected by state contexts. In general, the pattern for TLE and DFLE adhered to our expectation: more years of life in US states corresponded with more years without disability.

By contrast, the association between TLE and DLE varied. It was only moderately strong in states with relatively long TLE (mainly nonsouthern states) but strong in states with relatively short TLE (mainly southern states). One possible explanation is that, for states with longer TLE (mainly nonsouthern states), the underlying processes that affect disability and mortality are not as closely tied. It may be that, after a certain threshold of overall population health, state contexts influence disability and mortality through different underlying processes. Another possible explanation is that states with relatively low TLE (mainly southern states) are doubly disadvantaged. Their residents live fewer years and spend a greater proportion of those years with disability.

This latter finding has 2 possible implications: (1) the southern context may be pernicious to the extent that all body systems are independently at risk, leading to simultaneously higher rates for disability and mortality at younger ages, or (2) people with disability are less likely to survive. Because these types of health outcomes are a long time in the making, the observed clustering of southern states likely reflects shared, long-term, and cumulative state policy

TABLE 2— Minimum and Maximum Disability Prevalence and Mortality Risk by Age Group: United States, 2013–2017

	Disability Prevalence		Mortality Risk	
Age, Years	Minimum Rate (State)	Maximum Rate (State)	Minimum Rate (State)	Maximum Rate (State)
Women				
25–29	0.0121 (NE)	0.0436 (AK)	0.0020 (CA)	0.0067 (AK)
30–34	0.0135 (WY)	0.0512 (VT)	0.0026 (OR)	0.0114 (WV)
35–39	0.0166 (ND)	0.0519 (AR)	0.0040 (CA)	0.0121 (WV)
40–44	0.0250 (NJ)	0.0735 (WV)	0.0057 (CA)	0.0156 (WV)
45–49	0.0298 (NE)	0.0800 (MT)	0.0079 (CT)	0.0197 (OK)
50–54	0.0390 (HI)	0.1066 (WV)	0.0122 (MN)	0.0302 (WV)
55–59	0.0449 (ND)	0.1208 (MS)	0.0202 (MA)	0.0427 (MS)
60–64	0.0498 (ND)	0.1215 (KY)	0.0293 (CT)	0.0593 (WV)
65–69	0.0571 (ND)	0.1356 (MS)	0.0418 (HI)	0.0775 (WV)
70–74	0.0644 (MT)	0.1883 (MS)	0.0615 (HI)	0.1203 (MS)
75–79	0.1243 (IA)	0.2643 (MS)	0.1030 (HI)	0.1860 (KY)
80–84	0.1990 (VT)	0.3849 (MS)	0.1539 (HI)	0.2745 (AL)
85–89	0.3374 (AK)	0.5524 (AR)	0.2749 (HI)	0.4202 (WV)
Men				
25–29	0.0140 (ND)	0.0426 (MS)	0.0055 (NE)	0.0131 (WV)
30–34	0.0186 (NJ)	0.0419 (WV)	0.0063 (CA)	0.0189 (WV)
35–39	0.0156 (NE)	0.0616 (ME)	0.0073 (MN)	0.0231 (WV)
40–44	0.0172 (NE)	0.0722 (WV)	0.0098 (CA)	0.0246 (WV)
45–49	0.0274 (MN)	0.0772 (MS)	0.0143 (MN)	0.0334 (WV)
50–54	0.0216 (WY)	0.0905 (WV)	0.0226 (ND)	0.0442 (MS)
55–59	0.0398 (WY)	0.1040 (WV)	0.0319 (CT)	0.0713 (MS)
60–64	0.0472 (NH)	0.1176 (MS)	0.0487 (MN)	0.0967 (MS)
65–69	0.0423 (SD)	0.1290 (MS)	0.0705 (MN)	0.1219 (MS)
70–74	0.0589 (AK)	0.1378 (MS)	0.1012 (CO)	0.1740 (MS)
75–79	0.0763 (WY)	0.1919 (MS)	0.1637 (CO)	0.2450 (MS)
80–84	0.1631 (WY)	0.2662 (AK)	0.2258 (HI)	0.3560 (MS)
85–89	0.2299 (ND)	0.4911 (MS)	0.3747 (HI)	0.4964 (KY)

Note. Disability estimates are from the 2013–2017 American Community Survey, and the mortality estimates are from the 2017 US Mortality Database. Rates are per 100 adults.

changes over several decades. The factors that might moderate mortality risk among persons with disability, such as social supports, medical care, and housing accommodations, are relatively weak in the South. Southern states, in particular, have invested less in their populations' well-being on multiple dimensions such as maintaining low cigarette excise taxes, opting out of Medicaid expansion, providing weak antipoverty programs, and actively implementing state preemption laws, which prohibit local authority from legislating on many domains that could improve population health.[10,11]

Although we did not assess how specific state policies and contexts are associated with the variation in TLE, DFLE, and DLE among states, our analysis was nonetheless informed by recent studies that have examined how state-level contexts are associated with adult mortality and disability. Montez et al.[19] documented, for example, that more than 50% of state variation in women's mortality during 1980 to 2000 reflected states' characteristics as compared with women's characteristics. In addition, Fenelon[2] illustrated the importance of smoking for regional differences in adult mortality, a finding consistent with the importance of tobacco control policies

(e.g., excise taxes on cigarettes) for state differences in mortality.[10,19]

State legislatures also make a variety of decisions about key "inputs" to a healthy population and have played an increasingly large role in shaping population health because of structural changes through deregulation (affecting industries and local economies), preemption (state legislatures taking away local control over policies), and devolution (the transfer of responsibility of social insurance programs from the federal government to the states).[9,25] State policies also appear to be increasingly clustered in terms of their political nature (e.g., more conservative or more liberal), which may account for the growth in regional clustering of mortality.[26] This clustering may have contributed significantly to the growing importance of states as battlegrounds for population health.

Limitations

This study had some limitations that should be noted. First, the ACS data only provide information on people up to the age of 90 years. Nonetheless, it is unlikely that the inclusion of the oldest old would materially alter the patterns documented here given the small number of survivors at the very advanced ages. Second, we did not adjust for individual-level factors because the USMD lacks information on sociodemographic characteristics such as race, education, or income, which are known important correlates of both disability and mortality. The data also do not contain information on interstate migration histories. Although the possibility that interstate migration might contribute to the patterns we reported should not be ignored, previous studies examining its potential contribution concluded that its effect on state variation in health outcomes is modest.[3] State differences in sociopolitical contexts that may help account for the disparities in TLE, DFLE, and DLE should be investigated in future. For instance, states' investments in education systems affect their residents' education levels, the structure of states' tax policies affect poverty rates, and states' civil rights and antidiscrimination protections affect gender, racial, and other disparities in health and mortality.

Public Health Implications

As life expectancy increased gradually, policymakers and researchers faced a critical question: are the added years of life healthy years or disabled years? This is a critical issue because disability is enormously costly to individuals,[27] states, and the nation. In 2006, for instance, disability-associated costs for health care expenditures alone reached nearly $400 billion nationwide. The associated costs ranged widely from $600 million in Wyoming to $40 billion in New York.[17] The inextricable links between disability and longevity make it imperative that research on the health status of US states provide estimates of healthy life expectancy, in addition to its component measures of disability and mortality. We showed that states with higher life expectancy, such as Hawaii, Minnesota, or Colorado, have not more but fewer disabled years. This suggests that state policy contexts can support longer lives and longer healthy lives. Subsequent research should examine health-related, but also economic, educational, social, and other policies to understand how all US states can achieve comparable results. AJPH

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CONTRIBUTORS

M. P. Farina conducted the analysis and wrote the article. A. Zajacova and J. K. Montez edited the article and provided feedback on analysis. M. D. Hayward wrote and edited the draft, and provided feedback on analysis.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest.

HUMAN PARTICIPANT PROTECTION

Human participant protection was not required for this study because the data are publicly available and de-identified.

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Wage-Setting Policies, Employment, and Food Insecurity: A Multilevel Analysis of 492 078 People in 139 Countries

Aaron Reeves, PhD, Rachel Loopstra, PhD, and Valerie Tarasuk, PhD

Objectives. To examine the association between wage-setting policy and food insecurity.

Methods. We estimated multilevel regression models, using data from the Gallup World Poll (2014–2017) and UCLA's World Policy Analysis Center, to examine the association between wage setting policy and food insecurity across 139 countries (n = 492 078).

Results. Compared with countries with little or no minimum wage, the probability of being food insecure was 0.10 lower (95% confidence interval = 0.02, 0.18) in countries with collective bargaining. However, these associations varied across employment status. More generous wage-setting policies (e.g., collective bargaining or high minimum wages) were associated with lower food insecurity among full-time workers (and, to some extent, part-time workers) but not those who were unemployed.

Conclusions. In countries with generous wage-setting policies, employed adults had a lower risk of food insecurity, but the risk of food insecurity for the unemployed was unchanged. Wage-setting policies may be an important intervention for addressing risks of food insecurity among low-income workers. (*Am J Public Health*. 2021;111:718–725. https://doi.org/10.2105/AJPH.2020.306096)

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Food insecurity—"the uncertainty and insufficiency of food availability and access that are limited by resource constraints, and the worry or anxiety and hunger that may result from it"[1(p49)]—is a global problem, affecting the health of millions. Food-insecure adults have higher risk of depression, diabetes, and cardiovascular disease,[2,3] and children that have grown up in food-insecure homes have poorer health and education outcomes.[4,5] Food insecurity can even lead to stunting and wasting,[6] both of which increase the risk of mortality.[7] Although the last 100 years brought significant reductions in chronic food deprivation,[8] improvements in these trends have now stalled,[9] with COVID-19 threatening to increase food insecurity globally. In this context, developing policies to address food insecurity is a key priority because "ensur[ing] healthy lives and promot[ing] well-being for all" (United Nation's Sustainable Development Goal 3) is not possible without achieving food security.[10]

Food insecurity is largely rooted in socioeconomic inequalities, which undermine access to food.[11] A recent global analysis of 134 countries illuminated this point: food insecurity was more likely in households with low incomes and where 1 household member was unemployed.[12] This finding has been replicated in country-specific studies in high-income countries.[13,14] Importantly, however, food insecurity is also a problem among the employed. Indeed, in a global data set, over 50% of people who were food insecure were engaged in paid employment (authors' calculations using Food and Agriculture Organization data).[15] Workers in more precarious positions in the labor market (e.g., part-time employment) were also at heightened risk.[16] Employment status, length of contract, and wages may all affect food insecurity risk. It follows, then, that policies that increase wages may influence the risk of food insecurity.[17,18]

Wage-setting policies often include rules that govern contract negotiations between employers and employees. Wage bargaining, for example, can occur (1) directly between an employer and an employee, (2) in the context of a minimum wage, which restricts the lowest amount someone can be paid for their labor, or (3) through collective bargaining arrangements, where wages are set by unions and firms together.[19] Countries with collective bargaining or even high minimum wages may have lower food insecurity because these wage-setting policies tend to increase earnings compared with countries that have less generous minimum wages or that do not regulate earnings at all.[20] Collective bargaining arrangements could also reduce food insecurity through provision of nonincome benefits, such as employer-paid health insurance, as health care costs increase the risk of food insecurity.[21]

Research into the impacts of wage-setting activities on food insecurity has been scarce. Some simulation studies suggest that increasing the minimum wage would reduce food insecurity,[22] but there are significant gaps in our understanding of whether and how wage-setting policies affect food insecurity. It is currently unclear, for example, whether the possible benefits of wage-setting policies are concentrated among full-time workers.[23] Part-time workers may not fully benefit because they work fewer hours and therefore benefit less from minimum wages. People who are unemployed or who are in informal employment may not benefit at all, as they are not directly affected by wage-setting policies.[22]

The net effect of wage-setting policies on food insecurity may also depend on whether such policies create unemployment or lead to more part-time working, which, in turn, may increase food insecurity. Whether minimum wages create unemployment remains a contested issue,[24] but it is possible that some people may lose their jobs and that some firms may increase the number of part-time workers to reduce costs.[25] Thus, even if increasing the minimum wage improves earnings for some, others may lose out. This could mean that food insecurity rises if the unemployed are not protected from experiencing food insecurity by other policies, such as unemployment insurance.

Finally, when considering the impacts of wage-setting policies, it is necessary to take into account the size of the informal economy[26]—that is, the share of the population working outside the reach of labor market regulations. Higher minimum wages, for example, may reduce the risk of food insecurity, but these reductions could be diminished if labor market informality is high because more people are not regulated by these policies.

This article makes a significant contribution to understanding the relationship between wage-setting policies and food insecurity by addressing 2 main questions. First, are wage-setting policies correlated with risk of food insecurity (research question [RQ] 1)? In particular, we tested the hypothesis that food insecurity will be lower in countries with collective bargaining and higher minimum wage policies compared with countries with little or no minimum wage policies. Second, do associations between wage-setting policies and food insecurity differ between full-time employed, part-time employed, and unemployed (RQ2)? We also explored whether associations between wage-setting policies and food insecurity were moderated by the size of the informal economy (RQ3).

METHODS

To answer these questions, we brought together data from multiple sources, including nationally representative individual-level surveys and cross-national indicators of wage setting policies.

Data

We used cross-sectional data from the 2014–2017 Gallup World Poll (GWP), collected in 147 countries. In these years, the GWP included the Food and Agriculture Organization's survey instrument for measuring food insecurity, the Food Insecurity Experience Scale (FIES),[15] providing an experience-based measure of food insecurity. The 2014–2017 GWP was conducted by telephone in countries where telephone coverage included at least 80% of the population, and face-to-face questionnaires were used in contexts where this was not the case. The survey aims to be nationally representative at the country level of the adult population (aged 15 years and older). The FIES is used to produce a global measure of food insecurity as well as comparable country-level estimates of food insecurity around the world.[12] The FIES comprises 8 "yes or no" questions designed to elicit whether respondents faced difficulty or uncertainty in accessing sufficient food over the past 12 months.[15] We summed responses across the 8 questions (1 = yes, 0 = no) and converted the total score into 3 binary categories of food insecurity[27]: any indication of food insecurity (≥ 1 "yes" responses), "moderate or severe" food insecurity (≥ 4 "yes" responses), and "severe only" food insecurity (≥ 7 "yes" responses). We examined each of these

categories separately because the influence of wage setting polices may differ in magnitude and strength of association across these indicators.[13]

The GWP also contains a measure of employment status, which we recoded as (1) employed full-time (reference = 0), (2) employed part-time (coded as 1), or (3) not employed (coded as 2). The data set does contain a measure of self-employment; however, it is self-reported, so it could vary in meaning across different contexts. Whether wage-setting policies affect people in self-employment may also differ by country context. These ambiguities introduce significant uncertainties in the analysis and interpretation of findings related to self-employment status, so although we include self-employment as a category of employment in our regression models, we do not discuss it in the analysis. The GWP data set also provided data on respondent age, gender, marital status, social capital, social networks, and urban versus rural location, which are all included in our models as covariates.

We merged the GWP data with country-level measures of wage-setting policy taken from UCLA's World Policy Analysis Center,[28] which produces a policy database constructed from the constitutional and legal provisions for workers in 193 countries. These data were collected in 2014, although policy change in this area is very stable and so very few countries would have changed between 2014 and 2017. For our analysis, we combined 2 variables contained in their database—the legislative context for wage-setting policies and the value of the minimum wage required by law—to create a new variable that had 4 nonoverlapping categories. To increase comparability across countries, we expressed the minimum wage levels as Purchasing Power Parity Dollars (PPP$), a currency conversion that adjusts for prices and therefore compares purchasing power. We defined the 4 categories as (1) low (< PPP$2 per day) or no minimum wage (19 countries; examples include Singapore and Bangladesh); (2) moderate minimum wage set by law between PPP$2 and PPP$10 per day (58 countries; examples include Mexico and Ghana); (3) high minimum wage set by law above PPP$10 per day (50 countries; examples include Morocco and the United States); and (4) collective bargaining, where a minimum wage is not set by law but where wage negotiations are collectively organized (12 countries; examples include Bosnia and Herzegovina and Sweden).

Finally, we merged these data with GDP per capita, adjusted for purchasing power and inflation, which we obtained from the World Bank. We also merged data on informal employment, also from the World Bank. These data provide an estimate of the proportion of the nonagricultural labor force engaged in informal employment (all jobs in unregistered or unincorporated enterprises). These data were not available for 67 countries (48%) included in our merged GWP–UCLA data set. After we merged these data sets and excluded cases with missing individual-level and country-level data, our final analytic sample comprised 492 078 individuals spanning up to 139 countries for the years 2014 to 2017 for our main analyses and 72 countries and 257 032 individuals for RQ3 (a full list of countries is included in Appendix A, available as a supplement to the online version of this article at http://www.ajph.org).

Statistical Models

To evaluate the impact of wage-setting policy on food insecurity, we estimated separate multilevel logistic regression models (with random intercepts), with standard errors clustered at the country level to account for correlations between individuals living within the same country. The outcome variables across all models were the 3 measures of food insecurity described in the Data section. The main predictor variable was the measure of wage-setting policy. The analysis proceeded in 2 steps. First, we estimated whether food insecurity was, on average, lower in countries that had implemented specific wage-setting policies (RQ1). Second, we tested for possible heterogeneity in the association between wage-setting policy and food insecurity according to employment status (RQ2). To do this, we estimated a cross-level interaction term between employment status and the type of wage-setting policy in place in that country. For each of these models, we estimated the predicted probability of being food insecure and then calculated the marginal effect of the policies (predicted at the means)—that is, the average difference in the predicted probability of being food insecure between countries that have different types of wage-setting policies.

We adjusted models for possible confounders. These included age, because earnings are correlated with age and with food insecurity (we also added an age-squared term to account for any nonlinearities). We also controlled for gender because women tend to face higher risk of food insecurity but may also be underrepresented in the labor market and therefore less affected by labor market policies.[12] Marital status may also be a confounder because single parents may face a higher risk of food insecurity and may also be less able to work.[12] People in rural areas face an elevated risk of food insecurity but may

also be less likely to work for an employer.[12] We also included measures of social networks (respondents' satisfaction with their opportunities to make friends) and social capital (respondents have people in their life they can count on) because earlier work suggests that these are correlated with both food insecurity and employment opportunities.[12] Finally, our models controlled for GDP per capita because richer countries, on average, will have less food insecurity than poorer countries and GDP may also correlate with wage-setting policies.[17,18] More details on all variables are provided in Appendix B (available as a supplement to the online version of this article at http://www.ajph.org).

We also conducted an additional analysis that add an interaction term between the proportion of people employed informally in the labor market and our measure of wage setting policy (RQ3). We did not include countries with collective bargaining in these models because none of these countries had data on labor market informality.

We explored the robustness of our findings by conducting sensitivity tests (1) excluding low-income countries (because very few low-income countries had high minimum wages or collective bargaining), retaining middle-income countries only, and then retaining high-income countries only; (2) controlling for other policies that might be correlated with food insecurity (such as family, pension, and maternity- and paternity-leave policies, as defined by the World Policy Analysis Center); and (3) conducting a matching analysis at the country level—matching on economic development, population size, the degree of democracy, and their geographical location (continent)—and thereby focusing on those parts of the distribution where there was common support.[29]

RESULTS

We begin by exploring the association between wage-setting policies and food insecurity and then turn to the question of which groups benefit most from these policies.

Wage-Setting Policies and Food Insecurity

More generous wage-setting policies were negatively associated with the predicted probability of food insecurity across all measures (any indication, moderate or severe, and severe), even after we accounted for GDP and other control variables. In countries where there was no minimum wage or a low minimum wage, the probability of being moderately or severely food insecure was 0.31 (95% confidence interval [CI] = 0.25, 0.36; Table 1). Moderate or severe food insecurity was only slightly lower in countries with moderate minimum wage policies (0.29; 95% CI = 0.25, 0.33). The probability of moderate or severe food insecurity was 0.25 (95% CI = 0.21, 0.30) in countries with high minimum wages. Lastly, the probability of food insecurity was lower still at 0.21 (95% CI = 0.15, 0.26) in countries with collective bargaining arrangements.

Statistical tests of the difference in the probability of food insecurity, using countries with collective bargaining as the reference category, are also reported in Table 1. Countries with a moderate ($P = .016$) or no or low minimum wage ($P = .029$) had higher moderate or severe food insecurity. However, the null hypothesis could not be rejected when we compared countries with a high minimum wage to countries with collective bargaining ($P = .053$). We observed similar results for low, moderate, or severe and severe-only measures of food insecurity (Table 1). In sum, more generous minimum wages and collective bargaining arrangements were associated with less food insecurity.

Variation Across Employment Status

Next, we explored whether these policies benefited full-time workers more than part-time workers and the unemployed. Wage-setting policies appeared beneficial for full-time workers but not the unemployed. The predicted probability of moderate or severe food insecurity among the unemployed remained high, irrespective of wage-setting policies (see Figure 1 and Appendix C, available as a supplement to the online version of this article at http://www.ajph.org, for full models). By contrast, among those in full-time employment, the predicted probability of moderate or severe food insecurity was higher in countries without a minimum wage policy (0.31) than it was in countries with collective bargaining (0.17), a difference of 0.14 (Figure 1). Among part-time workers, the predicted probability of food insecurity was approximately 0.32 in countries without a minimum wage policy and approximately 0.22 in countries with collective bargaining, a difference of approximately 0.092. The risk of food insecurity was lower for both groups when they lived in collective bargaining countries compared with countries with little or no minimum wage, but the reduction was greater for full-time employees (0.14) than part-time employees (0.092), suggesting that the declines in food insecurity were concentrated among full-time employees (difference, 0.14 – 0.092 = ~0.047; $P = .026$).

