Supplement to

American Journal of PUBLIC HEALTH

A PUBLICATION OF
AMERICAN PUBLIC HEALTH ASSOCIATION

Racial Disparities in Cancer Care | Access to Care for Transgender Veterans | Hepatitis C Among US Veterans | Battling Tobacco Use at Home | HEALTH EQUITY | 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

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COVER: A worker wearing protective masks and food processing clothing pushes a cart stacked with bowls at an Amy's Kitchen facility in Santa Rosa, California, on Wednesday, June 24, 2020. Organic food maker Amy's Kitchen had to reduce its offering to just 71 products, down from 228 before the COVID-19 pandemic, including their Amy's Roasted Vegetable Pizza because it could not be made while maintaining social distancing in its factories.
Cover concept and selection by Aleisha Kropf. Photographer: David Paul Morris, Bloomberg. Printed with permission.

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For science. For action. For health.

Promoting public health research, policy, practice, and education is the *AJPH* mission. As we widen our scope to embrace global issues, we also sharpen our focus to support the needs of public health practitioners. We invite contributions of original unpublished research, opinion and commentary, and letters to the editor.

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OTHER DEPARTMENTS

Was Your Copy of *AJPH* Late?

Did you have to wait for your copy of *AJPH*? If you answered yes, then you were not alone; we waited also!

Since the onset of the COVID-19 pandemic, *AJPH* has been one of the foremost national and global resources for timely and relevant public health and public health policy scholarship. Indeed, not only has *AJPH* published significant COVID-19 research, but we continued to publish on a wide range of pressing public health issues during this period. These publications have contributed to our understanding of the far-reaching impact of COVID-19 across all aspects of our lives and societies, and they serve as a record of a pandemic that is the defining public health emergency of this generation.

As a result, articles published in *AJPH* continue to be influential, highly cited and featured in national news, and shared and discussed regularly across social media by public health practitioners, scholars, and community advocates. In fact, *AJPH* articles were cited 51 398 times—11 000 more times than in 2019. Articles published in *AJPH* were downloaded 5.4 million times—400 000 more times than in 2019. And finally, *AJPH*'s impact factor increased to 9.308: three points higher than in 2019. Achieving these noteworthy results would not have been possible without the concerted efforts of *AJPH*'s dedicated editorial team, indefatigable staff, and solid publishing partners.

However, *AJPH*—like everyone else—has not been immune to the effects of the COVID-19 pandemic. Unfortunately, during the late spring and early summer of 2021, the COVID-19 pandemic severely affected one of *AJPH*'s publishing partners. So even as our authors, editors, reviewers, and production staff were able to carry on with their work, our publishing partners were forced to work at less than their regular capacity to protect the health and safety of their staff. These necessary safeguards led to a reduction in publishing capacity and, in turn, created a substantial backlog in the production of *AJPH* articles.

But rest assured, these delays did not mean we were publishing fewer articles or even publishing fewer issues! In fact, the editorial team continued to review and accept articles with the same level of expediency as before the production delays. It is also worthy to note that once accepted, all articles were posted online, per our standard procedure, as soon as they were ready. Consequently, readers can always access our most recently accepted publications on our "First Look" page (https://ajph.aphapublications.org/toc/ajph/0/0). So even as our formal issues began to be published in late summer and early fall, we continued to make these issues available on our Web site at www.ajph.org as they became available.

We know that in the months and years to come, these temporary delays will be overshadowed by the significance of the research and public health practice articles, essays, and editorials published in *AJPH*. We hope that the information from these publications will serve as the background for ongoing efforts to understand the long-term consequences of pandemic-related disruptions.

We thank you for your patience during this challenging time, and we greatly value your continued support of *AJPH* and our mission to "advance public health research, policy, practice, and education" in the face of this ongoing pandemic. AJPH

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9 Years Ago

The Impact of Workplace Policies on Self-Reported Influenza-Like Illness

Higher influenza-like illness [ILI] incidence was related to workplace policies, such as lack of access to sick leave . . . [and] household crowding, inability to take time off work, and dependence on public transportation. . . . Difficulty avoiding public transportation would be [a] source of disparity in the exposure to infectious agents. [Also], staying away from work, if used as a social-distancing policy during a pandemic, would likely be more difficult for lower-wage workers because they would be less able to afford the subsequent loss of income. . . . In the United States . . . 33% of the civilian workforce lacks paid leave. Those who cannot take time off from work, who are unable to work from home, or who lack sick leave at work are at higher risk for exposure via colleagues not staying home when ill.

From AJPH, *January 2012, p. 134*

12 Years Ago

Pandemic Influenza and Farmworkers

[F]armworkers may . . . be more vulnerable than the general population to human influenza pandemics as a result of living conditions, suboptimal access to health services, and potential communication barriers resulting from language and culture. . . . The low English proficiency and literacy level of the majority of the farmworkers will impede the effectiveness of mainstream preparedness messages and communications not specifically targeted to this population. . . . Low-wage farmworkers may be reluctant to forgo wages, or possibly forfeit their jobs altogether, to stay home during a health emergency in which the community is required to "shelter-in-place." . . . Low wages are [also] a major deterrent to assembling an emergency kit with sufficient food, water, and supplies to participate in voluntary isolation. . . . According to a 2001 report of the Housing Assistance Council, 52% of farmworkers' living units are considered crowded . . . These crowded conditions and inability to isolate ill individuals could facilitate transmission of influenza.

From AJPH, *Supplement 2, October 2009, pp. S308–S311,* passim

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Implications of COVID-19 for the Management of School Financial Resources in Quintile 5 Public Schools

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Citation. Du Plessis P. Implications of COVID-19 on the management of school financial resources in quintile 5 public schools. *S Afr J Educ.* 2020;40(4):2043. https://doi.org/https://doi.org/10.15700/saje.v40n4a2043

Prepared by Stephen Lewandowski, Megan Marziali, Rebekah Hughes, and Vrinda Kalia, Columbia University, New York, NY. Correspondence should be sent to the AJPH *Global News team at vk2316@cumc.columbia.edu.*

DOI: https://doi.org/10.2105/AJPH.2021.306476

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Foundational, Structured, and Readable Primer on Health- and Rights-Based Law and Principles

Sandy A. Johnson, PhD

ABOUT THE AUTHOR

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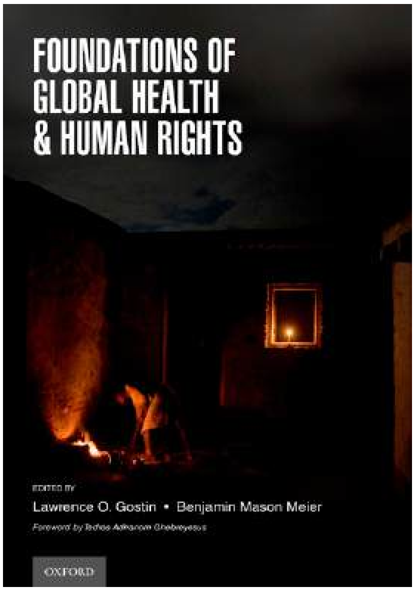

Foundations of Global Health & Human Rights
Edited by: Lawrence O. Gostin and Benjamin Mason Meier
New York, NY: Oxford University Press; 2020
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Foundations of Global Health & Human Rights arrives at a time when gains in population health and human rights are threatened by a global pandemic and populism. This edited volume provides a foundational understanding of health- and rights-based law and principles. It describes what human rights law does and does not do to enhance global health and thus helps to clarify misconceptions about individual and collective rights that are far too evident in COVID-19 times. Consequently, this is a timely and essential read for those working in public health, social policy, and human rights.

A primary focus throughout is on how the principle of social justice is used to understand the creation and propagation of health inequities. A human rights focus gives legal and humanitarian rational to improve social inputs to health as an avenue for advancing well-being. The focus is not merely on health outcomes but also on the process through which inequities become embodied.

NORMS AND PRINCIPLES

The first of four sections focuses on the normative foundation of individual rights, the translation of these norms into human rights law, and the reframing of public health into an issue of social justice in which inequity becomes "public health harms"—a violation of international law that therefore requires adjudication and remedy (p. 45). This section is the driest but most essential part of the book, as it lays out the historical context for our modern understanding of human rights and global health. These chapters describe the evolution of positive and negative rights and codification of the same in various United Nations instruments. They outline the roles of rights holders and duty bearers and look specifically at state obligations to respect, protect, and fulfill the right to health through progressive realization.

IMPLEMENTATION AND ACCOUNTABILITY

The second section tells us, "Human rights can be understood as a formal legal regime, a movement, and a universalizing approach to claiming entitlements" (p. 150). The progression from a regime to a lived experience is the central concern. Section 2 begins with an overview of actors and processes and then shifts to domestic implementations of health and human rights law to better address health inequities. Various chapters explore the tools of advocacy, monitoring, litigation, and human rights mainstreaming.

Two chapters in this section stand out. Chapter 6 by Joseph J. Amon and Eric Friedman provides a detailed discussion of how rights violations in the early days of HIV/AIDS mobilized the community of victims and brought about more inclusive policy that protected the victims rather than punishing them. The authors also explore rights violations in relationship to drug dependency, an approach that is too often overlooked in the substance abuse pandemic.

Chapter 8 by Colleen M. Flood and Bryan Thomas is galvanizing. The authors explore how litigation has furthered health-based human rights, for it is only through adjudication that health-based obligations are progressively realized. It was fascinating to learn that health-related human rights litigation is a recent occurrence that opened up only after the end of the Cold War. Flood and Thomas show how civil and political rights violations, such as discrimination and marginalization, intersected with the health-based right of access to health and the tides of democratization and decolonization to form a perfect storm for progress.

CONTEMPORARY APPLICATIONS

The third section is where the case studies are found. Although this will no doubt be the section of greatest interest to students, the book editors advise against treating any chapter or section independently from the whole, and I have to agree. Jurisprudence and advocacy methods, so carefully laid out in the previous sections, are here applied to diverse health issues. "Contemporary Applications" opens by examining different approaches used to manage communicable disease: a public health approach, a human rights approach, and a securitized approach. Whereas in section 2 we see how the human rights approach addressed failures of the public health approach during the early days of HIV/AIDS, here we see the tensions and possibilities that arise through the securitization of infectious disease as more resources and heightened attention are brought to bear but with the tradeoff of the loss of civil and political rights. This chapter is especially useful given the dual crises of protecting life and liberties during the COVID-19 pandemic.

Section 3 also considers how human rights law is applied to noncommunicable disease, disability, mental health, and reproductive rights. In so doing, the authors challenge us to consider an expansive understanding of vulnerability not just across risk groups but across the life course. Other chapters consider what the rights are to health inputs vis-à-vis water and sanitation and commercial determinants of health.

NEW CHALLENGES

The final section is where we see aspirational statements about where and how health-based rights can strengthen and protect human health and a warning about where failures of social justice and the reversal of progress loom. Section 4 lays out the institutional development and policy framing for rights-based aspects of international development, international trade, complex humanitarian emergencies, and globalized health research. This is a useful reference for anyone beginning to explore these issues. Alexandra L. Phelan's chapter on planetary health is especially compelling. Here, we learn that climate law only recently emerged at the international level, and the right to a healthy environment has yet to gain widespread support despite the existential threat posed by climate change.

The book closes with an exhortation from Gostin, Constantin, and Meier to guard against the rising tide of populism and its potential to harm human rights norms and legal protections and its ability to unravel global health governance. The authors end with a call for collective action to protect and strengthen these institutions. Let us hope that their optimism about course correction proves correct.

This book is accessible, and it is successful in explaining how human rights law strengthens health protections. Each section builds logically, adding details and examples. The writing style is clear, and there is consistency in language and structure across the chapters, no easy task given the number of contributing authors. One feels the confident editorial hands of Gostin and Meier throughout; they ensure that there is sufficient overlap and repetition of concepts and nomenclature to build the story, without bogging the reader down in redundancies. Each chapter includes helpful *Questions for Consideration* that remind the reader of the main points of the reading while encouraging higher-order thinking.

There is a lot of information to convey to achieve the stated goal of providing "a detailed understanding of the complex relationship between global health and human rights" (p. xv). This is done with clarity and organization, but sometimes at the loss of a critical examination of debates in global health and human rights. The case studies throughout the book are global in nature and do especially well in highlighting how health rights law often progresses more strongly outside North America and Europe.

Although the chapter authors draw largely from North America and Europe, there are several authors from Africa, Latin America, and Asia. Diverse representation is important. There is more work to be done in this area, but this is a good effort at including a global perspective.

The main downside is that, given the release date, the book cannot address real-time application to the current pandemic. Instead, it provides a structured, readable primer on human rights law and its application to global health writ broad. It is up to the reader to apply this framework to our current crisis. This book certainly gives one the tools for such analysis.

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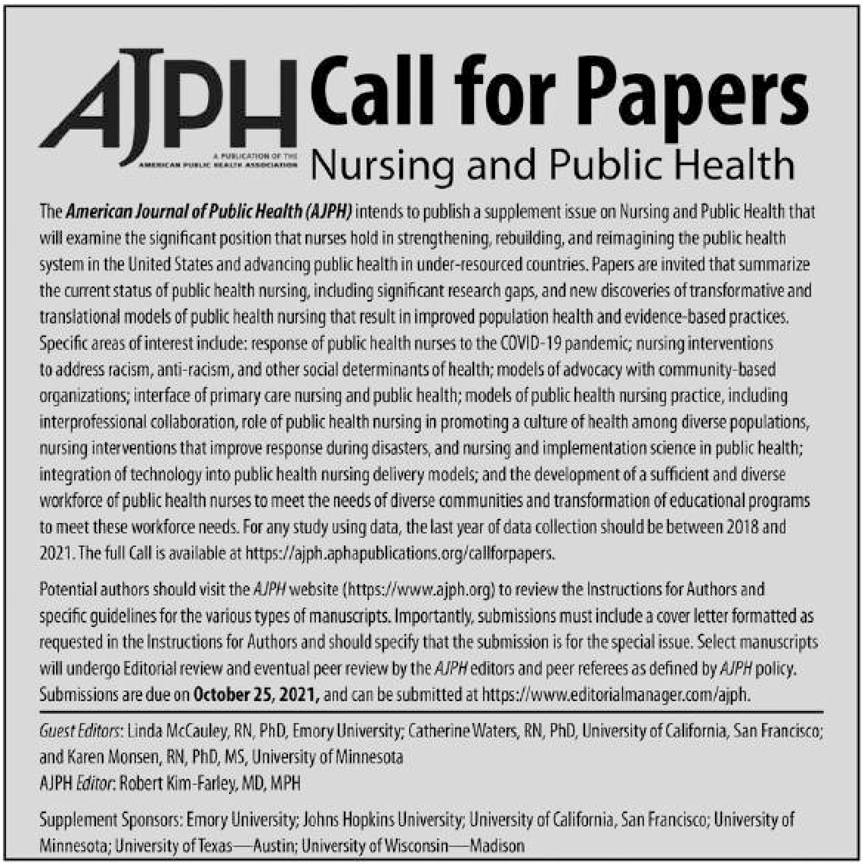

AJPH Call for Papers
A PUBLICATION OF THE AMERICAN PUBLIC HEALTH ASSOCIATION
Nursing and Public Health

The ***American Journal of Public Health (AJPH)*** intends to publish a supplement issue on Nursing and Public Health that will examine the significant position that nurses hold in strengthening, rebuilding, and reimagining the public health system in the United States and advancing public health in under-resourced countries. Papers are invited that summarize the current status of public health nursing, including significant research gaps, and new discoveries of transformative and translational models of public health nursing that result in improved population health and evidence-based practices. Specific areas of interest include: response of public health nurses to the COVID-19 pandemic; nursing interventions to address racism, anti-racism, and other social determinants of health; models of advocacy with community-based organizations; interface of primary care nursing and public health; models of public health nursing practice, including interprofessional collaboration, role of public health nursing in promoting a culture of health among diverse populations, nursing interventions that improve response during disasters, and nursing and implementation science in public health; integration of technology into public health nursing delivery models; and the development of a sufficient and diverse workforce of public health nurses to meet the needs of diverse communities and transformation of educational programs to meet these workforce needs. For any study using data, the last year of data collection should be between 2018 and 2021. The full Call is available at https://ajph.aphapublications.org/callforpapers.

Potential authors should visit the *AJPH* website (https://www.ajph.org) to review the Instructions for Authors and specific guidelines for the various types of manuscripts. Importantly, submissions must include a cover letter formatted as requested in the Instructions for Authors and should specify that the submission is for the special issue. Select manuscripts will undergo Editorial review and eventual peer review by the *AJPH* editors and peer referees as defined by *AJPH* policy. Submissions are due on **October 25, 2021,** and can be submitted at https://www.editorialmanager.com/ajph.

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Public Health Responses to Pandemics in 1918 and 2020

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See also Cozza et al. p. 1815.

The end of a pandemic prompts efforts to make sense of recent history, with the goals of evaluating public health responses and drawing lessons about how to respond more effectively to future disease outbreaks. The article "1918 Influenza Pandemic vs COVID-19: A Historic Perspective From an Italian Point of View" by Cozza et al. (p. 1815) illustrates how lessons from two pandemics, one that ended a century ago and one that is still ongoing, can provide valuable lessons for the future.[1] This review of Italian medical journal articles published in 1918 clearly illustrates that preparing for future pandemics must draw the necessary and correct lessons from both contemporary and historical experiences of pandemics.[1–3] Preparing for the next pandemic must begin with understanding what worked—and, more importantly, what did not work—in previous pandemics.[4]

The article by Cozza et al. surveys Italian responses to the 1918 influenza epidemic in terms of pharmaceutical interventions, including quinine treatment and vaccines, and nonpharmaceutical interventions, including masks, disinfection, and distancing. The guidelines published by the Torino city council in 1918 included steps broadly similar to recommendations in 2020: wash hands frequently, clean and ventilate homes, avoid gatherings indoors and crowds outside, be careful in visiting ill or convalescing patients, clean surfaces with disinfectant, stay home as soon as symptoms begin, and isolate those who are sick. Other recommendations are more specific to the public health context of the early 20th century: eat simple and well-cooked foods, do not spit on the floors, and avoid strong drafts. Missing from this list, conspicuously, are some of the preventive public health measures credited in 2020 with containing the spread of infection in many regions: contact tracing, closing businesses, and wearing masks. Two other measures central to the COVID-19 response were simply not available in 1918: reliable testing and effective vaccinations. Despite the passing of more than a century, public health measures in 1918 are broadly similar to recommendations encountered in 2020.

This review "from an Italian point of view" is suggestive of a series of articles published in January 1919 in *AJPH* as the epidemic came to an end. "A Working Program Against Influenza" drew on the "papers, committee reports, and discussions" from the annual meeting of the American Public Health Association in Chicago, Illinois, in December 1918 (the meeting scheduled for October was postponed as officials dealt with the epidemic).[5(p1)] The "working program" closely resembles the content of Italian journals, with discussion of preventive measures, use of vaccines, and steps to improve healthiness. The conclusions were also similar to those presented in Italian medical journals: preventing infection from person to person was the most important step, along with proper ventilation, limiting gatherings, closing theaters, and isolating patients. Yet this "working program" reached more equivocal conclusions about key measures, including closing schools, administering and receiving vaccines, and wearing masks—conceding that contradictory and inconclusive evidence did not support definitive recommendations.[6]

One element of the public health response to the 1918 epidemic familiar to us as we live through COVID-19 is the importance of accurate, consistent, and reliable statistics.[7] The January 1919 issue of *AJPH* included a detailed analysis of vital statistics during the epidemic. A comparison of deaths by week in 10 of the largest US cities provides an important comparative perspective on the COVID-19 pandemic (Figure 1).[8] As this graph indicates, each city experienced a dramatic rise in death rates from all causes during the first weeks of the epidemic, although the timing and scope differed. Boston, Massachusetts, reached its peak first, in early September, and Philadelphia, Pennsylvania, and Baltimore, Maryland, recorded the highest death rates in late October. States further to the west in the United States generally displayed flatter curves and lower average death rates, with San Francisco, California,

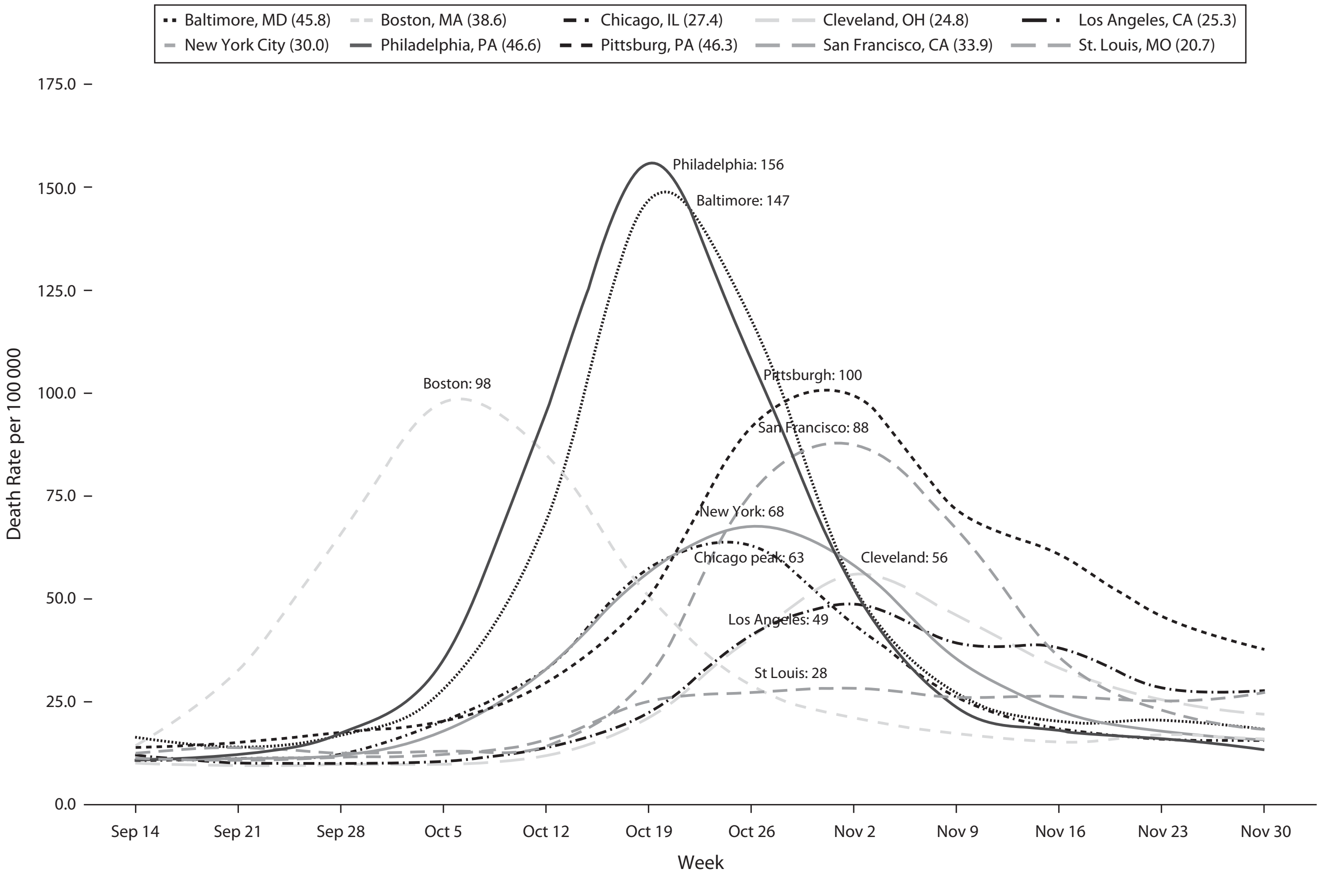

FIGURE 1— **Death Rates per 100 000 Population, From All Causes, Weekly: United States, September 14, 1918–November 30, 1918**

Note. Parenthetical values in the key represent the mean for the 12 weeks. Peak rates for each city are marked for the appropriate week within the chart.
Source. Davis.[8]

unusual in recording a death rate higher than that of New York City. By the end of November, death rates in each city had declined to close to levels recorded before the epidemic. Although death rates remained above average for the rest of 1919, they never again rose close to the remarkable levels recorded in the first two months of the epidemic.