TABLE 1— Predicted Probability of Food Insecurity by Type of Wage-Setting Policy and Difference in Predicted Probability of Food Insecurity Between Countries With Collective Bargaining and Other Wage-Setting Policies: 2014–2017

Wage-Setting Policy	Any Indication of Food Insecurity, PP (95% CI) or No.	Moderate or Severe Food Insecurity, PP (95% CI) or No.	Severe Food Insecurity, PP (95% CI) or No.
Collective bargaining (Ref)	0.394 (0.332, 0.457)	0.208 (0.153, 0.262)	0.094 (0.060, 0.127)
High minimum wage			
Overall	0.451 (0.413, 0.489)	0.255 (0.214, 0.295)	0.124 (0.092, 0.156)
Difference between high minimum wage and reference category	0.057 (–0.002, 0.116)	0.047 (–0.001, 0.095)	0.030 (0.001, 0.060)
Moderate minimum wage			
Overall	0.489 (0.444, 0.533)	0.293 (0.252, 0.334)	0.154 (0.126, 0.182)
Difference between moderate minimum wage and reference category	0.095 (0.006, 0.183)	0.085 (0.009, 0.162)	0.060 (0.012, 0.109)
Little or no wage-setting policy			
Overall	0.493 (0.432, 0.555)	0.307 (0.249, 0.365)	0.163 (0.120, 0.206)
Difference between little or no wage-setting policy and reference category	0.099 (0.004, 0.194)	0.099 (0.018, 0.181)	0.070 (0.017, 0.122)
Countries	139	139	139
Observations	492 078	492 078	492 078

Notes. CI = confidence interval; PP = predicted probability. The estimated differences reported in the table are absolute differences in the predicted probability of food insecurity (predicted at the means), on average, between countries with collective bargaining and countries with other types of wage-setting regime. Estimates come from a multilevel logistic regression model that controls for gender, age, age squared, marital status, whether respondents live in an urban or rural area, their employment status, whether there are children in the household aged < 15 years, whether respondents are satisfied with their opportunities to make friends, whether respondents have people in their life they can count on, and GDP per capita (adjusted for purchasing power and inflation, measured on a log scale). The categories of the wage-setting policy measure are defined as follows: little or no wage-setting policy: countries with either (a) no minimum wage or (b) a very low minimum wage (< PPP$2/day); moderate minimum wage: countries with a minimum wage set by law between PPP$2 and PPP$10/day; high minimum wage: countries with a minimum wage set by law above PPP$10/day; collective bargaining: countries without a minimum wage but where wage negotiations are collectively organized.

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If wage-setting policies do not reduce food insecurity among the unemployed, then any increase in unemployment attributable to the wage-setting policy would undermine the overall reduction in food insecurity brought about by the policy. Formally modeling this relationship would go beyond the scope of this article, but we have conducted a counterfactual analysis to estimate how large the rises in unemployment would need to be to offset the reductions in food insecurity achieved through increasing the minimum wage (see Appendix D, available as a supplement to the online version of this article at http://www.ajph.org, for more details). The models reported in Table 1 suggest that moving from a low to a high minimum wage would reduce moderate or severe food insecurity by approximately 4 percentage points. To offset these gains, our counterfactual analysis suggests the increase in unemployment would need to be very large, more than 10 percentage points.

Labor Market Informality and Food Insecurity

Finally, we explored whether the size of the informal economy moderated the impact of wage-setting policy on food insecurity. The direct association between informal labor markets and food insecurity was positive: on average, countries with larger informal economies had higher levels of food insecurity (Figure 2 and Appendix E, available as a supplement to the online version of this article at http://www.ajph.org). However, as shown in Figure 2, the association between the size of the informal economy and food insecurity appeared to vary according to the kind of wage-setting policies implemented. Among countries with a high or moderate minimum wage, an increase in the proportion of informal workers was clearly associated with higher levels of food insecurity (Figure 2 and Appendix D). In countries with little or no minimum wage, the impact of the size of the informal economy on food insecurity was less clear. The association was still positive, but there was far more variation in countries' experiences.

Sensitivity Tests

We conducted a series of sensitivity analyses. First, the findings remained

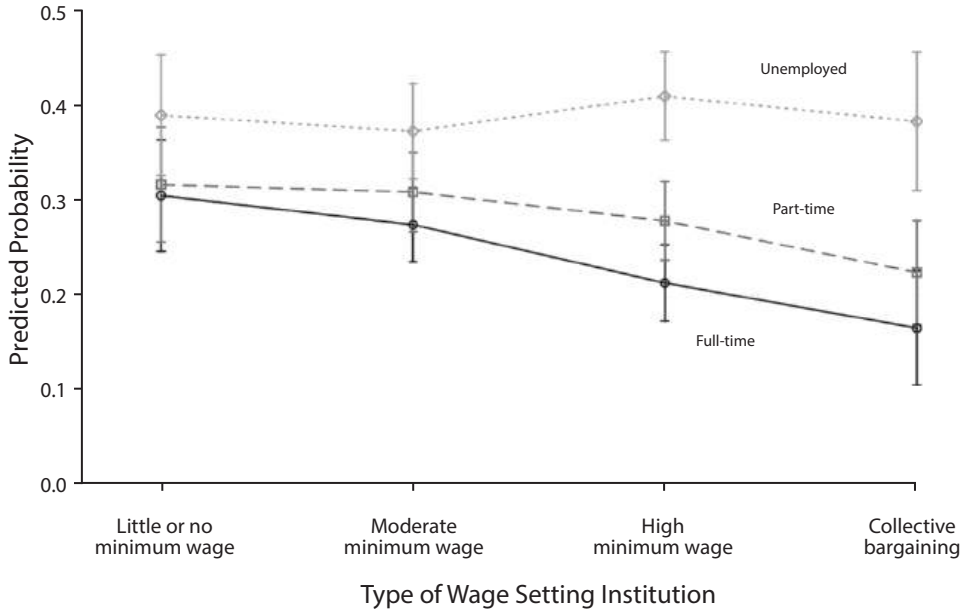

FIGURE 1— Predicted Probability of Moderate or Severe Food Insecurity Wage-Setting Regime, by Employment Status: 2014–2017

Note. Results reported in this figure are taken from column 2 of Appendix C, available as a supplement to the online version of this article at http://www.ajph.org.

consistent when we reestimated the models excluding low-income countries, including middle-income countries only, and including high-income countries only (Appendix F, available as a supplement to the online version of this article at http://www.ajph.org). Second, the results were unchanged after we controlled for 3 other policies that could be associated with wage-setting policies (Appendix G, available as a supplement to the online version of this article at http://www.ajph.org). Third, the results from the matching analysis were consistent with the findings reported in Table 1 (Appendix H, available as a supplement to the online version of this article at http://www.ajph.org).

DISCUSSION

This article explored whether wage-setting policies were associated with lower risks of food insecurity. Generous minimum wages and collective bargaining were associated with lower levels of food insecurity. To illustrate our findings, consider Costa Rica and Panama. Both are Latin American countries

FIGURE 2— Change in Predicted Probability of Moderate or Severe Food Insecurity Associated With 1 Percentage Point Increase in the Size of the Informal Labor Market, by Wage-Setting Policy: 2014–2017

Note. Results come from the model estimated in Table 1, with 2 changes. First, we added a measure of the size of the informal labor market and, second, we added an interaction term between this measure of labor market informality and wage-setting policy. Data on labor market informality come from the World Bank.

with approximately the same GDP per capita and population size. Costa Rica, however, has a high minimum wage (over PPP$10 per day, albeit with some exceptions) whereas Panama has only a moderate minimum wage (somewhere between PPP$4.01 and PPP$10.00 per day). Panama also has a much higher level of moderate and severe food insecurity (~30%) than Costa Rica (~18%), suggesting that if Panama increased its minimum wage, food insecurity might be reduced.

These findings add to the growing literature highlighting the health effects of minimum wages and other wage-setting policies,[30] but they also reinforce earlier work highlighting how adults in precarious work face greater risks of food insecurity.[31] Our results not only support these earlier findings, but they also suggest a policy remedy: when countries establish wage-setting policies that seek to ensure financial security for low-income households, the risk of food insecurity appears to be lower.

Importantly, however, our results also suggest that wage-setting policies do not benefit everyone to the same degree. The unemployed and those in the informal economy appear to benefit less from these policies. Part-time workers experienced lower risk of food insecurity, but full-time employees experienced even lower risks, most likely because they worked more hours. When viewed together, these differences between full-time and part-time workers reinforce other research revealing how labor market segmentation can have consequences for poverty and, by implication, health.[23,32]

Labor market segmentation between full-time workers, part-time workers, and the unemployed may be especially important in countries where there are fears that raising the minimum wage will increase unemployment or labor market informality. These risks must be put into perspective, however. Our models suggested that any increase in unemployment attributable to a higher minimum wage would need to be very large to offset the reductions in food insecurity (Appendix D). Such large rises in unemployment are unlikely because the impact of minimum wages on unemployment are very often negligible,[24] even in developing countries.[33] Thus, although pursuing higher minimum wages could create winners and losers in some contexts, it is very likely to lead to a net reduction in food insecurity. Of course, even in these contexts, it would be important to complement policies that increase wages with greater financial protection for the unemployed, which can also lower the risks of food insecurity.[11,34]

Limitations

There are a number of limitations to our analysis. First, although our data covered an unprecedentedly large number of countries, our measure of wage-setting policies did not vary over time, precluding any examination of how changes to wage-setting policy affect food insecurity. Although the matching analysis partially addressed this issue, in the absence of such changes, it is difficult to draw strong causal conclusions about the association between wage-setting policies and food insecurity. Second, the data did not follow the same individuals over time, so we were unable to test what happens to risk of food insecurity when people move into or out of employment under these different policy regimes. Future work will need to examine these issues in more detail.

Public Health Implications

Food insecurity is a major health problem that affects educational outcomes, depression, cardiovascular disease, and even mortality.[4,5] These findings are important because they suggest that food insecurity and, in turn, these health outcomes, may be reduced by the implementation of collective bargaining or high minimum wages. However, the reverse may also be true—namely, that moving away from collective bargaining and higher minimum wages may lead to increasing food insecurity. Indeed, a number of countries have seen major reconfigurations of their wage-setting policies in recent decades. There has been a steady erosion of coverage by collective bargaining in Germany, the United Kingdom, and the United States.[19] At the same time, minimum wages have frequently become less generous in real terms. This analysis suggests that public health actors have a role to play in working with other agencies (including government departments) involved in setting labor market protections and wage policies. The retrenchment of wage-setting policies not only exacerbates in-work poverty but, as this analysis suggests, may leave families facing insufficient food supplies and, in the worst cases, without enough to eat.[35] AJPH

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A. Reeves and R. Loopstra designed the analysis. A. Reeves conducted the analysis and wrote the first draft of the article. R. Loopstra and V. Tarasuk helped interpret the results and helped write the article.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

Human participant protection was not required because this study used publicly available, de-identified data.

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Gender Identity Disparities in Criminal Victimization: National Crime Victimization Survey, 2017–2018

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Objectives. To estimate the prevalence of personal and household victimizations among transgender people in the United States.

Methods. We analyzed pooled 2017 and 2018 data from the National Crime Victimization Survey, the first nationally representative sample that allows identification of transgender respondents.

Results. Transgender people experienced 86.2 victimizations per 1000 persons compared with cisgender people's 21.7 per 1000 persons (odds ratio [OR] = 4.24; 90% confidence interval [CI] = 1.49, 7.00). Households that had a transgender person had higher rates of property victimization (214.1 per 1000 households) than households with only cisgender people (108 per 1000 households; OR = 2.25; 90% CI = 1.19, 3.31). Transgender victims whose sex assigned at birth was male were more likely to perceive their victimization as a hate crime than cisgender victims whose sex assigned at birth was male. There were no disparities in reporting victimizations to authorities: only about half of the victimizations of both transgender and cisgender people were reported.

Conclusions. Public policy and administration need to consider the unique vulnerabilities transgender people routinely encounter, resulting in disparities in criminal victimization. (*Am J Public Health*. 2021;111: 726–729. https://doi.org/10.2105/AJPH.2020.306099)

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Anecdotal data and small-scale studies suggest that transgender populations are at a heightened risk of criminal victimization,[1] which is defined as any action by others that violate laws affecting oneself or one's property. However, outside of hate crime statistics, national data addressing this issue have been limited.[2] Beginning in 2016, the National Crime Victimization Survey (NCVS)—the nation's primary source of nonfatal criminal victimization statistics—began documenting the sexual orientation and gender identity of respondents.[3] NCVS 2017 data showed significant disparities in victimization rates between lesbian, gay, bisexual, and transgender (LGBT) people and cisgender heterosexual people.[4] However, small sample sizes prohibited analyses of LGBT subgroups (e.g., bisexual women or transgender people). By pooling 2 years of data, we report what are to our knowledge the first prevalence estimates of victimization among transgender adults in the United States from a nationally representative sample.

METHODS

The NCVS is administered to a nationally representative, longitudinal sample of individuals aged 12 years or older within households in the United States. The survey collects incident-level data about experiences with victimization both reported and not reported to police. The current analysis used pooled 2017 and 2018 NCVS data for a total sample of 296 563 households and 482 469 individuals.[5,6] More information about the NCVS is available through Bureau of Justice Statistics (BJS) publications.[7]

Measures

In July 2016, the BJS began identifying transgender people among NCVS respondents aged 16 years or older.[3] Gender identity was measured with 2 questions: sex assigned at birth (male, female, and don't know) and current gender identity (male, female, transgender, or none of these). Respondents

are categorized as transgender if they identified as transgender or their current gender identity was male or female and was different from their assigned sex at birth. Respondents are categorized as cisgender if their current gender identity matched their assigned sex at birth. In the 2017–2018 NCVS, about 0.10% (n = 420) people were thus classified as transgender and 99.9% (n = 435 061) were cisgender. This prevalence estimate is consistent with other government-sponsored surveys.[3] This includes respondents who were categorized as transgender men if their sex assigned at birth was female and they had a current gender identity that was male or transgender (n = 181) and categorized as transgender women if their sex assigned at birth was male and they had a current gender identity that was female or transgender (n = 188). In addition, some respondents (n = 51) indicated they were transgender but refused to answer the "sex assigned at birth" question and were not categorized as transgender men or women; these respondents are included in overall analyses. We recognize that the terms "transgender," "transgender men," and "transgender women" may not be how respondents identify themselves, and we use these categorizations solely for analytic purposes and to clearly communicate findings. NCVS data do not allow for assessment of gender nonbinary identities.

The NCVS documents numerous types of crime, which are broadly categorized as either personal or property victimizations. Victims were asked if the victimization was reported to the police, either by the victim or by others (e.g., witnesses or other victims). For each incident, victims indicated whether they thought the incident was motivated by prejudice or bigotry against their characteristics or religious beliefs. Respondents reported their age, race or ethnicity, educational attainment, marital status, household income, and urbanicity of residence.

Analysis

We conducted analyses for transgender and cisgender people separately and, within these groups, by current gender. After summarizing demographic characteristics, we estimated rates of personal victimizations per 1000 persons, rates of property victimizations per 1000 households, the percentage of victimizations reported to police, and the percentage of victimizations perceived as hate crimes.[8] We documented property victimizations at the household level. We defined a household as a transgender household if at least 1 member of the household was transgender. We applied the same categorization by current gender, and these households were not mutually exclusive. We defined cisgender households as households in which there were no transgender people. For point and standard error estimations, we used NCVS complex design variables and weights, which account for the address-based cluster sampling, longitudinal design with repeated interviews, and multiple interviews per household. Prior to computing estimates for this article, we used the analytic approach and weights to produce estimates that replicated those generated by the BJS. We estimated standard errors using Taylor series linearization.[9] We report unadjusted odds ratios with 90% confidence intervals as measures of association, and we report differences (Δ) between estimated rates and percentages and associated 2-tailed *P* values from use of the *t* test.

RESULTS

Transgender people were approximately evenly distributed by their sex assigned at birth, but those who self-identified as transgender were more likely than cisgender people to refuse to answer the "sex assigned at birth" question. Compared with cisgender people, transgender people had similar racial and ethnic and educational distributions but were younger and more likely to have never been married. Compared with cisgender people, transgender people were more likely to reside in urban locations and in households earning less income (Table A, available as a supplement to the online version of this article at http://www.ajph.org).

Transgender people experienced violence at a rate of 86.2 victimizations per 1000 persons compared with 21.7 per 1000 persons among cisgender people (Figure 1a; odds ratio [OR] = 4.24; 90% confidence interval [CI] = 1.49, 7.00). These differences remained for men and women. Transgender women and men had higher rates of violent victimization (86.1 and 107.5 per 1000 persons, respectively) than did cisgender women (23.7 per 1000 persons; OR = 3.88; 90% CI = 0, 8.55) and cisgender men (19.8 per 1000 persons; OR = 5.98, 90% CI = 2.09, 9.87), but there were no differences between transgender men and women (Δ = 21.4; SE = 68.7; *P* = .76).

Transgender households had higher rates of property victimization (214.1 per 1000 households) than cisgender households (108 per 1000 households; OR = 2.25; 90% CI = 1.19, 3.31; Figure 1b). These differences were consistent across genders.

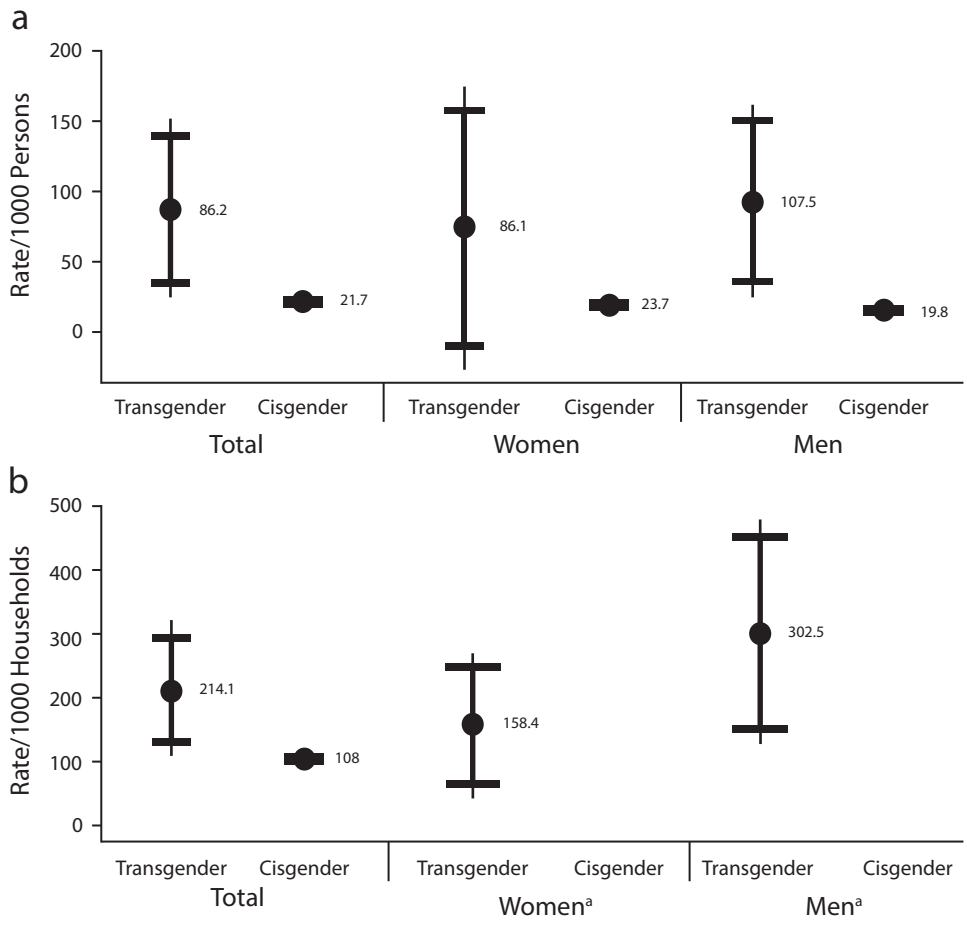

FIGURE 1— Unadjusted (a) Personal and (b) Household Victimization Rates Among Transgender and Cisgender People in the United States: National Crime Victimization Survey, 2017–2018

Note. cis = cisgender; trans = transgender. A transgender household is a residence with at least 1 person who is transgender, and a cisgender household is a residence with no transgender person. Thick black lines with caps represent 90% confidence intervals; thin black lines represent 95% confidence intervals. [a]Because property victimizations occur at a household level, dividing by gender for cisgender households produces two estimates that are nearly the same. Therefore, only total cisgender household values are shown.

Overall, there was a large, but not statistically significant, difference in the percentage of violent victimizations against transgender and cisgender people that were perceived to be hate crimes (19% vs 9%; $\Delta = 9.8$; SE = 6.2; $P = .12$). Between transgender and cisgender women, there was a large and statistically significant difference in the percentage of violent victimizations believed to be hate motivated (28% vs 9%; $\Delta = 18.4$; SE = 7.7; $P = .02$).

Approximately half of all violent victimizations were reported to police, with no differences between transgender and cisgender persons (51% vs 47%; $\Delta = 4.6$; SE = 13.3; $P = .73$) or between transgender and cisgender women (49% vs 44%; $\Delta = 4.7$; SE = 17.2; $P = .79$) and men (53% vs 50%; $\Delta = 3.1$; SE = 19.0; $P = .87$).

More transgender than cisgender people believed property victimizations to be hate crimes, but these were imprecise estimates with large standard errors (4% vs 1%; $\Delta = 2.9$; SE = 3.5; $P = .40$).

Approximately one third of property victimizations were reported to the police, but reporting by transgender and cisgender people was similar (35% vs 27%; $\Delta = 8.1$; SE = 8.8; $P = .35$). This pattern did not differ by gender (transgender vs cisgender women: 39% vs 35%; $\Delta = 3.6$; SE = 15.5; $P = .82$; transgender vs cisgender men: 21% vs 36%; $\Delta = -14.8$; SE = 11.7; $P = .21$).

DISCUSSION

To our knowledge, this is the first study using a nationally representative sample to examine the victimization of transgender adults in the United States. Our findings evidence the disproportionate

rate of transgender people's victimization. Rates of victimization did not differ between transgender women and men. Reporting to police was low and similar to the cisgender rate and to findings from the 2015 United States Transgender Survey.[10]

Although some attention has been given to homicides of transgender women of color in the media, little attention has been given to the crimes reported here and the fact that victimization levels are similar among transgender women and men. We found that 1 in 4 victimizations against transgender women were perceived to be hate crimes.

Our study is limited by relatively small sample sizes of transgender people, which accounts for large confidence intervals and limits our ability to assess victimization subtypes. We also could not investigate victimization at the intersection of gender identity, race and ethnicity, age, marital status, urbanicity, and other characteristics. Some of these characteristics may confound our findings, but others, such as household income, may be products of being transgender (e.g., employment discrimination) along a causal chain leading to criminal victimization. Future research, using multiple years of NCVS data, could unpack the type of hate crime and its severity, and consider potential confounders and mediators of victimization. There are also general limitations in the NCVS, such as the reliance on self-report.[11]

PUBLIC HEALTH IMPLICATIONS

The documentation of violence from population-based data should spur policymakers to enact "more effective and necessary policies at the local, state, and federal levels to protect people based on their gender identity and gender expression."[1(p170)] This is particularly important because victimization is related to other measures of well-being—such as suicide rates—of gender-diverse populations.[12] AJPH

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CONFLICTS OF INTEREST

The authors have no conflicts of interests to declare.

HUMAN PARTICIPANT PROTECTION

We used publicly available unidentified data, which is exempt from human participation protection review.