The graph illustrates one of the most important, and discouraging, comparisons between the 1918 and 2020 epidemics.[9,10] Whereas the dramatic increase in death rates in 1918 occurred in the first few weeks of the influenza epidemic, the dramatic increases in deaths from COVID-19 occurred over the course of many months. Some cities and states reached peak levels early in the epidemic, when treatment, prevention, and diagnosis were still under development, in a pattern more similar to 1918. In other cities and states, however, COVID-19 deaths peaked three, six, and even nine months into the epidemic—long after specific public health tools had been confirmed as effective. The shocking increase in COVID-19 deaths beginning in late November 2020 and peaking in late January 2021, 10 months after the epidemic began, is a striking departure from the 1918 patterns—and a terrible reminder of how the United States failed to deal with the actual threat posed by COVID-19. The responsibility for this failure should be broadly shared across society, including public health officials who issued inconsistent and contradictory policy guidelines, government officials who questioned or challenged guidelines for partisan or personal reasons, and members of the public whose indifference or denial led them to ignore necessary safety measures.

In the conclusion of their article, Cozza et al. cite the words of Azelio Filippini, who warned that people would likely forget the severity of the 1918 epidemic and its lessons in the decades to come when faced with a "hypothetical new pandemic awakening" (p. 1815). In the US context, a very similar sentiment was articulated by New York State assistant health commission Matthias Nicoll Jr at the December 1918 conference:

> It seems to me that it behooves all of us in public health work to keep our heads, acknowledge our ignorance, preserve our patience, and pray that some one of the great army of research workers throughout the world, happily removed from the tumult and shouting of unsubstantiated observations, will before long be able to enlighten us as to the cause of this disease, and later devise specific methods for its control, for in no other way does it appear that the health officials of the state and nation can be rescued from their present condition of utter helplessness in the face of future epidemics.[11(p44)]

As we near the end of the COVID-19 pandemic, we must wonder whether our historical experience will produce better responses to the next pandemic. We have all observed what Nicoll referred to as the "tumult" and "shouting of unsubstantiated observations." As suggested by Nicoll's final statement, acknowledging the extent of ignorance, preserving patience, allowing the scientific process to discover effective tools, and, most importantly, providing enlightened guidance from public health authorities will be essential "in the face of future epidemics." AJPH

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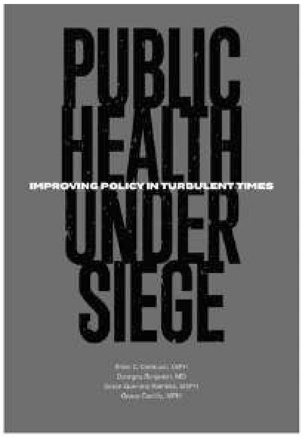

Harm Reduction for Veterans (and Others) Who Carry Guns and Experience Anger Attacks

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See also Bossarte et al., p. 1855.

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In their article "Mental Disorders, Gun Ownership, and Gun Carrying Among Soldiers After Leaving the Army, 2016–2019," Bossarte et al. (p. 1855) report that there is no overall association between mental illness and firearm availability. However, the findings suggest that there may be decreased firearm ownership among veterans with generalized anxiety disorder and increased carrying among those with intermittent explosive disorder (IED), posttraumatic stress disorder (PTSD), and panic disorder. They suggest that a harm-reduction strategy that includes screening for gun-carrying behaviors and intervening to reduce access to firearms at times of increased distress may be helpful for veterans with these conditions. A look at the conclusions in the context of other recent findings points to a broader issue that, given the nation's concerns about gun-related violence and suicide, should be considered urgent.

The defining feature of IED is recurring anger attacks—repeated behavioral outbursts representing a failure to control aggressive impulses.[1] In the survey used in this study, IED was identified when veterans reported that they "had attacks of anger when all of a sudden (they) lost control" and " broke or smashed something" or "hit or tried to hurt someone" or "threatened to hit or hurt someone."[2] If these anger attacks occur when veterans are carrying a gun, they could lead to tragic outcomes, including homicide or suicide. The principle, borrowed from discussions about firearms and suicides,[3] is that the negative consequences of impulsive behaviors can be increased by the ready availability of firearms and, therefore, that harm reduction focused on gun safety can be lifesaving.

The *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (*DSM-V*)[1] criteria for the diagnosis of IED require at least three severe episodes within a year, more if less severe and not leading to destruction of property or injuries to others. To be considered toward the diagnosis, aggressiveness during the outbursts must be out of proportion to any provocation, it must be impulsive rather than planned or goal directed, and the events cannot be better explained as part of another condition. The diagnosis of IED as a mental disorder, rather than a trait or pattern of behaviors, requires that the recurring outbursts have significant negative consequences, leading to marked distress for the individual, to impairments in functioning, or to financial or legal problems.

According to Bossarte et al., the other conditions associated with carrying guns are PTSD and panic disorder. The anger attacks associated with IED may be similar to the "irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects" that are included in the diagnostic criteria for PTSD.[1(p272)] The panic attacks in panic disorder are associated with anxiety or fear rather than anger, but they share characteristics with anger attacks, including autonomic symptoms, a sense of losing control, and intense emotions.[4] The increased rates of carrying firearms in the three conditions may reflect shared characteristics, possibly including concerns about losing control and a sense that the environment is threatening. However, the consequences of carrying firearms may differ between conditions.

The finding of Bossarte et al. that there were increased rates of gun carrying in veterans with IED echoes previous epidemiological findings in US adults from the National Comorbidity Survey Replication (NCS-R).[5,6] Swanson[5] reported findings that go beyond IED: that individuals with a wide range of mental health or substance use conditions (but not schizophrenia or bipolar disorder) both carried guns and experienced impulsive angry behavior. They estimated that 55.7% of the population-attributable risk for the combination of impulsive angry behavior and gun carrying was related to mental health conditions. This implies that almost half of those experiencing the combined risks may not have a mental disorder. For these people, the recurrent angry behaviors may reflect a trait, perhaps related to impulsivity, dysregulation of anger (and other emotions), and aggressiveness, rather than a diagnoseable illness. Coccaro and Lee also reported findings that go beyond IED as a diagnosis.[6] They divided the NCS-R sample into three groups: one that met lifetime criteria for IED, another with at least three recurrent aggressive episodes in a year but without the other diagnostic criteria for IED, and a control group. The IED group and the aggressive but not IED group differed from controls, but not from each other, in the number of episodes in the past year and in the proportions of individuals who carried guns outside the home, threatened others with a gun or other weapon, exhibited aggression toward a domestic partner, or had a history of arrests. They did differ from each other in the number of years with recurrent aggressive behavior and the proportion with aggression that led to the victims' need for medical attention. Together, these earlier studies suggest that the opportunities for saving lives through harm reduction relate to the recurring behaviors in whomever they occur, without regard to the behaviors' associations with any diagnoseable conditions.

This report is specifically relevant to the Department of Veterans Affairs (VA). Although Bossarte et al. reported that the prevalence of IED over the past month was 2.5% to 4.1% in recent veterans and that the estimated prevalence in US adults is 0.8% over one month and 1.5% over a year,[7] IED is recorded as a diagnosis for only 0.08% of VA patients (VA Northeast Program Evaluation Center, electronic personal communication, June 3, 2021). This may reflect the principle that the diagnosis of IED should not be made if the angry outbursts are better explained by another condition. In the VA the alternative explanation may frequently be PTSD, which is diagnosed in about 16% of VA patients (VA Northeast Program Evaluation Center, electronic personal communication, June 3, 2021). In fact, Veterans Outcomes Assessment Survey data[8] for veterans beginning treatment in specialized outpatient PTSD programs indicate that 65% report being at least moderately bothered by "irritable behavior, angry outbursts, or acting aggressively" on the PTSD Checklist for *DSM-V*.[9] The VA does not have data on the frequency of these behaviors in patients without mental health conditions. Nevertheless, VA data support a view of this problem based on the identification of behaviors rather than specific diagnoses.

Based on this discussion, the recommendations of Bossarte et al. could be modified. Addressing this problem may require screening primary care and mental health patients for recurring anger attacks in the VA and elsewhere. Follow-up for positive screens should include evaluations to identify specific treatable causes and the need for cognitive behavioral treatments, such as anger management and related evidence-based psychotherapies.[10] Concurrently, follow-up should include inquiries about gun ownership and carrying and, where appropriate, harm-reduction interventions designed to improve gun safety.

Certainly, research is necessary. With respect to treatment, there are a number of promising strategies for the treatment of IED but no well-established, evidence-based treatments. Little is known about the extent to which those with' recurring anger attacks or outbursts associated with other conditions respond to treatment of the underlying disorders and when interventions for specific disorders should be supplemented with behavioral treatments targeting anger attacks. With respect to harm reduction, there must be many questions about how and where screening should be conducted, how questions about firearms should be asked, and how increased safety could be achieved. Given that any program that addresses firearms, especially in a federal agency like the VA, is likely to engender controversy, this research must be informed by input from a broad array of experts, stakeholders, and interest groups. The report from Bossarte et al. should catalyze the conversations that are needed. AJPH

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CONFLICTS OF INTEREST

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Ubiquitous Lead

The ***American Journal of Public Health (AJPH),*** in collaboration with the Centers for Disease Control and Prevention (CDC), intends to publish a supplemental issue on the topic of lead hazards, prevention–mitigation programs, and emerging sources of exposure. The supplement will address and contribute to the comprehensive understanding of currently known and emerging hazardous sources of lead exposure related to global trade, climate change, and infrastructure renewal. Original social, policy, research and evaluation articles, and perspectives are invited. Topics of interest include but are not limited to evidence-based promising practices that strengthen efforts to identify, measure, and mitigate lead exposure in communities; analyses of data demonstrating geographic distribution of lead exposures and associated social vulnerabilities; social determinants of lead exposure risk and consequences; blood lead level testing in affected communities; building capacity for prevention and working with agency partners; emerging sources of lead exposure; implications of COVID-19 on lead poisoning prevention and surveillance; lead poisoning as a major international health crisis; and data demonstrating the impact of lead on children and adults. The full Call for Papers is available at https://ajph.aphapublications.org/callforpapers.

Scholars in academia, historians, public health departments, the medical professions, health educators and evaluators, community and faith-based organizations, and governmental agencies are invited to submit manuscripts related to lead exposure prevention and mitigation. Potential authors should visit the *AJPH* website (https://www.ajph.org) to review the Instructions for Authors and specific guidelines for the various types of manuscripts. Importantly, submissions must include a cover letter formatted as requested in the Instructions for Authors. In all manuscripts, the number of words, references and tables/figures must correspond to a specific *AJPH* article format. All manuscripts will undergo standard peer review by the *AJPH* editors and peer referees as defined by *AJPH* policy. Manuscripts must be submitted to *AJPH* by **January 30, 2022,** and can be submitted at https://www.editorialmanager.com/ajph. For additional information about this supplement, contact: T. LeBlanc at tleblanc@cdc.gov.

Guest Editors: Tanya Telfair LeBlanc, PhD, MS; Erik Svendsen, PhD; and Paul Allwood, PhD, Centers for Disease Control and Prevention, Atlanta, GA
AJPH *Editor:* Jonathan I. Levy, ScD

The Need for All-Cause Mortality Data to Aid Our Understanding of the COVID-19 Pandemic in Latin America

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See also Martinez-Folgar et al., p. 1839.

Latin America has been severely hit by the COVID-19 pandemic. The pandemic's impact has caused a health crisis in the region of a magnitude hitherto unseen in recent history, threatening to negate decades of work that had brought sizable improvements in decreasing mortality rates. Early evidence highlighted sharp increases in mortality from COVID-19 in 2020 in several countries, including Brazil, Chile, Colombia, Costa Rica, Ecuador, Honduras, Mexico, and Peru.[1] Many of these countries were in fact epicenters of the pandemic at some point. However, the lack of timely, accessible, comparable testing strategies and accurate data on COVID-19 mortality and infections makes the true toll of the pandemic difficult to assess in a timely manner. One approach to overcoming these limitations is by analyzing all-cause mortality.

All-cause mortality data offer the possibility of estimating excess deaths in a population. Defined as the difference between the observed deaths and the number of deaths that would have occurred in the absence of the pandemic, "excess deaths" is a key metric to estimate and track the burden of the pandemic in contexts with poor testing strategies and lack of COVID-19 mortality data. In addition, excess deaths, as an indicator, allow the quantification of the indirect effects of the pandemic beyond COVID-19 deaths. For example, mortality from accidents can decline because of lockdowns, whereas mortality from chronic degenerative diseases, such as diabetes and cancer, can increase because of the lack of treatment caused by fear of COVID-19 and overstretched health care systems.

Data on all-cause deaths are widely available in most countries in Latin America through national statistics offices, but they are often reported with a considerable lag, which makes it impossible to plan interventions in the short term. To put this into perspective, mortality statistics for a given year are made available more than six months into the next year in many countries; in Venezuela it is very difficult to have access to existing data[2]; and in other countries, such as Bolivia and Haiti, vital statistics are not reported.[3] The COVID-19 pandemic has highlighted the importance of mortality data and the need to report them as soon as possible to inform public health policies and interventions. At the very minimum, data must be made available that is stratified by demographic characteristics such as age and sex and ideally by week or month and place of occurrence to estimate changes in mortality during the pandemic. Even though vital registration systems in many Latin American countries are not perfect and data come with systematic errors, such as incomplete coverage and age misreporting,[3,4] data are essential for tracking the evolution and effects of the pandemic on mortality.

In the current issue of *AJPH*, Martinez-Folgar et al. (p. 1839) use all-cause mortality data from Guatemala's National Registry of Persons and population estimates and life tables from the United Nations to estimate excess mortality and related years of life lost in Guatemala in 2020. Drawing on my own experience as a Latin American demographer, I find this effort to assess the devastating impacts of the pandemic imperative. The authors report that in 2020 there were approximately 8000 excess deaths (approximately 10% relative excess). At its peak in 2020, the mortality rate was 73% higher than expected in July. Mortality was higher among men than women, and excess deaths were concentrated among individuals older than 60 years. Because Martinez-Folgar et al. do not attempt to correct for systematic biases in death counts, their reported mortality rates may be higher after correcting for completeness and systematic biases because of misreporting age at death.[4] Reporting whether excess deaths occurred at home, hospitals, or elsewhere is a salient point of the study. Martinez-Folgar et al. found that excess deaths predominantly happened at home. This result highlights the lack of access to health care infrastructure and medical treatment, which is not uncommon in many Latin American countries.[5]

Health inequalities exist in Latin America. It is reflected in cross-country comparisons of life expectancy[6] but also persistent at the subnational level, with unequal access to medical services and disparities in mortality. Emerging evidence shows that increases in mortality vary substantially across regions in Brazil, Chile, Ecuador, and Peru.[7] Similarly, a strong association between socioeconomic status and increased excess mortality has been found in Santiago, Chile's capital,[8] whereas indigenous people and low socioeconomic status individuals showed the highest mortality risk in Colombia in 2020.[9] Increased mortality in 2020 has affected life expectancy estimates too. In Brazil and Chile, life expectancy at birth for males dropped by 1.6 years and 1.3 years, respectively, whereas female life expectancy at birth dropped almost one full year in both countries.[10,11] It is likely that many other countries in the region experienced substantial drops in life expectancy at birth in 2020,[1] and I hypothesize that people with socioeconomic disadvantages have suffered the most from the consequences of the pandemic in Latin American countries.

A question that remains is whether health inequalities have widened during the pandemic and whether the scars left by this health crisis will last in the long term. With a third wave of COVID-19 cases in sight and slow vaccination rollout in low- to middle-income countries, the prospects are not positive for 2021. In a context of high levels of inequalities combined with low access to health care, increased prevalence of comorbidities, and lack of timely interventions,[12] Latin America generally and Guatemala in particular need further efforts and funding to quantify and address the detrimental consequences of the pandemic. Action is needed in terms of timely access to data on all-cause mortality and other information relevant to inform public health policies and interventions, to mitigate the immediate impact of this health crisis but also to minimize the long-term health effects and potential widening inequalities that may come about from overstretched health care infrastructures and disrupted social and economic systems.

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Mental Health Consequences of Racial/Ethnic Disparities in Policing Among Adolescents in the United States and the United Kingdom

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See also Jackson et al., p. 1885.

The ability to generalize findings across different contexts is valued among many social scientists. However, many social scientists grapple with the external validity of their own and others' results. Most research on policing among adolescents has come from a single Western, educated, industrialized, rich, and democratic (WEIRD) nation: the United States.

Jackson et al. (p. 1885) provide a valuable contribution to the literature as they examine disparities in police stops and the mental health consequences of such stops among adolescents in the Millennium Cohort Study, a nationally representative birth cohort study of children in the United Kingdom, another WEIRD nation. Ultimately, the authors found that adolescents in the United Kingdom who were ever stopped and questioned by the police at age 14 years reported higher rates of self-harm and significantly higher odds of attempted suicide at age 17 years than did their peers who had never been stopped, and mental distress at age 14 years mediated the longitudinal link between police stops at age 14 years and self-harm and attempted suicide at age 17 years.

The documented findings of Jackson et al. remained significant after the authors controlled for a series of relevant covariates, including youths' age, sex, race, delinquency, and self-esteem. That is, potential alternative hypotheses (e.g., whether youths with poor self-esteem were driving the observed effects) were ruled out.

The findings of Jackson et al. reflect many patterns found in US-based samples. US-based studies have found that adolescents who were stopped by the police, including stopped and frisked, also reported poorer mental health, including higher depression and anxiety, cross-sectionally[1] and longitudinally.[2] Many of these studies were conducted on adolescent samples that predominantly identified as African American and Latino. In fact, although the sample of youths in the Millennium Cohort Study was predominantly White, Jackson et al. continued to find racial/ethnic disparities in rates of police stops. Specifically, youths who identified as other and mixed race were more likely than were their White peers to experience police stops. Although the effects of a police stop on self-harm and attempted suicide did not vary across racial/ethnic groups, racial/ethnic disparities in policing may concentrate these negative effects among particular racial/ethnic groups when such groups are disproportionately exposed to a police stop.

These racial/ethnic disparities should be surprising in WEIRD nations, considering that the ideals of education and democracy are shared between the United States and the United Kingdom. Yet, biases and stereotypes permeate these societies and threaten these ideals. For instance, social psychologists have found that individuals view Black American boys as less innocent, more threatening, and older than their White American peers.[3,4] Although adolescence is characterized as a period of heightened risk-taking behaviors,[5] these behaviors, like delinquency, have not solely accounted for racial/ethnic disparities in negative police stop experiences between Black and White American youths.[6] Although studies examining the role of racial/ethnic biases in shaping Black–White disparities in policing have been largely conducted in the United States, possible directions for future research would be to use experimental methods to understand how biases and stereotypes shape observed racial/ethnic disparities in policing between racial/ethnic minority youths and their White peers in the United Kingdom.[7]

In addition to documenting racial/ethnic disparities, Jackson et al. found that police stop encounters at age 14 years predicted greater self-harm and attempted suicide at age 17 years. Specifically, youths who were stopped at any point before age 14 years reported greater rates of self-harm and higher odds of attempted suicide at age 17 years. Although the authors could not test the temporal ordering between their key constructs, it is notable that youths self-reported police stops three years before the outcomes, reducing the likelihood that their outcomes preceded the police stop encounters. Substantively, these findings shed light on the consequences of youths' possible negative encounters with the police. Indeed, even in the absence of delinquent behaviors, law enforcement has been found to stop, question, and frisk many youths, particularly youths of color.[8] In turn, many youths feel unfairly targeted, and their police stop encounters have been found to include racial/ethnic epithets.[6] These experiences threaten youths' sense of safety, as police officers are in a position of power and have been found to threaten and use unwarranted lethal force against children and adults of color.[6,9]

Jackson et al. also found that mental distress helped mediate the longitudinal link between police stop encounters at age 14 years and self-harm and attempted suicide at age 17 years. Specifically, youths who were stopped at any point before age 14 years reported greater mental distress contemporaneously, which in turn predicted greater rates of self-harm and higher odds of attempted suicide at age 17 years. With this mediation analysis focusing on mental distress, Jackson et al. provide a psychological mechanism that can be used to guide interventionists and community leaders with directions on how to intervene and reduce the harmful effects of police stops. Without these interventions, unfortunately, policing as a governmental institution can have serious consequences on how youths relate with and view their governments.[10,11] Youths with negative police encounters may develop increased cynicism toward the law[11] and engage in greater avoidant behaviors toward other government institutions keeping formal records (e.g., schools, hospitals),[10] further compromising the ideals of WEIRD countries. Thus, tackling policing as an institution and its relationship with young citizens may be necessary for government leaders as they work to sustain equitable and democratic societies in the United States, the United Kingdom, and beyond. AJPH

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Sexism and Health: Advancing Knowledge Through Structural and Intersectional Approaches

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See also Rapp et al., p. 1796.

During the first decade of the twenty-first century, research on the social determinants of health proliferated rapidly, with growing attention to factors such as neighborhood conditions, housing, employment, transportation, and education. Since then, researchers have increasingly turned their focus even further upstream to examine more macro-level structural determinants of health (e.g., welfare state policy, globalization, income inequality, and structural racism). This trend reflects increasing awareness of how systemic inequity can be built into the fundamental social, economic, cultural, political, and legal institutions that shape individuals' daily living conditions, medical care, and, ultimately, health.[1]

Yet, one structural determinant in particular has received comparatively little attention in public health until recently: sexism. In fact, the word "sexism" rarely appears in the pages of leading public health journals. There are, however, substantial bodies of research examining sexual harassment, sexual violence, women's health, and physician bias. These existing lines of research examine important types of direct, interpersonal gender-based mistreatment, but they do not capture more systemic, institutionalized forms of sexism. The inequitable gendered distribution of power, status, resources, rights, roles, exposures, and opportunities that characterizes a society's gender structure has the potential to profoundly shape the health of its members. Thus, an emerging line of structural sexism and health research has begun to explore the health consequences of systematic gender inequality between men and women in power and resources, as manifest in institutions, interactions, and individuals.[2] Higher levels of structural sexism in state-level political, economic, and cultural institutions have been linked to more chronic conditions, worse self-rated health, and worse physical functioning in US men and women.[2]

The article by Rapp et al. in this issue of *AJPH* (p. 1796) builds on this nascent line of research by examining the relationship between structural sexism and health care access across the United States. I highlight the key contributions made by Rapp et al. and outline how the field can proceed to build a more robust knowledge of sexism and health using structural and intersectional perspectives.

EXPLORING PATHWAYS OF EMBODIMENT

Structural sexism is theorized to become embodied and shape population health through numerous pathways, including economic deprivation; reduced subjective social status and psychosocial resources (e.g., self-esteem and autonomy); exposure to violence, harassment, and unsafe living or working conditions; and inadequate health care.[1,2] Rapp et al. make a major contribution to knowledge of structural sexism by being among the first to examine how it affects barriers to health care among women. They find that greater exposure to state-level sexism is associated with more barriers to health care access (particularly affordability barriers such as the cost of medical bills, health insurance, prescriptions, and tests) among Black and Hispanic women in the United States. In their analysis, the authors control for Medicaid expansion under the Affordable Care Act, as it is not central to their argument, but there is clearly a need for future scholarship that more closely analyzes the connections between structural sexism and specific health care policies.

The findings of Rapp et al. also suggest that in addition to health care policy, any policies promoting gender equity are also likely to improve health care access among women of color. Health care is only one pathway through which sexism can harm health; therefore, much more research is needed to investigate the other social factors that function as mechanisms in this relationship. Future research exploring the social mechanisms will allow the development of other social policy interventions that can reduce gender inequity and shape social determinants in ways that improve population health.[3]

EXPANDING STRUCTURAL SEXISM MEASUREMENT

Another vital contribution made by Rapp et al. is their addition of new measures to capture state-level structural sexism. Previous research measured structural sexism with indicators that included women's state legislative representation, the gender wage gap, the gender gap in labor force participation, the feminization of poverty, the prevalence of conservative religion, and the proportion of women who live in a county without an abortion provider. Rapp et al. identify two new measures of structural sexism in the social policy and legal domains that they add to their composite index: the absence of a paid family and medical leave policy and the absence of a state law restricting gun ownership for domestic violence offenders. Future work on structural sexism can incorporate these new measures and develop additional indicators reflecting different dimensions of structural sexism, such as gender-based job segregation; the underrepresentation of women in powerful business, professional, media, and governmental positions; and the curtailment of women's bodily autonomy through cultural and legal issues of reproductive freedom and sexual violence.

Furthermore, although US states play a unique role as institutional actors shaping health,[4] it is important to examine structural sexism in other social contexts. A more complete picture of structural sexism and health requires additional research examining structural sexism in other settings, such as religious institutions, neighborhoods, community organizations, schools, occupations, workplaces, and health care facilities.

STRUCTURAL SEXISM AND INTERSECTIONALITY

The final key contribution made by Rapp et al. is the application of an intersectional approach to structural sexism and health research. Rapp et al. are to my knowledge the first to identify the unique effects of state-level structural sexism on Black and Hispanic women. Their approach recognizes that sexism and racism do not operate entirely independently of one another but instead combine to jointly shape individual life experiences and health. The study by Rapp et al. takes the first important steps in this direction by incorporating an intersectional lens, but their approach to intersectionality is limited to the individual level by accounting for race and racism with individual racial identification categories.

Scholars can build on this work by using a structural intersectionality approach to population health.[5,6] A structural intersectionality approach would (1) measure structural sexism and structural racism (and other systems of oppression such as classism, heterosexism, cissexism, ageism, ableism, and nativism) in a given social context and explore how they relate to one another, and (2) examine how these structural inequalities jointly shape the health of various population groups defined by specific constellations of individual-level statuses (e.g., race, gender, class, sexuality, nativity, and disability).[6] For example, future research can examine how structural racism, classism, and cissexism combine to shape the health of Black trans women. Although no single study can account for the myriad of intersecting identities and axes of oppression, a synthesis of structural and intersectional approaches is a promising avenue for future research.

CONCLUSIONS

As sociologists and epidemiologists increasingly turn upstream to understand the larger social forces driving population health, the study by Rapp et al. points to the importance of structural sexism. Rapp et al. provide vital new evidence of the relationship between systematic gender inequality and women's health care access in the United States. Nevertheless, structural sexism research remains in a very early stage of development, and a great deal more work is needed to build the body of evidence documenting its associations with health and health care. Structural and intersectional perspectives like those employed by Rapp et al. are needed to further advance this emerging line of healthy equity research and to ultimately work toward a more just and healthier society. AJPH

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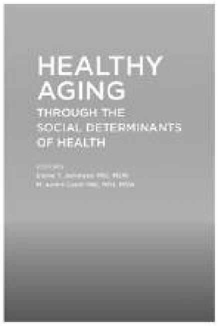

US Communities Need More Accessible Data to Improve Health, Not Less

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See also Phillips et al., p. 1865.

In this *AJPH* issue, Phillips et al. (p. 1865) raise a major concern about discontinuation of the Community Health Status Indicators (CHSI) tool in 2017 without a similar replacement. CHSIs are standardized health outcomes and key social, economic, and physical environmental determinants of health for US counties with peer comparisons. These data were also easily accessible to the public as a data set. As health equity researchers who search for and use publicly available data to improve community health through community engagement, we are also concerned that to date there is still no replacement tool for informing community stakeholders' advocacy and action as described in the Morehouse model for effective community engagement.[1]

Although the measurement unit is the county, CHSIs are important sources of data. The CHSI tool is also a platform to stimulate data collection at smaller geographic areas such as city, zip code, census track, or census blocks. These are the local areas in which community- and faith-based organizations, civic organizations, social services, local public health agencies, and community leaders and advocates are increasingly engaged to improve the health of local residents.[2] Smaller geographic areas are often those most affected by the determinants of health, which the CHSI tool helps to explicate. Smaller geographic areas are also those where many health disparities are often observed and areas that stimulate the most significant community involvement and strategic action by local communities to find local solutions to improve health and well-being.[2]

Although Phillips et al. point out many very important uses of the CHSI, most communities and local public health agencies interested in relevant and needed data do not have the ability to access and analyze the data for meaningful, action-oriented decision making and intervention planning. We also agree that having needed data that are more detailed does not diminish the importance of CHSIs; it points out the need for more, not less data. Past and current work have clearly shown the importance of county-level and peer-comparison data in highlighting and directing resources to areas of need in improving community health.[3,4] The need for CHSIs might be clearer if they were more tightly aligned with such national efforts as the Action Plan to Reduce Racial and Ethnic Health Disparities or other efforts, such as the Eliminating Health Disparities Act of 2017, to allow a state to establish a Health Disparities Elimination Program, through which the state could develop community-based interventions to reduce health disparities.[5]

We ask the following: What national, regional, or state-level initiatives could the reintroduction of the CHSIs be aligned with?

IMPROVING COMMUNITY HEALTH

In 2013, a pivotal report of the National Research Council and the Institute of Medicine (now the National Academy of Medicine), *US Health in International Perspective: Shorter Lives, Poorer Health*, comprehensively and clearly outlined the health differences and reasons for these differences between the United States and its peer high-income countries, including 16 democracies.[6] Sadly, US health ranking was near the bottom as measured by life expectancy, which had improved but not as fast as in peer countries. The smaller gains in US life expectancy were actually reversed before the COVID-19 pandemic, from a peak of 78.84 years in 2014 to 78.54 years through 2018.[7] And during the pandemic, the US media has shone a bright light on the US health disadvantage by highlighting greater COVID-19–associated mortality in the United States than reported in peer countries.[8]

In the wake of the National Research Council and Institute of Medicine report, the American Public Health Association began an initiative to become the healthiest nation in a generation (by 2030), which included a strategy to promote the building of safe and healthy communities because the average life span across the nation is rooted in the health of communities.[9] If data on community health outcomes and determinants are not widely accessible to communities, gaps in knowledge will remain about current community health and any health progress.

As the US public health system transforms to improve overall health through full implementation of the Affordable Care Act,[10] by meeting goals and objectives of Healthy People 2030,[11] by meeting Public Health Accreditation Board Standards, and by implementing other national, local, and community initiatives to eliminate health disparities and achieve health equity,[12] communities need more, not less, essential data to actually improve the health of every member. Although many communities in the United States are strong, resilient, and capable of meeting the health needs of its residents, many communities are underresourced, have limited social supports and preventive and primary care health care services, and are not well enough organized to address the many environmental, social, behavioral, health care, and structural needs of its residents.[13]

Many communities require more and more varied interventions informed by data to provide the conditions for a healthy environment that leads to the optimal health of all residents. Stakeholder knowledge of current health outcomes and determinants of health enables science-based action to improve community health. Furthermore, the National Prevention Strategy also steers communities to implement evidence-based recommendations strategically to create healthy and safe community environments, integrate clinical and community preventive services locally, empower people, and eliminate health disparities in priority activities of tobacco-free living, preventing drug abuse and excessive alcohol use, healthy eating, active living, injury and violence-free living, and promotion of reproductive and sexual health and mental health and emotional well-being.[14]

Similarly, Healthy People 2020, and now Healthy People 2030, also calls for communities to use their goals and objectives to set local priorities.[11] Setting effective community target objectives will depend on current knowledge of health outcomes and health determinants at the level of community action as well as accessible data for surveillance and monitoring of the targets.

ACCESSIBLE HEALTH DATA

Although other sources of county-level data are available through the Robert Wood Johnson Foundation, PolicyLink, and other organizations, these resources provide aggregate data and allow some comparisons of key essential data between counties but do not provide all the essential data on health outcomes and health determinants in one data set that the CHSI tool made accessible to the public. We concur with the authors that there is still a need for CHSI-type data that are easily accessed by the public and expand indicators to also measure emotional well-being and better community health, particularly if they are combined in one accessible data set for smaller geographic areas, as the Federal Data Strategy presents an opportunity to build on lessons from the use of CHSIs.

CONCLUSIONS

Although national initiatives, such as the Federal Data Strategy and the National Committee on Vital Health Statistics, identify key health indicators to move the entire health status of the nation forward, local communities often need additional data, including smaller geographic areas of data for community health planning, interventions, programs, evaluation, and monitoring ultimately for advocacy and public health action. Creating a complete set of essential data as suggested by Phillips et al., which also addresses the gaps identified by the Federal Data Strategy and the National Committee on Vital Health Statistics, could arm communities with the needed science to effectively improve community health and achieve health equity. Only then can we realize the aphorism from a wise epidemiologist that "what gets measured gets done." AJPH

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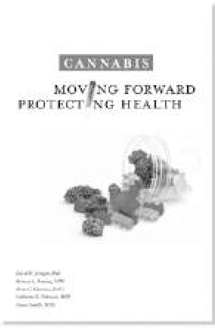

Trading Poverty for Health: Ending the Scourge of Medical Bankruptcy Requires Bold Action

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In 1994, Hall began an article on the ethics of health care rationing with an assertion. "When we are ill," he wrote, "we want our doctors to do everything within their power to heal us, regardless of the costs involved." Taking this assertion as a given, he went on to craft an elegant legal and ethical justification for granting physicians the authority to ration care at the bedside.[1]

But what if it is not a given? What if we do not actually want our doctors to do everything within their power, regardless of the costs involved? What if we care about those costs, care about the effects they have on us? And what if we want those effects accounted for?

In 2017, my colleagues and I undertook a nationally representative survey of Americans, explicitly trying to answer whether Hall's assertion reflects how the US population approaches health care in general.[2] Do we in fact take a cure-at-all-costs approach?

The short answer is no, we do not. Only 31% of our 2359 respondents adhered to Hall's cure-at-all-costs rubric. No matter the scenario presented to this particular group, they always chose the option with the highest probability of cure, irrespective of any associated risks of bankruptcy.

However, this cure-at-all-costs approach represents neither the national average nor the view of the remaining 69%. In fact, although the average respondent did value health over solvency, it was only by a factor of about five to one. In addition, this population average belies significant underlying individual variability: 1 in every 12 of our respondents would rather be dead than bankrupt.

In short, Americans constantly have to make a vicious trade-off when seeking medical care. We have to balance the risk of disease against the risk of financial catastrophe. This trade-off is more than just theoretical: recently, Patel et al. showed an abrupt increase in cancer diagnoses as people transitioned from 64 to 65 years—that is, as they became eligible for Medicare. The increase was most pronounced for stage 1 cancers, suggesting that at least some people knowingly delay care until they can get the costs of that care covered.[3] Some of us, it seems, trade our health for financial security.

On the other hand, some of us make the opposite decision, paying for health by going bankrupt. In 2009, Himmelstein et al. surveyed a random sample of 2314 Americans who filed for bankruptcy, abstracted their court records, and interviewed about half of them.[4] They found that 62% of bankruptcies could be attributed to medical costs.

Although bankruptcy itself is a distinct, legal measure present in only about a dozen countries, medical insolvency is not limited to these countries. It is a global issue with substantial impact: 150 million people face financial catastrophe annually as a result of medical costs, with the risk falling most heavily on those already in poverty.[5]

The United Nations has called for the world to track financial catastrophe. The third Sustainable Development Goal—good health and well-being—includes metrics for measuring catastrophic expenditure, which the United Nations defines as any health expense of more than 10% or 25% of total income.

If health care causes traumatic financial expenses, which not everybody is willing to accept, then these expenses must be accounted for in policy decisions. And, like any other side effect of care, they must be ameliorated.

Some progress has been made. In states that expanded Medicaid as part of the Affordable Care Act, for example, the uninsurance rate for trauma patients dropped by 80%, which led to an almost halving of the risk of financial catastrohe.[6] Similarly, becoming eligible for Medicare also mitigates age-related death: cancer outcomes are worse for younger, uninsured patients than for Medicare-eligible patients older than 65 years.[3]

Medicare and Medicaid are publicly administered systems, however, and the same mitigating effect does not seem to exist with private insurance. Because private insurance coverage is not one size fits all, merely expanding access to it does not go far enough. The jump in cancer diagnoses that Patel et al. found once people became eligible for Medicare was still seen among those who already had private insurance, suggesting that their insurance coverage was insufficient.[3] Similarly, private insurance also cannot fully protect trauma patients from catastrophic bills.[6]

In the 2009 study by Himmelstein et al., three fourths of all medical debtors were insured at the time of their bankrupting medical event.[4] Himmelstein et al. repeated and refined their analysis a decade later—and found no change in medical bankruptcy: 66.5% of cases from 2013 to 2016 implicated health care bills and illness-related income loss in the bankruptcy.[7] Although the Affordable Care Act had improved access to individual insurance between those two studies, there was no effect on the proportion of bankruptcies caused by medical costs.

If individual insurance is not the answer, then what is? In a review of 146 countries, Wagstaff et al. found that financial catastrophe was lowest in countries whose health budget is funneled through social health insurance and other governmental and nonprofit schemes,[5] exactly like Medicare and Medicaid.

This makes sense. We do not choose to get sick, but we must choose to get well. And the evidence shows that we do not want that choice to impoverish us. We do not want treatment *regardless* of the costs involved; we want to know that if we get treated, we will not be impoverished because of the costs.

To achieve that, we cannot rely on individual or employer-sponsored insurance because those most at risk for financial catastrophe are exactly those with the least access to it. We must, instead, build safety nets into our health system that cover everybody—that are strong enough to catch us when we get sick and strong enough to ensure that we are not cured into destitution. AJPH

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Extending the Scope of Health in All Policies Approaches

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See also Rapp et al., p. 1796, and Jackson et al., p. 1885.

A health in all policies (HiAP) approach has long been a cornerstone of multisectoral approaches that aim to improve population health.[1] The National Prevention Strategy, released by the National Prevention Council in 2011, explicitly prioritized a HiAP approach, aiming to align the work of sectors that are not traditionally focused on health (e.g., transportation, housing) with decision making that promotes, and does not harm, health. A HiAP approach has been intimately linked to the growing appreciation of the social determinants of health for health and health equity, effectively recognizing that absent a focus on the factors that shape where we live, work, and play, we will continue to live shorter, sicker lives. Although much of this thinking has been formalized in the US public health discourse over the past decade, it builds on a long tradition of similar thinking in other parts of the world, including the social medicine movement in Latin America[2] and more formal implementations of HiAP-like efforts in countries such as Australia.[3]

The HiAP approach has grown in visibility in recent years. The availability of tools, such as health impact assessments, that cross disciplinary and sectoral boundaries to motivate whole community efforts for positive change in health have pushed the ideas of HiAP closer to the mainstream and to realizing their potential. This is a welcome development and stands to reverse what has been the slow decline in American health over the past several decades,[4] in no small part because of our disinvestment in the social and economic conditions that ultimately shape health.[5] At a time of both social opportunity for change and renewed political opportunity in the United States, it seems reasonable to reflect on our evolving understanding of what affects health and, commensurately, on how a HiAP approach can—and perhaps should—extend to better serve its intended purpose: the promotion of health and the narrowing of health gaps.

THE DIFFERENTIAL IMPACTS OF POLICIES

A HiAP approach, in a social determinants framework, suggests a categorical determination of health, whereby specific factors—including, for example, the conditions of our neighborhoods and the availability of good education—are linked to health. This pushes us to make sure that urban planning and educational policy bear these health consequences in mind. That remains all correct and important, but our understanding of the causes of good versus poor health has expanded, as has our understanding of health gaps across groups.

Intersectionality theory, for one, has now been established for decades and shows how different aspects of social and political identities experience multiple factors of privilege, advantage, and disadvantage.[6] This suggests, for example, that sexism may, because of experiences of multiple forms of disadvantage, have a greater impact on Black and Latina women than on non-Hispanic White women. Intersectionality thinking then adds to our understanding of the impact of policies on health by recognizing that policy impacts are differently felt and that developing policies that overcome these differential disadvantages must explicitly address these intersecting forces.

Similarly, antiracist thinking pushes us to recognize that the unequal impact of policies means that policies that aim to overcome structural racism must embed explicit efforts to overcome the structures that promote and preserve racism.[7]

These approaches suggest that although a HiAP approach continues to be a useful foundation for ensuring that action on social determinants promotes health, these efforts need to embrace thinking and action that are sophisticated enough to extend well beyond the categorical simplification that any one policy can promote or harm health in isolation from the complex web of structural forces that shape population health—often differently—on an ongoing basis.

This complex interplay between policy and health is well illustrated by two articles in this issue of *AJPH*. Rapp et al. (p. 1796) present an analysis that shows that state-level sexism is associated with barriers to health care access among Black and Latina, but not non-Hispanic White, women and that more frequent need for care exacerbated this relation among Latinas in particular.

This analysis has two important lessons for our thinking about extending HiAP. First, consistent with intersectionality, this analysis shows how minority women, facing multiple disadvantages, experience more negative consequences of state-level sexism. This suggests that policies that aim to push back on state-level sexism need to bear in mind the disproportionate harms wrought and accordingly design solutions that aim to level a long unlevel playing field. Second, the very definition of state-level sexism shows how challenging this is. Dimensions of the measures Rapp et al. use include gender earnings, labor force, poverty ratios, availability of paid family leave, proportion of men in state legislature, state laws about gun ownership for domestic violence offenders, and proportion of women without abortion access.

The essential truth that this analysis reveals is that sexism is a complex construct, reflecting a broad array of policies, each implemented at different times and with different goals, that are all plausibly contributing to the gender inequality in power and resources, here summarized as state-level sexism. This does not minimize the importance of a HiAP approach. Rather, it should redouble our focus on the centrality of health in a broader range of policies than we have traditionally considered and help us recognize that each policy is influenced by a breadth of other policies, reflecting overlapping and historical structures of advantage and disadvantage. Although complex, it is clear that until we better unpack these interconnected policy relationships, we run the risk of implementing well-meaning policies that perhaps harm, rather than promote, health.

Jackson et al. (p. 1885) offer a different analysis that contributes to this same general point. These authors gather data from the United Kingdom about police stops experienced by youths and show an association between police stops and subsequent rates of self-harm and attempted suicide, a substantial proportion of which was explained by mental distress. Fundamentally, this article illustrates that policy decisions as distal from individual health as those that lead to police stops have important implications for health throughout the life course. Data in this sample included youths born in the United Kingdom, and one can imagine, given the challenges faced by immigrant youths, how these findings could have revealed intergroup differences if a broader range of youths with various disadvantages had been included. It is sobering to reflect on the policy and implementation decisions that lead to police stops, including not only legislative frameworks but also locality-by-locality norms of policing, all of which would need to align to reduce the unintended consequences of police stops and improve the health of youths. Indeed, although difficult to quantify, it is not unreasonable to speculate how negative interactions with police early in life could have the domino effect of harmful health consequences across the life course.

EXTENDING OUR THINKING

As our understanding of HiAP moves forward, it is becoming ever more important to extend the scope of our thinking to recognize the full range of specific policies, cultures, practices, norms, and histories that affect health and how these forces affect health differentially among persons who experience privilege and advantage differently. A risk of this expansion and scope of HiAP is that it may seem as though everything matters differently for all. That is perhaps true as a reductive simplification. But a recognition that our thinking needs to evolve to reflect complex intersecting realities can also pave the way for more innovative adaptations of HiAP approaches, always to the end of improving population health and narrowing health gaps. We look forward to seeing the emergence and evolution of these ideas. AJPH

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Vulnerability and Resilience: Use and Misuse of These Terms in the Public Health Discourse

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> "Social science research is oftentimes problem-focused. The questions tend to start from the perspective of asking, 'What's wrong with Black people?' We approach the issues from a very different perspective. Our question is, 'Given the structural impediments that they face, why do Black people do so well?'"
>
> —*James S. Jackson (1944–2020)*[1]

The terms "vulnerability" and "susceptibility" have been used inconsistently across as well as within diverse disciplines. However, when applied to individual health, susceptibility often refers to the chance of death (or other health threat) when exposure to a risk factor is assumed, and it is considered to be biologically based; vulnerability, on the other hand, additionally takes into account the likelihood of exposure, as well as the potential health impact of the exposure.[2] The terms vulnerability and susceptibility are often used interchangeably, and some argue that the distinction can be unclear since increased exposure can lead to biological changes that influence susceptibility.[2,3] However, the difference between vulnerability and susceptibility is important because, according to this perspective, not all susceptible individuals are vulnerable because they are not exposed. Not all exposed individuals are vulnerable because they are not susceptible. But all vulnerable individuals are both susceptible and exposed (Box 1).

Use of the terms vulnerability and susceptibility has become increasingly popular in public health discourse—vulnerability in particular—but vaguely and with little critique. What do public health scientists mean when using vulnerability to describe not only individuals but also groups of people? What are the hidden assumptions behind labeling a population as "vulnerable," and what are subsequent implications for targets for intervention? Moreover, what are the potential public health pitfalls, particularly when referring to racial/ethnic groups experiencing health inequities as "vulnerable communities," commonly in opposition to "resilient" (often in terms of "building resiliency")? What is implicit in this jargon—for understandings of etiology, causation, accountability, and agency?

SUSCEPTIBILITY, EXPOSURE, AND VULNERABILITY

We propose that whereas the concept of group vulnerability may highlight systematic health inequities, such labels can pathologize communities that have been historically discriminated against or socially disadvantaged. For instance, health inequities occurring along lines of race and ethnicity, class and socioeconomic status, sexual orientation and gender identity, immigration and documentation status, or place of residence (rural vs urban) have been well documented.[4] However, labeling some groups as "vulnerable" may also lead to internalization of stereotypes among group members, which may unintentionally lead to increased disease risk through fatalism and diminished self-efficacy, and as such could be detrimental to health equity.[5] For instance, stigmatizing public health messages may have resulted in beliefs about the inevitability of HIV infection, overestimation of risk, and fear among gay men in the United States, particularly during the 1990s, leading to internalized homophobia, worse mental health, and increased risk-taking.[6] Another consequence of vulnerability labeling is

BOX 1— Conceptual Model of Exposure, Susceptibility, and Vulnerability

		Exposed (Environmental)	
		No	**Yes**
Susceptible (Biological)	No	Not Vulnerable	Not Vulnerable
	Yes	Not Vulnerable	Vulnerable

masking health inequities in communities that are not considered "vulnerable," making it difficult for those groups to advocate for health protective resources. Health inequities in Asian American communities are often invisible in the public health landscape, and addressing them has been challenging given the pervasiveness of the "model minority myth."[7] These issues highlight the need to be more explicit about what is meant by vulnerability in public health messaging—particularly when used at the group level to describe communities and populations—and to be more thoughtful in its application.

Of central importance is the way that vulnerability is conceptualized and its relationship to susceptibility. Vulnerability is a function of susceptibility, but using these terms interchangeably can blur their distinct meanings. One illustration in the zoological sciences is the emerald ash borer, an insect species native to Asia that is considered to be invasive in North America and Europe; its larvae bore into the bark of ash trees and feed on the trunk, disrupting the flow of water and nutrients and eventually killing the tree.[8] However, although ash trees in North America and Europe are susceptible to the emerald ash borer, ash trees in Asia—which have coevolved with the insect—are less so because of biological adaptation.[8] In this example, differences in susceptibility make ash trees in Asia less vulnerable—an instance of differential vulnerability informed by variation in biological susceptibility.

Vulnerability is contingent on biological susceptibility. Importantly, vulnerability is also related to exposure. In the example just given, ash trees in the Western United States, though susceptible, are not currently vulnerable because emerald ash borers have not penetrated that region.[8] In the case of humans, examples may also be found in the environmental health sciences. Agricultural workers in the United States are at higher risk of exposure to pesticides than all other workers and in any other industry.[9] Migrant and seasonal farmworkers are most likely to experience occupational exposures to pesticides, yet they are not inherently more or less vulnerable to pesticides.[9] This is because, although these farmworkers are susceptible to pesticide hazards, their increased vulnerability is due to greater exposure driven by historically inequitable immigration and work protection policies. More broadly, although humans are biologically susceptible to environmental toxins, not all groups are equally exposed. There is considerable geographic variation in exposures to contaminants in air and water; areas with greater percentages of Black or African Americans are characterized by higher levels of pollutants.[10] These instances of disproportionate exposures are issues of environmental injustice rather than an inherent vulnerability—an example of differential vulnerability shaped by inequitable exposure to health hazards.