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Trends in Prevalence of Cigarette Smoking in Brazil: 2006–2019

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See also Romer, p. 549.

Objectives. To analyze trends in cigarette smoking among Brazilian adults from 2006 to 2019.

Methods. We performed a time-series analysis based on data from the Surveillance of Risk and Protective Factors for Chronic Diseases Telephone Survey (n = 730 309). We calculated the annual prevalence of current cigarette smokers, heavy smokers, and passive smokers in the workplace and investigated linear trends using Prais–Winsten regression, for the entire period and for the past 5 years. We performed the analyses for the total population and according to the sociodemographic characteristics.

Results. The prevalence of cigarette smoking, heavy smoking, and passive smoking in the workplace declined, respectively, an average of 3.99% per year, 5.65% per year, and 6.55% per year from 2006 to 2019. We observed this reduction regardless of gender, age, educational level, and geographic region. The magnitude of reduction in the prevalence of current cigarette smoking decreased in the past 5 years, while the magnitude of the change in heavy smoking increased.

Conclusions. The prevalence of cigarette smoking decreased in the time period studied. The smaller magnitude of reduction for current cigarette smoking in the most recent years might indicate a fatigue with the current policy scenario. (*Am J Public Health*. 2021;111:730–738. https://doi.org/10.2105/AJPH.2020.306102)

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In the most recent decades, tobacco smoking has been highlighted as one of the main behavioral risk factors for noncommunicable chronic diseases (NCDs), the leading causes of death worldwide.[1] According to the World Health Organization (WHO), the global prevalence of tobacco smoking (including cigarettes and any other smoked tobacco product, such as pipes, cigars, cigarillos, bidis, kreteks, and water-pipe tobacco) decreased from 24% in 2005 to 19% in 2017.[2] However, it is still estimated that 10% of total global deaths (8 million deaths per year) will be related to smoking by 2030.[3] Thus, to assist in the prevention of avoidable deaths from NCDs and to reduce the health threat of tobacco use and exposure, the global target is a relative reduction of 30% in the prevalence of tobacco use in individuals aged 15 years or older by 2025 (with 2010 levels as baseline),[2] as well as encouraging the implementation of the WHO Framework Convention on Tobacco Control (FCTC) in all parties to the treaty.[4]

Several governments have already engaged in reducing the prevalence of tobacco use in the population through monitoring, educational, and regulatory measures.[5,6] In Brazil, between 1989 and 2003, cigarette smoking among adults was reduced by an average of 2.5% per year, from 34.8% to 22.4%.[7] A modest reduction in the mean number of cigarettes smoked was also observed, from 14.9 cigarettes per day to 12.6 cigarettes per day. Both downward trends were greater among men, younger age groups, and those with higher socioeconomic status.[7] This downward trend has been continuously monitored since Brazil signed the FCTC in 2005.[8]

However, based on data from the Brazilian Health Information System, the disease and economic burden associated with smoking is still high in the country. In 2015, smoking was responsible for 156 337 deaths, 4.2 million potential years of life lost, 229 071 acute myocardial infarctions, 59 509 strokes, and 77 500 cancer diagnoses.[9] Besides that, about BRL 57 billion (US $10.6 billion) were spent on direct health costs and indirect costs attributable to loss of productivity by premature death and disability.[9] In this context, the present study aims to analyze the trends and

sociodemographic distribution of cigarette smoking over a 14-year period in a representative sample of the adult population from Brazilian state capitals and the Federal District.

METHODS

We performed a time series analysis based on data from the *Sistema de Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico* (Vigitel; Surveillance of Risk and Protective Factors for Chronic Diseases Telephone Survey), conducted by the Ministry of Health, from 2006 to 2019 (730 309 participants). Vigitel investigates risk and protective factors for NCDs among the adult population (aged ≥ 18 years) in the 26 Brazilian state capitals and the Federal District, which represents approximately a fifth of total Brazilian adults, through telephone interviews conducted annually since 2006.

A minimum sample size of approximately 2000 adults in each city per year was established to estimate the frequency of each factor with a 95% confidence interval (CI) and a maximum error of 2 percentage points. The Vigitel sampling process is performed in 2 stages. In the first one, 5000 landlines are randomly selected in each city from landline telephone catalogs (made available annually by the main telephone companies in Brazil). These numbers are then organized into replicates (or subsamples) with 200 landlines (reproducing the same proportion of lines by postal code of the original catalog). This division is performed because of the difficulty in estimating the proportion of active residential numbers in the catalogs. Nonresidential numbers, out-of-service numbers, and numbers that do not answer to any attempt of contact (6 attempts are performed on different days and hours, including weekends and holidays) are considered ineligible. Once the eligibility of the landline is established, at the second stage, 1 adult among the residents of each household is selected (simple random sample) and invited to participate.[10]

Weighting factors are estimated, allowing the representation of the total adult population of each city. The weight is composed of 2 factors. The first one aims to deal with unequal sampling probability of households with more than 1 landline and more than 1 resident, while the second compares the distribution of the population interviewed through Vigitel with that predicted for the entire population in each study site and year (according to gender, age, and educational level) based on official predictions.[10] More details on the sampling process used in Vigitel can be obtained from the annual reports of the system.[10]

Data Collection and Organization

Regarding data collection, a computer-assisted telephone interviewing method was used, allowing the immediate identification of invalid responses and the automatic pass-through of not-applicable questions ensuring the continuous feeding of the database, in addition to the provision of the total time duration of the each interview (about 12 minutes). Vigitel's core questionnaire involves questions on sociodemographic characteristics, cigarette smoking, self-reported weight and height, food consumption, physical activity, alcoholic beverage consumption, self-rated health status, self-reported cancer screening tests in women, and self-reported morbidity.

Three questions concerning cigarette smoking were used in the present investigation: "Do you currently smoke?" ("Yes, every day"; "Yes, but not daily"; or "No"); "How many cigarettes do you smoke per day?"; and "Does a co-worker usually smoke in the same environment where you work?" ("Yes" or "No"; only for those referring to have worked in the 3 months before the interview). We calculated 3 dichotomous indicators to identify respectively the prevalence of (1) current cigarette smoking (regardless of the number of cigarettes and frequency and duration of the cigarette smoking habit), (2) heavy smoking (individuals who smoked 20 or more cigarettes per day), and (3) passive smoking (secondhand smoking) in the workplace. Information regarding passive cigarette smoking has been available since 2009, whereas the other smoking-related indicators have been available for the entire study period.

We included a set of 4 sociodemographic variables in the analysis: gender (male or female), age groups (18–24, 25–34, 35–44, 45–54, 55–64, or ≥ 65 years), educational level (0–8, 9–11, or ≥ 12 years) and geographic region (northern, northeastern, midwestern, southeastern, or southern).

Data Analysis

Initially, we described the population distribution for each year according to gender, age group, education level, and geographic region. Next, we estimated the annual prevalence of each indicator (current cigarette smokers, heavy smokers, and passive smokers in the workplace). We conducted all analyses for the total population of each indicator and according to sociodemographic characteristics (gender, age groups, education level, and geographic region).

We employed Prais–Winsten regression models to investigate time trends in the prevalence of cigarette smoking. This model is based on linear regression

analysis and aims to correct the effect of serial autocorrelation, which is recommended in time-trend studies.[11] The dependent variables were the prevalence of the indicators related to cigarette smoking in each given year and the independent variable was the year of data collection. In these analyses, the regression coefficient indicates the average annual relative variation (percentage). These models allowed establishing the cigarette smoking prevalence trends as stable ($P > .05$), declining ($P < .05$ shown as a negative regression coefficient), or ascending ($P < .05$ shown as a positive regression coefficient).[11] We performed this analysis for the entire study period, from 2006 to 2019, and for the most recent period, from 2015 to 2019. This most recent period was delimited considering the publication of the last decrees related to tobacco control measures in Brazil.[12]

We illustrated the time trend in the prevalence of cigarette-use indicators (current cigarette smokers, heavy smokers, and passive smokers in the workplace) for the total population in trend graphs.

We performed data analysis with Stata statistical software version 14 (StataCorp LP, College Station, TX) and the survey module, which takes into consideration the complex survey design.

RESULTS

The population was composed mostly of women, young adults (aged 25–44 years), individuals with lower educational level (0–11 years), and those residing in the southeastern and northeastern regions of the country. Between 2006 and 2019, there was a measurable change in population age and educational level. The percentage of individuals aged 18 to 44 years decreased, whereas the percentage of people aged 45 years or older increased from 15.8% to 17.9% (age 45–54 years), from 10.0% to 13.1% (age 55–64 years), and from 9.4% to 11.4% (age ≥ 65 years). Similarly, the percentage of individuals with between 0 and 8 years of formal education decreased from 45.5% to 28.8%, while the percentage of those with 12 years and more of formal education increased from 21.2% to 32.8%. The percentage of people residing in the most developed regions of the country decreased in the studied period (from 8.4% to 8.0% in the southern region and from 45.9% to 44.6% in the southeastern region; Table 1).

Cigarette smoking prevalence showed a significant reduction of 3.99% per year, ranging from 15.7% in 2006 to 9.8% in 2019. This trend was observed in all groups, regardless of gender, age group, educational level, and geographic region. The average reduction was greater among women (–4.56% per year; $P < .001$), in the group aged 45 to 54 years (–5.98% per year; $P < .001$), in those with higher educational level (≥ 12 years; –4.87% per year; $P < .001$) and in individuals who lived in the less-developed regions (northern: −6.92% per year; $P < .001$ and northeastern: −6.61% per year; $P < .001$). The magnitude of reduction was lower in the recent period (from 2015 to 2019) when compared with the entire study period (2.72% per year vs 3.99% per year). This magnitude of reduction was greater only for women (5.20% per year) and individuals aged 65 years or older (7.14% per year) in the recent period (Table 2).

We observed a similar scenario for heavy cigarette smoking. In general, the prevalence of adults who reported smoking 20 cigarettes or more per day decreased from 4.6% in 2006 to 2.3% in 2019. The average reduction was greater among women (–6.00% per year; $P < .001$), individuals aged 45 to 54 years (–8.50% per year; $P < .001$), those with higher educational level (≥ 12 years; –6.91% per year; $P < .001$), and those who lived in the less-developed regions (northern: −9.72% per year; $P < .001$ and northeastern: −8.00% per year; $P < .001$). However, in this case, the reduction was greater in the most recent period (2015–2019; −7.49% per year; $P < .05$) than in the entire study period (–5.65% per year; $P < .001$; Table 3).

Thus, for the total population, the magnitude of reduction in the prevalence of current cigarette smoking strongly decreased in the past 5 years, while the magnitude of the change in heavy smoking increased. The time trend in the prevalence of passive smokers in the workplace showed no significant reduction in the most recent period (2015–2019; Figure 1).

The prevalence of passive smokers at the workplace was reduced from 12.1% in 2009 to 6.6% in 2019, but it stabilized in the recent period (2015–2019). The average magnitude of reduction for passive smokers at the workplace was greater among women (–7.75% per year; $P < .001$), those aged between 18 and 24 years (–7.77% per year; $P < .001$), those with an intermediate educational level (9–11 years; –6.31% per year; $P < .001$), and individuals who lived in the most underdeveloped regions (northern: −8.36% per year; $P < .001$ and northeastern: −7.18% per year; $P < .001$; Table A, available as a supplement to the online version of this article at http://www.ajph.org).

DISCUSSION

The data collected systematically in Brazil over a 14-year period indicated a

TABLE 1— Distribution (%) of the Adult Population (Aged ≥ 18 Years) by Gender, Age, Educational Level, and Geographic Region: 26 Brazilian State Capitals and the Federal District, 2006–2019

	Distribution of the Adult Population, %															
Variables	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Annual Variation, %[a] (2006–2019)	Annual Variation, %[a] (2015–2019)
Gender																
Male	46.1	46.2	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.0	46.0	46.0	46.0	46.0	−0.02**	−0.03**
Female	53.9	53.8	53.9	53.9	53.9	53.9	53.9	53.9	53.9	54.0	54.0	54.0	54.0	54.0	0.02**	0.03**
Age, y																
18–24	18.9	18.2	17.9	17.5	17.1	16.7	16.4	15.9	15.6	15.2	14.8	14.5	14.1	13.8	−2.36**	−2.46**
25–34	25.4	25.4	25.4	25.4	25.4	25.4	25.2	25.3	25.3	25.2	25.2	25.2	25.1	25.0	−0.11**	−0.21**
35–44	20.6	20.5	20.4	20.2	20.1	20.0	19.9	19.7	19.6	19.4	19.3	19.1	19.0	18.8	−0.70**	−0.77**
45–54	15.8	15.9	16.1	16.3	16.4	16.6	16.8	16.9	17.1	17.3	17.4	17.6	17.7	17.9	0.97**	0.90**
55–64	10.0	10.2	10.4	10.7	10.9	11.1	11.4	11.6	11.8	12.1	12.3	12.6	12.8	13.1	2.10**	2.02**
≥ 65	9.4	9.8	9.8	9.9	10.1	10.2	10.4	10.5	10.6	10.8	10.9	11.1	11.2	11.4	1.36**	1.30**
Educational level, y																
0–8	45.5	45.0	43.7	42.0	40.6	38.8	36.8	36.6	35.9	34.6	32.5	30.8	30.2	28.8	−3.53**	−4.38*
9–11	33.3	35.1	34.7	35.8	35.8	36.7	38.5	37.5	38.1	38.1	35.9	37.3	38.0	38.4	0.85*	0.95
≥ 12	21.2	19.8	21.6	22.2	23.5	24.5	24.7	25.9	25.9	27.3	31.6	31.9	31.8	32.8	3.88**	3.34
Geographic region																
Northern	9.7	9.3	9.4	9.4	9.8	9.8	9.9	10.0	10.0	10.1	10.2	10.2	10.3	10.4	0.74**	0.64**
Northeastern	25.5	24.2	25.4	25.5	25.0	25.1	25.1	25.1	25.1	25.1	25.2	25.2	25.2	25.2	0.05	0.08**
Midwestern	10.5	11.1	11.1	11.2	11.2	11.3	11.4	11.4	11.5	11.5	11.6	11.6	11.7	11.7	0.59**	0.48**
Southeastern	45.9	46.6	45.6	45.4	45.8	45.6	45.5	45.4	45.3	45.1	45.0	44.9	44.8	44.6	−0.25**	−0.28**
Southern	8.4	8.7	8.5	8.5	8.2	8.2	8.1	8.1	8.1	8.1	8.1	8.1	8.0	8.0	−0.48*	−0.20**
Total no.	52 796	55 824	54 353	54 367	54 339	54 144	45 448	52 929	40 853	54 174	53 210	53 034	52 395	52 443		

Source. Vigitel: Surveillance of Risk and Protective Factors for Chronic Diseases Telephone Survey.

[a]Corresponding to the coefficient evaluated through Prais–Winsten regression (expressed in percentage per year).
*$P < .05$; **$P < .001$.

significant decrease in the prevalence of current cigarette smoking, heavy smoking, and passive smoking in the workplace among adults in Brazil, from 2006 to 2019. While the reduction in the prevalence of smoking has decreased in intensity since 2015 (until 2019), the prevalence related to heavy smoking has intensified when compared with the entire study period (2006–2019). Higher prevalence of cigarette smoking was systematically observed among men and those with lower educational level. These same groups presented a smaller magnitude of reduction when compared, respectively, to women and individuals with higher educational level, increasing their disadvantage.

In 2013, the World Health Assembly endorsed the voluntary global target of a 30% relative reduction in tobacco use worldwide among people aged 15 years or older by 2025 (with 2010 levels as baseline).[13] However, according to projections made for 2025, including data from 175 countries, many countries are not on track to achieve tobacco control targets, mainly low- and middle-income ones.[13] On the other hand, in Brazil, the prevalence of cigarette smoking has been decreasing since the 1990s,[7] up to the most recent period (2019), as shown in this study's results. This scenario can also be confirmed with the recent publication of the National Health Survey of Brazil (it produces national estimates beyond the state capitals), highlighting the reduction in the prevalence of cigarette smoking (from 14.7% in 2013 to 12.3% in 2019) and of the total use of smoked or nonsmoked tobacco (from 14.9% in 2013 to 12.8% in 2019) among Brazilian adults.[14,15]

Although it is not possible, based on our data, to identify the cause of the

TABLE 2— Prevalence of Current Cigarette Smokers by Gender, Age, Educational Level, and Geographic Region: 26 Brazilian State Capitals and the Federal District, 2006–2019

	Prevalence of Current Cigarette Smokers, %															
Variables	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Annual Variation, %[a] (2006–2019)	Annual Variation, %[a] (2015–2019)
Gender																
Male	19.5	19.5	18.0	17.5	16.8	16.5	15.5	14.4	12.8	12.8	12.7	13.2	12.1	12.3	−3.87**	−1.45
Female	12.4	12.3	12.0	11.5	11.7	10.7	9.2	8.6	9.0	8.3	8.0	7.5	6.9	7.7	−4.56**	−5.20*
Age, y																
18–24	12.1	13.5	11.4	10.9	10.9	8.8	8.5	7.1	7.8	7.2	7.4	8.5	6.7	7.9	−4.56*	−0.02
25–34	14.0	14.6	13.8	14.5	14.2	13.2	11.7	12.1	11.9	10.5	9.7	9.6	9.4	9.2	−3.78**	−2.80*
35–44	18.7	17.4	16.5	14.8	15.1	13.9	12.9	11.2	9.9	10.4	10.0	11.7	9.1	9.7	−5.44**	−2.49
45–54	22.8	21.5	19.6	18.9	18.0	18.6	16.0	15.1	13.2	12.7	12.6	11.2	11.1	10.9	−5.98**	−4.68*
55–64	15.0	15.8	17.2	16.7	16.7	15.9	15.0	13.6	12.5	12.8	13.5	11.6	12.3	13.6	−1.73	−0.15
≥ 65	9.6	8.4	9.3	8.4	8.1	9.0	7.6	6.9	8.1	8.2	7.7	7.3	6.1	7.8	−2.08**	−7.14*
Educational level, y																
0–8	19.3	18.7	18.9	18.1	18.1	18.2	16.3	15.0	14.1	14.4	14.3	13.2	13.0	13.8	−3.10**	−2.00
9–11	13.8	13.6	12.0	11.9	12.2	10.7	10.0	10.3	10.3	9.0	9.4	9.9	8.8	9.5	−3.27**	−0.06
≥ 12	10.8	12.2	10.8	10.8	10.0	9.7	9.1	7.4	6.8	7.2	6.9	7.4	6.2	6.7	−4.87**	−2.68
Geographic region																
Northern	15.0	14.9	13.3	12.3	12.2	11.5	9.3	8.1	7.9	8.2	6.7	7.8	6.3	6.7	−6.92**	−4.21*
Northeastern	13.1	12.8	10.6	11.5	10.3	9.3	8.9	7.4	7.6	6.4	6.6	5.9	5.9	6.3	−6.61**	−2.21
Midwestern	14.7	14.3	13.9	13.7	13.4	10.9	10.6	10.9	10.1	10.1	10.6	10.6	8.7	10.5	−3.43**	−3.10
Southeastern	16.8	16.9	17.1	15.4	16.2	15.8	14.4	13.6	12.7	12.7	12.2	12.2	11.4	11.9	−3.33**	−2.55**
Southern	19.1	18.8	17.6	20.0	17.1	17.8	14.8	14.6	14.5	12.9	13.4	13.9	12.5	12.5	−3.76**	−1.36
Total	15.7	15.6	14.8	14.3	14.1	13.4	12.1	11.3	10.8	10.4	10.2	10.1	9.3	9.8	−3.99**	−2.72*

Source. Vigitel: Surveillance of Risk and Protective Factors for Chronic Diseases Telephone Survey.

[a]Corresponding to the coefficient evaluated through Prais–Winsten regression (expressed in percentage per year).
*$P < .05$; **$P < .001$.

reduction trend observed, it is likely to be affected by the progress in the fight against tobacco use through regulatory measures such as ban on tobacco advertising, warnings about the risks of smoking on cigarette packages, taxation and minimum price policy, smoking prohibition in closed collective environments,[6] expansion of warnings on the packages, control of the advertising in outlets, and the prohibition of flavor additives in cigarettes carried out in 2011 (Law no. 12 546/2011).[16] In addition, Decree no. 7555/2011 regulated, in articles 14 through 20 of this law, the increase in tobacco taxation (through changes in the *imposto sobre produtos industrializados* [tax on industrialized products] focusing on cigarettes)[17] and set a minimum retail price for cigarettes.[18]

These actions seemed to have a more intense impact on the heavy smoking prevalence, as their relative reduction was always higher than the one identified for the current cigarette smoking prevalence, especially in the period since 2015. It suggests that cigarette smokers are using a strategy of smoking less often to reduce their risk. However, the real benefit of reducing the number of cigarettes smoked daily is yet unclear. On the one hand, this reduction can decrease some of the damage caused by smoking and help people to quit smoking altogether in the long run; on the other hand, it is not enough to restore the health of individuals and may even decrease their motivation to stop smoking completely.[19] This reinforces the need for studies to explore whether smokers are adopting this strategy, and, if so, what are the most effective monitoring, educational, and regulatory measures.

TABLE 3— Prevalence of Adults (Aged ≥18 Years) Who Smoked 20 or More Cigarettes Per Day by Gender, Age, Educational Level, and Geographic Region: 26 Brazilian State Capitals and the Federal District, 2006–2019

	Prevalence of Adults (Aged ≥18 y) Who Smoke 20 or More Cigarettes Per Day, %															
Variables	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Annual Variation, %[a] (2006–2019)	Annual Variation, (%)[a] (2015–2019)
Gender																
Male	6.3	6.4	6.2	5.4	5.4	5.2	5.5	4.5	4.1	4.2	4.0	3.8	3.4	3.2	−5.22**	−7.36*
Female	3.2	3.3	3.2	3.1	3.4	3.0	2.8	2.4	2.1	2.2	1.8	1.6	1.6	1.5	−6.00**	−8.01*
Age, y																
18–24	2.2	2.7	1.9	1.8	2.3	1.8	1.8	1.8	1.0	1.6	1.6	1.4	1.2	1.1	−5.40**	−10.65*
25–34	3.0	3.6	3.5	3.0	3.5	2.9	3.2	2.7	3.0	2.9	2.2	1.9	2.0	1.8	−4.51**	−10.99*
35–44	5.7	5.3	5.1	5.3	4.5	3.8	4.6	3.3	2.7	3.6	3.1	3.0	2.7	1.6	−7.00**	−12.43*
45–54	9.4	8.1	7.3	6.8	6.9	7.0	5.7	5.5	5.0	3.6	3.6	3.5	3.2	3.0	−8.50**	−4.98*
55–64	5.7	6.6	7.4	6.4	7.1	5.8	7.0	4.6	4.2	4.3	4.4	4.0	3.7	4.3	−4.64*	−3.79
≥65	2.5	2.6	3.9	1.9	2.3	3.8	2.9	2.6	2.4	2.7	2.3	2.3	1.9	2.6	−2.06*	−5.87
Educational level, y																
0–8	5.9	6.1	6.8	6.0	5.8	6.1	6.2	4.9	4.1	5.1	4.3	3.6	3.3	3.6	−4.75**	−10.24
9–11	3.8	3.8	2.9	3.0	3.6	2.7	3.0	3.1	2.9	2.4	2.8	2.7	2.4	2.1	−3.31**	−4.08
≥12	3.0	3.2	3.0	2.5	2.9	2.7	2.5	1.6	1.8	1.5	1.3	1.6	1.7	1.3	−6.91**	4.03
Geographic region																
Northern	3.2	3.1	3.3	2.9	2.7	2.8	2.5	1.7	1.4	1.6	1.0	1.6	1.0	0.8	−9.72**	−11.10
Northeastern	3.7	3.2	3.0	2.9	2.7	2.5	2.9	2.2	2.1	1.6	1.6	1.3	1.4	1.2	−8.00**	−6.61*
Midwestern	3.9	4.0	4.3	3.7	4.2	2.8	3.4	2.4	3.1	2.9	2.3	2.1	2.3	2.6	−5.14**	−3.09
Southeastern	5.2	5.6	5.4	4.7	5.2	5.0	4.9	4.3	3.6	4.1	3.8	3.3	3.1	2.9	−4.65**	−8.97*
Southern	6.7	6.6	6.8	7.0	6.4	6.3	5.6	5.3	4.8	4.3	3.8	4.9	3.8	3.7	−5.04**	−2.51
Total	4.6	4.7	4.6	4.1	4.3	4.0	4.0	3.4	3.0	3.1	2.8	2.6	2.4	2.3	−5.65**	−7.49*

Source. Vigitel: Surveillance of Risk and Protective Factors for Chronic Diseases Telephone Survey.

[a]Corresponding to the coefficient evaluated through Prais–Winsten regression (expressed in percentage per year).
*$P < .05$; **$P < .001$.

It is worth mentioning that, possibly, even better results could be achieved with the continuity and intensification of these tobacco control measures. However, the smaller magnitude of reduction for current cigarette smoking in the most recent years might indicate a fatigue with this current policy scenario. In 2016, the government decided to end the policy leading to price increase and minimum value per package. In this year, the last decree on the subject was imposed (Decree no. 8656/2016), setting the minimum price of a package at BRL 5.00 and reducing the magnitude of tax increase over cigarettes,[18] which remains to the present day (2019).

The magnitude of reduction of cigarette smoking varied according to sociodemographic characteristics of the population. Despite women increasingly starting to smoke at the same age as men,[20] men have a higher prevalence of cigarette smoking because of historical and cultural encouragement for men to smoke as a symbol of their masculinity.[21] Although all cigarette-use indicators showed a higher smoking prevalence among men, women observed a greater decrease in smoking prevalence. Culturally speaking, women tend to be more careful about their health, avoiding some risk factors for NCDs such as unhealthy eating and consuming tobacco and alcohol products.[15]

Regarding age, the prevalence of current cigarette smoking and heavy smoking was higher among older adults, while the prevalence of passive smoking in the workplace was higher among younger adults. Secondhand tobacco smoking corresponds to a significant burden of deaths and illnesses in the Brazilian population.[9] It is related to the

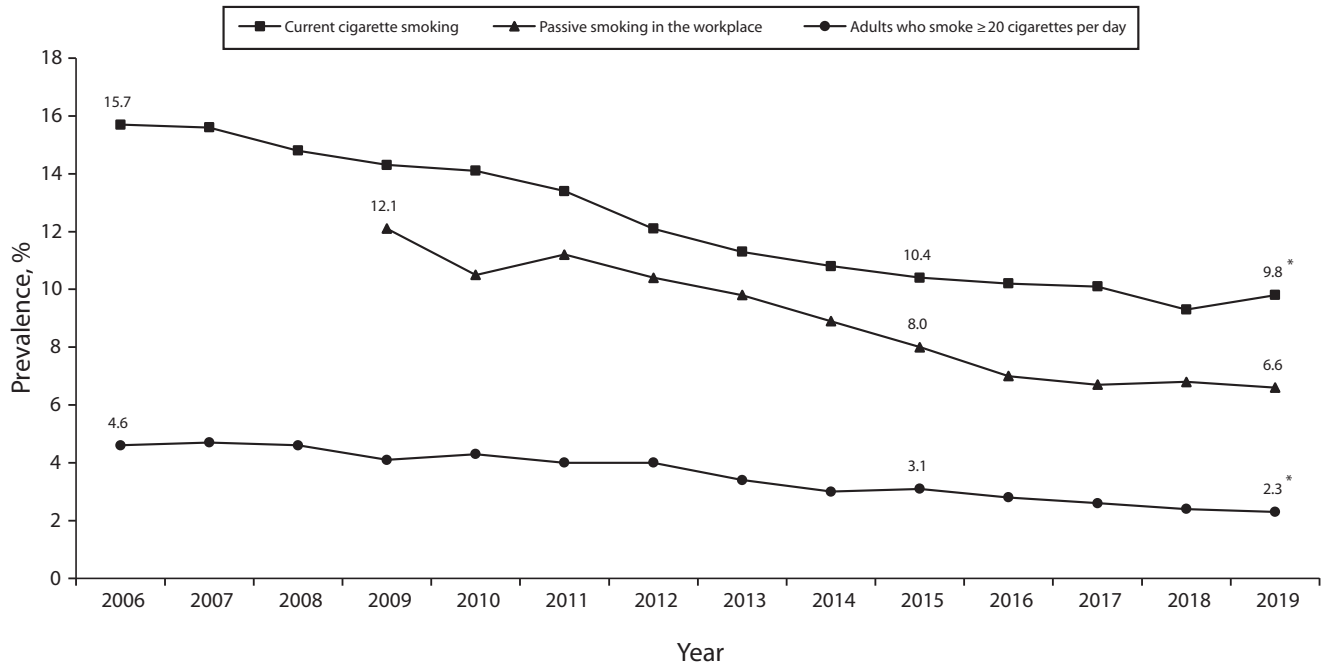

FIGURE 1— Prevalence of Current Cigarette Smokers, of Adults (Aged ≥ 18 Years) Who Smoked 20 or More Cigarettes per Day, and of Passive Smokers in the Workplace: 26 Brazilian State Capitals and the Federal District, 2006–2019

Note. Information regarding passive cigarette smoking has been available since 2009, whereas the other smoking-related indicators have been available for the entire study period.
*The downward trend was significant ($P < .05$) not only in the total period (from 2006 to 2019) but also in the most recent period (from 2015 to 2019).

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increased risk of death from heart diseases[22] and is an important risk factor for early smoking among adolescents.[23] Brazil already has a law regulating smoking-free environments since the mid-1990s (Law no. 9294/1996), which restricted smoking in public offices, hospitals, primary care units, classrooms, libraries, collective workspaces, theaters and movie theaters, and aircrafts and other means of public transportation. These restrictions were later reinforced and strengthened by Law no. 12 546/2011 and Decree no. 8262/2014, which essentially prohibited smoking in any closed environments, public or private, for collective use. Thus, the high prevalence of secondhand smoking in the workplace at the beginning of the study period (2009), 12.1%, may in fact be considered surprising. Even though this was reduced by almost half (6.6%) by 2019, it may be still considered high because of the previously mentioned legal restrictions as it is equivalent to 2.4 million adults regularly exposed to secondhand smoking in the work environment in the Brazilian state capitals and the Federal District.

Although the prevalence of cigarette smoking is almost twice as high among adults with lower educational level, the reduction observed was more modest than that identified for those with higher schooling. These findings could be partially explained by the level of knowledge about the hazards of tobacco to health or even because they are replacing cigarettes with another type of drug.[24] On the other hand, the prevalence of former smokers among adults with lower educational levels has increased over the period, which is positive, considering that these individuals are more vulnerable to the illness process.[25] Efforts should focus on identifying and investing in targeted approaches to support socioeconomically disadvantaged smokers to quit.

The tobacco industry lobby has been one of the main challenges for the progress of policies under the FCTC.[2] The tobacco industry depreciates scientific research, manipulates public opinion to gain respectability, attempts to capture political and legislative processes, and intimidates governments with litigation or threats of litigation. In this context, the FCTC secretariat has initiated a process to expand the establishment of tobacco industry monitoring centers in the BRICS (Brazil, Russia, India, China, and South Africa) nations.[26] Brazil is the largest exporter and one of the main producers of tobacco in the world.[27] In 2014,

about 719 Brazilian municipalities had tobacco-growing areas, of which 90% were located in the southern region.[28] This may explain the higher prevalence of smokers and intense smokers in the southern and southeastern regions of Brazil.

Among the effective tobacco control policies recommended by the WHO Framework Convention Alliance, tobacco taxation is highlighted as one of the most effective interventions to reduce the demand for cigarettes.[29] The increase in taxation and the minimum price of cigarettes were last established in 2011 but are currently surpassed by the accumulated inflation in the period and by the widespread sale of cheaper illicit tobacco products.[30] At the same time, there was a sustained trend of increase in the estimated proportion of illicit cigarette use in Brazil, from 28.8% in 2014 to 42.8% in 2016.[31] The weakening of the Brazilian government's regulatory agendas and the strong interference of the tobacco industry could partially explain this.

In 2019, to reduce the consumption of foreign cigarettes (illegally imported, especially from Paraguay), the Ministry of Justice and Public Security of Brazil instituted a working group to evaluate the convenience and opportunity of reducing the taxation of cigarettes manufactured in Brazil.[32] There was no consensus on the benefits of reducing the tax burden as a strategy to combat the sale of illicit cigarettes.[32] According to WHO report on the global tobacco epidemic of 2019, based on the experiences of several countries, it is not necessary to reduce the price and taxes of tobacco products to successfully reduce their illicit commerce. To that end, measures such as strengthening tax and customs administration, as well as improving law enforcement capacity, are essential.[33]

Limitations

The questionnaire used in the survey is composed of closed, short, and objective questions, specially developed (and tested) to be applied by telephone interview in large population samples.[10] However, the questions do not allow detailed quantitative and qualitative evaluation of the studied factors. The indicators adopted for monitoring smoking do not explicitly include the types of cigarettes (e.g., whether they are traditional or electronic cigarettes). Household passive smoking exposure was not included because it cannot be the object of public policies in Brazil. However, we also observed similar trends to the ones observed in smoking exposure at work for household exposure (data not shown). Furthermore, it is known that self-reported tobacco smoking information is more subject to inaccuracies than those biochemically validated as part of research projects. However, this approach is considered valid and widely used in large surveys of health and lifestyle conditions[15] because of its simplicity and low cost. Also, the self-reported data, over time, usually reflect a consistent bias, and so they remain valuable for trend analyses.

Public Health Implications

The present study indicated a decline in the prevalence of current cigarette smoking, heavy smoking, and passive smoking in the workplace among Brazilian adults. However, the reduction in the intensity of the decline of cigarette smoking prevalence in the recent period is worrying and indicates that, although the current policy scenario seems effective to curb heavy smoking prevalence, it seems insufficient to reduce total smoking prevalence. It is necessary to work toward a country essentially free from the sale (legal and illegal) of tobacco products. It reinforces the need to intensify actions to promote health and protect the population of modifiable risk factors associated with NCDs. AJPH

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CONTRIBUTORS

E. Gomes Maia and R. Moreira Claro conceptualized the study, performed the statistical analysis, and drafted and reviewed the article. S. Rizzato Stopa and R. de Oliveira Santos participated in data interpretation and reviewed the article critically for important intellectual content. All authors approved of the final version to be published.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

HUMAN PARTICIPANT PROTECTION

The Surveillance of Risk and Protective Factors for Chronic Diseases Telephone Survey was approved

by the National Commission of Ethics in Research for Human Beings of the Ministry of Health, no. 355.590. Microdata are freely available for public access and use and do not allow identification of the respondents. Free consent was replaced by verbal consent at the time of telephone contact with the interviewees. All procedures were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Crowdfunding Campaigns and COVID-19 Misinformation

Jeremy Snyder, PhD, Marco Zenone, MSc, and Timothy Caulfield, LLM

Objectives. To understand whether and how crowdfunding campaigns are a source of COVID-19–related misinformation.

Methods. We searched the GoFundMe crowdfunding platform using 172 terms associated with medical misinformation about COVID-19 prophylaxes and treatments. We screened resulting campaigns for those making statements about the ability of these searched-for or related terms to prevent or treat COVID-19.

Results. There were 208 campaigns worldwide that requested $21 475 568, raised $324 305 from 4367 donors, and were shared 24 158 times. The most discussed interventions were dietary supplements and purported immune system boosters (n = 231), followed by other forms of complementary and alternative medicine (n = 24), and unproven medical interventions (n = 15). Most (82.2%) of the campaigns made definitive efficacy claims.

Conclusions. Campaigners focused their efforts on dietary supplements and immune system boosters. Campaigns for purported COVID-19 treatments are particularly concerning, but purported prophylaxes could also distract from known effective preventative approaches. GoFundMe should join other online and social media platforms to actively restrict campaigns that spread misinformation about COVID-19 or seek to better inform campaigners about evidence-based prophylaxes and treatments. (*Am J Public Health*. 2021;111:739–742. https://doi.org/10.2105/AJPH.2020.306121)

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Efforts to combat the COVID-19 pandemic have been complicated by misinformation about preventing and treating it.[1] Much of this misinformation is spread online. More than one quarter of the most viewed videos about COVID-19 on YouTube and nearly a quarter of tweets using COVID-19–related hashtags contain misinformation.[2,3] In response, online platforms including Google, YouTube, Twitter, Reddit, and Facebook have announced steps to combat this misinformation, including flagging false claims, removing misinformation, and directing users to reputable information sources.[4]

Medical crowdfunding campaigns are significant and persuasive sources of medical misinformation.[5] These include unfounded claims about the efficacy of homeopathic treatments for cancer, hyperbaric oxygen treatment of brain injuries, and stem cell treatments for neurologic conditions.[6,7] These campaigns can be especially persuasive sources of misinformation, as they are typically presented as patient testimonials by trusted individuals and then spread via social media.

GoFundMe, the largest medical crowdfunding platform, reports that more than 150 000 COIVD-19-related campaigns have been created, raising $625 million from more than 9 million donors between March 1 and August 31, 2020.[8] But unlike other online platforms, GoFundMe has not announced steps to monitor or respond to pandemic misinformation. We reviewed GoFundMe campaigns to better understand whether they are a source of COVID-19–related medical misinformation and what unproven COVID-19 prophylaxes and treatments are drawing the most interest by crowdfunders.

METHODS

We identified 172 search terms related to unproven prophylaxes and treatments for COVID-19 by reviewing US Food and Drug Administration and Federal Trade Commission warning letters and news reports on known instances of individuals providing unproven COVID-19 prophylaxes and treatments (search terms are available

in the Appendix [available as a supplement to the online version of this article at http://www.ajph.org]).[9,10] We selected these sources as representing the scientific consensus on then-known effective treatments and prophylaxes for COVID-19.

We searched GoFundMe campaigns from June 11 to 13, 2020, using that platform's internal search engine and variations of these search terms with "COVID" or "coronavirus." After we removed duplicate campaigns and campaigns from nonmedical and nonemergency categories, we identified 3823 campaigns.

The second author (M. Z.) reviewed these campaigns and excluded those not making statements about the ability of 1 or more of these searched-for or related terms to prevent or treat COVID-19. The first (J. S.) and third (T. C.) author each reviewed 10% of the campaigns to ensure consistent application of exclusion criteria. The first (J. S.) and second (M. Z.) authors reviewed included campaigns for information on the funding sought and received, social media shares, intended intervention, target population, efficacy claims, and whether prevention or treatment were intended. The third author (T. C.) reviewed 10% of these campaigns, and all authors resolved disagreements about data interpretation.

RESULTS

We identified 208 crowdfunding campaigns that intended to raise funds for unproven prophylaxes and treatments for COVID-19. They requested $21 475 568 (median $5000), raised $324 305 (median $112.50) or 1.5% of the requested amount from 4367 (median 3) donors, and were shared 24 158 (median 0) times on Facebook. Eighteen (8.7%) of these campaigns met or exceeded their fundraising goal. The most commonly discussed interventions were dietary supplements and purported immune system boosters (n = 231; 85.6%), including dietary supplements (n = 69; 25.6%), vitamin supplements (n = 66; 24.4%), vitamin C (n = 42; 15.6%), and herbal supplements (n = 22; 8.1%). The next largest category was other forms of complementary and alternative medicine (n = 24; 8.9%), including cannabidiol (n = 4; 1.5%) and essential oils (n = 4; 1.5%), followed by unproven medical interventions (n = 15; 5.6%), including hydroxychloroquine (n = 8; 3.0%). Some campaigns included multiple interventions.

Most campaigns made definitive efficacy claims (n = 171; 82.2%) compared with only 10 (4.8%) claiming possible efficacy and 27 (13.0%) making no efficacy claims. Dietary supplements skewed toward purported preventative effects (85.3%). Complementary and alternative treatments were relatively balanced between purported preventative and curative effects and unproven medical interventions skewed toward curative claims (73.3%; Table 1).

Nearly all campaigns targeted communities (n = 194; 93.3%) rather than a single person or household (n = 14; 6.7%). Campaigns targeting communities most commonly focused on frontline health workers (n = 60; 29.7%), followed by local low-income or otherwise vulnerable groups, such as unhoused or elderly people (n = 53; 26.2%), the general public (n = 45; 22.3%), low-income or otherwise vulnerable communities abroad (n = 30; 14.9%), research on interventions presented as known or highly likely to be effective (n = 9; 4.5%), and protesters against police brutality (n = 50; 2.5%). Some campaigns described multiple target communities.

DISCUSSION

Crowdfunding campaigns are spreading misinformation about purported COVID-19 prophylaxes and treatments. The 208 campaigns we identified are a small share of the 150 000 COVID-19–related campaigns initiated between March 1 and August 31, 2020. Nevertheless, our search was completed on June 23 and so did not include campaigns initiated between June 24 and August 31. Moreover, only 3.2% (4800) of the 150 000 campaigns GoFundMe cataloged were for medical needs.[8]

These 208 campaigns received funding pledges from thousands of people and were shared on social media tens of thousands of times. These peer engagements are noteworthy, as it is more difficult to counter misinformation from peers than from news media.[11] These campaigns nearly all targeted communities rather than individuals as recipients of their fundraising, further increasing their reach. Thus, they form an important source of pandemic misinformation.

Most campaigns sought funding for dietary supplements, purported immune system boosters, and other forms of complementary and alternative medicine as prophylaxes and treatments for COVID-19. Campaigns supporting purported treatments for COVID-19 are particularly concerning as they could distract seriously ill individuals from evidence-based treatments. But campaigns for prophylaxes, including the purported immune-boosting dietary supplements that made up the majority of these campaigns, can also create a dangerous sense of invulnerability to COVID-19, as medical misinformation can lead individuals to delay or altogether fail to seek effective care.[12]

TABLE 1— COVID-19 Treatment Misinformation Types and Aims: Worldwide, June 11–13, 2020

Intervention Type	No. (%)	Preventative, No. (%)	Treatment, No. (%)	Both, No. (%)
Dietary supplements and immune system boosters (all)	231 (85.6)	197 (85.3)	25 (10.8)	9 (3.9)
Dietary supplements (general)	69 (25.6)	62	6	1
Vitamins (general)	66 (24.4)	57	6	3
Vitamin C	42 (15.6)	38	3	1
Herbal supplements (general)	22 (8.1)	14	5	3
Zinc	9 (3.3)	6	2	1
Ginger	6 (2.2)	5	1	0
Turmeric	6 (2.2)	6	0	0
Vitamin D	6 (2.2)	5	1	0
Other	5 (1.9)	4	1	0
Other complementary and alternative treatments (all)	24 (8.9)	11 (45.8)	7 (29.2)	6 (25.0)
Cannabidiol	4 (1.5)	1	1	2
Essential oils	4 (1.5)	3	1	0
Acupuncture	3 (1.1)	2	1	0
Colloidal silver	3 (1.1)	0	1	2
Other	10 (3.7)	5	3	2
Unproven interventions (all)	15 (5.6)	2 (13.3)	11 (73.3)	2 (13.3)
Hydroxychloroquine	8 (3.0)	1	6	1
Other	7 (2.6)	1	5	1

That these messages generally targeted frontline health workers and individuals in vulnerable and low-income settings further demonstrates the seriousness of this concern and raises questions of justice in which groups are targeted with misinformation.

Previous studies of COVID-19 misinformation have identified conspiracy theories on the origins, spread, and political dimensions of the pandemic as common.[2,3] Our findings augment this research by noting specific types of unproven prophylaxes and treatments that are receiving public interest. Although specific unproven treatments, such as hydroxychloroquine, have received considerable political support and news coverage, our findings suggest that dietary supplements, vitamins, and other purported immune system boosters have a much higher public profile as means of preventing COVID-19 infections and should be a major target of public health education efforts.

PUBLIC HEALTH IMPLICATIONS

GoFundMe should join other companies and restrict the use of their platform to spread misinformation about prophylaxes and treatments for COVID-19 and other forms of medical misinformation. This could be achieved by proactively providing campaigners with reputable information on COVID-19 prevention and treatment, for example by adding links to these sources when campaigners are creating COVID-19–related campaigns, flagging campaigns for review, employing fact checkers to review campaigns, and, as a last resort, banning problematic campaigns. As there is a danger of bias and lack of public accountability in making social media platforms the sole arbiters of medical misinformation, these actions should be taken in cooperation with public health experts and other stakeholders. By not taking these steps when other social media platforms have demonstrated their feasibility and importance, GoFundMe is willingly supporting and disseminating misinformation that can harm public health. AJPH

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

Research ethics approval was not required under the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans article 2.2 for this study because data were posted publicly and without an expectation of privacy.

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Health Care Coverage and Preexposure Prophylaxis (PrEP) Use Among Men Who Have Sex With Men Living in 22 US Cities With vs Without Medicaid Expansion, 2017

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Objectives. To compare health care coverage and utilization between men who have sex with men (MSM) in Medicaid expansion versus nonexpansion states.

Methods. We used cross-sectional weighted data from the National HIV Behavioral Surveillance system, which used venue-based methods to interview and test MSM in 22 US cities from June through December, 2017 (n = 8857). We compared MSM in Medicaid expansion versus nonexpansion states by using the Rao-Scott χ^2 test stratified by HIV status. We used multivariable logistic regression to model the relationship between Medicaid expansion, coverage, and preexposure prophylaxis (PrEP) use.