VULNERABILITY DURING THE COVID-19 PANDEMIC

Unevenness in the population-level distribution of disease points to disparities in vulnerability between groups, which can be driven by differences in either susceptibility or exposure, or in both. It is widely acknowledged that groups vary in (biological) susceptibility to disease. The COVID-19 pandemic has shown that older age is a risk factor for greater COVID-19 complications, including mortality.[11] These individual-level observations may be generalizable to the broader population of people who are elderly, presumably because of common biological changes that correspond with increasing age. Another factor that has been shown to increase susceptibility to COVID-19 is comorbid conditions, which constitute a biological risk factor for greater disease severity.[11] Individual-level observations about comorbid risk factors may be broadened to the population of "people with underlying conditions." Greater biological susceptibility to COVID-19 severity in these groups contributes to increased vulnerability. Vulnerability in these groups can be reduced through therapeutics and other medical innovations targeting biological susceptibility, or through public health strategies and policies that intervene on the environment and are designed to reduce exposure, such as those promoting physical distancing and mask-wearing.

There is also abundant epidemiological evidence that individuals belonging to certain racial and ethnic groups in the United States are disproportionately represented in COVID-19 cases, hospitalizations, and deaths—in particular, those identifying as Black or African American, Hispanic/Latinx, or Native American/American Indian.[11] These observations have led some public health officials to also characterize these groups as vulnerable, but the reasons behind labeling them as such are murky.

Among the manifold reasons for racial/ethnic inequities in COVID-19, one that is commonly—yet erroneously—put forth is implicitly grounded in inherent biological susceptibility. There is no evidence for anything biologically or genetically unique to race or ethnicity (social constructs) for increased COVID-19 susceptibility. However, the greater prevalence of underlying health conditions among non-Whites likely has contributed to increased biological susceptibility to severe disease, contributing to greater hospitalization risk.[11] These existing racial/ethnic inequities in health represent population-level socially induced biological susceptibility created by the unjust distribution of hazards inimical to health versus health-protective factors occurring systematically along racial/ethnic lines (social determinants of health, including structural and personally mediated racism).[12] For example, hazardous air pollution, which is worse in areas with greater percentages of Black or African American residents,[10] increases the population-level risk of chronic diseases that have been shown to result in greater susceptibility to severe COVID-19.[13]

Racism is a unique source of threat, and a social toxin that can also more directly increase biological susceptibility. Research shows that racism compromises biological systems engaged in the stress response; repeated experiences of racism accumulate and result in "weathering," or premature physiological deterioration caused by the body being continually challenged.[14] Racism has been shown to lead to accelerated aging at the cellular level, as indicated by the length of telomeres—repetitive sequences of DNA capping the ends of chromosomes that generally shorten with age.[14] Telomere length is considered to be a marker of replicative history and cumulative biological "wear and tear"; as an indicator of systemic aging, it has been linked to increased disease susceptibility and severity for a range of aging-related diseases, as well as mortality.[14] Other research has shown that persistent exposure to racism is associated with greater allostatic load, a multisystem metric of biological dysregulation, as well as DNA methylation patterns reflective of accelerated epigenetic aging.[14] These studies indicate that racism becomes biologically embedded and thus plays a profound role in the creation of susceptibility.

In addition to increasing susceptibility to disease, structural racism also contributes to greater exposure to COVID-19. Historical and contemporary racism has resulted in distinct racial/ethnic patterns in workplace (e.g., high-risk essential jobs) and neighborhood characteristics (e.g., isolation and density), centralization in urban areas, and reliance on public transportation.[15] Underlying social inequities have generated differential population-level exposure to COVID-19 via these mechanisms. Studies have also documented how Black or African American communities have disproportionally fewer COVID-19 testing sites than White neighborhoods.[16] This means that despite little evidence for any racial/ethnic differences in COVID-19 risk-taking behaviors—in fact, Asian, Black or African American, and Hispanic/Latinx adults may be more likely to engage in mask-wearing and other protective behaviors compared with Whites[17]—on a population level, communities of color are still at greater risk for COVID-19 exposure because of contextual inequities, regardless of individual behavior.[15,16]

RETHINKING RESILIENCE AND VULNERABILITY

Racism proliferates vulnerability via increased biological susceptibility as well as greater exposure to infectious and other disease causative agents. Addressing this type of vulnerability—one that is driven by socially induced biological susceptibility and environmentally driven exposure—entails intervening on social inequities and addressing structural drivers of health. The prevailing point of view, however, runs the risk of premising vulnerability and susceptibility as being inherent and rooted in communities themselves, and diverts attention from the need to dismantle the enduring legacy of past racism and current racial inequality.

Members of "vulnerable communities" have also been unduly tasked with "building resilience." Resilience, conceptualized as the ability to withstand or recover from adversity, has typically been operationalized as an individual-level attribute, having primarily biological or psychological undertones (e.g., coping); rarely has it been used to describe social structures or systems.[18] Public health discourse is replete with appeals for Black or African Americans to become resilient[19] (presuming that they are not already). This attitude overlooks the fact that they have had to overcome institutional slavery, racial terror lynchings, Jim Crow, redlining, and police brutality, among a litany of other legally sanctioned injustices, while ignoring the fragility of White people.[20]

Moreover, research also suggests that resilience developed in the context of social vulnerability can confer health tolls. John Henryism—high effortful coping, including an intense motivation to succeed and commitment to hard work—has been associated with worse underlying health among Black or African Americans, particularly among men who are socioeconomically disadvantaged.[21] Studies on Superwoman Schema, a framework used to describe how Black or African American women respond to intersectional race and gender strains, suggest that striving and feeling an obligation to remain strong and resilient is associated with increased disease risk among those in resource-poor contexts.[22] These observations are concordant with the concept of "skin-deep resilience," which posits that resilience developed against the backdrop of adversity is a doubled-edged sword: on the one hand it can lead to socioeconomic gains, but on the other it can have deleterious health consequences.[14] These studies draw attention to some of the ethical nuances of "building resilience" without addressing the structural conditions that necessitate the development of resilience in the first place, especially when that mandate is made using a White and privileged lens.[18]

In addition to ignoring some of the hidden consequences of "building resilience," public health views of vulnerability are almost always negative. However, recent research on Black or African American women suggests that suppressing emotions and resisting vulnerability may be associated with worse underlying health.[22] On an individual level, allowing oneself to be vulnerable is critical for open and honest conversations and is viewed as being essential for progress in a number of settings, including individual therapy and relationship counseling, as well as in other types of clinical encounters where transparency is paramount. Vulnerability is necessary for feeling empathy and for processing higher-order emotions, such as grief, and may in fact lead to resilience through greater emotional preparedness.[23] Psychotherapeutic techniques employ this framework and leverage vulnerability to explore and understand emotions and build processing skills.[23] On a population level, coming to terms with systemic racism and surrendering privilege require White people to have the courage to be vulnerable—to admit to longstanding injustice, and acknowledge their own accountability and responsibility in the perpetuation of racism.

IMPLICATIONS FOR PUBLIC HEALTH DISCOURSE

The COVID-19 pandemic has simultaneously exposed and exacerbated underlying health and social inequities. The terms "vulnerability" and "resilience" have been injected into public health discourse around COVID-19, particularly to describe communities and populations, including in reference to the disparate impact of the COVID-19 pandemic on certain groups.[24] These terms, however, have been used inconsistently and without clear conceptual grounding. This is particularly the case when referring to people of color as "vulnerable communities" or under the umbrella of "vulnerable populations." This discourse has been largely indifferent to the reasons behind vulnerability—for instance, whether it is socially or biologically rooted, and whether this is driven by susceptibility, exposure, or both. A consequence of reckless usage of these terms is placing the onus on people affected by societal oppression not only to adapt to but also to thrive in unhealthy environments. Such labeling also results in blindness to the strength and resilience of "vulnerable communities."

Moving forward, we recommend being more explicit about levels in which the terms vulnerability and resilience are being applied (e.g., individuals vs groups of people). When vulnerability is discussed, its sources should be described; increased vulnerability stemming from greater exposure, which is environmentally or socially driven, should be distinguished from increased susceptibility. In addition—and of paramount importance when making inferences about communities—it should be determined whether group differences in susceptibility are the result of natural biological processes (aging) or are generated by legacies of historical injustice and contemporary forms of inequality (racism). In general, more caution should be exercised when applying these terms to communities, as this language may be stigmatizing. Per the 2018 revisions to the Federal Policy for the Protection of Human Subjects ("Common Rule"), abandoning the term "vulnerable population" and instead referencing the sources of vulnerability (in the Common Rule, "vulnerable to coercion or undue influence," thereby emphasizing its contextual nature) may be warranted.[25] Along these lines, we suggest that vulnerability and resilience are more often appropriate for describing social and societal structures, and the implications of addressing "vulnerable contexts" and building "resilient systems" should be discussed instead. Lastly, we should reconsider expectations that so-called "vulnerable communities" build resilience; we should anticipate possible downsides, and contemplate whether it would be more reasonable to address the social and structural confines on health. AJPH

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Toward an Office of Evidence-Based Learning in Public Health: Formal Support, Pedagogical Scholarship, and Effective Teaching

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Graduate public health training has the charge to ensure that students acquire practical skills that they can apply in various public health practice settings.[1] Accordingly, the Council on Education for Public Health has laid out related foundational competencies to guide graduate public health programs in this endeavor.[2,3] Moreover, the dynamic nature of public health requires practitioners to be flexible and responsive to changing workforce demands. Sullivan and Galea state that public health training must be "relevant, authentic, and practical"[4(p553)] and include diverse groups and an ongoing process. The challenge presented to schools and programs of public health is to achieve these training objectives through classroom, online, and community-based training. A recent compilation of innovative pedagogy and scholarship of teaching and learning (SoTL) in public health suggests that our discipline has been tackling these challenges, although more work is needed.[5] The current reckoning with structural racism and the ongoing COVID-19 pandemic underscore that public health training must continue to innovate and to remain adaptable to incorporate critical lenses on curricula and a variety of teaching and learning modalities while ensuring educational continuity.

Normalizing and extending pedagogical scholarship as a standard for public health is needed to ensure that training is relevant, practical, adaptable, and aligned with the needs of an increasingly diverse student body. Such research is needed to inform curricula and course design and implementation in public health.[6] An expanding evidence base has demonstrated that a variety of teaching approaches used in public health education, including active, collaborative, and engaged learning strategies, are linked with enhanced student learning.[7] Despite growing recognition of the value of SoTL, there are numerous institutional- and individual-level barriers to its broad uptake.[7] Considering these barriers, Merzel et al. outline an "action agenda" for public health pedagogical scholarship.[6] Yet, pedagogy-focused programs in schools of public health remain a rarity. We briefly review the barriers to pedagogy programs and describe the headway we have made over the past five years in creating an Office of Evidence-Based Learning (OEBL) to support faculty development and engagement in evidence-based teaching and SoTL.

BARRIERS

Institutional-level barriers, particularly in research-focused institutions, include limited infrastructure to support faculty in evidence-based teaching and SoTL. Although many universities have centers for teaching and learning, few are located in a specific professional school or health sciences institution.[8] Although there are some generic best practices in teaching (e.g., practice applying content, scaffolding, and targeted feedback),[9] training public health practitioners and researchers requires attaining some skills that are unique to the discipline (e.g., community engagement, intersectoral collaboration). Thus, SoTL efforts and leadership housed in schools and programs of public health can focus on developing an evidence base to support these unique skills.[6]

Academic tenure and promotion norms that value research over teaching also present barriers to adopting evidence-based teaching and conducting SoTL projects.[10] It is widely noted that academic settings, where student tuition constitutes the lion's share of institutional funding, provide relatively few incentives for faculty to engage in

SoTL. Indeed, SoTL projects may be viewed as a distraction from high-impact research.[6,11,12] Accordingly, although pedagogical scholarship in public health is a growing field, there are few funding opportunities for SoTL. For example, there are few National Institutes of Health or foundation funding opportunities to support public health teaching research.

Traditionally, faculty receive little or no training in either teaching approaches or SoTL in their own graduate school education. Therefore, faculty may rely on familiar teaching methods, such as lectures, without much incentive or support to innovate. Prioritizing time to develop and advance research programs and securing external funding often competes with pursuing professional development in public health teaching practices.

INSTITUTIONAL MODEL

To help address the institutional- and individual-level barriers to evidence-based teaching and SoTL, the Department of Behavioral, Social, and Health Education Sciences (BSHES) in Emory University's Rollins School of Public Health established the OEBL. The idea for OEBL arose in 2015 as part of a departmental strategic planning process led by the department chair. Through this process, faculty identified a desire to demonstrate excellence in teaching as a priority. Subsequently, two teaching faculty with expertise and interest in pedagogy agreed to take on leadership roles for developing activities to achieve this strategic goal. The two lead faculty and other faculty convened in the department and the school to gauge interest in and needs for teaching support. Based on the feedback, OEBL was established in 2016 as a departmental pilot with the goal of eventually expanding to school-wide reach. OEBL is seen as a disciplinary-specific complement to the university-wide Center for Faculty Development and Excellence, which provides faculty development and support in teaching, particularly for faculty in the humanities, arts, and sciences.

OEBL's mission is to generate scholarship in public health pedagogy and to support instructors in implementing effective teaching practices as they train future public health professionals. OEBL focuses on two main areas: (1) SoTL in public health, and (2) public health faculty and instructor development. For the first aim, OEBL conducts SoTL research and collaborates with faculty in developing and conducting SoTL projects that will contribute to a data-driven knowledge base to inform best practices in how to most effectively train our students. For the second aim, OEBL supports faculty and instructors in incorporating effective and evidence-based teaching strategies in their courses with the goal of ensuring students' mastery of their degree competencies and preparedness to enter the public health workforce. OEBL offers consultations on syllabi and course elements, peer observations, and faculty development sessions on such topics as inclusive pedagogies, backward design, and supporting student teams.

The establishment of OEBL in the BSHES department provided a formal infrastructure for faculty seeking to advance their teaching approaches through evidence-informed practices. Initially, the BSHES department supported 10% effort (i.e., annual salary coverage) for two lead faculty (approximately $30 000 in the first year); support was increased in 2020 to 20% effort for one of the lead faculty. Additionally, the department provides $2000 to $4000 annually to cover graduate research assistants and other expenses associated with evaluation projects (e.g., transcription services). The Dean's Office provided additional funding for school-wide evaluation efforts. With this relatively modest financial commitment, OEBL developed a portfolio of research on teaching innovation and curriculum development that has shaped the direction of the BSHES curriculum in significant ways.

INSTITUTIONAL-LEVEL SUPPORT ACTIVITIES

OEBL's research on teaching innovation focuses on methodologically rigorous evaluations of newly adopted teaching approaches selected based on the pedagogy evidence, including team-based learning,[13,14] community-engaged learning,[15] and problem-based learning.[16] The mixed-methods studies on team-based learning and problem-based learning show that students value interactive and team-based activities and report strong confidence in meeting the course learning objectives.[13,14,16] Community partners who worked with the community-engaged learning courses indicate that students provided quality data that informed their subsequent work.[15]

In addition, OEBL conducts and disseminates less formal course evaluations in the BSHES department to assess teaching approaches across different sections of the same courses and to inform changes to course structure and content delivery. For example, OEBL evaluated the implementation of a flipped classroom approach in a health behavior theory course.

The flipped classroom section involved students preparing for class by completing readings and watching a prerecorded lecture and then working in teams during class to apply the material and develop a conceptual model. Compared with the traditional section, students in the flipped classroom section reported higher confidence to meet course objectives. As a result of these findings, the flipped classroom approach was expanded to other sections the following year.

Although some OEBL research has informed specific teaching practices, other efforts have addressed curriculum development more broadly. For example, OEBL contributed to an assessment of master's-level core curricula at the top 20 accredited schools of public health in the United States in 2017 to examine the degree to which students learn about social determinants of health in their coursework. In an *AJPH* commentary, we encouraged schools of public health to reevaluate their curricula with a particular focus on enhancing not only knowledge of social determinants of health but also the ability to intervene in social determinants of health to improve health outcomes.[17] Based on this work, OEBL collaborated with BSHES faculty to review and integrate social determinants of health content in the master's of public health curriculum.

Beyond the BSHES department, OEBL evaluated the implementation of new hybrid sections, which combined online and in-person sessions, across five discipline-specific core courses required of all master's of public health students (i.e., behavioral sciences in public health, perspectives in environmental health, fundamentals of epidemiology, introduction to the US healthcare system, critical issues in global health). This two-year evaluation concluded in spring 2020, just before the COVID-19 pandemic disrupted established teaching practices and forced many faculty into the unfamiliar world of online teaching. Results of the evaluation showing that hybrid and online courses are equivalent to traditional classroom teaching provided a foundation from which to confidently launch the necessary transition to online courses with the support of instructional designers.[18] Based on this evaluation, the Rollins School of Public Health is supporting further revisions to the newly developed hybrid courses (e.g., improved communication to students about hybrid course expectations, strategic use of discussion boards for student engagement), implementing lessons learned for online teaching during the COVID-19 pandemic, and considering the expansion of hybrid or online teaching approaches to other courses after the pandemic.

INDIVIDUAL-LEVEL SUPPORT ACTIVITIES

Providing skills development opportunities for instructors is important for supporting the adoption of evidence-based teaching methods and enhancing public health pedagogy. Although the university-wide Center for Faculty Development and Excellence offers professional development in teaching, there are few opportunities specifically tailored for teaching in public health. To meet this need, OEBL offers training and support in two main areas of skill development.

First, through skills-based workshops and one-to-one consultations, we offer training and guidance on redesigning and implementing courses using active and inclusive pedagogies. For example, we have delivered trainings on using competencies and learning objectives for effective teaching and implementing strategies for inclusive teaching (e.g., including multiple perspectives in course content and materials, using a variety of teaching methods to support the learning of all students).

Second, OEBL has developed protocols designed to help faculty collect better data about the effectiveness of their teaching practices and augment the school-sponsored student course evaluations.[19] These approaches include modifications to midterm course evaluation, which have now been adopted school-wide (e.g., including questions prompting students to reflect on their effort on preparation, class participation, and assignments); the group instructional feedback technique, which generates constructive feedback for course instructors;[20,21] and peer observations of teaching. After group instructional feedback or observation, we provide actionable feedback to the instructor through discussions and a written summary. Faculty have used these tools to identify areas in need of improvement, respond to student concerns, and implement new, innovative teaching strategies.

Peer observations are used in three main ways: for faculty who want to receive feedback on their teaching and document teaching effectiveness in promotion packets, for doctoral students who are developing their pedagogical skills and building their teaching portfolios, and for adjunct instructors teaching in the department for the first time to receive feedback. Notably, instructors who have requested consultations about course development or peer observations are evenly distributed between tenure track and tenured faculty, nontenure track faculty, and adjunct instructors (including doctoral students).

The OEBL supports faculty in conducting their own SoTL projects. We provide technical assistance in designing evaluations to assess teaching and student learning, assistance with navigating institutional review board processes, the development of measures and recruitment strategies, and financial support for graduate research assistants and logistics. For example, OEBL is currently collaborating with faculty members on the evaluation of two courses: (1) Applied History of Public Health, a required core course for BSHES master's of public health students; and (2) Lesbian, Gay, Bisexual, Transgender and Queer (LGBTQ) Public Health, an elective seminar. These evaluations, which include data collection with students and alumni, assess the scope of course content, instructional delivery, and the students' application of the material in other courses, public health practice experiences, and jobs.

CONCLUSIONS

Our experience with OEBL demonstrates that a formalized structure for supporting faculty teaching and SoTL in public health is feasible and can address institutional- and individual-level barriers to the adoption of evidence-based public health teaching and SoTL. At the institutional level, OEBL can serve as a model for formalized infrastructure and leadership, which is a critical ingredient in supporting faculty development in teaching and SoTL, increasing uptake of evidence-based teaching practices, and enhancing teaching effectiveness.[6,22,23] At the individual level, OEBL supports faculty training in and the dissemination of evidence-based teaching methods.

During its five years of operation, OEBL increased the opportunities for faculty to engage in SoTL, design and implement curricula that align with Council on Education for Public Health competencies, and address the rapidly changing landscape of public health research and practice. OEBL increased the visibility of SoTL in public health through faculty workshops, presentations at professional conferences, and publications in peer-reviewed journals. Moreover, OEBL strengthened internal support for faculty through training, individualized course evaluations, and consultations, thereby providing the supports that are important to faculty implementation of evidence-based teaching practices.[22] These endeavors have provided faculty with feedback on their teaching, which has been used to refine pedagogical methods and has been incorporated into teaching dossiers that showcase faculty teaching performance and accomplishments in tenure and promotion packets. Additionally, OEBL evaluations informed departmental efforts to integrate social determinants of health into the master's of public health curriculum as well as school-level efforts to extend online and hybrid course modalities. These adjustments helped the department to better respond to the student demands emerging from the protests against systematic racism in the summer of 2020 and the shifts toward online learning because of the COVID-19 pandemic.

The next steps for OEBL include long-term evaluations of changes in curriculum, learning, and instruction. We will continue our commitment to inclusive teaching, with plans to expand our focus on antiracist pedagogies that examine and work to address structural racism and power in public health.[24] Additionally, we continue to plan ways to sustain OEBL's work, especially in achieving the goal of taking OEBL school-wide. One action has been to increase the effort of the lead OEBL faculty to extend our capacity for conducting SoTL and supporting instructors. However, additional resources may be necessary to meet the needs of faculty across the school.

As with any model for faculty development in teaching,[8] we recognize that the OEBL model should be tailored to the characteristics and needs of a particular department, program, or school. However, we share the evolving accomplishments of our OEBL to engage other schools and programs of public health in considering similar initiatives to improve public health pedagogy and SoTL in response to recent recommendations. Efforts such as OEBL can facilitate the uptake and implementation of effective, inclusive, and innovative teaching practices; support instructors in responding to challenges, such as those resulting from the COVID-19 and racial injustice pandemics; contribute to the scholarship on public health pedagogy; and, ultimately, help prepare diverse students to successfully enter the public health workforce. AJPH

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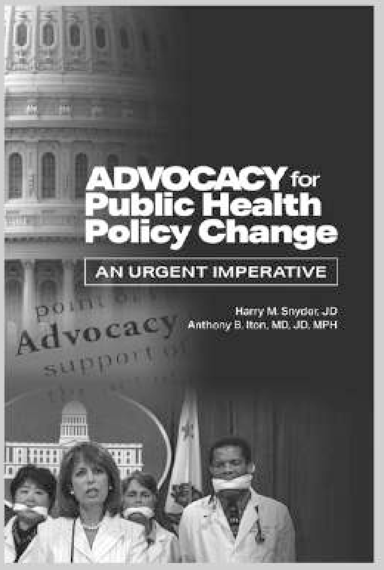

Finding the Next Flint: The Need to Update the Blood Lead Reference Value

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In 2012, the US Centers for Disease Control and Prevention (CDC) adopted a blood lead reference value of 5 micrograms per deciliter and recognized that there is no known health-based threshold for effects in children. Previously, the agency had identified a "level of concern" implying that blood lead levels (BLLs) under 10 micrograms per deciliter were not associated with harm. In making the switch, there was purposeful intent to recognize that there is no safe level of lead exposure and therefore a new classification system was needed to identify and prioritize the most highly exposed.[1] The reference value is an action level at which the CDC recommends environmental investigations to identify sources of lead exposure in a child's home.