Results. MSM in expansion states were more likely to have insurance (87.9% vs 71.6%), have Medicaid (21.3% vs 3.8%), discuss PrEP with a provider (58.8% vs 44.3%), or use PrEP (31.1% vs 17.5%).

Conclusions. Medicaid expansion is associated with higher coverage and care, including PrEP.

Public Health Implications. States may consider expanding Medicaid to help end the HIV epidemic.
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As of 2017, 37 states and Washington, DC, have expanded Medicaid as part of the Patient Protection and Affordable Care Act (ACA),[1] extending eligibility to nonelderly adults with incomes less than or equal to 138% of the federal poverty level (FPL). Medicaid expansion increased health care coverage for many populations, including sexual minorities.[2]

Pre- and postexpansion analyses found increases in health care coverage and having a usual source of care[2] among gay, bisexual, and other men who have sex with men (MSM). Despite those gains, many MSM live in states that did not expand Medicaid. Among the approximately 4.4 million uninsured adults who would have been eligible had their state expanded Medicaid, most live in the South,[3] where new HIV diagnoses and racial/ethnic disparities are high. Populations at risk for HIV are disproportionately low income and likely to be eligible under the expansion criteria.[4] A previous analysis found that Medicaid expansion was associated with health care access and utilization among persons who inject drugs.[5] However, it is unknown whether MSM experience differences in health care coverage or utilization in expansion versus nonexpansion states.

To achieve the national goal of ending the HIV epidemic,[6] it is critical to increase use of preexposure prophylaxis (PrEP),[7] a daily pill that is about 99% effective in preventing HIV.[8] Health care access is important to ensure that people with HIV engage in care, visit their provider regularly, and achieve viral suppression, which helps patients stay healthy and have effectively no risk of transmitting HIV.

PrEP's effectiveness depends on adherence,[9] but cost can be a barrier.[10] Without insurance or assistance, PrEP

can cost thousands of dollars per year in out-of-pocket expenses. Although pharmaceutical companies offer assistance programs, patients sometimes experience gaps in assistance,[11] which could affect adherence. Although Medicaid and most private plans already cover PrEP, the US Preventive Services Task Force classified PrEP as a grade A medication, requiring plans to cover it without cost sharing in 2021.[12] However, low-income MSM in nonexpansion states may not have access because of stricter Medicaid eligibility criteria.[13] MSM in nonexpansion states who can neither afford private insurance nor qualify for Medicaid may be vulnerable.

We compared MSM in states that expanded versus did not expand Medicaid, stratified by HIV status.

METHODS

The Centers for Disease Control and Prevention's (CDC's) National HIV Behavioral Surveillance (NHBS) system collects cross-sectional data on HIV-related behaviors among populations at risk for HIV, including MSM.[14] We recruited MSM through a venue-based sampling methodology for interviews and HIV testing in 23 US cities from June through December 2017. We selected cities based on highest HIV prevalence. NHBS sampling procedures have been previously published.[15]

We limited our analysis to men who had sex with another man in the past 12 months, were 18 to 64 years old because of near-universal Medicare access for persons 65 years old or older, lived in a participating metropolitan statistical area, were able to complete the interview in English or Spanish, and had a valid HIV test result. We excluded data from San Juan, Puerto Rico, because their Medicaid system was not comparable to other project areas.[16] Of 13 852 people screened, we included 8857.

We weighted NHBS data to account for unequal selection probabilities, multiplicity, and nonresponse bias, allowing us to extrapolate to all venue-attending MSM.

Definitions

We defined Medicaid expansion status as implementing Medicaid expansion before June 1, 2017.[1] Table 1 shows states' Medicaid expansion status, the year the state implemented the policy,

TABLE 1— Map of MSAs, States' Medicaid Expansion Status, and Implementation: United States, National HIV Behavioral Surveillance, 2017

NHBS MSA[a]	Medicaid Expansion Status	Year of Expansion
CA		
Los Angeles	Expanded	2014
San Francisco	Expanded	2014
San Diego	Expanded	2014
CO: Denver	Expanded	2014
FL: Miami	Did not expand	. . .
GA: Atlanta	Did not expand	. . .
IL: Chicago	Expanded	2014
LA: New Orleans	Expanded	2016
MA: Boston	Expanded	2014
MD: Baltimore	Expanded	2014
MI: Detroit	Expanded	2014
NJ: Newark	Expanded	2014
NY		
Nassau-Suffolk	Expanded	2014
New York City	Expanded	2014
OR: Portland	Expanded	2014
PA: Philadelphia	Expanded	2015
PR: San Juan	Excluded from analysis	. . .
TN: Memphis	Did not expand	. . .
TX		
Dallas	Did not expand	. . .
Houston	Did not expand	. . .
VA: Norfolk	Did not expand	. . .
WA: Seattle	Expanded	2014
Washington, DC	Expanded	2014

Note. MSA = metropolitan statistical area. NHBS = National HIV Behavioral Surveillance. Massachusetts enacted a similar health care reform policy in 2006.

Source. State Medicaid status was categorized using Kaiser Family Foundation's interactive map as of June 1, 2017: https://www.kff.org/medicaid/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map.

[a]Some metropolitan statistical areas extended into multiple states. Participants were categorized based on state of residence, regardless of the city they were sampled in. Participants sampled in Baltimore, MD; Norfolk, VA; or Washington, DC, may have lived in MD, VA, or Washington, DC. Memphis, TN, participants may have lived in AR, MS, or TN. Participants sampled in Newark, NJ; Nassau-Suffolk, NY; or New York, NY, may have lived in NJ or NY. Portland, OR participants may have lived in OR or WA.

and NHBS project areas. Because metropolitan statistical areas may cross state borders, we classified participants by state of residence. Because states expanded at different times, we calculated time since expansion as months since implementation.

We assessed poverty using the 2017 Health and Human Services guidelines based on household income and number of dependents.[17] To determine differences in possible Medicaid eligibility, we categorized household income as less than 100%, 100% to 138%, and greater than 138% of the FPL. We defined insurance status as currently having any type of health insurance.

We limited all PrEP variables to HIV-negative MSM who were aware of PrEP. We limited discussion of PrEP with a provider in the past 12 months to MSM who visited any provider in the past 12 months. We measured PrEP use as taking PrEP in the past 12 months. The full NHBS questionnaire is available online.[18]

Analysis

We obtained weighted percentages and 95% confidence intervals (CIs). We compared characteristics between MSM living in expansion states versus nonexpansion states by using the Rao-Scott χ^2 test ($P < .05$). Because people with HIV often have access to other forms of assistance, such as the Ryan White HIV/AIDS Program, we also stratified results by HIV status. We excluded or suppressed variables with an unstable coefficient of variation (CV) because of sparse data (CV > 0.30).

Then, we used multivariable logistic regression models to assess how state Medicaid expansion policy was related to 3 outcomes: current insurance status, current Medicaid status, and PrEP use in the past 12 months. We estimated crude and adjusted prevalence ratios (APRs) and 95% CIs. We selected covariates for each model based on the literature or a priori interest.

The model examining the association between Medicaid expansion and current insurance status controlled for race/ethnicity, age, employment, income, HIV status, geographic region, and time since expansion.

The model measuring the association between expansion status and current Medicaid status controlled for race/ethnicity, age, employment, income, disability, HIV status, geographic region, and time since expansion. We categorized the Medicaid status outcome as MSM with Medicaid versus any other insurance, excluding uninsured MSM.

We modeled the association between state Medicaid expansion and PrEP use among HIV-negative MSM, controlling for race/ethnicity, age, current insurance status, geographic region, and time since expansion. We included disclosing sexuality and discussing PrEP with a provider, as they are related to obtaining a prescription.[19]

We conducted analyses using SAS version 9.4 (SAS Institute, Cary, NC) and SUDAAN version 11.0.3 (RTI International, Research Triangle Park, NC).

RESULTS

Overall (n = 8857), 28.3% of MSM lived in nonexpansion states. Compared with MSM in expansion states (Table 2), men who lived in nonexpansion states were more likely to be non-Hispanic Black (hereafter referred to as Black; 35.3% vs 21.5%) or Hispanic/Latino (35.3% vs 30.1%). Among MSM in nonexpansion states, 14.8% and 9.0% had incomes within 0% to 100% and 100% to 138% of the FPL, respectively, and may have been eligible for Medicaid had they lived in an expansion state.

MSM in nonexpansion states were more likely to be uninsured than were MSM in expansion states (28.4% vs 12.1%). They were less likely to have Medicaid (3.8% vs 21.3%), a usual source of care (78.9% vs 85.9%), visited a provider in the past 12 months (81.7% vs 87.7%), or disclosed their sexuality to a provider (80.7% vs 86.7%).

Because most states that did not expand Medicaid were in the South, we compared key variables between New Orleans, Louisiana, which expanded Medicaid, and other Deep South cities, which had not (Table A [available as a supplement to the online version of this article at http://www.ajph.org]). We found no differences in social determinants of health, such as poverty or unemployment; however, MSM in New Orleans were more likely to have any insurance, have Medicaid, or have visited a provider in the past 12 months. This suggests that the differences between expansion and nonexpansion states in our analysis are not solely attributable to preexisting geographic inequities.

Descriptive statistics stratified by HIV status are available in Table B (available as a supplement to the online version of this article at http://www.ajph.org). HIV-positive MSM in nonexpansion states were more likely to be employed and less likely to be homeless than were HIV-positive MSM in expansion states. Despite socioeconomic advantages, HIV-positive MSM in nonexpansion states were less likely to be insured (75.1% vs 92.6%), have Medicaid (5.7% vs 37.3%), or have visited a provider in the past 12 months (91.7% vs 95.2%), all factors associated with viral suppression.[20]

HIV-negative MSM in nonexpansion states were less likely to have insurance (70.4% vs 86.7%), have Medicaid (3.2% vs 17.1%), visited a provider (78.3% vs 85.7%), or come out to their provider

TABLE 2— Sociodemographic and Care Differences Between MSM Living in Medicaid Expansion Versus Nonexpansion States: United States, National HIV Behavioral Surveillance, 2017

	Did Not Expand Medicaid (n = 2507)		Expanded Medicaid (n = 6350)		
Variable	**No.**	**%[a] (95% CI)**	**No.**	**%[a] 95% CI**	***P***
Race/ethnicity[b]					<.001
Non-Hispanic Black	976	35.3 (30.6, 39.9)	1729	21.5 (19.2, 23.8)	
Hispanic/Latino	793	35.3 (31.5, 39.2)	1403	30.1 (27.9, 32.2)	
Non-Hispanic White	597	24.1 (20.6, 27.5)	2536	38.6 (36.2, 41.0)	
Other/multiracial	133	5.3 (3.8, 6.8)	642	9.8 (8.8, 10.8)	
Age, y					.06
18–29	1099	45.5 (41.5, 49.5)	2486	40.8 (38.3, 43.3)	
30–39	712	28.4 (25.9, 30.8)	1983	32.8 (30.8, 34.7)	
40–49	370	14.4 (12.3, 16.5)	984	14.5 (13.0, 15.9)	
50–64	326	11.7 (9.4, 14.0)	897	12.0 (10.4, 13.6)	
Employment					.005
Employed full/part time	2058	84.0 (82.1, 86.0)	4894	79.8 (78.1, 81.4)	
Not in labor force/cannot work	251	9.0 (7.4, 10.5)	760	11.1 (9.9, 12.3)	
Unemployed	198	7.0 (5.7, 8.3)	695	9.2 (7.9, 10.5)	
Poverty[d]					.72
<100% FPL	419	14.8 (12.5, 17.2)	1220	15.9 (14.1, 17.7)	
100%–138% FPL	260	9.0 (7.4, 10.6)	571	9.2 (8.9, 10.4)	
≥139% FPL	1808	76.2 (73.5, 78.8)	4513	74.9 (72.8, 77.0)	
Homeless, 12 mo					.12
Yes	166	6.0 (4.5, 7.5)	602	7.5 (92.5, 95.5)	
No	2341	94.0 (92.5, 95.5)	5748	92.5 (91.4, 93.6)	
HIV status					.01
HIV positive	676	24.9 (21.8, 27.9)	1442	20.4 (18.4, 22.4)	
HIV negative	1831	75.2 (72.1, 78.2)	4908	79.6 (77.6, 81.7)	
Any disability					.33
Yes	482	17.3 (15.2, 19.5)	1341	18.7 (17.1, 20.2)	
No	2023	82.7 (80.5, 84.8)	4995	81.3 (79.8, 82.9)	
Currently insured					<.001
Yes	1777	71.6 (68.7, 74.4)	5557	87.9 (86.6, 89.2)	
No	727	28.4 (25.6, 31.3)	782	12.1 (10.8, 13.4)	
Insurance type[c]					<.001
Private only	1263	56.0 (52.7, 59.3)	3377	56.2 (54.0, 58.5)	
Medicaid only	128	3.8 (2.8, 4.8)	1418	21.3 (19.5, 23.1)	
Medicare only	57	1.3 (0.8, 1.8)	155	1.6 (1.1, 2.2)	
Other/multiple types	326	10.4 (8.7, 12.2)	593	8.7 (7.7, 9.7)	
No insurance	727	28.5 (25.7, 31.3)	782	12.1 (10.8, 13.4)	
Usual source of care					<.001
Yes	1933	78.9 (76.2, 81.5)	5362	85.9 (84.6, 87.3)	
No	554	21.1 (18.5, 23.8)	930	14.1 (12.7, 15.4)	

Continued

(77.4% vs 85.2%). HIV-negative MSM in nonexpansion states were also less likely to have discussed PrEP with a provider (44.3% vs 58.8%) or have used PrEP in the past 12 months (17.8% vs 31.1%) than were MSM in expansion states (Figure 1).

Our first model (Table 3) assessed the relationship between Medicaid expansion and having insurance. MSM in expansion states were more likely to have insurance (APR = 1.14; 95% CI = 1.07, 1.22).

Our second adjusted model assessed the relationship between Medicaid expansion and current Medicaid status. MSM in expansion states were 5.88 times as likely to have Medicaid (95% CI = 4.07, 8.48) as MSM in nonexpansion states.

Our third model assessed the relationship between Medicaid expansion and PrEP use in the past 12 months. MSM living in expansion states were 1.19 times as likely to use PrEP (95% CI = 1.01, 1.40). In expansion states, racial/ethnic PrEP disparities narrowed but persisted. White MSM were more likely than were Black MSM to use PrEP in both expansion (34% vs 26%) and nonexpansion (27% vs 13%; data not in table) states.

DISCUSSION

MSM in states that did not expand Medicaid were less likely to have insurance or utilize health care, including PrEP. Approximately 1 in 5 HIV-positive and 1 in 3 HIV-negative MSM in nonexpansion states were uninsured. MSM in expansion states were more than 5 times as likely to have Medicaid, suggesting that when Medicaid is available, it is used. Because there were no differences in age, poverty, or disability, higher Medicaid use is likely attributable to not higher need but better availability.

We found that PrEP use was lower among HIV-negative MSM in nonexpansion states, although the effect

TABLE 2— Continued

	Did Not Expand Medicaid (n = 2507)		Expanded Medicaid (n = 6350)		
Variable	No.	%[a] (95% CI)	No.	%[a] 95% CI	*P*
Health care visit, 12 mo[c]					<.001
Yes	2074	81.7 (79.2, 84.1)	5564	87.7 (86.4, 89.0)	
No	431	18.3 (15.9, 20.8)	785	12.3 (11.0, 13.6)	
Disclosed sexual identity to provider[c]					<.001
Yes	2027	80.7 (78.3, 83.2)	5470	86.7 (85.3, 88.1)	
No	477	19.3 (16.8, 21.7)	875	13.3 (12.0, 14.7)	

Note. CI = confidence interval; FPL = federal poverty limit; MSM = men who have sex with men; NHBS = National HIV Behavioral Surveillance. Study size was n = 8857. Expansion states were those that implemented Medicaid expansion before June 1, 2017.

[a]Column percentages were weighted; not all percentages sum to 100 because of missing or suppressed values; values suppressed if coefficient of variation was > 0.30.
[b]Hispanic/Latinos could be of any race; all racial groups were single-race; other racial groups were American Indian/Alaska Native, Asian, Native Hawaiian/Pacific Islander, and multiracial.
[c]Poverty defined by 2017 Department of Health and Human Services federal poverty guidelines: https://www.federalregister.gov/documents/2017/01/31/2017-02076/annual-update-of-the-hhs-poverty-guidelines.

size was small. Most nonexpansion states are in the South, which already experiences higher burden of HIV diagnoses and disproportionately low PrEP uptake.[21] Racial/ethnic PrEP disparities could worsen as MSM in Southern nonexpansion states—which have high Black and Hispanic/Latino populations, who bear inequitable HIV burden—continue to have fewer public insurance options.

MSM in expansion states were more likely to use PrEP, consistent with a report showing that PrEP prescriptions among Medicaid recipients increased after New York expanded Medicaid.[22] A national study found that a PrEP monthly copay of $20 or more was associated with lower long-term adherence,[23] suggesting that no- or low-cost programs are needed for long-term PrEP use. The government program Ready, Set, PrEP provides no-cost PrEP medication to qualified individuals without prescription drug coverage[24]; however, it does not cover costs of required provider visits or laboratory tests, so some cost barriers may persist.

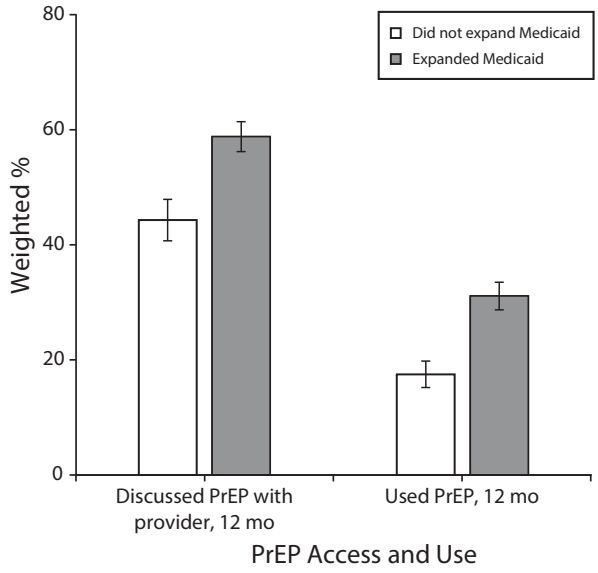
Black MSM were less likely to use PrEP than were White MSM, regardless of Medicaid expansion. This is consistent with literature showing that Black MSM have low PrEP uptake even when costs are covered.[25] Unmeasured factors, including PrEP stigma,[26] provider bias,[27] and lower access, can help explain this disparity.

MSM in nonexpansion states were less likely to either visit or disclose their sexuality to providers and thus miss the opportunity to talk with a provider about PrEP. Although assistance programs sometimes cover the medication costs, they often do not cover the cost of the 4 CDC-recommended provider visits and laboratory tests each year,[8] which involve additional time and financial burden.[28] Some MSM may not be able to afford visits or have easy access to clinics. When they do attend, they may not disclose their sexuality, missing the chance for providers to assess risk factors.

Provider attitudes toward PrEP also play a role in uptake. In a study of primary care providers and HIV specialists, most primary care providers were aware of PrEP but rarely discussed or prescribed it.[29] Although most HIV specialists were willing to prescribe PrEP, concerns about coverage were the biggest barrier to prescribing it.[29] Another study found that the lack of HIV training explained why some Southern primary care providers did not prescribe PrEP.[30] Training primary care providers about PrEP, initiating PrEP discussions, and cost-assistance programs is important because HIV-negative men who are not already using PrEP might not see an HIV specialist or feel comfortable initiating the topic with their primary care provider. PrEP expansion efforts may need to address providers' PrEP attitudes and include fostering stigma-free clinics where patients feel comfortable disclosing their sexuality.

HIV-positive MSM reported differences in insurance coverage and type. About 1 in 13 HIV-positive MSM in expansion and 1 in 4 in nonexpansion states were uninsured. Medicaid is the largest source of coverage for people with HIV, and Medicaid coverage increased substantially for HIV patients after expansion.[31] This is consistent with our results showing that HIV-positive MSM in expansion states were 7 times more likely to have Medicaid.

Before the ACA, people with HIV struggled to obtain health insurance because of the preexisting conditions exclusion, cost barriers, and Medicaid eligibility limitations that required disability status.[4] Although Medicaid expansion insured more HIV patients, it did not necessarily result in better care quality. In some cases, HIV patients who previously received comprehensive services in a medical home model of care through the Ryan White program suddenly had to navigate a fractured, culturally incompetent system; however,



	Weighted % (95% CI)		
	Did Not Expand Medicaid (n = 1831)	Expanded Medicaid (n = 4908)	*P*
Discussed PrEP with a provider, 12 mo			<.001
Yes	44.3 (40.7, 47.8)	58.8 (56.2, 61.3)	
No	55.7 (52.2, 59.3)	41.2 (38.7, 43.8)	
Used PrEP, 12 mo			<.001
Yes	17.5 (15.1, 19.9)	31.1 (28.7, 33.6)	
No	82.5 (66.4, 71.3)	68.9 (66.4, 71.3)	

FIGURE 1— Differences in Preexposure Prophylaxis (PrEP) Discussion and Use Between HIV-Negative Men Who Have Sex With Men (MSM) Living in Medicaid Expansion Versus Nonexpansion States: United States, National HIV Behavioral Surveillance, 2017

Note. CI = confidence interval. MSM live in a state that implemented Medicaid expansion before June 1, 2017

these patients were also newly covered for more non-HIV illnesses under Medicaid.[32] Sometimes Ryan White patients receive treatment elsewhere but rely on the Ryan White program to provide support services, such as case management,[33] that are often not covered by Medicaid.[34] A nationally representative survey of HIV patients found that patients with Medicaid coverage supplemented by the Ryan White program had better viral suppression outcomes than did patients with Medicaid alone.[31] However, the Ryan White program is intended as a safety net, so Medicaid expansion may alleviate its burden.

Limitations

This analysis had several limitations. First, NHBS collected data using venue-based sampling in cities with high HIV burden. Men who live in cities and attend MSM-majority venues may have higher incomes, be more likely to be out, and have easier access to clinics and PrEP programs than are men in nonurban areas. Second, not all states are represented in the NHBS sample, and some states had greater representation. Third, behavioral data are self-reported and subject to social desirability and recall biases. Unmeasured factors likely influenced outcomes. Unmeasured factors that could affect insurance status include marital or legal status. PrEP use could be influenced by stigma, PrEP program, trial participation, and clinic factors, such as distance, waitlists, hours, and provider attitudes. Other state policy changes concurrent with expansion likely occurred; therefore, not all differences are attributable to Medicaid expansion. All NHBS nonexpansion states were in the South and were not representative of all nonexpansion states. Regional disparities in access to care existed before the ACA, so differences may not be attributable to Medicaid expansion. Finally, NHBS data are cross-sectional and may not support causal inferences.

Despite these limitations, this analysis highlights differences in care coverage and utilization for both HIV-positive and HIV-negative MSM in diverse US cities.

Conclusions

MSM living in nonexpansion states reported lower health care coverage and utilization, including PrEP use. Lower access and utilization of care could have implications for curbing new HIV infections and present a challenge for making the goal of ending the HIV epidemic a reality.

Public Health Implications

Medicaid can help HIV-positive MSM access the care they need to stay healthy and HIV-negative MSM access life-saving medicines like PrEP. Studies, including this analysis, have shown that health care coverage, access, and outcomes were better[35] in expansion states, even when other socioeconomic factors were worse or similar. States may consider expanding

TABLE 3— Adjusted Association Between Medicaid Expansion Status and Insurance, Medicaid, or PrEP Use Among MSM: National HIV Behavioral Surveillance, 2017

	Model 1: Currently Insured (n = 8729)		Model 2: Medicaid vs Other Insurance[a] (n = 7222)		Model 3: Used PrEP, 12 mo (n = 4919)[b]	
	CPR[c] (95% CI)	APR (95% CI)	CPR[c] (95% CI)	APR (95% CI)	CPR[c] (95% CI)	APR (95% CI)
Expanded Medicaid (Ref = No)	1.23 (1.18, 1.28)	1.15 (1.06, 1.26)	4.55 (3.40, 6.08)	5.62 (3.75, 8.41)	1.78 (1.52, 2.09)	1.16 (1.01, 1.40)
Mo since expansion	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)	0.99 (0.98, 0.99)	0.99 (0.99, 1.00)	1.00 (1.00, 1.01)	1.00 (1.00, 1.00)
Region[d] (Ref = other): South	1.03 (0.97, 1.09)	1.01 (0.96, 1.07)	1.06 (0.85, 1.31)	0.96 (0.79,1.16)	1.00 (0.78, 1.28)	0.97 (0.80, 1.18)
Race/ethnicity (Ref = Non-Hispanic White)						
Non-Hispanic Black	0.96 (0.93, 1.00)	0.99 (0.96, 1.03)	2.69 (2.21, 3.27)	1.53 (1.27, 1.84)	0.68 (0.57, 0.82)	0.81 (0.71, 0.93)
Hispanic/Latino	0.89 (0.85, 0.93)	0.92 (0.88, 0.96)	1.80 (1.46, 2.22)	1.33 (1.11, 1.59)	0.75 (0.64, 0.88)	0.94 (0.85, 1.05)
Other/Multiracial[e]	0.96 (0.91, 1.00)	0.98 (0.93, 1.03)	1.36 (1.01, 1.82)	1.10 (0.85, 1.42)	0.81 (0.66, 1.00)	0.95 (0.81, 1.11)
Age, y (Ref = 50–64)						
18–29	0.88 (0.84, 0.91)	0.91 (0.87, 0.95)	1.57 (1.25, 1.97)	1.54 (1.22, 1.95)	1.50 (1.16, 1.95)	1.18 (0.96, 1.45)
30–39	0.90 (0.86, 0.94)	0.91 (0.87, 0.95)	1.16 (0.90, 1.49)	1.34 (1.05, 1.71)	1.77 (1.34, 2.32)	1.30 (1.06, 1.61)
40–49	0.95 (0.91, 0.99)	0.96 (0.91, 1.00)	0.96 (0.72, 1.28)	1.02 (0.77, 1.34)	1.59 (1.19, 2.12)	1.39 (1.11, 1.73)
Employment (Ref = Other/None): Full time	1.09 (1.05, 1.14)	1.06 (1.02, 1.11)	0.41 (0.36, 0.48)	0.62 (0.53, 0.72)	. . .	. . .
Poverty[f]						
≤ 138% FPL	1 (Ref)	1 (Ref)	4.05 (3.52, 4.67)	2.84 (2.42, 3.34)	. . .	. . .
> 138% FPL	1.23 (1.18, 1.29)	1.21 (1.15, 1.27)	1 (Ref)	1 (Ref)	. . .	. . .
Disability (Ref = No)	. . .	. . .	1.85 (1.61, 2.13)	1.34 (1.16, 1.55)	. . .	. . .
HIV status (Ref = HIV negative): positive	1.07 (1.03, 1.10)	1.08 (1.04, 1.11)	2.00 (1.74, 2.30)	1.51 (1.30, 1.76)	. . .	. . .
Insurance (Ref = None)						
Medicaid only	. . .	. . .	. . .	. . .	1.87 (1.45, 2.43)	1.27 (1.05, 1.53)
Any other insurance			. . .	. . .	2.08 (1.68, 2.59)	1.22 (1.04, 1.44)
Disclosed sexual identity to provider (Ref = No)	. . .	. . .	. . .	. . .	3.58 (2.64, 4.86)	1.12 (0.92, 1.36)
Discussed PrEP with provider, 12 mo (Ref = No)	. . .	. . .	. . .	. . .	17.68 (12.93, 24.17)	16.62 (12.03, 22.96)

Note. APR = adjusted prevalence ratio; CI = confidence interval; CPR = crude prevalence ratio; FPL = federal poverty limit; MSM = men who have sex with men; PrEP = preexposure prophylaxis.

[a]Model 2 outcome was limited to MSM with Medicaid vs MSM who reported any other type of health insurance, excluding uninsured MSM.
[b]Model 3 was limited to HIV-negative MSM who were aware of PrEP.
[c]All models accounted for state's Medicaid expansion status and were weighted for unequal selection probabilities, multiplicity, and nonresponse.
[d]Southern region of residence was defined by the US Census Bureau as living in AL, AR, DE, DC, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, or WV.
[e]Other racial groups were American Indian/Alaska Native, Asian, Native Hawaiian/Pacific Islander, and multiracial.
[f]Poverty defined by 2017 Department of Health and Human Services federal poverty guidelines: https://www.federalregister.gov/documents/2017/01/31/2017-02076/annual-update-of-the-hhs-poverty-guidelines.

Medicaid while carefully considering care quality, coverage of support services, and cultural competency. AJPH

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A. R. Baugher drafted the article and analyzed the data. C. Wejnert supervised the project. All authors planned, designed, and oversaw data collection; interpreted results; and edited and revised the article.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

National HIV Behavioral Surveillance activities were approved by the US Centers for Disease Control and Prevention and by applicable institutional review boards in each participating city. Informed consent was required for participation.

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Effects of Laws Expanding Civilian Rights to Use Deadly Force in Self-Defense on Violence and Crime: A Systematic Review

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See also Burris, p. 559.

Background. Since 2005, most US states have expanded civilian rights to use deadly force in self-defense outside the home. In most cases, legislation has included removing the duty to retreat anywhere one may legally be, commonly known as stand-your-ground laws. The extent to which these laws affect public health and safety is widely debated in public and policy discourse.

Objectives. To synthesize the available evidence on the impacts and social inequities associated with changing civilian rights to use deadly force in self-defense on violence, injury, crime, and firearm-related outcomes.

Search Methods. We searched MEDLINE, Embase, PsycINFO, Scopus, Web of Science, Sociological Abstracts, National Criminal Justice Reference Service Abstracts, Education Resources Information Center, International Bibliography of the Social Sciences, ProQuest Dissertations and Theses, Google Scholar, National Bureau of Economic Research working papers, and SocArXiv; harvested references of included studies; and consulted with experts to identify studies until April 2020.

Selection Criteria. Eligible studies quantitatively estimated the association between laws that expanded or restricted the right to use deadly force in self-defense and population or subgroup outcomes among civilians with a comparator.

Data Collection and Analysis. Two reviewers extracted study data using a common form. We assessed study quality using the Risk of Bias in Nonrandomized Studies of Interventions tools adapted for (controlled) before–after studies. To account for data dependencies, we conducted graphical syntheses (forest plots and harvest plots) to summarize the evidence on impacts and inequities associated with changing self-defense laws.

Main Results. We identified 25 studies that estimated population-level impacts of laws expanding civilian rights to use deadly force in self-defense, all of which focused on stand-your-ground or other expansions to self-defense laws in the United States. Studies were scored as having serious or critical risk of bias attributable to confounding. Risk of bias was low across most other domains (i.e., selection, missing data, outcome, and reporting biases). Stand-your-ground laws were associated with no change to small increases in violent crime (total and firearm homicide, aggravated assault, robbery) on average across states. Florida-based studies showed robust increases (24% to 45%) in firearm and total homicide while self-defense claims under stand-your-ground law were more often denied when victims were White, especially when claimants were racial minorities.

Author's Conclusions. The existing evidence contradicts claims that expanding self-defense laws deters violent crime across the United States. In at least some contexts, including Florida, stand-your-ground laws are associated with increases in violence, and there are racial inequities in the application of these laws.

Public Health Implications. In some US states, most notably Florida, stand-your-ground laws may have harmed public health and safety and exacerbated social inequities. Our findings highlight the need for scientific evidence on both population and equity impacts of self-defense laws to guide legislative action that promotes public health and safety for all.

Trial Registration. Open Science Framework (https://osf.io/uz68e). (*Am J Public Health*. 2021;111:e1–e14. https://doi.org/10.2105/AJPH.2020.306101)

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PLAIN-LANGUAGE SUMMARY

Since 2005, most of the United States have adopted stand-your-ground laws. These laws expand people's right to use deadly force in self-defense anywhere they may legally be without first attempting to retreat. To understand how such laws may affect public health and safety, we searched for all evidence on the impacts of laws that expand or restrict the right to use deadly force in self-defense. We identified 25 studies that examined the impacts of stand-your-ground laws and other expansions to self-defense laws on violence, crime, and firearm use and demand in the United States. An additional 7 studies looked at the outcomes of self-defense cases involving stand-your-ground claims in Florida. Evidence from our review suggests that expanding people's right to use deadly force has not reduced crime on average across the United States. In at least some US states, most notably Florida, stand-your-ground laws have been associated with increases in homicides and there has been racial bias in the application of legal protections. More research is needed on how the impacts of these laws on violence, injury, and criminal justice differ by race and gender across states. Our results demonstrate the importance of using scientific evidence on how laws may have an impact on the overall population and social justice in law and policymaking.

The extent to which civilians can justifiably kill or injure others has been the topic of religious, philosophical, and legal discussion for several centuries.[1] Traditional common law allows citizens to use deadly force in self-defense only when safe retreat is impossible—except when in one's home, where there is no duty to retreat (otherwise known as the castle doctrine).[2] Recent amendments to self-defense laws in the United States have reinvigorated this debate.[3] Beginning with Florida in 2005, 26 US states adopted stand-your-ground (SYG) statutes over the past 15 years, which remove civilian duty to retreat anywhere one may legally be (and, in some cases, provide immunity from civil liability and the presumption of reasonable fear).[4] In addition to these states and Utah, which passed a similar law in 1994, 8 states have SYG by case law, and 7 states have expanded castle doctrine laws (sometimes referred to as "limited" SYG laws) that remove the duty to retreat in certain places outside the home (e.g., the workplace; see Appendix Table A [available as a supplement to this article at https://ajph.org] for a summary).[2,5] Advocates maintain that these laws strengthen legal protections for law-abiding citizens to defend themselves and, in some cases, may deter predatory crime.[6] Critics stress that expanding laws to use deadly force threatens public health and safety by encouraging the use of violence and vigilante justice, likely to exacerbate social inequities in violence and criminal justice outcomes.[7]

Changes to self-defense laws create an opportunity to assess how the relaxation (or strengthening) of legal restrictions on the use of deadly force affects violence, injury, crime, and related social inequities. The prevalence of gun ownership and gun violence in the United States amplifies the ability to use deadly force and appears to be a predictor of states adopting SYG laws.[3] However, understanding the consequences of relaxing legal restrictions on civilian use of deadly violence is important to public health and safety beyond the US context: governments worldwide (e.g., Australia, Canada, the United Kingdom) have received petitions for the introduction of US-style relaxations to self-defense laws. We therefore aimed to systematically review all quantitative research available internationally on the impacts of laws altering civilian rights to use deadly force in self-defense on violence, injury, firearm, and criminal justice outcomes and to examine whether there are differences in impacts among sociodemographic groups (e.g., by race or gender).

METHODS

We searched for published and unpublished studies in 10 databases: MEDLINE, Embase, PsycINFO, Scopus, Web of Science, Sociological Abstracts, National Criminal Justice Reference Service Abstracts, Education Resources Information Center, International Bibliography of the Social Sciences, and ProQuest Dissertations and Theses (protocol registered on Open Science Framework, https://osf.io/uz68e). In consultation with an information specialist (University of Oxford Bodleian Libraries), we searched for stand your ground, SYG, shoot first, line in the sand, self-defence, self-defense, deadly force, legal immunity, castle law, castle doctrine, lethal force, or reasonable force (Appendix Box A). We conducted directed searches of Google Scholar, National Bureau of Economic Research working papers, and SocArXiv; harvested references from relevant studies and reviews; set up search alerts; and consulted experts in the field via author networks for any additional studies. Study searching and inclusion proceeded until April 2020.

Five reviewers (A. Y., B. L., G. M. T, A. P., and D. H.) screened titles and abstracts, including all quantitative studies about self-defense laws except studies on state or military violence. All reviewers first independently screened 200 randomly selected records to establish consistency; the remaining records were then randomly divided among the reviewers. A second reviewer (A. Y. or B. L.) double-screened a random 10% of the excluded studies to ensure sensitivity. Three reviewers (A. Y., B. L., and D. H.) screened all potentially relevant full texts; M. D. E. double-screened all decisions. Discrepancies were discussed and resolved with A. Y. and D. H. We included studies that quantitatively estimated the association between laws that expanded or restricted the right to use deadly force in self-defense and population or subgroup outcomes. Studies that had any comparator (including before implementation) and investigated any outcome among civilians were included. There were no language, location, or time restrictions.

Two reviewers (A. Y. and M. D. E.) extracted data on publication information, design, methods, and effect estimates and appraised study quality. When studies provided more than 1 intervention effect estimate for any given outcome, we followed a decision-making algorithm based on previous reviews and guidelines[8–10]:

1. Extract the most adjusted estimate.
2. Extract the model estimate most appropriate for count or rate outcomes as relevant (e.g., Poisson or negative binomial models).
3. Extract the estimate for an immediate, permanent intervention effect (first order) in autoregressive integrated moving average models for comparability with other studies.
4. If multiple estimates equally meet 1 to 3, extract the most- and least-liberal estimates (based on effect size and precision) to determine the range of estimates.

We appraised included studies using the Risk of Bias in Nonrandomized Studies of Interventions (ROBINS-I) tools for before–after and controlled before–after studies.[11] ROBINS-I evaluates bias by confounding, selection of study units, classification of interventions, deviations from intended interventions, missing data, outcome measurement, and results reporting. We evaluated risk of bias in each study based on the highest-risk outcome to be conservative (e.g., justifiable homicides—which are affected by SYG laws, making this analysis more susceptible to bias—over total homicides). Ratings were based on extracted analyses: we did not evaluate analyses presented in figure format without extractable data.

Meta-analysis was not possible as included studies used the same data sources (violating assumptions of data independence). We used graphical synthesis methods and followed reporting guidelines for systematic syntheses without meta-analysis.[12] Most results were available in, or could be transformed to, percent change in outcome rates, which we used as our standardized metric. We graphed these percent changes for each outcome by geographic region wherever there were 2 available estimates by using forest plots. We exponentiated log estimates from log-linked models (producing risk or rate ratios) and estimates from linear models with log-transformed outcomes (producing geometric mean ratios)—both relative effect estimates that could be synthesized in a single plot.

We summarized the results from subgroup analyses using tables and harvest plots.[13] We focused on subgroup characteristics in PROGRESS-plus—a Cochrane framework for the analysis of health inequities.[14] PROGRESS characteristics are place of residence; race/ethnicity, culture, and language; occupation; gender or sex; religion; education; socioeconomic status; and social capital. "Plus" refers to personal characteristics associated with discrimination (e.g., age), relationship features, and time-dependent relationships. Harvest plots highlight where the evidence suggests a positive, negative, or null gradient for inequities in outcomes and where evidence gaps exist. Null associations were defined as small or variable estimates centered around the point of no effect; positive or negative associations were large or consistent estimates in the positive or negative direction, respectively.

RESULTS

After duplicates were removed, we screened 20 987 titles and abstracts, excluding 20 706 records as irrelevant (Appendix Figure A). After title and abstract screening, we identified 19 additional studies through reference harvesting, search alerts, and expert consultation and therefore screened 210 full texts. We included 25 studies that had main effect estimates of expanding civilian rights to use deadly force in self-defense.[15–38] An additional 7 studies only investigated outcome distributions (usually judicial rulings) of Florida self-defense cases by subgroup characteristics—we included these to supplement our overview of the equity impacts of self-defense laws.[39–45]

Study Characteristics

Table 1 summarizes the characteristics of the 25 main effect studies; Appendix Table B summarizes each study's characteristics. All studies were US-based: most investigated SYG laws (84%); 3 studies investigated SYG laws and expanded castle doctrine laws applying to property outside the home. The remaining study investigated mainly castle doctrine laws up to 2005, before most SYG statutes.[6] All but 1 study[25] controlled for covariates in analyses: 8 only accounted for seasonal, secular, or regional or state trends; 16 also accounted for time-varying covariates (e.g., other laws; see Appendix Table C, for summary of covariates). Eighteen studies compared treated versus untreated units across the United States; 9 conducted a before–after analysis of a single geographic unit (e.g., a state). Only 6 of the main effect studies conducted subgroup comparisons (most commonly by race). Some studies only investigated subgroup samples: adolescents,[19] urban counties,[18] states that passed laws within a restricted time frame (2005–2007),[22] or eastern states.[36] These were included as main effect studies because they did not compare subgroups on the sampling characteristic, but noted as potential sources of heterogeneity and evaluated for selection bias as relevant.

Appendix Table D summarizes classifications of states as "treated" versus "untreated" in US-wide studies of laws expanding the right to use deadly force outside the home. Of 32 states that were classified as "treated," only 9 were consistently analyzed as treated across all studies: Arizona, Georgia, Indiana, Kentucky, Louisiana, Michigan, Oklahoma, South Carolina, and Texas. All of these states implemented statutory SYG

TABLE 1— Summary of Characteristics of the 25 Included Studies on the Effects of Laws Expanding Civilian Rights to Use Deadly Force in Self-Defense: 2010–2019

Characteristic	No. (%)
Date of publication	
2010–2014	10 (40)
2015–2019	15 (60)
Type of publication	
Peer-reviewed journal article	20 (80)
Not in a peer-reviewed journal	5 (20)
Working paper	2 (33)
Book	1 (17)
Dissertation	1 (17)
Preprint	1 (17)
Study design[a]	
Controlled before–after study	15 (60)
Controlled interrupted time series study	5 (20)
Interrupted time series study	4 (16)
Case–control study	1 (4)
Comparator	
Preintervention and "untreated" area	12 (48)
Preintervention	7 (28)
Synthetic control	4 (16)
Untreated area	2 (8)
Type of law	
SYG	21 (84)
SYG and expanded castle doctrine laws	3 (12)
Castle doctrine laws	1 (4)
Geographic unit of analysis	
State	22 (88)
County	2 (8)
City	1 (4)
Intervention unit[b]	
Subset of "treated" units	17 (68)
Single unit[c]	10 (40)
Analytic method	
Fixed-effects model	11 (44)
Mixed-effects model	2 (8)
Segmented regression	4 (16)
ARIMA	4 (16)
Synthetic control analysis[d]	1 (4)
Between-group comparison only	2 (8)
Frequency of data intervals[b]	
Annual	16 (64)
Monthly	8 (32)

Continued

TABLE 1— Continued

Characteristic	No. (%)
Quarterly	1 (4)
Daily	1 (4)
Any covariates	
No	1 (4)
Yes	24 (96)
Time-varying covariates	16 (67)
Only seasonal or secular trends	8 (33)
Sensitivity or falsification analysis	
No	8 (32)
Yes[b]	17 (68)
Robustness to model specification	7 (41)
Negative control	6 (35)
Control series	6 (35)
Variation in laws of interest[e]	4 (24)
Subgroup or equity analysis	
No	19 (76)
Yes[b]	6 (24)
Race	4 (67)
Location	2 (33)
Age	1 (17)
Gender	1 (17)
Race*location	1 (17)
Race*gender	1 (17)

Note. ARIMA = autoregressive integrated moving average model; SYG = stand your ground. The sample size was 25 studies.

[a]We defined interrupted time series studies as those that estimated the underlying time trends in the outcome (based on preintervention trends) as part of the counterfactual (e.g., using segmented regression), distinguished from studies that compared pre- versus postimplementation outcome means or only analyzed variation within time or geographic units (as in difference-in-difference designs or fixed effects analyses of panel data).[46]

[b]Does not add to 100% as at least 1 study analyzed multiple categories.

[c]Single states included Florida (n = 5), Alabama (n = 1), Arizona (n = 2), Georgia (n = 1), Indiana (n = 1), Kansas (n = 1), Kentucky (n = 1), Louisiana (n = 1), Michigan (n = 1), Mississippi (n = 1), Oklahoma (n = 2), South Carolina (n = 2), South Dakota (n = 1), and Texas (n = 2).

[d]Comparison of pre– and post–mean square prediction error ratios for the observed outcome of a unit and its synthetic control for all treated and untreated units.

[e]Four studies accounted for variations in state laws that expanded civilian rights to use deadly force. Two studies included dummy control variables in sensitivity analyses representing the inclusion of different legal provisions (i.e., duty to retreat anywhere one may legally be, requirement of imminent fear of bodily harm, removal of civil liability, or presumption of reasonable fear).[34,37] A third study ran sensitivity analyses with different formulations of the intervention variable (i.e., restricted to laws that removed the duty to retreat anywhere one may legally be; restricting to laws that removed civil liability) or that compared different formulations or circumstances of the laws (i.e., expanded castle doctrine laws in states that previously required duty to retreat versus those that did not; expanded castle doctrine laws that include a presumption of reasonable fear versus those that do not).[17] The fourth study adopted a "multiple case study approach" to estimate state-specific effects of SYG laws.[22]

laws between 2006 and 2011. Differences in state classifications were often attributable to variations in study time frames (including whether different states had adopted SYG laws within the study's time frame) and whether authors analyzed only SYG laws or additionally expanded castle doctrine laws. Only 2 studies defined states that adopted SYG in practice (by case law) as treated: Illinois[21] and Oregon.[32] See Appendix Box B, for further discussion.