The reference value is intended to identify individual children who have greater lead exposures than others in the same population.[1] This serves to inform parents that their children are being exposed to lead at "elevated" levels far in excess of the median level in the United States (0.69 μg/dL in 2015–2016).[2] Collectively, these results also inform communities and public health authorities of patterns in BLLs and provide a warning of the need to identify and reduce specific sources of environmental lead exposure. Comparing results from blood lead testing against the population background levels allows communities to analyze trends, thereby highlighting changes in exposure patterns.[3] Conversely, the success of efforts to remove lead from products and abate environmental lead hazards are measured against BLL benchmarks over time.

In 2014, when the city of Flint, Michigan, changed its drinking water source and failed to control the pH level, the protective mineral layer in pipes was stripped away, allowing more lead into the water. The prevalence of elevated BLLs greater than 5.0 micrograms per deciliter among children aged younger than 6 years went from 2.4% to 4.9% after the change in water source. This increase was detected by physicians and researchers looking at incremental changes in the proportion of children with BLLs greater than the CDC reference value.[4] Had the reference value not been adopted by the CDC, it is likely that this increase would have been underappreciated.

There has long been a false dichotomy between those arguing for increased surveillance with blood lead testing (considered secondary prevention) and the public health paradigm of primary prevention that seeks to eliminate sources of exposure before they cause harm. Although eliminating sources of environmental lead exposure is the ultimate long-term objective to stop childhood lead poisoning, in the interim we also need to prioritize individuals and communities that are overexposed to facilitate actions to reduce harm.

IMPACTS OF LOW-LEVEL LEAD EXPOSURE

There is scientific consensus that lead exposures in children, even at levels less than the CDC reference value of 5 micrograms per deciliter, are associated with adverse neurological and behavioral outcomes in children. Low-level lead exposures are also linked to hypertension and cardiovascular disease in adults.[5]

In 2012, the National Toxicology Program published a comprehensive review on the health effects of lead. The program's consensus was that there is sufficient evidence for neurological effects in children at BLLs less than 5 micrograms per deciliter. In particular, they pointed to reduced cognitive function as measured with standardized tests such as IQ, and increased incidence of attention-related behavioral problems and antisocial behavior at these levels.[5]

At least five epidemiological studies have demonstrated adverse outcomes for children with BLLs less than 5 micrograms per deciliter. These outcomes include lower reading and math scores and attention-related behaviors. The authors of a review of this evidence conclude that these impacts are seen at BLLs as low as 2 micrograms per deciliter.[6]

REVERSING HEALTH INEQUITY

It is well recognized that elevated BLLs are not uniformly distributed in the United States, because of environmental injustice from living in older, poorly maintained housing and in areas closer to industrial emissions. Non-Hispanic Black children are more than twice as likely to have a BLL of 5 micrograms per deciliter or higher and have mean BLLs that are 50% higher than those of White children.[7,8] A recent study shows that this difference starts before birth and persists into childhood.[9] The disparity in BLLs remains even when controlling for known risk factors, including housing age, indoor household smoking, and socioeconomic factors.[8]

Poverty also plays a significant role, especially when combined with race. Black children living in poverty are four times more likely to have an elevated BLL than White or Hispanic children, even after controlling for other known risk factors.[8]

It has been well understood that housing age and conditions are significant predictors of lead exposure. Environmental lead exposures outside the home are also contributing to disparities in BLLs. Findings from a study involving more than 60 000 children in Kansas have shown that proximity to lead-emitting industries, including lead battery manufacturing, is significantly linked to higher BLLs.[10] Another study found that race and poverty were predictors of soil lead levels in both urban and rural areas. Areas of South Carolina with higher proportions of Black children had significantly higher soil lead levels, and the disparities attributable to race were greater than disparities observed with income levels.[11]

Differences in lead exposures by race and economic background have been observed since at least the 1950s and well documented since the 1970s.[12,13] This situation has persisted for decades even as median BLLs have dropped precipitously, highlighting the need to prioritize actions to abate lead hazards in these communities.

RESPONDING TO ENVIRONMENTAL CONTAMINATION

Identifying and responding to children with BLLs above the reference value allows us to investigate, identify, and mitigate environmental lead contamination in and around homes. For example, one study examined the findings from Maine after the state required environmental investigations of homes where children's BLLs exceeded 5 micrograms per deciliter. They concluded that such inspections were nearly as likely to identify lead hazards that required abatement as were inspections in homes where BLLs exceeded 10 micrograms per deciliter.[14]

At the time that the CDC adopted the reference level, there were estimated to be more than 500 000 children in the United States with BLLs exceeding 5 micrograms per deciliter.[7] However, very few of these children had their homes tested for lead or received any public health services. Even today in most states, including California, children with BLLs below 10 micrograms per deciliter generally do not receive environmental inspection services to identify potential sources of exposure.

Responding to environmental lead hazards has been shown to be effective at reducing BLLs among children. The ability to identify and successfully mitigate exposures from paint, dust, and soil has been repeatedly demonstrated to reduce BLLs.[15–17] In addition, occupations that result in "take home" exposures and other sources, including imported food, spices, pottery, and home remedies, are known to contribute to childhood lead exposures that often go undetected in the absence of public health interventions.

NEED FOR ACTION

The CDC blood lead reference value does not inform medical, diagnostic, or treatment protocols for childhood lead poisoning. Instead, it serves a dual purpose: to inform individual cases (e.g., parents) that a child's exposure exceeds background levels and to serve as a public health surveillance tool to warn that children are being overexposed. This was the criterion that alerted physicians in Flint—who in turn notified the general public, which forced authorities to respond to the crisis. In recent years, we have seen similar communitywide elevated BLLs in one area of East Chicago, Indiana, and throughout Newark, New Jersey, serving to inform authorities of the need to respond to lead-contaminated soil and lead in drinking water.[18,19]

Despite the demonstrated importance of revising the blood lead action level in the past, the CDC has failed to follow the advice of its independent expert committees to revise the reference value based on current national surveillance data. In 2012, the Advisory Committee on Childhood Lead Poisoning Prevention set the initial value at 5 micrograms per deciliter, based on the 97.5 percentile of the National Health and Nutrition Examination Survey

(NHANES) BLL distribution for children aged younger than 6 years at that time. In 2017, the CDC's Board of Scientific Counselors recommended that the agency adopt a revised blood lead reference value for children, using the most recent NHANES data, that would set the level at 3.5 micrograms per deciliter.[20] In 2021, the CDC's Lead Exposure and Prevention Advisory Committee unanimously recommended that the agency lower the blood lead action level for children to 3.5 micrograms per deciliter.[21] However, to date no action has been taken by the agency.

Concerns have been raised about the expense of public health interventions for a larger number of children who would be identified through an updated reference value.[22] There has been controversy during each of the four times that the CDC lowered the blood lead action level—starting in 1970, when the level was 40 micrograms per deciliter.[23] However, the CDC is not a regulatory agency and its guidance is not mandatory for state or local health departments. In fact, since the last revision in 2012, only 18 states and a small number of local agencies have revised their response criteria to require some action when a child's blood lead test exceeds 5 micrograms per deciliter.[24] Some states, including Maine, Illinois, and New York, have passed laws in accordance with CDC recommendations requiring environmental assessments for children with BLLs above the action level.[25–27]

It is well-known that lead poisoning has consistently affected more vulnerable populations who have greater exposures from residing in low-income areas, living in poorly maintained older homes, and absorbing more lead through poor nutrition. Efforts to prioritize the reduction of exposures in disadvantaged low-income communities require surveillance to identify the most highly exposed. If we fail to update our measure of "overexposure," we are ignoring those who are disadvantaged by living in a contaminated environment or drinking contaminated water. By not conducting environmental investigations and abating identified hazards for all children with exposures well above background levels, we knowingly subject those children to ongoing harm.

If no decision is taken over time to lower the blood lead action level, then fewer at-risk children will be identified. This will ultimately impede community efforts to utilize aggregate blood lead testing data to investigate and identify possible sources of lead exposure. It also keeps parents, who may be living in a contaminated environment, unaware of lead hazards in their home.

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CONFLICTS OF INTEREST

The author serves as an expert witness in litigation regarding lead exposures.

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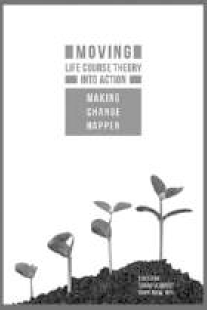

The Prison Industrial Complex as a Commercial Determinant of Health

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Researchers and the public alike increasingly recognize that elements of modern capitalism and poor health outcomes are fundamentally intertwined. A small number of industries, including tobacco, alcohol, and food and beverage, now contribute to the major causes of poor health and premature deaths in the United States and globally.[1] The commercial determinants of health (CDOH) provide a framework to systematically analyze the strategies that corporate interests employ to boost consumption of their unhealthful products and behaviors. In laying out both the strategies that corporate interests employ and the mechanisms to counteract these strategies, the CDOH provides a set of tools to address corporate practices, an important determinant of health.

Many research fields that focus on corporate impacts on health are not in communication with each other, yet they can all learn from each other in both mapping and analyzing the strategies that industries use and the methods researchers have developed to analyze industry practices' impacts on health. Despite selling very different unhealthy products, corporations frequently follow a similar playbook and operate through parallel channels, including control over decision-making and agenda-setting, continual political lobbying, campaign and party donations, participation in governmental agencies, deployment of public relations committees, reduced legal liability, and greenwashing strategies to reduce attention on companies' broader deleterious actions.[2]

To date, CDOH researchers have predominantly focused on corporate strategies within tobacco, alcohol, and unhealthy food and beverages. These areas are all vital to an improved understanding of epidemiological patterns, but the frameworks and methodological approaches of CDOH can greatly contribute to other fields as well. As the CDOH field has grown, recent scholarly attention has been aimed at the firearm industry, gambling, and more. Little attention to date, however, has been paid to the prison industrial complex (PIC).

THE PRISON INDUSTRIAL COMPLEX

The United States is the world leader in incarceration, with about 2.1 million Americans currently incarcerated and one in three African American men incarcerated at some point in their lives. As outlined by a recent Sentencing Project report, the health harms from mass incarceration are indisputable: for incarcerated individuals, intense mental and physical health impacts both during incarceration and upon release, inadequate health care, overall elevated mortality risks, and increased rates of communicable diseases such as HIV and viral hepatitis (https://bit.ly/3upt2vd); for the partners, children, and communities of incarcerated persons, overall health impacts that partially underlie systemic health disparities (i.e., the disproportionate burden of morbidity and mortality borne by racial minorities, particularly African Americans).[3] These direct health impacts of incarceration have been even more evident during the COVID-19 pandemic, with 5.5 times higher case rates for incarcerated persons than the overall US population case rate.[4]

American mass incarceration is a direct result of systemic racism, and a broader project to enforce both traditional and novel methods of discrimination and oppression through "systems of racialized social control."[5(p18)] This racial project also interacts with a broader economic project: by fueling the dehumanization of minority communities, notably African Americans, systemic racism enables the commodification of bodies. A CDOH lens allows not only an exploration of commercial aspects of mass incarceration but also of power asymmetries in the institutionalization of racism in societal structures, and of how it enables the commodification of African Americans and other minorities for the profit motive. Moreover, CDOH frameworks incorporate theories of power to guide the study of the structural factors that enable corporate influence on health. Madureira Lima and Galea,[2] for instance, apply Lukes' tridimensional view of power[6] to examine the dimensions, vehicles, practices, and outcomes of corporate power. Such frameworks are indispensable in outlining the ways in which mass incarceration power operates along both racial and commercial avenues.

One irrefutable factor underlying mass incarceration and associated health risks is the PIC. In speaking about the PIC, we are referring to the private sector that profits from mass incarceration as a whole, as well as the prisons that are directly privatized. More than just prison operations and management, the PIC includes commercial actors involved in bail programs, community surveillance, prison construction, corrections data systems, security equipment, prison food and vending machines, transportation, health services, communications, and prison labor.[7] The PIC also includes the wide range of tactics actors employ to maintain systems of mass incarceration. A relatively recent *Washington Post* article outlined the many strategies that PIC actors have used to extensively shape the policy environment, including lobbying, providing direct campaign contributions, and building relationships and networks to a range of state and federal politicians, often leading to the awarding of state contracts for high-price prisons (https://wapo.st/3bWHtjM). Moreover, in recent decades, the same private actors involved in the prison sector have expanded their operations to encompass migrant detention centers. A recent *New York Times* article estimated that about 10% of American prisons and 73% of migrant detention centers are now privatized (https://nyti.ms/3fpLgbH). This level of privatization has created incentives to increase prison and migrant detainee populations while cutting health and safety measures for incarcerated persons. Although there have been no comparative studies, an American Academy of Family Physicians report noted anecdotal evidence from multiple court cases of increases in inmate mortality upon privatization of prison health care; significant deficiencies in care; and allegations of increased risk of serious harm, including amputation, preventable injuries, and disfigurement (https://bit.ly/3ylcPV5). Yet systematic data on the connections remain sparse.

US President Joe Biden recently signed an executive order aiming to end the use of private prisons by the Justice Department. Although an important first step, the order does not apply to private facilities used by the Department of Homeland Security to detain immigrants, nor does it include the approximately 90% of private prisons that are state run.[7]

AREAS FOR RESEARCH

Building on previous research and CDOH frameworks, we advocate for four primary areas of inquiry.

First, a CDOH framework provides guidance on a wide range of methods for the analysis of corporate activities, including Freedom of Information requests, corporate document analysis, social media research methods, and interviews with key informants from the corporate sector. Research on prisons remains limited, in large part because of the difficulty of obtaining access. Although these methods are not unique to CDOH, taken together they provide important tools for in-depth investigations of the PIC in their ability to focus on the impact of specific PIC interests and the policy environment surrounding them.

Second, although the health harms of mass incarceration have been well documented, the impacts of the PIC, both in terms of private prisons and the broader set of industries that profit from mass incarceration, have received far less attention. In order to isolate the particular harms of the PIC, it is vital to understand the extent to which these harms are a result of industry practices, as opposed to the broader carceral system. This can be achieved by examining the specific pathways, such as lobbying and political influence, through which the PIC wields its power.

Third, research must extend past the PIC's role as an economic actor into its positioning as a stakeholder and influencer of policy. Applying a power lens to this positioning may shed light on the process through which the state has delegated one of its core functions: the monopoly over the administration of punishment to the private sector. This shift in the role of corporations has been outlined more generally, but the PIC's influence has not been comprehensively outlined to date. Although understanding the impact of privatization within prisons is vital, equally important is its role in affecting both social policy and public opinion more broadly.

Finally, research on the PIC should have an inbuilt equity component. CDOH frameworks can complement a social determinants of health framework by illustrating the specific paths through which social inequities are borne out of corporate and commercial interests. Crime and antisocial behavior are heavily determined by social factors, including access to quality education, employment, housing, and social protection. In other words, the PIC draws its profits from those at the bottom of the socioeconomic scale, including both incarcerated individuals and their families. Moreover, US incarceration is deeply stratified by race, with African Americans five times more likely to be imprisoned than Whites. An equity-minded research agenda must explore the role of the PIC in exacerbating and perpetuating these health and social inequities.

CONCLUSION

Most of what we know about the links between the PIC and health comes from a combination of investigative journalism and legal documents. We believe it is well past time for public health researchers to turn our focus toward the issue as well. CDOH frameworks allow for shared paradigms and methodologies from researchers from a wide range of fields that have been similarly affected by different commercial interests.

We don't believe the justice system should be conducted through the motivation of profit. But while such a profit incentive remains, it is vital that the CDOH framework illustrate the connections between this profit motive and health outcomes—among incarcerated individuals as well as affected communities more broadly. The CDOH framework allows for important critical attention to be paid to one of the root causes of mass incarceration—immoral corporate practices—and the broader political–economic structures and strategies that enable these inequities. It is time we bring this focus to an enormously health-harming industry that has so far escaped the field's scrutiny. AJPH

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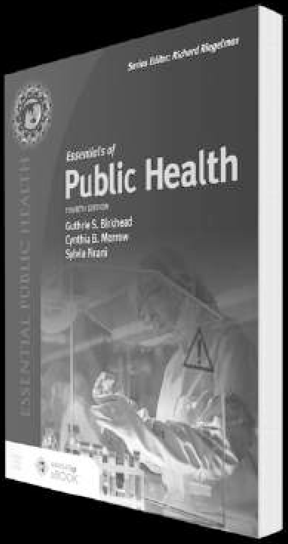

Countering Misinformation About Abortion: The Role of Health Sciences Librarians

Jill Barr-Walker, MPH, MS, Teresa DePiñeres, MD, Peace Ossom-Williamson, MLS, MS, Biftu Mengesha, MD, MAS, and Nancy F. Berglas, DrPH

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A substantial body of research has concluded that abortion is safe, with minimal complications and without increased risk of breast cancer, infertility, depression, anxiety, or posttraumatic stress.[1] Nonetheless, abortion is among the most regulated medical procedures in the United States.[1] Abortion-focused laws often have the stated intent to protect patient health and safety, although there is no evidence that they do so;[1] rather, these increased restrictions have a direct impact on communities that are also disproportionately affected by overall health disparities and inequities, particularly communities of color and those with low incomes.[2]

We believe that health sciences librarians, a professional group whose core values prioritize informed health care decisions, have a role in the provision of evidence-based information around abortion. Drawing on our collective expertise in library science, medicine, and public health, we propose that health sciences librarians build partnerships with public health departments and abortion providers to develop authoritative resources, advocate for change through legislative action, and raise public awareness about abortion misinformation.

ABORTION MISINFORMATION

All states have general laws requiring that patients give their informed consent before receiving medical treatment; abortion is a rare situation with its own specific mandate. These laws, commonly termed “Women’s Right to Know” laws, take the language of informed consent as motivation for their enactment, despite the fact that they go beyond the general ethical practices used for comparable procedures.

As of April 2021, 29 states have laws in place that detail the information a patient must be given or offered before having an abortion.[3] In 22 states, mandated information materials include statements that are not supported by scientific evidence (Figure 1).[3,4] These materials include inaccurate or misleading information indicating that abortion increases the risk of breast cancer (five states), infertility (three states), or negative mental health consequences (eight states). Other states include inaccurate information about fetal pain (13 states) or about reversing medication abortion after the first set of pills have been taken (six states). Seven states include inaccurate or misleading information in their materials even though it is not mandated by state law. Overall, these trends make clear that patients may receive very different information about abortion depending on the state in which they seek care.

Knowledge about abortion among the public is limited[5] as a result of systematic misinformation and limited access to accurate information, which particularly affects populations experiencing significant reproductive injustices.[6] Structural factors such as lack of access to quality information resources or infrastructure, limited availability of information in culturally responsive formats, or lack of translation services may further perpetuate this disparity. Inaccurate information about abortion may affect patients’ ability to make informed decisions, increase anxiety about having an abortion, and affect expectations about coping afterward; there is evidence indicating that state-mandated misinformation may influence understanding of abortion safety and risks.[5,7]

FIGURE 1— **Distribution of State-Mandated Abortion Information Laws and Inaccurate or Misleading Materials: United States, April 2021**

Note. States with mandated materials are shown in black (n = 29); states with mandated materials that contain inaccurate or misleading information are marked with an asterisk (n = 22).
Source. Data were derived from the Guttmacher Institute.[4]

Abortion providers have reported increases in costs, work hours, and physical and emotional stress associated with providing inaccurate information to their patients.[8] The cornerstones of clinicians' professional and ethical responsibilities are to serve patients' interests without being compromised by societal pressures or administrative exigencies, to respect patient autonomy, and to maintain a commitment to honesty with patients.[9] Mandated information infringes on patients' and providers' autonomy[10] and perpetuates stigmatization of both abortion providers and patients. This can cause harm by forcing providers to go against the principle of nonmaleficence, ultimately eroding patient trust, which is the foundation of safe and effective clinical care.

HOW HEALTH SCIENCES LIBRARIANS CAN HELP

Among the core values of the Medical Library Association are the use of scientific evidence in making health care decisions, advancement of health information research and evidence-based practice, and promotion of public awareness of, access to, and use of high-quality health information.[11] State laws requiring that health care providers give inaccurate information to abortion patients are contrary to the foundations on which librarianship is built. Far from being neutral, librarians have a rich history of engagement in social justice work, with a recent focus on questioning the idea that libraries are inherently good and beyond critique.[12] There are unexplored opportunities for librarians to partner with public health departments and providers to address abortion misinformation in ways consistent with the profession's core values.

Finding Evidence-Based Information

We suggest that librarians seek out contacts in public health departments to find the teams responsible for creating abortion information materials and offer support in supplying evidence-based resources to inform or review the content of materials. Recent research shows that some health departments—even in states that are more politically conservative—have made efforts to include evidence-based information in their materials, indicating a desire and need for these services.[13] Such partnerships are not new: the National Network of the Library of Medicine collaborates with hundreds of public health department workers each year through its extensive outreach. Librarians can also supply abortion providers with supplemental information for patients at the point of care. We suggest that librarians offer their support to national provider organizations such as the Abortion Care Network and National Abortion Federation and identify providers in their communities.

Librarians can make special efforts to partner with providers and organizations that serve communities affected by structural factors that cause information gaps. Librarians can identify Title X clinics and clinics in underserved areas to enhance the information resources available, which will in turn benefit populations that are structurally disadvantaged in terms of access to information. Community-based organizations, especially those that provide reproductive health information, are another avenue for librarians to help disseminate accurate information that is culturally responsive and available in different languages. In this way, librarians can partner directly with communities and patients to get them the information they deserve.

Advocacy and Legislative Efforts

We see an opportunity for librarians, clinicians, and public health experts to collaborate on advocacy efforts against abortion misinformation. Librarians advocate at every level of government by testifying before legislative committees, partnering with policymakers and nonprofit organizations, and creating political action committees to advance issues such as ensuring home Internet equity and combating attempted bans of library materials.[14]

More specifically, library workers and organizations have advocated for greater and more immediate access to health information. In 2020, the Medical Library Association and the Association of Academic Health Sciences Libraries released a joint call to action for immediate and transparent dissemination of information, “reject[ing] all attempts to interfere with or delay the dissemination of scientific evidence” and stating that “the health sciences library community stands ready to support efforts to increase transparency and impartiality in the dissemination of health information.”[15] Together, these organizations submitted testimony to the Senate to advocate for funding in support of access to health information and partnerships that ensure outreach and engagement with communities nationwide.

Librarians have also advocated for access to information about abortion. In 2008, abortion was included as a stop word—that is, a word blocked from being searchable—in the reproductive health database Popline after database administrators noticed entries stating that abortion is a human right. This decision was ultimately reversed because of the advocacy of librarians at the University of California, San Francisco who raised awareness and support nationally.[16] Librarians interested in advocating against abortion misinformation can bring this issue to statewide political action committees, create calls to action or sign-on letters in collaboration with professional organizations such as the American Library Association and Medical Library Association, and partner with public health professionals and providers to prepare issue briefs and reports for policymakers, legislators, and advocates.

Raising Public Awareness

Finally, we recommend awareness raising as an important tool in which public health professionals and providers can share their expertise with librarians. The fact that many librarians are unaware of a legislatively mandated practice that explicitly goes against their professional values and is happening in many of their states, communities, and institutions is unacceptable. We suggest considering librarians as a stakeholder group with the potential to raise awareness among their users, who often include students, faculty members, researchers, public health workers, providers, patients, and community members. Public health professionals, researchers, and providers can share their work at library conferences, through library list-servs, and on social media to explain how evidence is used to inform practice locally and discuss areas in which evidence is dismissed or misinterpreted.

CONCLUSIONS

A core tenet across the fields of medicine, public health, and health sciences librarianship is patients' right to evidence-based information when making decisions about their health. The politicized nature of abortion in the United States has resulted in the denial of the public's right to be equipped with accurate information about abortion provision, laws, and safety, especially for those considering abortion. Materials that further limit pregnant people's access to accurate information about abortion, such as those mandated in 22 states, violate accepted principles of informed consent and raise important ethical concerns.

No medical procedure is subject to more system-level misinformation than abortion, demonstrating how reproductive politics continues to be centered on a system of dominance based on sex, gender, and race. This is a reproductive justice issue, as denying or limiting access to accurate information does not allow individuals to make reproductive decisions free of coercion or undue burden. The core professional values of health sciences librarians prioritize access to evidence-based health information for everyone, with the goal of facilitating informed health care decisions. Drawing on their training, experience, and professional values, health sciences librarians can play an important role in countering state-mandated misinformation and improving general understanding of abortion. AJPH

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A Public Health Agenda for the 2020s

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In the past 20 years, the United States has experienced a cascade of public health crises causing millions of premature deaths and preventable illnesses. Several intersecting health problems define this cascade both nationally and globally. These issues include the COVID-19 pandemic, the climate emergency, the failure of the global food system to adequately nourish the world's population, a growing burden of mental health problems, and the rise of precarious, underpaid, and unsafe work, as shown in Figure 1.

Absent intervention, the next decade may be even more perilous. In past health calamities, social movements have mobilized to improve urban living conditions, reduce environmental pollution, and make food safer.[4] A first step toward building a public health movement that can take on today's threats to public health is to define a shared agenda that could bring together the many constituencies harmed by the perilous status quo.

The problems that constitute the current crises are rooted in recent changes in the global economy and politics. For the most part, our society has reacted to these crises as if each were separate, requiring unique solutions. Few have suggested that the United States has the opportunity and obligation to improve its own health by improving global health. To date, piecemeal and reactive solutions have failed to mitigate or prevent recurrent health crises. Although each problem has different proximal causes, a global economic and political system that values profit over human and planetary well-being exacerbates all.

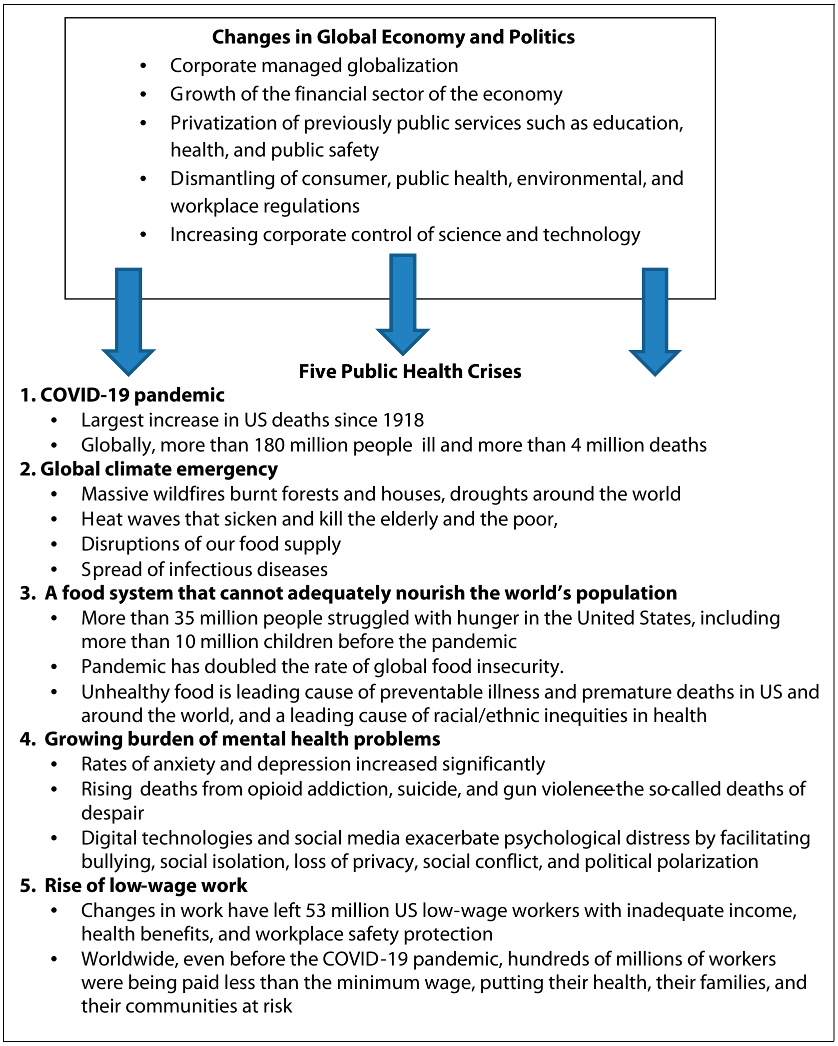
Public health scholars have attributed these declines in health to changes in the global political economy (Figure 1). These changes include increasing corporate control of globalization; the growth of the financial sector of the economy; privatization of previously public services such as education, health, and public safety; the dismantling of consumer, public health, environmental, and workplace regulations; and increasing corporate control of science and technology.[1,5,6] Together these changes have increased income and wealth inequality both within and between nations, reinforced racial and other stratification systems, increased consumption of unhealthy and polluting products,[2] and diminished the power of governments to protect health.[7] Underlying each are the steady accumulation of power by corporations and their allies and the resulting decline in the capacity of individuals, families, communities, and governments to act to support their well-being.[3]

Can a public health movement that takes on these underlying drivers of global health crises prevent further declines and future disasters? Many business and political leaders reject such an approach, arguing that there is no alternative to our current economic and political system. They insist that corporate-led economic growth is the only reliable road to prosperity and happiness, calling the health and environmental costs imposed by business as usual the price of progress. Even those who agree with the necessity of change may believe that transformative strategies are not feasible and that only incremental changes can work, despite historical evidence to the contrary.

SIX STRATEGIES TO OVERCOME PUBLIC HEALTH CRISES

To encourage a robust debate on the best approaches to protecting public health in the coming decade, I suggest six unifying strategies for a US public health movement that, in partnership with movements and other actors elsewhere, can reverse recent threats to health.

First, to overcome the private interests of corporations and the wealthy, a public health movement will need to build broad alliances of those who will benefit from reforms. Over the past 120 years, victories in public health have occurred when social movements and progressive public officials have made alliances to challenge corporate power.[8] In the United States, improvements in food safety, child labor, workers' rights, and environmental protection illustrate this process. Today, the social movements mobilized to dismantle racism, reverse global warming, protect workers, end gun violence, improve women's status, or make health care universal can each



Changes in Global Economy and Politics

- Corporate managed globalization
- Growth of the financial sector of the economy
- Privatization of previously public services such as education, health, and public safety
- Dismantling of consumer, public health, environmental, and workplace regulations
- Increasing corporate control of science and technology

Five Public Health Crises

1. COVID-19 pandemic
- Largest increase in US deaths since 1918
- Globally, more than 180 million people ill and more than 4 million deaths

2. Global climate emergency
- Massive wildfires burnt forests and houses, droughts around the world
- Heat waves that sicken and kill the elderly and the poor,
- Disruptions of our food supply
- Spread of infectious diseases

3. A food system that cannot adequately nourish the world's population
- More than 35 million people struggled with hunger in the United States, including more than 10 million children before the pandemic
- Pandemic has doubled the rate of global food insecurity.
- Unhealthy food is leading cause of preventable illness and premature deaths in US and around the world, and a leading cause of racial/ethnic inequities in health

4. Growing burden of mental health problems
- Rates of anxiety and depression increased significantly
- Rising deaths from opioid addiction, suicide, and gun violence—the so-called deaths of despair
- Digital technologies and social media exacerbate psychological distress by facilitating bullying, social isolation, loss of privacy, social conflict, and political polarization

5. Rise of low-wage work
- Changes in work have left 53 million US low-wage workers with inadequate income, health benefits, and workplace safety protection
- Worldwide, even before the COVID-19 pandemic, hundreds of millions of workers were being paid less than the minimum wage, putting their health, their families, and their communities at risk

FIGURE 1— **Common Drivers of Recent US and Global Public Health Crises**

Note. Data were derived from Sell and Williams,[1] Moodie et al.,[2] and Freudenberg.[3]

contribute to improved health but often operate in siloes. Acting separately, they miss opportunities to garner the power needed to overcome actors that oppose change.

Second, a successful public health movement in the United States must make eliminating systemic racism a top priority. Systemic racism creates and widens health inequities and allows corporations and some elected officials to use race to keep those who benefit from a more equitable society divided.[9] By identifying the specific ways that systemic and individual racism reduces access to and quality of food, health care, housing, and work for people of color and implementing specific policies and programs to correct inequitable distribution of the necessities of life, public health can contribute to ending racism. In the food sector, for example, ending racialized marketing of unhealthy products such as fast food and soda, reversing federal policies that make it difficult for Black farmers to keep their land, and building a public infrastructure for increasing access to affordable, healthy produce in communities of color could begin to dismantle the impact of racism on food access. As McGhee has noted, a policy agenda that focuses on dismantling racism brings solidarity benefits to both White and Black low-income and middle-class populations.[10]

Third, a public health movement needs to fight for a more powerful public sector. The pharmaceutical industry has been unable to produce affordable essential medicines to treat cancer, diabetes, and other conditions for the millions of Americans who need them. Multinational food corporations have failed to reduce hunger and food insecurity and prevent diet-related diseases. Big employers have opposed or delayed laws to provide workers with living wages, paid sick leave, and the right to unionize. These market failures show that the private sector is unwilling or unable to make public health a priority. Only government has the capacity and mandate to take on that task. If the United States wants to protect human and planetary health, it will need to rebalance market and public power.

Fourth, a public health movement can change how Americans understand the connection between the nation's health and the well-being of the rest of the world. The United States has failed to make COVID vaccines more available and affordable in low-income countries, stop the fossil fuel industry from intensifying global warming, or pressure the food industry to reduce its export of highly profitable ultra-processed foods that promote diet-related diseases in low- and middle-income countries. The COVID pandemic has shown that global health crises become national ones, giving the United States an additional incentive to prevent such catastrophes. A public heath movement that can persuade the American people that this country will benefit from solving rather than exacerbating global health problems will improve our nation's standing in the world.

Fifth, overcoming our health crises will require a new relationship with science and truth. The disasters of the past decade show the costs of accepting public lies and denigrating science. Had the nation confronted its climate crises two decades earlier by preventing the fossil fuel industry from using its political power to deny climate change, some climate disasters of the past few years could have been avoided. Had the federal government more closely monitored the deceptive advertising campaigns of Purdue Pharma, it could have countered the company's false messages to doctors, preventing tens of thousands of opioid deaths.[11]

In addition, continuing to allow industry sectors to use developments in science and technology—from digital data collection and precision agriculture to autonomous vehicles—without public accountability enables them to use this knowledge to benefit their bottom lines at the expense of public well-being, a likely cause for health crises of the next decade. A public health movement that makes a robust public case for science and truth can counter the distortions of private interests seeking to use science for private gains.

Finally, our nation needs to strengthen its democracy. In the past, it has been democratic uprisings that have limited private interests with new laws and policies and democratic debates that have educated the public to choose healthier futures. With a business-friendly Supreme Court, politicians calling for suppression of voters who disagree with them, and wealthy individuals and corporations using campaign contributions and dark money to advance their interests, the threats are clear. A movement that can make the public health case for limiting campaign contributions, ensuring voter rights, and preventing corporate capture of regulatory agencies can build support for the democratic processes that are the foundation of a healthy society.

According to the American Public Health Association, public health champions the health of all people and communities. To realize this potential, the public health community must become a catalyst for building a movement that can take on this generation's challenge of restoring the health of the American people and our planet. Coming to agreement on the strategies that can unify and strengthen such a movement is a first step in fulfilling that promise. AJPH

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Rurality, Gender, and Obesity: An Intersectionality Perspective on Rural Men's Health

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Rural residents in the United States tend to experience poorer health outcomes than urban residents, largely because of disadvantages in social determinants of health, including access to care, health insurance, and socioeconomic conditions.[1] Although addressing these social determinants of health remains imperative for improving health in rural America, we propose that additional emphasis should be given to intersectionality to better understand and address rural health disparities. Intersectionality is a theoretical framework that recognizes the interaction of multiple socially disadvantaged statuses that reflect broader structural systems of privilege and power.[2] In this editorial, we highlight how rurality and gender as characteristics of intersectionality may adversely affect rural men's health, with an emphasis on masculinity and obesity as an outcome of interest.

OBESITY AND HEALTH DISPARITIES IN RURAL MEN

Rural men live nearly two, six, and seven fewer years compared with urban men, rural women, and urban women, respectively.[3] Obesity is associated with multiple chronic diseases that contribute to higher excess mortality in rural compared with urban areas.[4] The prevalence of adult obesity among US men is nearly 37% but is higher in medium and small metropolitan statistical areas (MSAs; 42.7%) and non-MSAs (38.6%) than in large MSAs (31.8%).[5] The prevalence of severe obesity (defined as a body mass index of 40 kg/m^2 or higher) among men is highest in non-MSAs (9.3%) compared with medium and small MSAs (6.0%) and large MSAs (4.1%).[5]

INTERSECTION OF RURALITY AND GENDER ON MEN'S HEALTH

The American Psychological Association's Guidelines for Psychological Practice With Boys and Men define masculinity as "a set of descriptive, prescriptive, and proscriptive of [sic] cognitions about boys and men."[6(p2)] These guidelines emphasize the importance of contextual norms and briefly speculate that expressions of masculinity may vary between rural and urban settings. Geography is also considered a social determinant of health that interacts with masculinities in the Health, Illness, Men and Masculinities (HIMM) Framework, along with other social determinants, including race, ethnicity, community, socioeconomic indicators, sexuality, and ability.[7] However, potential ways in which rurality and masculinities may interact to affect men's health are not discussed in the HIMM Framework. Considering ways in which rurality and gender may interact to affect obesity prevention and management among rural men can guide future initiatives seeking to improve the health of this population.

CHALLENGES OF GEOGRAPHY AND WEIGHT PERCEPTIONS

Men are more difficult to recruit into weight loss trials than women, and very few weight loss trials to date have been conducted specifically for men.[8] Rural men may be particularly difficult to recruit because of the combined effects of geographic constraints and socially constructed perceptions pertaining to body weight. Geographic constraints to recruiting rural men into weight loss trials may include factors such as relatively fewer recruitment opportunities and longer travel distances to recruitment sites compared with men living in urban areas. In addition to these geographic barriers, rural men have reported that social norms regarding masculinities allow men to have larger body sizes compared with expectations for women.[9] Rural men are also more likely than rural women to underestimate their weight status, and the magnitude of this misperception is greatest for rural African American men.[10] Consistent with the HIMM Framework, these findings highlight that interactions between geography, race, and masculinities may have important implications for addressing obesity and improving rural men's health.

HEALTH CARE AND SOCIOECONOMIC BARRIERS

Rural men may lack awareness of their weight status because of challenges to accessing health care or the decision to forgo or postpone health care even when care is accessible. Evidence suggests that men and rural residents may be reluctant to seek care when needed,[6,11] and rural men may be most likely to avoid health care through the combined effects of barriers to health care access and the potential underlying masculinities that deter men in general from seeking care. The synergistic effects of these barriers may be strongest for health conditions such as obesity and related chronic diseases that do not significantly disrupt daily activities and therefore may not be perceived as an immediate health threat.

Although socioeconomic deprivation tends to be more prevalent in rural areas and contributes to poorer rural health outcomes,[1,3] interactions between rurality, socioeconomic conditions, and gender as barriers to obesity prevention and management among rural men have been understudied in the scholarly literature. In addition to limiting their ability to afford high-quality, nutritious food and to engage in physical activities requiring financial resources (e.g., gym memberships), adverse socioeconomic conditions may contribute to rural men needing to work even when they are ill or cannot perform work safely. For example, rural Latino men have reported that being the family provider is an important masculine role and that men will work even when it threatens their health to maintain their household income.[12] The travel time required to obtain health care may further prevent many rural men from missing work and losing income. This may be particularly true in remote rural areas where health care may not be readily available and residents must travel substantial distances to receive care. With health care avoidance being a concern among men in general, the intersections of masculinities, barriers to accessing health care, and socioeconomic disadvantage can potentially be deleterious for rural men and underscore the importance of the social determinants of health in the HIMM framework.

PERCEPTIONS ABOUT OCCUPATIONAL AND LEISURE ACTIVITIES

Other ways in which rurality may interact with gender to affect obesity prevention and management efforts for rural men is through occupational and leisure activities. There is some qualitative evidence that manual labor may be a barrier for rural men to engage in sufficient physical activity (PA) because of perceptions linking PA with work activities rather than leisure, health-enhancing activity.[9,13] This perspective has been observed among rural Canadian men who view laborious work as a replacement for recreational PA and prioritize physical strength over aerobic capacity.[14] Data from qualitative studies also indicate that rural men understand the importance of PA for obesity prevention but report lacking motivation for engaging in PA and report engaging in PA when performing leisure activities such as hunting and fishing.[9,13] Research is needed to understand how occupational and leisure activity contributes to meeting PA recommendations among rural men and how these activities might be leveraged to promote rural men's health.

CULTURE, RURAL ENVIRONMENTS, AND GENDER

Interactions between gender, rural culture, and aspects of rural environments related to diet and PA may also negatively affect obesity prevention and management among rural men. Indeed, residents of rural communities have described the synergistic effects of cultural and structural factors as contributors to obesity.[15] Commonly noted cultural factors include obesogenic food preparation methods, events and celebrations revolving around unhealthy foods, and social norms involving technology use as a barrier to PA. Environmental barriers noted by rural residents include challenges to accessing affordable and high-quality healthy foods and an abundance of fast-food restaurants.[15] The intersection between gender and these aspects of some rural environments may be particularly concerning for rural men given qualitative evidence that rural men with overweight and obesity perceive themselves as healthy, adopt fatalistic beliefs about weight-related health outcomes, and brag about not engaging in healthy behaviors.[13] Researchers who conduct obesity trials in rural areas are well positioned to begin addressing the intersection between rurality and gender, and the HIMM Framework can serve as a useful guide for endeavors to improve health outcomes among rural men.

CONCLUSIONS

In this editorial, we have highlighted several ways in which gender and rurality may interact to hinder obesity prevention and management among rural men. Because there is very little research specifically addressing obesity, men, and rurality, we also highlight several opportunities for future research and contend that such research is warranted as part of ongoing efforts to reduce rural health disparities. Considering the intersection between gender and rurality does not imply that masculinity is the sole driver of poor health outcomes among rural men or that researchers should abandon ongoing efforts to improve rural environments to promote health. Critical work remains to improve the social determinants of health that are substantial contributors to rural health disparities.[1,3] However, adopting an intersectional approach to understanding and addressing rural health disparities may offer new and promising insights for improving health outcomes for men in rural America.

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The authors do not report any conflicts of interest.

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Broader Implications of Eliminating FDA Jurisdiction Over Execution Drugs

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In 1977, Oklahoma began conducting executions by administering lethal injections of medicines, which is now the primary execution method in the United States. Early lethal injections used a three-drug combination that included sodium thiopental, but in recent years states also have used midazolam, pentobarbital, and even fentanyl. States increasingly have struggled to obtain legally manufactured versions of such substances, largely because of foreign governments' and manufacturers' actions. For example, in 2011, the European Union passed antitorture measures prohibiting trade in "goods that could be used for capital punishment."[1] Hospira, the sole manufacturer of sodium thiopental—then a key component of lethal injection protocols—was manufacturing in Italy and discontinued production. Other pharmaceutical companies sought to prevent their products' use in executions through restrictions in sales contracts. In response, states began purchasing products that lacked Food and Drug Administration (FDA) approval (e.g., by importing unapproved substances or purchasing unapproved compounded substances), and people sentenced to execution have brought legal challenges asserting violations of the Federal Food, Drug, and Cosmetic Act (FDCA).

In May 2019, however, the Department of Justice's Office of Legal Counsel (OLC) issued an opinion asserting that substances intended for execution are not "drugs" under the FDCA and that the FDA lacks authority to regulate them.[2] Although one federal appellate court recently concluded, to the contrary, that execution substances are "drugs" under the FDCA[3] and a 2012 court order in another case requires the FDA to prevent the importation of sodium thiopental,[4] this OLC opinion stymies the FDA's ability to regulate execution substances. This is because the FDA generally must follow OLC opinions, FDA decisions not to enforce FDCA requirements (including for execution substances) often are not reviewable by courts,[5] and the 2012 court order applies only to sodium thiopental in the context of importation—and not other substances.[4] Indeed, the FDA indicated it would comply with the OLC opinion. Lethal injections with unregulated substances, therefore, may be likely if the opinion stands. And since the federal government resumed executions in 2020—after having halted them in 2003—some court challenges have argued that the federal government has used compounded pentobarbital in violation of the FDCA.[3]

We argue that it was a grave mistake for the OLC to take the position that the FDA lacks jurisdiction over execution substances, and it is a decision that the Department of Justice can now undo. There are strong legal bases for concluding that these substances are drugs in the FDA's purview and compelling public health reasons for doing so. Allowing states and the federal government to source lethal injection substances from outside the regulated supply chain not only exposes individuals being executed to uncertain and unnecessary risks[6] but also may enable a broader unregulated market for these drugs.[7]

LEGAL BASIS

The FDCA broadly defines "drugs" subject to FDA regulation as including "articles" that are intended to "affect the structure or any function of the body."[8] Execution substances seem to fall within this part of the definition's plain language. Indeed, the 2019 OLC opinion acknowledges that human execution substances "literally" affect the structure or function of the body,[2] and one federal appellate court has concluded that the FDCA's requirements for drug importation apply to substances intended for execution.[3] And, for more than 40 years, the FDA has regulated animal euthanasia substances as drugs "clearly intended to affect the function of the body by inducing death."[9]

Nevertheless, the Supreme Court has never decided what it called "the thorny question" of the FDA's jurisdiction over execution substances,[5] and the OLC opinion offered various reasons such substances are not drugs within FDA jurisdiction. Ultimately, however, the OLC's reasoning was flawed.

For example, the OLC argued that substances intended for lethal injection "could hardly be found 'safe and effective,'" and thus the FDA would be required to ban them, effectively banning lethal injection—a result that Congress could not have intended.[2] Although the OLC took the position that animal euthanasia substances are not analogous to those intended for executions, the FDA has concluded that animal drugs intended to induce death are safe and effective for that purpose when they "result in a humane and painless death."[9] Because the legal standards for approving new animal and human drugs mirror each other, the FDA similarly could approve a drug as safe and effective for inducing death in humans. Such an approval likely could be based on nontrial data, such as animal studies, as in other contexts where conducting clinical trials can be unethical.

The OLC further argues that, if the drug definition covers execution substances, all means of execution, including guns and electric chairs, would be within FDA jurisdiction. Although it is true that the FDCA's device definition, like its drug definition, encompasses products intended to affect the body's structure or function, the FDA has long drawn commonsense boundaries around what is a device versus a consumer product outside its purview. For example, the FDA has declined to regulate exercise equipment as devices absent an intended therapeutic use (e.g., physical therapy), even though such equipment technically seems intended to affect structure or function. The FDA similarly could interpret the device definition as excluding traditional, nonchemical means of execution outside the agency's expertise, such as guns and electric chairs. Moreover, for guns specifically, numerous federal laws regulate production and sales, none of which rely on the FDA, which may suggest that Congress, having created other means of oversight, intends guns to be outside the FDA's purview. In short, as the Supreme Court stated, the scope of the FDCA should not be "narrowed . . . by envisioning extreme possible applications."[10]

PUBLIC HEALTH BASIS

Interpreting the FDA's jurisdiction as reaching execution substances is critical both for avoiding unnecessary and significant harms to individuals being executed and for protecting public health overall. This can be so even when FDA approval may not be required, for example for off-label execution uses of drugs approved for other purposes, such as fentanyl. In fact, the problem for states and the federal government often has not been that the FDA has not approved drugs for executions. Rather, it has been that drug manufacturers have sought to prevent their products' use in executions, including, in at least one instance, suing a state government that purchased a drug for executions seemingly in contravention of the manufacturer's sales contracts.[11] But even when the FDA has not approved a particular use, FDA oversight is important for ensuring drug quality.