All studies were at serious or critical risk of bias attributable to confounding, by virtue of being nonrandomized and at risk for influence from simultaneously occurring events (Appendix Table E). Confounding ratings were affected by the likely extent of uncontrolled systematic differences between the intervention and comparator groups, adjusting for postintervention variables that could have been affected by the intervention (e.g., violent crime) and evidence of differences or no information on preintervention trends among intervention and control units. Risk of bias was rated as mostly low across most other domains (i.e., selection, missing data, outcome, and reporting biases). Appendix Table E presents the ratings for each study and Appendix Box C provides further discussion.

Main Effects

Forty outcomes—spanning deaths, injury, crime, unemployment, criminal justice, and firearm demand—were analyzed across the 25 main effect studies (Appendix Table F). The most common outcomes were firearm (n = 9 studies) and total homicides (n = 9). Sixteen outcomes were analyzed as negative controls (i.e., an outcome not hypothesized to change because of the intervention) in at least 1 study.

All study results are presented in the Appendix Tables G and H. We focus here on outcome categories with combinable estimates (i.e., transformable to the standardized metric) from at least 2 studies. Figure 1 shows the percent change in outcome before and

after the intervention for US-wide and Florida-specific studies. Panel A shows that, overall, expanding rights and protections for the use of deadly force in self-defense outside the home had an average null to small positive association with firearm homicide, total homicide, robberies, and aggravated assaults across the United States. A third noncombinable study on aggravated assaults found a negative but variable association with SYG[26]; as the authors noted, these results were not robust to different analyses and were unreliable given their placebo test (traffic fatalities) was also negative. Three studies analyzed nonfirearm homicide, 2 of which were combinable. Overall, associations were null; 1 study found a small, negative average association with nonfirearm homicides[31] (consistently conceptualized as a negative control[18,31,35]). Two combinable studies showed positive but variable associations between expanding self-defense laws and justifiable homicide rates across the United States,[17,37] in line with noncombinable US-[25] and Florida-based[24] evidence. A fifth study showed that homicides were more likely to be ruled justifiable in SYG versus non-SYG states.[30]

Three US-wide studies considered legal variations in expansions of state self-defense laws governing civilian use of lethal force.[17,34,37] All ran analyses accounting for different variants in these laws (e.g., removal of civil liability) and found consistent estimates of the impacts of expanding no duty to retreat outside the home. One study also compared results for states that previously required the duty to retreat and those that did not: the former showed greater increases in homicide rates than the latter after the implementation of expanded castle doctrine laws.[17]

Panel B (Figure 1) demonstrates robust positive associations between SYG in Florida and state firearm (+32% to +45%) and total homicide rates (+24% to +27%). In contrast, firearm suicide (conceptualized as a negative control) showed null or highly variable associations with SYG in 2 Florida-based studies.[19,23] The 2 studies with other state-specific estimates of impacts on homicide rates besides Florida were not conclusive,[15,22] apart from finding strong evidence of increased homicides in Michigan following implementation.[22]

Two studies investigated intermediary variables between laws expanding the right to use deadly force outside the home and violent outcomes—in other words, variables that may be on the causal pathway. These intermediary variables included firearm acquisition or demand and firearm ownership, each of which was measured with a proxy variable. Both studies used federal background checks to approximate firearm acquisition or demand and found that these increased on average across states after implementation.[28,34] One of the studies used the proportion of suicides attributable to firearms to approximate firearm ownership and found that this decreased following implementation.[34]

Equity Effects

Subgroup comparisons from main effect studies. Table 2 shows the subgroup comparisons from the main effect studies. Apart from 1 exception noted subsequently, no main effect study ran interaction analyses, which limits inferences. The results shown in Table 2 are, therefore, estimates of the impacts of expanding the right to use deadly force among each subgroup. SYG was associated with greater firearm and total homicide rate increases across more- versus less-urbanized counties in Florida.[33] Barring a few exceptions, SYG associations with homicide- and firearm-related outcomes tended to be positive among all race groups when intersected by gender or jurisdiction. McClellan and Tekin conducted an interaction analysis (the only study to do so for any outcome) for firearm homicides across the United States, finding consistent associations for all race and gender groups, with postimplementation increases greatest among White males (i.e., homicides in which White males were the victims).[37] For justifiable homicides, McClellan and Tekin also found stronger associations among White males in stratified analyses,[37] whereas Spanbauer, using longer and more frequent data, found stronger associations for cases of Blacks killing Blacks in urban areas.[32] Florida's SYG was associated with increases in firearm homicides for both Black and White people; among adolescents (ages 15–19 years), SYG was associated with greater increases for Black versus White people[19] whereas among adults (age ≥ 20 years), the opposite pattern was observed.[23]

Supplementary studies of the outcomes of stand-your-ground cases in Florida. As discussed previously, 7 supplementary studies only analyzed the characteristics or outcomes of cases (fatal or nonfatal) involving a SYG defense (herein referred to as SYG cases) in Florida—these analyses provide further insight into potential inequities in the application of SYG laws. Appendix Tables J and K detail study characteristics and results, respectively. Figure 2 summarizes the associations between PROGRESS-plus characteristics and conviction rulings: studies analyzed the associations between the odds of a case ending in

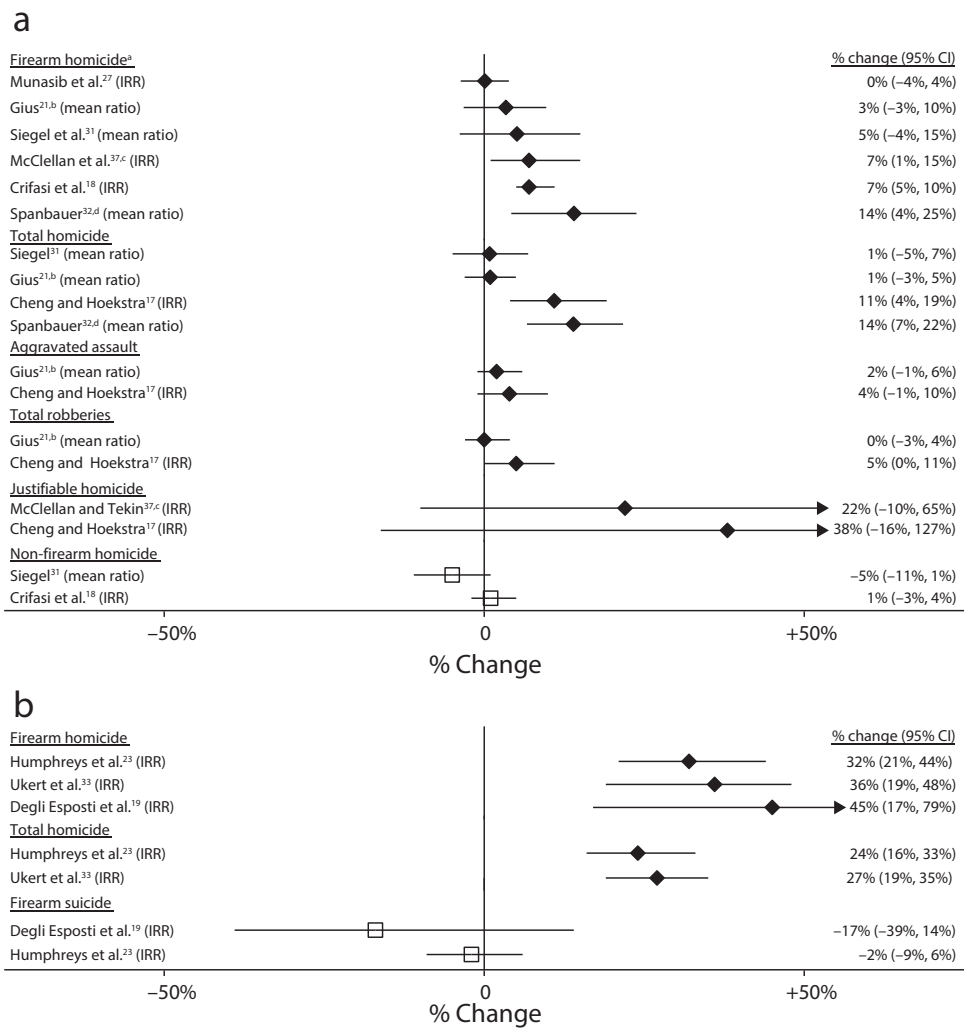

FIGURE 1— Graphical Synthesis Showing Percent Change in Violent Outcomes of Laws Expanding the Right to Use Deadly Force in Self-Defense Outside the Home in (a) United States–Wide Studies and (b) Florida-Specific Studies: 2013–2020

Note. CI = confidence interval; IRR = incidence rate ratio. We multiplied exponentiated coefficients by 100 and subtracted 1 to determine percent change. The type of estimate from which the percent change in outcome was derived is provided in parentheses. Black diamonds indicate associations estimated as intervention effects; white squares indicate associations estimated as a negative control. We excluded Lott[6] from our synthesis as this study analyzed a heterogeneous exposure compared with all other studies (mainly the implementation of castle doctrine laws up until 2005, before most stand-your-ground statutes were implemented). Results are presented in the Appendix Tables G and H (available as a supplement to this article at http://www.ajph.org). Updates to these analyses with data until 2012 were not extractable[47]; however, a later editorial suggests results were close to the null (–1.5%).[48]

[a]Including studies that analyzed gun deaths excluding suicide.

[b]The most conservative estimates are included for Gius.[21] The most liberal estimates are provided in the Appendix Table G—results were consistent, with liberal estimates suggesting null to small positive effects.

[c]There are 3 iterations of these analyses (2 working papers[49,50] and 1 peer-reviewed publication[37]). We included the latter in this review as the most up-to-date analysis.

[d]Study used inverse hyperbolic sine rather than log transformation.[32]

conviction and characteristics of the person claiming self-defense (i.e., the claimant) or the person injured or killed (i.e., the victim). Victim and claimant race as well as claimant gender were most commonly analyzed (n = 5 studies). SYG cases that involved racial minority victims ended in conviction less often than those with White victims, regardless of sample size and whether studies adjusted for other case characteristics (e.g., claimant race).

In addition, Roman[30] found that the proportion of homicides ruled justifiable was higher for all possible race pairs of victims and claimants in SYG versus non-SYG states in unadjusted comparisons. The study also showed similar patterns

TABLE 2— Results From the 6 Main Effect Studies on the Effects of Laws Expanding Civilian Rights to Use Deadly Force in Self-Defense With PROGRESS-Plus Subgroup Analyses: 2010–2019

Author (Year), Characteristic	Location	Firearm Homicide, IRR (95% CI)	Total Homicide, IRR (95% CI)	Justifiable Homicide, IRR (95% CI)	Nonjustifiable Homicide, IRR (95% CI)	Firearm-Related Injuries, IRR (95% CI)
Race/ethnicity						
Humphreys et al.[23]	Florida					
White		1.5 (1.3, 1.6)	1.3 (1.2, 1.4)			
Black		1.2 (1.1, 1.4)	1.2 (1.1, 1.3)			
Degli Esposti et al.[19,a]	Florida					
White and other races		1.3 (0.9, 1.9)				
Black		1.5 (1.2, 3.0)				
Age, y						
Humphreys et al.[23]	Florida					
20–34		1.4 (1.2, 1.5)	1.3 (1.2, 1.5)			
≥35		1.2 (1.0, 1.4)	1.1 (1.0, 1.3)			
Gender						
Humphreys et al. (2017a)[23]	Florida					
Male			1.3 (1.2, 1.4)			
Female			1.1 (1.0, 1.3)			
Race*gender						
McClellan and Tekin[37,b]	United States					
White males		1.3 (1.1, 1.4)		2.7 (1.7, 4.1)	1.2 (1.0, 1.4)	1.8 (1.2, 2.7)
White females		1.1 (1.0, 1.4)			1.1 (0.9, 1.3)	1.3 (0.6, 2.9)
Black males		1.0 (0.8, 1.2)		0.7 (0.4, 1.3)	1.0 (0.9, 1.2)	0.8 (0.3, 2.2)
Black females		1.0 (0.8, 1.1)			1.0 (0.9, 1.2)	1.2 (0.3, 4.6)
McClellan and Tekin[37,b]	Florida					
White males						1.2 (1.1, 1.3)
White females						0.8 (0.4, 1.7)
Black males						1.0 (0.6, 1.5)
Black females						1.8 (1.8, 1.8)
Race*location						
Spanbauer,[32,c] in urban areas	United States					
Blacks killing Blacks				1.2 (1.1, 1.3)		
Whites killing Blacks				1.1 (1.0, 1.1)		
Blacks killing Whites				1.0 (1.0, 1.0)		
Whites killing Whites				1.0 (1.0, 1.1)		
Spanbauer,[32,c] in rural areas	United States					
Blacks killing Blacks				1.1 (1.0, 1.4)		
Whites killing Blacks				1.0 (1.0, 1.1)		
Blacks killing Whites				1.0 (1.0, 1.0)		
Whites killing Whites				1.0 (1.0, 1.1)		
County-level unemployment						
Ukert et al.[33]	Florida					
Quartile 1 (lowest)		1.3 (1.2, 1.4)	1.3 (1.2, 1.4)			
Quartile 2		1.5 (1.2, 1.8)	1.4 (1.1, 1.6)			

Continued

TABLE 2— Continued

Author (Year), Characteristic	Location	Firearm Homicide, IRR (95% CI)	Total Homicide, IRR (95% CI)	Justifiable Homicide, IRR (95% CI)	Nonjustifiable Homicide, IRR (95% CI)	Firearm-Related Injuries, IRR (95% CI)
Quartile 3		1.3 (1.1, 1.6)	1.2 (1.0, 1.3)			
Quartile 4 (highest)		1.3 (1.1, 1.5)	1.4 (1.3, 1.6)			
Location						
Munasib et al.[27]	United States					
Central cities		1.0 (1.0, 1.1)				
Suburbs		1.0 (1.0, 1.1)				
Smaller urban areas		1.0 (1.0, 1.1)				
Rural areas		1.1 (1.0, 1.2)				
Ukert et al.[33]	Florida					
Large metro		1.4 (1.2, 1.6)	1.3 (1.1, 1.5)			
Large fringe metro		1.5 (1.3, 1.8)	1.4 (1.2, 1.6)			
Medium metro		1.2 (0.9, 1.5)	1.2 (1.0, 1.4)			
Small metro		1.5 (0.9, 2.0)	1.3 (1.0, 1.7)			
Micro		1.2 (0.7, 1.8)	1.4 (0.8, 2.1)			
Noncore		0.9 (0.5, 1.3)	1.0 (0.7, 1.4)			

Note. CI = confidence interval; IRR = incidence rate ratio; PROGRESS-Plus = place of residence; race/ethnicity, culture, and language; occupation; gender or sex; religion; education; socioeconomic status; social capital; personal characteristics associated with discrimination (e.g., age); relationship features; and time-dependent relationships. In addition to the results shown here, subgroup differences were also analyzed for 3 outcomes hypothesized as negative controls (firearm suicide, total suicide, and property crime). The full table of results is included in the Appendix Table I (available as a supplement to this article at http://www.ajph.org). All coefficients are incidence rate ratios unless otherwise noted. We only present analyses for which comparisons were made between at least 2 subgroups (i.e., excluding analyses of 1 subgroup only, such as White people). We provide the highest-order interaction results from Spanbauer[32] and McClellan and Tekin[37] as these provided the greatest detail on subgroup differences. Subgroup differences in outcomes that were only ever investigated as negative controls in the included studies are not summarized here.

[a]In contrast to the other included studies, Degli Esposti et al. focused on homicides among adolescents (aged 15–19 years).[19]
[b]There are 3 iterations of these analyses (2 working papers[49,50] and 1 peer-reviewed publication[37]). We include the latter in this review as the most up-to-date analysis.
[c]Results are mean ratios.

in White-on-Black homicides being ruled justifiable more often and Black-on-White homicides being ruled justifiable less often than White-on-White homicides in adjusted analyses. Roman did not run interaction analyses to determine if these differences were exacerbated by SYG laws.

Most other characteristics showed null associations with conviction outcomes across studies. Murphy also conducted adjusted interaction analyses between victim and claimant race and gender.[42] Cases in which the victim was White (vs a racial minority) had lower odds of ending in conviction when the claimant was White or the victim was male (vs female). In a separate interaction model, Murphy further found that cases involving domestic (vs nondomestic) violence had lower odds of resulting in conviction when the claimant was male (vs female). The only study to consider nonconviction outcomes, Isijola found that racial (Black vs non-Black) and age (< 25 vs ≥ 25) concordance between victim and claimant in Florida SYG cases were unrelated to the claimant initiating aggression, proportionality of force, or ability to avoid conflict.[40] Lack of clarity on initial aggressor and ability to avoid conflict were more common in cases where both victim and claimant were Black. The study also analyzed cases involving young Black males, but cell counts were too low (< 5) to be reliable.

DISCUSSION

All available evidence evaluating the quantitative impacts of laws altering civilian rights to use deadly force in self-defense is from the United States, focused primarily on SYG laws. The weight of this evidence suggests that expanding civilian rights to use deadly force in self-defense outside the home is associated with, at most, modest

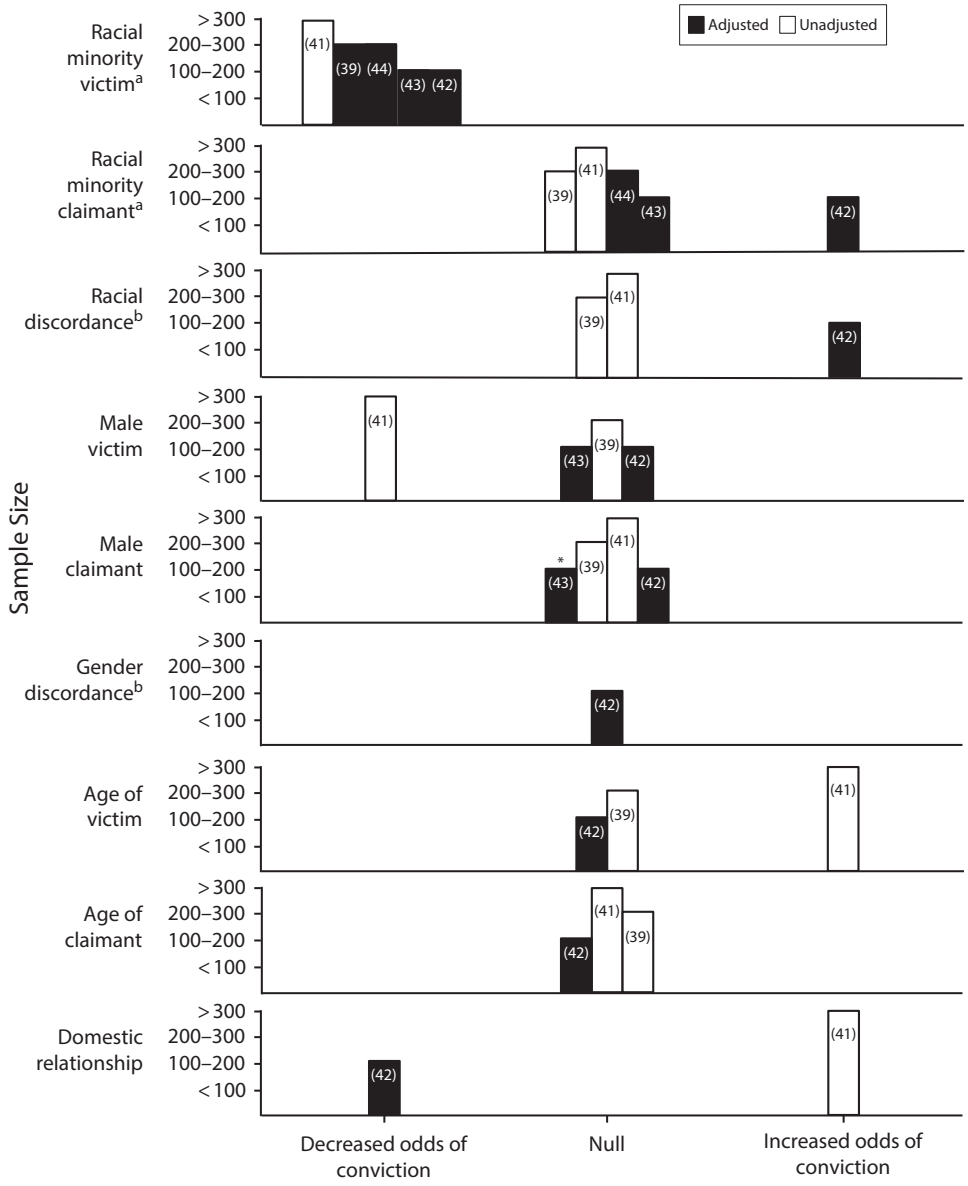

FIGURE 2— Harvest Plots of the Association Between PROGRESS-Plus Characteristics and the Odds of Conviction in Stand-Your-Ground Cases in Florida After Implementation (n = 5 Studies): 2014–2018

Note. PROGRESS-Plus = place of residence; race/ethnicity, culture, and language; occupation; gender or sex; religion; education; socioeconomic status; social capital; personal characteristics associated with discrimination (e.g., age); relationship features; and time-dependent relationships. Each bar represents a study (number = reference number); the position of the bar on the plot indicates whether the characteristic had a negative, null, or positive association with odds of conviction. Null associations were defined as small or variable estimates centered around the point of no effect; positive (increased odds of conviction) or negative (decreased odds of conviction) associations were large or consistent estimates in the positive or negative direction, respectively. Numerical results are provided in the Appendix Table K (available as a supplement to this article at http://www.ajph.org).

[a]Lott also studied victim and claimant race/ethnicity and found that conviction was negatively associated with cases involving Hispanic victims and positively associated, but with extreme variability (SE > 20 000 000 000), with cases involving White or Hispanic claimants.[45] We have not plotted these findings because Lott analyzed dummy variables for all available race/ethnicity categories (White, Black, Hispanic) in the same model (a likely contributor to the model's instability); therefore, the referent for these associations is unclear and the model is unreliable. In addition, McCormick conducted 3 iterations of analyses[41,51,52]; we included only the version with association estimates as per our eligibility criteria.[41]

[b]Discordance refers to discordance between race or gender of victim and claimant (e.g., White victim and racial minority claimant = racially discordant).

*Large point estimate but highly variable association.

increases, on average, in the rates of violent crime (including total and firearm homicide, aggravated assault, and robbery) across the United States. The existing evidence is inconsistent with hypotheses that these laws have an average deterrent effect or lead to large increases (> 25%) in violent crime on average. However, findings across states

were heterogeneous, and Florida-specific evidence demonstrated robust increases (24%–45%) in firearm and total homicide rates following the enactment of its SYG law[19,23,33]—highlighting the need for further studies that account for implementation differences across states.