When states or the federal government purchase unregulated drugs for executions, they, and any physicians involved,[12] have little assurance about the products' quality. Although courts can prohibit execution methods as constitutionally impermissible cruel and unusual punishment, the bar is high for doing so. The Supreme Court has held that execution substances may be used unless there is a "substantial risk of severe pain" and people sentenced to executions identify an available alternative without that risk—a standard that, as explained by Justice Sonia Sotomayor in a dissent, could permit execution methods that are "intolerably painful—even to the point of being the chemical equivalent of burning alive."[13] Additionally, judges simply have limited expertise to identify and address drug quality problems.

Drugs that do not contain the purported active ingredients at the purported dosages, or were not produced consistent with good manufacturing practices, are associated with serious risks. For example, midazolam, when used in two- or three-drug execution protocols, is intended to render the incarcerated person unconscious but does not affect the sensation of pain. The dosage, therefore, is critical: if the substance is subpotent, individuals may experience severe pain from subsequently administered drugs.[6] Executions with pentobarbital alone, in theory, would not pose a similar risk of pain. In practice, however, some pentobarbital used in executions appears to have expired or to have been manufactured or stored inappropriately (e.g., it appeared "cloudy").[14] Individuals executed with compounded pentobarbital have complained of burning sensations, and some appeared to be writhing in pain. Such issues are consistent with evidence from outside the execution context that compounded drugs—which can be exempt from certain FDA requirements—have been associated with serious quality problems that have even caused deaths, such as during a

2012 fungal meningitis outbreak traced to compounded drugs.[15]

Moreover, because of secrecy and lack of expert regulation, such incidents often leave more questions than answers about what went wrong. Even for unapproved, off-label execution uses, FDA oversight could lead to greater transparency, including an ability to track drugs involved in botched executions back to their source. This could help determine a problem's cause after the fact, as well as prevent risks in future executions or patient care (e.g., through enabling notification of other states or pharmacies about substandard drugs).

Unregulated execution drugs also may pose other risks to the general public. Perhaps most importantly, by procuring drugs outside legitimate supply chains, governments may help to foster unregulated markets that are difficult to control once established. This concern is not theoretical; for instance, unapproved sodium thiopental imported in 2010 from a UK company operating out of a driving school ended up in a Georgia pharmacy.[4] And Congress has recognized the public health importance of a tightly regulated drug supply chain.[16,17] This is not to say that FDA oversight is the only mechanism available to protect drug supply chains or that any regulatory scheme is likely to completely eradicate unregulated drug markets. But the FDA's authority is one important tool that can be used to protect both people sentenced to execution and the public's health overall.

NEXT STEPS

The United States began using drugs for execution in part to medicalize the death penalty to make it more publicly acceptable. But using medical means for executions has unintended consequences, including raising questions about whether the FDA should be involved in the oversight of lethal injection executions. Although expressly affirming the FDA's jurisdiction over execution substances may run the risk of further medicalizing the death penalty, this risk must be weighed against the dangers associated with limited expert oversight of the substances that governments use to cause death. Whether or not the FDA regulates execution substances, lethal injection executions seem likely to continue. The OLC's 2019 decision to block FDA oversight has troubling ramifications for individuals sentenced to death and the public more broadly. The opinion might also be understood not as an isolated legal document specific to the controversial area of capital punishment but as aligned with other recent efforts to undermine the FDA's critical role in drug regulation. These include attempts to influence the agency's emergency use authorization decisions for COVID-19 products—efforts that former FDA commissioners, among others, have identified as deeply concerning.[18]

At the same time, there is a relatively easy solution available for the specific problems directly raised by the 2019 OLC opinion: the OLC can undo that opinion. This step, as a legal matter, would enable the FDA to assert jurisdiction over substances intended for executions. Importantly, it also would signal the current presidential administration's support for the agency enforcing the requirements of the FDCA in the context of execution substances, in turn protecting individuals sentenced to execution, drug supply chains, and the public health. Perhaps, too, it would serve as one counter to the trend of chipping away at the FDA's role in protecting the public health.

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CONTRIBUTORS

P. J. Zettler wrote the first draft of the editorial and revised it in light of feedback. S. K. Shah wrote some sections of the editorial and edited the content to make intellectual contributions. Both authors conducted literature searches, analyzed relevant laws, and approved a final version of the editorial. The authors combined bring expertise in, and have studied, US administrative law, US food and drug law, drug policy, bioethics, and ethical questions associated with lethal injection executions.

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P. J. Zettler reports being a signatory on an amicus brief filed in the US Supreme Court on behalf of pharmacy, medicine, and health policy experts in *Bucklew v. Precythe*; serving as an expert witness retained by the Direct Purchaser Class Plaintiffs in *In re Suboxone Antitrust Litigation*, No. 2:13-MD-2445 (E.D. Pa) and the Direct Purchaser Class, End Payor Class, and Retailer Plaintiffs in *In re Opana Antitrust Litigation*, No. 14cv-10150 (N.D. Ill.); and receiving honoraria for academic presentations and workshops from the Gray Center for the Study of the Administrative State and the Law & Economics Center at George Mason University Antonin Scalia Law School and the Ewha Institute for Biomedical Law & Ethics at Ewha Women's University. S. K. Shah reports being a signatory on an amicus brief filed in the US Supreme Court on behalf of Medical Professionals and Medical Ethicists in *Arthur v. Commissioner, Alabama Department of Corrections*.

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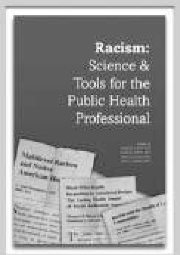

Rapid-Cycle Experimentation With State and Federal Policymakers for Optimizing the Reach of Racial Equity Research

Elizabeth C. Long, PhD, Jessica Pugel, MA, J. Taylor Scott, PhD, Nicolyn Charlot, MSc, Cagla Giray, PhD, Mary A. Fernandes, MA, and D. Max Crowley, PhD

Racial disparities and racism are pervasive public health threats that have been exacerbated by the COVID-19 pandemic. Thus, it is critical and timely for researchers to communicate with policymakers about strategies for reducing disparities. From April through July 2020, across four rapid-cycle trials disseminating scientific products with evidence-based policy recommendations for addressing disparities, we tested strategies for optimizing the reach of scientific messages to policymakers. By getting such research into the hands of policymakers who can act on it, this work can help combat racial health disparities. (*Am J Public Health*. 2021;111(10):1768–1771. https://doi.org/10.2105/AJPH.2021.306404)

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The American Medical Association has declared racism a public health threat,[1] recognizing that racial disparities are pervasive problems in the United States caused by systemic racism. For example, Black people are 3.73 times more likely than White people to be arrested for marijuana possession, despite similar rates of use.[2] Incarceration affects the detainee's physical health[3] as well as their communities' social and economic conditions. Consequently, disproportionate rates of incarceration perpetuate racial health disparities.

COVID-19 has exacerbated these disparities. For instance, COVID-19 death rates are highest among people of color, with the death rate of Black Americans being 2.5 times higher than that of White Americans.[4] Mitigation efforts also disproportionately leave racial minorities less protected (e.g., working from home is possible for only one in five Black people[5]). Given these issues and President Biden's recent executive order to advance racial equity, it has arguably never been timelier and more important for researchers to communicate with policymakers about strategies for reducing racial disparities.

INTERVENTION

We conducted four rapid-cycle randomized controlled trials to test strategies for optimizing science–policy communication.

PLACE AND TIME

We conducted trials electronically between April and July 2020 in the United States.

PERSON

Participants included state legislators, their staff, and federal staff who work on committees and issues related to health, education, children, the judiciary, and race. Our sample varied across trials because we chose participants based on distribution topic and because our sampling strategy evolved over time. Demographic information for staff is not readily available in public databases because of high turnover. Accordingly, we are able to provide demographic information only for state legislators (see the Appendix, Table A [available as a supplement to the online version of this article at http://www.ajph.org]).

PURPOSE

The purpose of these trials was to improve the reach of research on racial disparities to policymakers.

IMPLEMENTATION

Across four trials, we disseminated an op-ed on marijuana legalization (trial 1), an invitation to a congressional briefing on racial and rural health disparities (trial 2), a fact sheet on employment issues Black individuals have faced during the COVID-19 pandemic (trial 3), and a second invitation to the briefing (trial 4). Trial topics were informed by previous interactions with policymakers that occurred through the Research-to-Policy Collaboration, which is a model for bridging the research–policy gap through relationships or by the timeliness of the issue. Therefore, topics were current and relevant to policymakers' priorities.

An author of the research product, who received support in creating the product from the Research-to-Policy Collaboration, sent all e-mails. Therefore, the senders were always human names, not organization names. It was not apparent from the sender line that the sender was a researcher because it appeared as just a name, which policymakers likely perceived to be from a constituent. Because policymakers frequently receive e-mails from constituents with concerns or information, the interactions these distributions produced were typical and expected. In trials, the senders were consistent except for trial 2, which used a counterbalanced design. Between trials, senders were different. All e-mails included a brief introduction and a link to a resource for evidence-based policy recommendations to address racial disparities. In accordance with the nature of rapid-cycle trials, these trials occurred approximately two weeks apart over a two-month period.

To guide the development of subject lines, we relied on social psychology theories such as the elaboration likelihood model.[6] This model suggests there is a peripheral route to persuasion that relies on emotion. Thus, hot-button issues (e.g., racism) may elicit strong emotions, resulting in action (e.g., opening an e-mail). Relatedly, the theory of automatic vigilance suggests that individuals pay more attention to negative information than positive.[7] Negative framing (e.g., "threats," "risks") may prompt automatic vigilance and capture the recipient's attention, resulting in more e-mail opens. However, the central route to persuasion relies on logic and reasoning. Neutral framing that relies on reason (e.g., "information," "issues") may instead be more effective than emotional framing. Findings from each trial informed subject line development in subsequent trials (see the Appendix for more details).

We randomized participants into equally sized groups to receive one of the following subject lines:

> Trial 1: "Information on marijuana policy reform"; "Research on marijuana policy reform"; "Social disparities in marijuana policies"
>
> Trial 2: "Briefing on racial and rural health issues"; "Briefing on racial and rural health disparities"; "Briefing on racial and rural health inequities"
>
> Trial 3: "Black community faces more oppression during COVID"; "Compounded risks for Black people during COVID"; "Unequal threats for Black people during COVID"
>
> Trial 4: "Briefing: New solutions for addressing health differences"; "Briefing: Threats to the health of various communities"

EVALUATION

We tracked the number of e-mail opens for 14 days to evaluate which framing was most successful. We conducted negative binomial regressions to test whether the experimental subject lines resulted in more e-mail opens than did a control subject line (Table 1 presents results).

Trial 1 participants who received the e-mail with the "social disparities" subject line opened the e-mail 21% more times than those who received the "information" line ($P = .02$). There were no significant effects of subject line on e-mail opens in trial 2. In trial 3, those who received the subject lines with the word "oppression" opened the e-mail 18% more times than those who received the subject line with the phrase "unequal threats" ($P < .01$). Those who received the subject line with the word "threats" in trial 4 opened the e-mail 17% more than those who received the line with the phrase "new solutions" ($P = .02$). In post hoc analyses, we found no evidence of interaction between political party and messaging group.

ADVERSE EFFECTS

We are not aware of any adverse effects that occurred as a result of the trials. Observing open rates of e-mails is common practice. Responses from offices were monitored and were typically neutral or positive.

SUSTAINABILITY

Identifying ways to improve the reach of research sent via e-mail to

TABLE 1— Negative Binomial Regression of the Effects of Subject Lines on the Number of E-Mail Opens: United States, April–July 2020

	No. of Participants	E-mail Opens	IRR (95% CI)
Trial 1	3260		
Information on marijuana policy reform	1087	623	1 (Ref)
Research on marijuana policy reform	1089	580	0.93 (0.79, 1.09)
Social disparities in marijuana policies	1084	754	1.21 (1.04, 1.42)
Trial 2	6931		
Briefing on racial and rural health issues	2292	1499	1 (Ref)
Briefing on racial and rural health disparities	2319	1520	1.01 (0.88, 1.15)
Briefing on racial and rural health inequities	2320	1667	1.10 (0.96, 1.25)
Trial 3	6959		
Black community faces more oppression during COVID-19 pandemic	2314	1990	1 (Ref)
Compounded risks for Black people during COVID-19	2308	1751	0.88 (0.77, 1.01)
Unequal threats for Black people during COVID-19	2337	1645	0.82 (0.71, 0.94)
Trial 4	5468		
Briefing: new solutions for addressing health differences	2737	1597	1 (Ref)
Briefing: threats to the health of various communities	2731	1867	1.17 (1.03, 1.33)

Note. CI = confidence interval; IRR = incident ratio interval.

policymakers lends itself to the increased need for safe communication when geography or public health risks restrict in-person communications. However, infrastructure for communicating with policy audiences remains lacking across scientific and medical contexts and should be strengthened.

PUBLIC HEALTH SIGNIFICANCE

The goal and subsequent public health impacts of these rapid-cycle randomized trials were to assess communication patterns that improve research access among policymakers. It is critical to identify effective ways for researchers to reach policymakers and to convey research in a way that is useful so that it can be used in policies intended to combat public health threats. Racism is one such public health threat that must be addressed through systemic public policy changes. The trials in this study elucidated several helpful communication techniques that can be used in research communication work. Notably, evoking strong emotional responses appears to increase policymakers' access to research on racial health disparities, which can lead to evidence-driven policies that dismantle racism in health systems. Future work is needed, however, to further understand the impact of emotion-evoking framing (e.g., does it prompt action or just attention?), examine other public health contexts such as climate change, and examine how sociopolitical conditions at the time of the trials may affect results. Our work lays the foundation for future research on science–policy communication that can facilitate evidence-based policymaking and improve public health. AJPH

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CONTRIBUTORS

E. C. Long wrote the first and subsequent drafts of the article, with contributions and feedback from J. Pugel, J. T. Scott, N. Charlot, C. Giray, M. A. Fernandes, and D. M. Crowley. E. C. Long, J. Pugel, and J. T. Scott conceptualized the study. J. Pugel conducted data analysis and interpretation, with contributions from E. C. Long, J. T. Scott, and D. M. Crowley.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

This work was deemed exempt by the Pennsylvania State University's institutional review board because policymakers are elected public officials and the study consists of natural observation using nonintrusive monitoring mechanisms.

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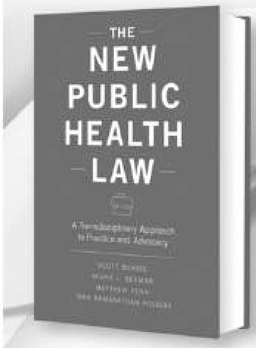

COVID-19 Isolation and Quarantine Experience for Residential Students at a Large Four-Year Public University

Meredith E. Hayden, MD, Diane Rozycki, MD, Kawai O. Tanabe, MPH, Marsh Pattie, PhD, Laurie Casteen, PhD, Susan Davis, JD, and Christopher P. Holstege, MD

Rapid identification and management of students with COVID-19 symptoms, exposure, or disease are critical to halting disease spread and protecting public health. We describe the interdisciplinary isolation and quarantine program of a large, public university, the University of Virginia, Charlottesville. The program provided students with wraparound services, including medical, mental health, academic, and other support services during their isolation or quarantine stay. The program successfully accommodated 844 cases during the fall 2020 semester, thereby decreasing exposure to the rest of the university and the local community. (*Am J Public Health*. 2021;111(10):1772–1775. https://doi.org/10.2105/AJPH.2021.306424)

For highly infectious reportable diseases, such as COVID-19, rapid identification and management of infected students and their close contacts are critical to halting disease spread and protecting public health. As institutions of higher education prepared to operate during the COVID-19 pandemic, previous isolation and quarantine plans for small outbreaks, such as mumps, required deployment on a much grander scale to effectively mitigate COVID-19.[1–3]

INTERVENTION

A broad, interdisciplinary university isolation and quarantine team was created to serve students requiring isolation or quarantine because of COVID-19 symptoms, exposure, or disease. The team's steering committee worked collaboratively to develop a comprehensive program that provided students with wraparound services during their isolation and quarantine stay, including medical, pharmacy, mental health, food, and social support.

PLACE AND TIME

The program was implemented during the fall (September–December) 2020 academic semester at the University of Virginia in Charlottesville.

PERSON

All students living and learning on campus who were exposed to or had COVID-19 disease or symptoms were served by this program. The isolation and quarantine team consisted of representatives from across the university, including student affairs, student health and wellness (SHW), dining, facilities management, student housing, real estate and leasing services, major events, development, and information technology services. Beyond a steering committee of 15, the number of staff who carried out isolation and quarantine operations varied across the semester. On average, direct one to one advice and medical support for students in isolation and quarantine was provided by four full-time equivalent nurses and two full-time equivalent student affairs professionals (drawn from a rotating pool of approximately 50) who were trained and supervised by a SHW physician and student affairs dean, respectively.

PURPOSE

In a university setting, where students live in congregate settings and interact with many peers, prompt isolation and quarantine of affected students is essential to reduce the risk of transmission among students, faculty, staff, and community members.[4,5]

IMPLEMENTATION

The isolation and quarantine team identified housing spaces among university-owned properties (i.e., dormitories, apartments) and private hotels in the local community. This inventory of nearly 1500 beds was prepared, maintained, and continuously refined through collaborations between the isolation and quarantine team and local vendors. Three dormitories were specifically identified for isolation housing, which allowed students to walk from their usual on-campus residence. Quarantine housing was available at both on- and off-campus locations; transportation was provided via a contracted vendor. Quarantine spaces consisted of a single room and single bathroom, and isolation spaces were suite-style, with five or six double-occupancy rooms and a shared bathroom.

To organize and centralize the complex sets of data necessary to execute this system, information technology services staff created a build-out to the student affairs' incident tracking database (SafeGrounds) to capture all housing and student assignment details (e.g., isolation and quarantine dates, locations, meal needs, and any special circumstances). In addition, information technology services created a bridge between SafeGrounds and the SHW electronic medical records system to allow one-way secure transmission of templated data pertinent to isolation and quarantine.

SHW staff or the local health department identified students who met Centers for Disease Control and Prevention (CDC) criteria for isolation and quarantine. SHW staff then documented COVID-19 status (i.e., isolation, quarantine, or patient under investigation), with start and end dates in a template in the electronic medical records (Medicat), which electronically transmitted to SafeGrounds. COVID-19 status updates (e.g., a change from patient under investigation to isolation) were communicated via the same mechanism.

Upon notification, student affairs staff assigned students to the appropriate living space (Figure 1). Once students were assigned a living space, they remained in that space regardless of a status change. Students in isolation and quarantine housing received personalized wraparound support from university staff under the leadership of the isolation and quarantine team (Figure A [available as a supplement to the online version of this article at http://www.ajph.org]).

Each student was assigned a medical and general support care team. The general support team ensured that all individual needs were met, including dietary, transportation, medication delivery, mental health, and virtual academic and social engagement. The medical team assessed isolation and quarantine students at regular intervals via telephone call or electronic medical record secure message and escalated to further medical evaluation as needed.

All students were contacted at entry, midpoint, and before discharge, and symptomatic students were contacted

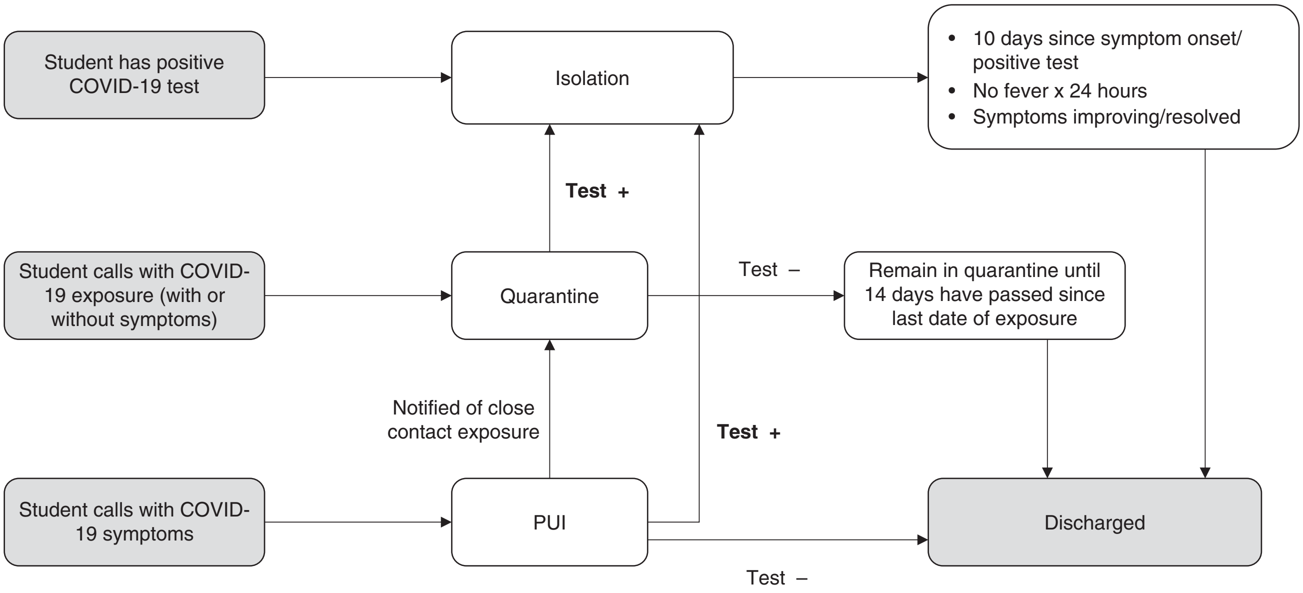

FIGURE 1— Simplified Process Flow Map Used by the Isolation and Quarantine Team to Manage University of Virginia, Charlottesville Students With COVID-19 Symptoms, Exposure, or Disease: Fall 2020 Semester

Note. PUI = patient under investigation.

more frequently. The medical team ensured that testing occurred at the recommended time and location. Testing was performed via polymerase chain reaction and analyzed in the university academic medical center laboratory. Testing for asymptomatic students was performed at a designated university site, free of charge, with samples collected via staff-proctored, self-collected midturbinate nasal swab. Testing for symptomatic students was collected by trained clinical staff at SHW via nasopharyngeal swab and billed to patient insurance. Once students met the CDC criteria for discharge,[6] they returned to their regular housing (Figure B [available as a supplement to the online version of this article at http://www.ajph.org]).

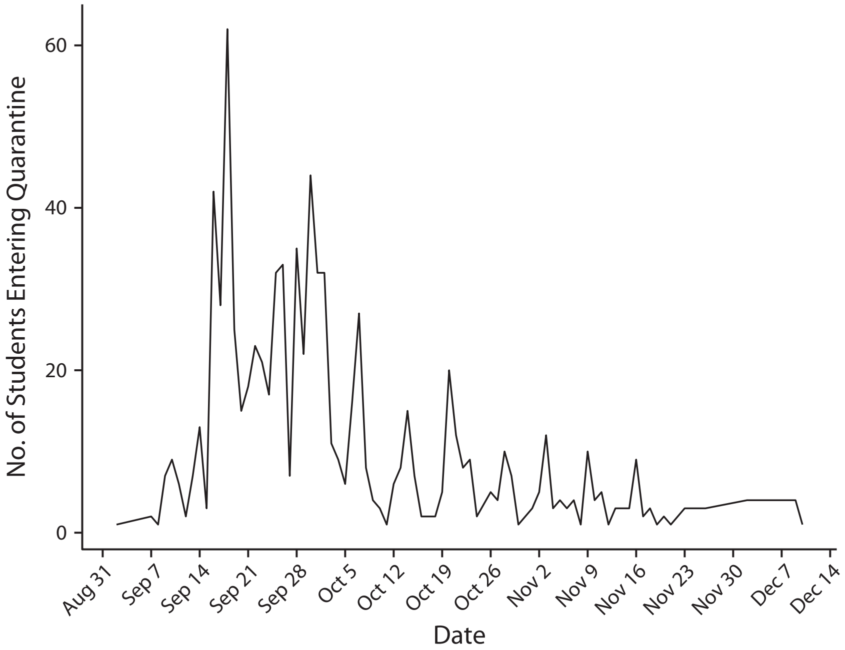

FIGURE 2— Daily Count of University of Virginia, Charlottesville Students Entering On-Campus Isolation and for COVID-19 Quarantine Housing During the Fall 2020 Semester

EVALUATION

During the fall 2020 semester, approximately 4700 students (92.6% undergraduate and 7.4% graduate; 55.5% White; and 54.1% female) were living in on-campus housing. The isolation and quarantine housing accommodated 844 students, including those classified as isolation (n = 119), patient under investigation (n = 298), and quarantine (n = 427). These cases occurred in 799 unique students living on campus; 761 of them entered isolation and quarantine housing one time and 38 students entered two to three times throughout the semester.