Four studies accounted for variations in changes to state self-defense laws,[17,22,34,37] 3 of which computed an average (across states) intervention effect.[17,34,37] These 3 studies adjusted for different legal provisions (e.g., removing civil liability) and found that their primary results persisted. There was preliminary evidence that states that previously had a duty to retreat experienced larger increases in homicide rates following expansions to civilian rights to use deadly force outside the home.[17,22] This could, in theory, serve to explain the larger effects observed for Florida, along with its expansive media coverage, partly attributable to Florida being the first state to adopt the "model" SYG law.[3] Nonetheless, the largest estimate of the average intervention effect on homicides (14%) came from a study that excluded Florida, suggesting that the inclusion or exclusion of Florida did not drive the variation observed across study estimates.[32]

Further studies are needed on between- (and within-) state variation and potential explanations (e.g., varying laws, implementation, media coverage, legislative, and societal contexts) as well as the impacts of statistical decisions (e.g., model specifications, time periods covered, and temporal resolution). The common approach to handling interstate variation was to model 2-way fixed effects or conduct state-specific analyses. Alternative methods to explore state-specific deviations from the average effect would be to include a meta-analysis of state-specific effects[20] or the Bacon decomposition for 2-way fixed effects in the presence of varying treatment timing.[53] Authors also differed in their definitions of SYG or expanded castle doctrine laws and tended to focus only on statutory rather than case law. This raises the potential for different impact models (including mechanisms and timing of effects), which future research should investigate by including all states with SYG in practice—perhaps particularly for criminal justice outcomes, discussed later in this section.

Only one quarter of studies considered subgroup differences.[19,23,27,32,33,37] This is notable given concerns that expanding civilian rights to use deadly force outside the home will exacerbate social inequities in violent victimization—particularly for Black people, as the expansion of these rights adds to the history and ongoing context of racism (e.g., via racialized perceptions of threat, stereotypes of criminality, and the increased likelihood of excessive force).[54,55] Comparisons by race showed mixed findings, which are difficult to draw conclusions from without interaction analyses. In Florida, firearm homicide rates increased more dramatically among Black adolescents compared with White adolescents after the implementation of SYG,[19] whereas the reverse pattern was observed among adults.[23] Across states, the associations between expanding self-defense laws and firearm and justifiable homicide rates tended to be small and positive across victim race.[32,37]

Studies examining Florida self-defense cases involving SYG claims help contextualize these findings. Cases ended in conviction (i.e., were not ruled justifiable) more often when the victim was White[39,41–44]—especially when the claimant was a racial minority.[42] These racial inequities were not explained by case characteristics (e.g., victim being armed)[41–44] or dimensions of SYG (e.g., proportionality of force).[40] This initial evidence suggests that there are not dramatic differences in increases in homicide rates among Black versus White people following SYG and expanded castle doctrine laws. However, at least in Florida, there appears to be racial bias in the criminal justice process in rulings on SYG cases.[39,42] This means that even if SYG has increased legal protections for those claiming self-defense, there remains racial bias in the application of these protections that was not explained away by other case characteristics. To draw implications beyond Florida, racial inequities in the outcomes of self-defense claims before and after the implementation of SYG relative to non-SYG states must be analyzed accounting for case characteristics. It is possible that self-defense cases have similar outcome distributions by race in SYG versus non-SYG states but that levels are higher in SYG states (given more self-defense claims).[30] Barriers to such an analysis include the inconsistent reporting of justifiable homicide across states, discussed further in this section.

There has been even less consideration of gender in eligible evaluations, and only 2 included studies examined intersections of race and gender. Scholars have long noted the gendered notions of self-defense underlying castle doctrine laws (i.e., the "true man" empowered to use lethal force in self-defense where he has the legal right to be)[56]—in contrast, for instance, with the battered women syndrome defense, which requires expert testimony to evidence abused women's psychological condition of learned helplessness.[57] Extending the tradition

of castle doctrine, most SYG statutes do not mention domestic violence, and those that do typically only remove the duty to retreat if there is an active protection order.[51] The initial findings of this review and available descriptive evidence[58] demonstrate the importance of further research that examines the outcomes of SYG cases by gender and race across states, with attention to different forms of domestic violence and variations in case characteristics and state laws.

As expected with nonrandomized studies, all studies were rated as having critical or serious risk of bias attributable to confounding.[11] However, reflecting their (overall) high methodological quality for nonrandomized studies, most studies were low-to-moderate risk on most domains of bias. A common problem across studies was not adjusting for time-varying covariates or adjusting for postimplementation variables likely on the causal pathway (e.g., violent crime). Future evaluations of self-defense laws should map hypothesized pathways to impacts (e.g., using directed acyclic graphs) to a priori determine covariates and impact models.[59] Few studies evaluated mechanisms through which these laws may work. Gun ownership and demand have been hypothesized to increase after expanding rights to use deadly force in self-defense outside the home, yet only 2 studies examined this, with mixed findings depending on the outcome.[28,34] Proponents argue that SYG laws empower civilians who need to defend themselves; yet measuring legitimate self-defense is notoriously difficult.[4] The existing studies analyzed justifiable homicides as a proxy. This limits conclusions because self-defense laws change the definition of justifiable homicides, and these data are inconsistently reported across states—in addition to the social disparities in judicial rulings. Future research should triangulate analyses with other available data (e.g., the National Crime Victimization Survey).

Strengths and Limitations

We only synthesized quantitative evaluations—qualitative studies offer important insight of experiences of self-defense laws, which we will consider in future research (see protocol, https://osf.io/uz68e). To create a succinct summary, wherever possible, we focused on a single intervention–outcome effect estimate from each study based on predefined criteria and evaluated risk of bias for the most at-risk outcome. Our risk of bias assessments are thus conservative, and synthesized estimates are not always those highlighted by study authors. In doing so, we maximized consistency among study results and used the highest quality estimates. We focused on outcomes for which there were at least 2 studies to synthesize (all study results are in the Appendix Tables G and H).

Our review placed no restrictions on location—we sought to include all international evidence meeting our inclusion criteria. We only searched in English and our search terms were influenced by the US context (e.g., including SYG), which may mean that we missed relevant studies globally. However, to our knowledge, this review produced the most comprehensive synthesis of the quantitative evidence on the impacts of expanding civilian rights to use deadly force in self-defense in the United States to date.[2,4,7,60] We searched for and included gray literature, which minimizes publication bias. Although all evidence was US-based, our findings may have implications for future reforms to self-defense laws governing civilian use of deadly force internationally and underscore the need for robust and diverse scientific evidence to guide policy decisions.

Conclusions

Self-defense laws have rapidly changed in the United States with the introduction of SYG laws in the past 15 years. Expanding civilian rights to use deadly force in self-defense outside the home has been associated with modest increases in violent crime rates on average across the United States but robust increases in some states, most notably Florida. There are racial inequities in the application of SYG laws to self-defense cases, at least in Florida, with cases involving racial minority victims ruled justifiable more often, accounting for case characteristics like firearm use. Further evaluations are needed on differences in violence, injury, and criminal justice outcomes by state and legal variant, the mechanisms of impacts, and social inequities associated with altering civilian rights to use deadly force, across the United States and internationally. Our findings demonstrate the importance of using scientific evidence on both population and equity impacts of self-defense laws to guide legislative action that promotes public health and safety for all. AJPH

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CONTRIBUTORS

All authors contributed to the conceptualization and design of this study. D. K. Humphreys originated the study idea and secured funding for the project. A. R. Yakubovich and D. K. Humphreys oversaw all steps of the study process. A. R. Yakubovich and B. C. L. Lange conducted all searches. A. R. Yakubovich, M. Degli Esposti, B. C. L. Lange, G. J. Melendez-Torres, A. Parmar, and D. K. Humphreys screened studies. A. R. Yakubovich, M. Degli Esposti, and B. C. L. Lange extracted data from included studies. A. R. Yakubovich and M. Degli Esposti conducted the risk of bias assessment. A. R. Yakubovich conducted the study syntheses, created all tables and figures, and drafted the appendices. A. R. Yakubovich led and D. K. Humphreys contributed to the writing of the first draft of the article. All authors revised the article critically for important intellectual content and approved the final version.

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CONFLICTS OF INTEREST

M. Degli Esposti, D. K. Humphreys, and D. J. Wiebe were authors on three of the primary studies analyzed as part of this review.

HUMAN PARTICIPANT PROTECTION

Human participant protection is not applicable because this is a systematic review.

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Health Care Waste and Climate Change

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The *AJPH* issue on wasteful medical care spending is excellent.[1] Many sound reasons to root out waste are cited: the vast expenses we can ill afford, the avoidable suffering inflicted on patients, the opportunity costs of misallocated dollars, the rot of fraud and abuse. But an additional key reason to deplore wasteful medical care goes largely unremarked: climate change.

Health care accounts for nearly 18% of the US economy and nearly 8% of the nation's greenhouse gas emissions.[2] Some of these emissions derive from energy use, some from transportation, some from practices such as using climate-active anesthetic gases, some from the embedded carbon in the extensive supply chain. Delivering health care is material and energy intensive. Of the identified sources of waste in health care,[3] roughly 60% relate directly to the delivery of health care services (as opposed to administrative waste, excessive pricing, and fraud). Just as pervasive waste in the food system accounts for a large portion of that sector's climate change contributions,[4] pervasive waste in health care delivery accounts for a substantial portion of the health care carbon footprint.

At a time when we need rapid decarbonization of the economy, including in the health system,[5] reducing wasteful health care is an essential climate change mitigation strategy—and therefore a health strategy. AJPH

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CONFLICTS OF INTEREST

H. Frumkin reports no conflicts of interest.

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Teutsch et al. Respond

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Although our articles focused primarily on financial costs, waste in the medical care system takes an enormous toll in other ways and exacerbates health-related inequalities.[1,2] Howard Frumkin correctly points out that there are direct consequences of medical care on our environment, and particularly the most cataclysmic public health issue of our time: climate change. The data he relates are impressive and part of medical care waste's substantial nonfinancial costs and is another example of medical care causing harm.[3] As "anchor institutions," health care organizations have responsibility to their communities to address this often-hidden waste. There are practical steps they can take, such as strategies to reduce greenhouse emissions from laparoscopic surgery,[4] emerging guides for "climate-smart" emergency departments,[5] and "environmentally sustainable" head and neck cancer practices.[6]

In medical care, individuals suffer from needless clinical procedures and their consequences, waste time dealing with needlessly complex administrative issues, risk bankruptcy from high costs they can ill afford, and must protect themselves from fraud and abuse. The administrative burden of the medical care system is staggering. Wasted medical costs mean businesses are disadvantaged in international commerce and employees pay is commensurately reduced. Meanwhile the nation fails to ensure the availability of high-quality education, housing, and other social supports for everyone. To this long list, we applaud Frumkin's addition—the wastefulness of the carbon footprint of medical care delivery and other environmental impacts. The appropriate societal valuation of the health benefits of individuals' medical care against its accompanying climate impacts is worthy of additional ethical and empirical consideration. But in cases in which medical care services have no health value (i.e., waste), the calculus becomes more apparent. We agree that this should contribute to an increased sense of urgency and action on medical care system waste.

Unraveling medical care waste will be a heavy lift, but without action the heavy opportunity cost in inadequate socioeconomic supports and protections for the environment—major contributors to the nation's health and well-being—will continue. AJPH

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The Health Impacts of COVID-19–Related Racial Discrimination of Asian Americans Extend Into the Workplace

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The article, "Potential Impact of COVID-19–Related Racial Discrimination on the Health of Asian Americans" by Chen et al. provides critical context of the history of racism toward Asian Americans and underscores the impending health impacts of COVID-19–related discrimination on Asian Americans.[1] The treatment of Asian Americans as a monolith and the erasure of our experiences, issues, and needs cannot continue to be accepted. In their article, Chen et al. call for public health professionals and clinicians to heighten their awareness of historical and current anti-Asian bias as this global pandemic rages on.[1] With this letter to the editor, I hope to appeal to those of us who specifically work in occupational safety and health and industrial hygiene. The COVID-19–related racial discrimination of Asian Americans extends into and is exacerbated in the workplace. As practitioners and researchers, we must pay attention to this.

There is no question that Asian-owned businesses have suffered,[1] but Asian Americans in the workforce have also been affected by COVID-19. Although Asian Americans are only approximately 6% of the US population and labor market,[1] they represent large sectors of the workforce that are on the frontlines of the COVID-19 battle. For example, although Filipino Americans account for only 1.0% to 1.5% of the total US population,[2] they represent at least 28% of registered nurses and 30% of COVID-19 registered nurses' deaths.[3] The simultaneous indifference and racism toward our community leads to a mentality of Asian Americans in the workplace as invisible and disposable. Asian Americans are perceived as essential, quiet, and hardworking but expendable.

These types of circumstances compounded with the discriminatory treatment and workplace microaggressions that Asian Americans frequently experience[2,4,5] can result in negative psychosocial work factors that affect not only the organization's health but also the individual health of Asian American employees. Discrimination in the workplace has been noted to lead to job strain, decreased job satisfaction, and turnover intention coupled with physiological deterioration.[6,7]

Chen et al. urged that more data be collected on Asian Americans, and this is especially needed in occupational safety and health. As the fastest growing racial/ethnic group in the United States, this means our workforce presence is also increasing and we cannot continue to be an overlooked population that suffers in silence. AJPH

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A. B. Le does not have any conflicts of interest to declare.

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EDITOR'S NOTE

No response forthcoming.

Sexual Orientation Change Efforts, Adverse Childhood Experiences, and Suicidality

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We write to express just three of many concerns regarding the article by Blosnich et al.,[1] who appear to have drawn unwarranted conclusions from highly inconclusive findings. First, the authors used only the total sum of adverse childhood experiences (ACEs) in their regressions, but not all ACEs have the same effect on suicidality. The distribution of ACEs was very different in the sexual orientation change efforts (SOCE) group than among those not reporting SOCE, including greater exposure to parental violence and emotional, physical, and sexual abuse. These experiences interact to produce even stronger risks.[2] We believe that had the authors adjusted their models for differences in ACE distributions, it likely would have accounted for the difference in risk, conceivably even resulting in a lower suicide risk among the SOCE group.

Second, a plausible alternative hypothesis to putative causal effects of SOCE on suicidality is that those seeking treatment are a more distressed group at the outset of their clinical presentation. The attribution of increased suicidality to SOCE is quite speculative without a control for pre-SOCE suicidality, a non-SOCE treatment group, and a longitudinal design, features that are in very short supply in the SOCE literature.

Finally, the study was based on data from the Generations study, which sampled members of sexual minority groups who identified as LGBT (lesbian/gay/bisexual/transgender) and relied on a single-item measure of SOCE. This identity inclusion criterion likely excluded sexual minority group members who did not identify as LGBT and may have reported very different experiences,[3,4] perhaps including contemporary SOCE. The measure of SOCE in the Generations study is fraught with validity concerns (e.g., it is nonspecific regarding "treatment," "tried to change," and "try to make") and hence impossible to interpret definitively. Such "treatments" could run the gamut from harmful aversive practices to generic prayers for healing or discussions of religious moral teaching. We cannot know what participants envisioned, and thus the authors can have no real understanding of the source of their findings.

Our interest is not to defend genuinely unethical practices but, rather, to promote scientific integrity in a domain of research that is subject to immense professional and political pressure to support specific legislative and policy aims.[5] In our view, the Blosnich et al. study, as with most research in this literature, offers conclusions in support of expansive and imprecisely defined SOCE bans that run ahead of what methodological limitations allow. AJPH

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C. H. Rosik was the primary author of the letter. D. P. Sullins provided methodological critiques and assisted with reviewing and revising drafts of the letter. W. R. Schumm and A. Van Mol assisted with reviewing and revising drafts of the letter.

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Blosnich et al. Respond

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Rosik et al. offer three critiques of our research. The first concerns our method of adjusting for adverse childhood experiences (ACEs). In fact, we used the measure and its control in a standard way.[1,2] Even the research provided by Rosik et al. demonstrates that all ACE factors were similarly positively associated with suicide attempts,[3] suggesting that using separate ACE factors would not have changed our conclusions.

The second critique suggests a reversed-causality interpretation, speculating that those in the sexual orientation change efforts (SOCE) group may have been more distressed than their counterparts at the outset. We see it as less plausible than our interpretation of the data, but it does not contradict our conclusion in that people who experienced SOCE, purportedly a curative treatment, had a greater prevalence of suicidal behavior than their counterparts.

Their third critique focuses on sampling bias, which we had already acknowledged. Although we cannot draw conclusions about people not included in our sampling frame, it is noteworthy that people identifying as "mostly heterosexual" or as heterosexuals who have same-sex attractions or behaviors report stress and depression at levels similar to those among members of sexual minority groups.[4]

Rosik et al., invoking scientific rigor, suggest that we cannot truly know whether SOCE are harmful unless the scientific design is akin to the gold standard of a randomized controlled clinical trial. But such a trial would be unethical and is impossible to conduct. In lieu of a clinical trial, our approach is scientifically rigorous. There have been considerable strides in public health with respect to making causal inferences from observational studies,[5] which are especially fitting when, as here, clinical trials of SOCE are not feasible owing to ethical concerns.

Considering Rosik and colleagues' critiques, we conclude that these critiques do not seriously threaten the validity of our conclusions. AJPH

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C. H. Rosik was the primary author of the letter. D. P. Sullins provided methodological critiques and assisted with reviewing and revising drafts of the letter. W. R. Schumm and A. Van Mol assisted with reviewing and revising drafts of the letter.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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Blosnich et al. Respond

John R. Blosnich, PhD, MPH, Ilan H. Meyer, PhD, Jeremy T. Goldbach, PhD, MSSW, Emmett R. Henderson, MPH, and Robert W. S. Coulter, PhD, MPH

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Rosik et al. offer three critiques of our research. The first concerns our method of adjusting for adverse childhood experiences (ACEs). In fact, we used the measure and its control in a standard way.[1,2] Even the research provided by Rosik et al. demonstrates that all ACE factors were similarly positively associated with suicide attempts,[3] suggesting that using separate ACE factors would not have changed our conclusions.

The second critique suggests a reversed-causality interpretation, speculating that those in the sexual orientation change efforts (SOCE) group may have been more distressed than their counterparts at the outset. We see it as less plausible than our interpretation of the data, but it does not contradict our conclusion in that people who experienced SOCE, purportedly a curative treatment, had a greater prevalence of suicidal behavior than their counterparts.

Their third critique focuses on sampling bias, which we had already acknowledged. Although we cannot draw conclusions about people not included in our sampling frame, it is noteworthy that people identifying as "mostly heterosexual" or as heterosexuals who have same-sex attractions or behaviors report stress and depression at levels similar to those among members of sexual minority groups.[4]

Rosik et al., invoking scientific rigor, suggest that we cannot truly know whether SOCE are harmful unless the scientific design is akin to the gold standard of a randomized controlled clinical trial. But such a trial would be unethical and is impossible to conduct. In lieu of a clinical trial, our approach is scientifically rigorous. There have been considerable strides in public health with respect to making causal inferences from observational studies,[5] which are especially fitting when, as here, clinical trials of SOCE are not feasible owing to ethical concerns.

Considering Rosik and colleagues' critiques, we conclude that these critiques do not seriously threaten the validity of our conclusions. AJPH

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Measurement Error in Body Mass Index May Affect Trajectory Modeling

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Wang et al. used group-based trajectory modeling to model body mass index trajectories and calculate the odds of incident hypertension over an average follow-up period of nine years within four distinct trajectory groups stratified by gender.[1] However, group-based trajectory modeling is only as good as the variables loaded into the models. Among adults, body fat increases and muscle mass decreases with age; among children, however, depending on gender, both fat and muscle can increase or fat can decrease as muscle mass increases throughout puberty.[2]

Considering the model of measurement error, there are likely to be large sources of error in terms of both bias and error related to participant variables (e.g., day-to-day variations in weight, miscalibrations of portable scales, and bias estimates regarding blood pressure if study staff have not been blinded to children's obesity status). Unknown intrarater and interrater variabilities in measurements of weight, height, and blood pressure can result in misclassification. These errors are likely to be correlated from year to year and result in greater bias. The spacing and frequency of nonstable measurements affect individual assignments despite consistent curve patterns, increasing the likelihood of misclassification.[3] Collecting measurements every six months would help attenuate seasonal changes in blood pressure and weight.

The authors recorded yearly measures, but it is unclear at what points throughout the year measurements were taken. Also, in terms of outcomes, reporting interim incident hypertension trends rather than a summary of the follow-up period and the final measurement from their Table 2 would have been more meaningful.

The authors claimed that their findings could be generalizable to children in other parts of China. However, as they pointed out, their study population tended to have lower body mass indexes than the remainder of the population.[4] Also, the discrepancy in modeling between the Wang et al. investigation and other studies suggests a lack of generalizability of their findings. Fan and Zhang, using data from the China Health and Nutrition Survey (a nationally representative sample of children who were 3 to 13 years old at baseline), reported odds of hypertension that were significantly higher than the estimates reported by Wang et al. within their medium-increase and heavy-increase groups.[5] Fan and Zhang also modeled four group trajectories but adjusted for some of the covariates missing in the Wang et al. study.[1,5] AJPH

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CONTRIBUTORS

J. Pollack drafted the letter. T.-Y. D. Cheng helped revise the letter.

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Wang et al. Respond

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We thank Pollack and Cheng for their interest in our work. First, we agree that there may have been some measurement errors and that those errors could have reduced the strength of the association estimates between higher trajectory groups and high blood pressure.[1] However, it is unlikely that they would have altered our conclusion that children with higher body mass index trajectories are at increased risk of high blood pressure during adolescence.

Second, the justification regarding the generalizability of our findings requires external data beyond the scope of a single study. Although Fan and Zhang used different groups than those included in our study,[2] their findings are consistent with ours: different childhood body mass index trajectories confer significantly different odds of elevated blood pressure, and, specifically, body mass index increases in childhood are significantly associated with an increased risk of high blood pressure later in life.

Finally, all of our analyses were conducted separately by gender, as there were disparities between the growth trajectories of male and female participants. We also adjusted for baseline age, baseline body mass index, baseline systolic blood pressure, and living area, which were the same variables adjusted for in Fan and Zhang's study. Follow-up duration was not adjusted because there were no significant differences between the four trajectory groups. AJPH

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CONTRIBUTORS

X. Wang completed the original version of this response, and Z. Wang helped revised the letter. B. Dong and J. Ma were co-investigators in and designers of the original study.

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Wang et al. Respond

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