Students with isolation and quarantine stays were predominantly undergraduates (99.5%), White (66.5%), and female (53.6%). Undergraduate and White students living on campus were more likely to have isolation and quarantine stays (99.5% vs 92.6%; $P < .01$ and 66.5% vs 55.5%; $P < .01$, respectively) compared with the total student population living on campus.

At the peak of the surge, the team accommodated 62 students in isolation and quarantine housing in one day (Figure 2). Approximately 26% of the 298 patient under investigation students and 15% of the 427 quarantine students subsequently tested positive during their time in isolation and quarantine. We excluded students who went home to isolate or quarantine from the data, as follow-up testing or result data were not consistently available. No student required hospitalization for worsening medical or mental health status.

ADVERSE EFFECTS

Any person in isolation or quarantine, whether at an institution of higher education or in the community, can experience feelings of social isolation, loss of productivity, and possible financial loss.[7] Wraparound support services provided to students in university isolation and quarantine housing allowed early identification and mitigation of these potential negative impacts by connecting students with the appropriate resource.

Students did not receive any charge for housing or services received during their isolation and quarantine stay, and most coursework could be completed remotely. During the early weeks of the program, many students expressed a desire to go outside for exercise and fresh air while in isolation and quarantine housing. With guidance from public health officials, the isolation and quarantine team developed a plan to safely accommodate outdoor excursions for students in quarantine.

SUSTAINABILITY

The isolation and quarantine program will continue throughout the pandemic as an essential component of the university COVID-19 mitigation strategy. Although the scale of the isolation and quarantine program will eventually contract as the pandemic subsides, this model of pan-university collaboration to meet the needs of students in isolation or quarantine remains relevant for the future. It provides a framework that can be rapidly activated to serve students with other highly infectious diseases, such as mumps or varicella.

PUBLIC HEALTH SIGNIFICANCE

Isolation and quarantine for affected individuals is an essential COVID-19 control measure. By safely housing and caring for nearly a fifth of university students who lived on campus during the fall semester, exposures were decreased to the rest of the university and the local community. In addition, students were able to remain local during their isolation and quarantine period, thus decreasing transmissions to their families and home communities. Students staying in isolation and quarantine spaces were able to readily access medical, mental health, academic, and other support services, which may not have been available in other areas, thus decreasing public health burden. AJPH

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CONTRIBUTORS

M. E. Hayden conceptualized and supervised the study and led the writing and final editing of the article. D. Rozycki, K. O. Tanabe, L. Casteen, and C. P. Holstege provided input on study design. D. Rozycki, M. Pattie, and L. Casteen assisted with data collection. D. Rozycki, K. O. Tanabe, and M. Pattie helped draft the article. K. O. Tanabe performed all data analyses. S. Davis and C. P. Holstege reviewed the article. C. P. Holstege edited the article.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

HUMAN PARTICIPANT PROTECTION

The University of Virginia institutional review board approved this research.

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Implementation of a COVID-19 Mass Vaccination Clinic to College Students in Montana

Sally Moyce, RN, PhD, Julie Ruff, EdD, Ann Galloway, PhD, and Sarah Shannon, RN, PhD

We describe a large-scale collaborative intervention of practice measures and COVID-19 vaccine administration to college students in the priority 1b group, which included Black or Indigenous persons and other persons of color. In February 2021, at this decentralized vaccine distribution site at Montana State University in Bozeman, we administered 806 first doses and 776 second doses by implementing an interprofessional effort with personnel from relevant university units, including facilities management, student health, communications, administration, and academic units (e.g., nursing, medicine, medical assistant program, and engineering). (*Am J Public Health*. Published online ahead of print September 9, 2021:1776–1779. https://doi.org/10.2105/AJPH.2021.306435)

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Successful control of the pandemic caused by the severe acute respiratory syndrome coronavirus (SARS-CoV-2) requires large-scale vaccination efforts, yet experts predict widespread logistical challenges in vaccine distribution.[1]

INTERVENTION

We conducted two large-scale COVID-19 vaccination clinics to administer vaccines to students, faculty, and staff in the 1b priority category.

PLACE AND TIME

The first clinic occurred in early February 2021 at the Student Union Building at Montana State University in Bozeman. A second dose clinic occurred three weeks later in the same location.

PERSON

Persons in the state's 1b priority category included residents older than 70 years, those 16 to 69 years old with high-risk medical conditions, and Native Americans and other persons of color.[2] We estimated that 7% of Montana's population of just over 1 million citizens self-identify as Native American and another 4% are persons of color.[3] University enrollment of students who identified as Black or Indigenous people and other people of color (BIPOC) in academic year 2020–2021 was 18%.

PURPOSE

The purpose of this intervention was to vaccinate eligible university students, faculty, and staff.

IMPLEMENTATION

We describe the process we undertook to implement the clinic.

Planning

In January 2021, the university's student health service faced the logistical challenge of providing vaccinations for students while maintaining usual clinic operations. An interprofessional "team of teams" model of leadership[4] was adopted, with a lead person from various university and academic units identified for each aspect of the clinic. We adapted protocols shared by Swedish Medical Center and Seattle University's mass vaccination clinic. This team planned clinic logistics, volunteer recruitment, supply lists, and protocols. They provided leadership on the clinic day.

Patient Identification and Registration

Data from the registrar's office and student health service identified 2125 eligible 1b priority students, and human resources data identified faculty and staff. A notification e-mail with a vaccination endorsement by BIPOC campus leaders was sent and included links for (1) registration, and (2) information about emergency use authorization for the vaccine (Pfizer). Participants registered via an online appointment system.

Student Volunteer Preparation

Students from nursing, medicine, engineering, and medical assistance were recruited as volunteers. Students delivered vaccines, observed vaccine recipients after administration, provided peer education, and served as "way finders" and runners. Engineering students monitored patient flow for potential quality improvement. Medical and nursing faculty supervised student volunteers.

All volunteers prepared by reading required Pfizer vaccine safety and administration materials. Before the first appointment, leads conducted just-in-time training to review (1) key information, (2) clinic logistics, (3) transitions between stations, and (4) introduction of the faculty members available for consultation and assistance.

Clinic Processes

The Student Union Building space was organized to allow smooth patient flow, social distancing of participants, and security of the vaccine.

Participants were greeted by nursing or medical assistant students and screened for current COVID-19 symptoms. All vaccine recipients donned a new surgical mask and used hand sanitizer.

Participants presented personal identification and completed a short checklist assessing safety to receive vaccines. Student data were entered into the student health center's electronic health record system. Participants were provided with an electronic link to vaccine information sheets for the Pfizer vaccine (https://bit.ly/3CLHYt5). Peer educators answered questions to reduce participants' anxiety.

Pharmacists from the student health center and faculty from the College of Nursing were trained in preparation of mRNA vaccine for injection. Working as teams, one person diluted the vaccines according to Pfizer protocols and another drew up doses. We recorded the time of dilution and the number of doses extracted from each vial (which was five or six). Syringes were placed three at a time in plastic baskets and covered in aluminum foil because of the vaccine's light sensitivity. Way finders delivered baskets of vaccine to vaccination stations as needed. Vaccines were replenished as injections were administered to prevent overproduction. Production rate was controlled by delivering 10 vials to the dilution stations every 30 minutes and carefully tracking no-show appointments.

Vaccines were administered at 22 individual stations. Vaccinators used green circles to indicate an open station and red circles to notify way finders to resupply vaccine. Vaccinators confirmed vaccine recipients' safety to receive a vaccine, provided them with additional patient education, and completed the Centers for Disease Control and Prevention (CDC) vaccine card with lot number and injection site. Participants received an "exit ticket" indicating their observation completion time and QR (Quick Response) codes for the CDC V-safe program and second dose scheduling.

Per CDC monitoring postvaccination protocol, participants were observed in socially distanced chairs by medical and nursing students and medical faculty. Partitioned "rooms" were equipped with a stretcher, epinephrine, and an automatic external defibrillator as a safety precaution in case participants with a history of adverse reactions needed them. Emergency Medical Services and the local hospital were notified in advance of each clinic date, and an ambulance was positioned outside the Student Union Building.

EVALUATION

Engineering students and faculty evaluated the first clinic to make improvements implemented in the second.

Clinic 1

The first clinic included 833 scheduled appointments, with 27 no-shows. We called persons who did not come to their scheduled appointments and reminded them to attend. An estimated 500 students, 294 faculty and staff, and 12 volunteers received the vaccine ($n = 806$). The night before the first clinic, 120 vials were pulled out of cold storage and thawed in a refrigerator. A total of 135 vials were used.

Engineering students provided system improvement feedback. Engineers estimated a rate of 150 vaccinations per hour, representing a 52.6% capacity. For an ideal work capacity of 80% to 90%, they suggested an increase to 180 vaccinations per hour to be achieved by slightly increasing the number of personnel in the vaccine preparation area.

Clinic 2

The second vaccination clinic, held three weeks after the first one, resulted in 790 scheduled appointments. We contacted and reminded those who did

TABLE 1— Numbers From First- and Second-Dose COVID-19 Vaccine Clinics: Montana State University, Bozeman, February 2021

	Clinic 1	Clinic 2
Volunteers, no.	153	109
Appointments scheduled, no.	833	790
No-shows, no.	27	19
Vaccines given, no.	806	776
Vials used, no.	135	130
Wasted doses,[a] no.	4	1
Unused doses,[b] no.	0	0

[a] Wasted doses were drawn and not administered.

[b] Unused doses were not drawn.

not schedule their second dose. The morning of the clinic, 132 vials were removed from cold storage and brought to the clinic. A total of 130 vials were used. We followed the same procedures that were used at the first clinic with the system changes noted above, allowing an approximate rate of 175 to 180 vaccinations per hour. There were 19 no-shows, and 776 vaccines were administered. After scheduled participants were vaccinated, three remaining doses were administered to volunteers (Table 1).

Our vaccination rates matched rates in other US states at the time of the clinic. Additional vaccines were provided at the student health center to those who missed their second dose.

ADVERSE EFFECTS

Identifying BIPOC eligibility relied on self-identification in university records. Potentially qualified recipients may have been missed with this method, particularly those who declined to provide this optional demographic information. The first hour of the first clinic was crowded and overwhelmed the system; this was ameliorated by reducing the number of appointments at the start of the second clinic, which allowed volunteer orientation and vaccine preparation. We identified a need for translation services.

SUSTAINABILITY

Effective vaccination campaigns may help the country achieve herd immunity in a short period. Our procedures can be adapted to implement decentralized vaccine distribution in a variety of locations.

PUBLIC HEALTH SIGNIFICANCE

Control of SARS-CoV-2 is a public health emergency requiring collaborative approaches to widespread vaccination efforts. Hospitals and public health departments implement vaccine clinics across the United States with varying degrees of success. Although they have access to resources and facilities that allow vaccine distribution, they can be overwhelmed by demand. Decentralized efforts are an alternative to relying solely on large health systems and may speed efforts to reach herd immunity and prevent the further spread of COVID-19.[5]

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S. Moyce and Julie R. drafted the article. A. Galloway and S. Shannon coordinated the clinic. All authors reviewed and approved the final version of the article.

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The authors have no conflicts of interest to disclose.

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The protocols for the clinic were not submitted to the institutional review board at Montana State University because the clinic was not for research purposes.

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COVID-19 Case Rates After Surveillance and Vaccinations in a Statewide Psychiatric Hospital System

Thomas E. Smith, MD, Ian T. Rodgers, MPH, Daniel J. Silverman, MD, Sally R. Dreslin, RN, MA, MS, Mark Olfson, MD, MPH, Lisa B. Dixon, MD, MPH, and Melanie M. Wall, PhD

Individuals with serious mental illness are particularly vulnerable to COVID-19. The New York State (NYS) Office of Mental Health implemented patient and staff rapid testing, quarantining, and vaccination to limit COVID-19 spread in 23 state-operated psychiatric hospitals between November 2020 and February 2021. COVID-19 infection rates in inpatients and staff decreased by 96% and 71%, respectively, and the NYS population case rate decreased by 6%. Repeated COVID-19 testing and vaccination should be priority interventions for state-operated psychiatric hospitals. (*Am J Public Health*. 2021;111(10): 1780–1783. https://doi.org/10.2105/AJPH.2021.306444)

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Individuals with serious mental illness are especially vulnerable to COVID-19. We report results from a coordinated COVID-19 infection control program involving testing and vaccination that was implemented in 23 state psychiatric hospitals operated by the New York State (NYS) Office of Mental Health (OMH).

INTERVENTION

The intervention was designed to limit the spread of COVID-19 in a statewide inpatient psychiatric hospital system during the second surge of the virus in the state in fall and winter of 2020–2021. The intervention included (1) rapid antigen testing for all patients and staff either once a week (if there were low community transmission rates and no current positive staff or patients) or twice a week (if there were high community transmission rates or any positive staff or patients) with quarantining of positive individuals, and (2) a system-wide vaccination campaign.

PLACE AND TIME

The intervention occurred in the 23 OMH state-operated psychiatric hospitals of NYS. Testing began on December 1, 2020. The vaccination campaign began in the last week of December 2020, and 8943 individuals (63.2% of eligible patients and 49.4% of eligible staff) received an initial dose of either the Pfizer-BioNTech or the Moderna COVID-19 vaccine between January 1, 2021, and January 15, 2021.

PERSON

The population targeted by this intervention included patients and staff in 23 state psychiatric hospitals operated by OMH. The hospitals employ nearly 13 000 staff and care for approximately 3500 patients each day.

PURPOSE

The morbidity and mortality burden of COVID-19 has been borne disproportionately by adults in congregate settings.[1] Controlling COVID-19 spread in confined populations is a public health priority. A US Air Force base evaluation demonstrated the effectiveness of a screening, quarantining, and close monitoring program in controlling COVID-19 spread.[2] Distinctive characteristics of psychiatric inpatients, including cognitive and behavioral challenges that may lower levels of adherence to vaccination and hygienic recommendations, can complicate infection prevention and control in these particular institutions.

Psychiatric hospitals have historically been associated with outbreaks of respiratory tract infections.[3] Compared with medical inpatients, psychiatric inpatients tend to have fewer medical comorbidities and are less often immune compromised. However, they are typically ambulatory and may move about freely, coming into close contact with other patients and staff. These characteristics make psychiatric inpatients vulnerable to infectious agents circulating in the community. In addition, freestanding psychiatric facilities not affiliated with general hospitals may not have access to infectious disease expertise and so may rely more on state or local health or mental health departments for infection control expertise and guidance.

IMPLEMENTATION

On December 1, 2020, shortly after Abbott Lab's BinaxNOW COVID-19 Antigen Test became available, OMH required all 23 state-operated hospitals to offer voluntary rapid antigen testing to all staff and patients. Department supervisors at every hospital oriented their staff to testing procedures, identified staff on a daily basis for testing, and monitored staff participation. Hospital attending physicians and infection control staff identified patients who would also be offered rapid testing each day.

Starting January 1, 2021, Pfizer-BioNTech and Moderna COVID-19 vaccines were made available to all OMH inpatients and staff with patient care responsibilities on a voluntary basis. OMH distributed informational materials and offered educational sessions regarding the vaccine. Vaccinations were not mandated. Attending physicians explained the vaccine to patients, obtained consent, and ordered vaccines to be administered by nurses on inpatient units. Staff received vaccines in clinics at each of the 23 hospitals.

EVALUATION

Case rates for OMH residential and inpatients, OMH staff, and NYS residents were calculated from November 16, 2020 through February 16, 2021 from a COVID-19 registry developed by OMH as well as publicly available data on COVID-19 infections in the overall NYS population. An interrupted times series analysis estimated the associations between testing (December 2020) and vaccination (January 2021) campaigns with changes in infection rates and whether the changes differed between OMH staff, patients, and the overall NYS population.

Nearly 5000 patients with serious mental illnesses were treated in the statewide psychiatric hospital network from November 2020 through February 2021. Figure 1 presents daily new COVID-19 cases rates (per 1000 persons) and rate changes from November 16, 2020, through February 16, 2021. There were 337 COVID-19 patient cases and 730 staff cases from November 16, 2020 to February 16, 2021, accounting, respectively, for 7.5% and 5.7% of patients and staff. From November 16 to December 1, 2020, new COVID-19 cases rapidly increased. On December 1, when rapid testing started, the daily case rate was 2.02 for patients, 0.84 for staff, and 0.42 for state residents.

By January 1, 2021, a month after widespread rapid antigen testing began, the case rate had decreased by 60% among patients to 0.81, decreased by 10% among staff to 0.76, and increased by 65% to 0.69 among state residents. The decrease in OMH patients and staff continued throughout January after the vaccine distribution scale-up, down 89% in patients to 0.23 and down 71% to 0.24 in staff on February 1, 2021, compared with December 1, 2020. Meanwhile, in NYS, the overall daily case rates remained higher on February 1 at 0.52 cases per

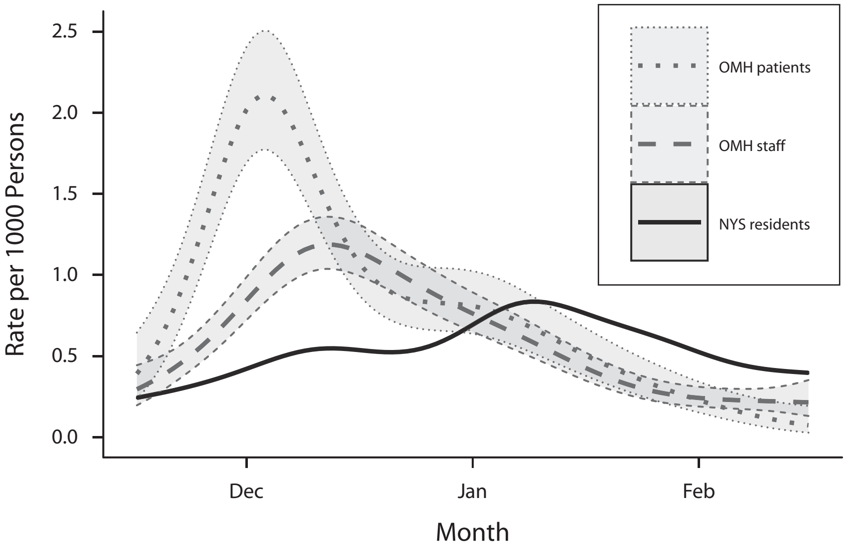

FIGURE 1— New COVID-19 Cases (Rate per 1000 persons) and Case Rate Changes: New York, NY, November 16, 2020–February 16, 2021.

Note. NYS = New York State; OMH = New York State Office of Mental Health.

1000 residents. Case rates in the OMH system declined significantly two weeks after the testing protocols were implemented, before the vaccination campaign began; these rate changes suggest that the testing and quarantine protocols led to a decrease in the transmission of COVID-19 independent of the vaccinations, which did not start until January 1, 2021. During the second COVID-19 surge in NYS, five patients in the OMH-operated psychiatric hospitals were confirmed to have died from COVID-19 illness compared with 44 in the spring 2020 surge.

Results must be interpreted with caution because of differences in testing between the OMH system and the NYS population: because testing in NYS was voluntary, there is a possibility that selection bias introduced error into the statewide COVID-19 prevalence estimation. Another potential limitation is our inability to separate the independent effects of the testing and vaccination campaigns once both were in effect in January 2021. The plateau in OMH patient case rates in the last week of December 2020, followed by the subsequent decrease in case rates two weeks after the vaccination campaign began, suggests that both interventions contributed to the decline in cases.

ADVERSE EFFECTS

There were no adverse effects or unintended consequences associated with this intervention.

SUSTAINABILITY

It is desirable for these interventions to continue. Considerations related to sustainability include the cost of staff and materials for implementing rapid testing, quarantining, and vaccination as well as ongoing concerns about the availability of vaccines. The most significant barrier to the intervention will be continued vaccine hesitancy, throughout both the OMH system and the community at large. Educational and outreach efforts are ongoing to increase vaccine acceptance.

PUBLIC HEALTH SIGNIFICANCE

Worldwide, the rate of psychiatric inpatient hospitalization averages 29.3 per 100 000 population with a maximum of 200.3 beds per 100 000 population.[4] Patients and staff in these psychiatric hospitals are particularly vulnerable to the spread of the COVID-19.[5,6] The importance of curtailing the spread of COVID-19 in psychiatric populations is underscored by recent evidence that individuals with schizophrenia may be particularly vulnerable to COVID-19-related mortality.[7] It is important to use evidence-based public health strategies to limit the spread of infections in these settings. These findings support public health interventions that include testing and quarantining as well as vaccination campaigns, which may help limit spread in congregate settings and the general population as the pandemic continues.

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CONTRIBUTORS

T. E. Smith conceptualized the study; he had full access to all study data and takes responsibility for the data integrity. T. E. Smith and M. M. Wall assisted in drafting the article. I. T. Rodgers assisted with data collection and analyses and drafted the article. D. J. Silverman and S. R. Dreslin collected the data. M. Olfson and L. B. Dixon assisted with the conceptualization of the study and analytic plan. M. M. Wall conducted all analyses and takes responsibility for the data analyses. All authors provided critical review of the final article.

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The New York State Office of Mental Health institutional review board deemed this study not human participants research.

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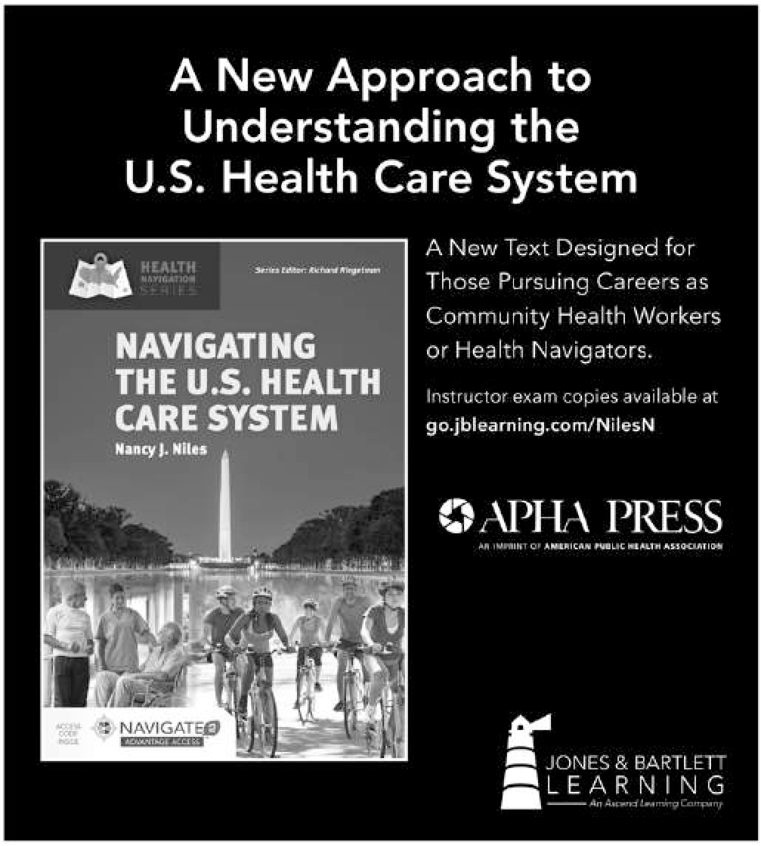

The Interplay of Workplace Redesign and Public Policy in the 21st Century

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See also Lovejoy et al., p. 1787.

Workplace redesign in the 21st Century is eloquently addressed by Lovejoy et al. in this issue of *AJPH* (p. 1787). The authors discuss the interplay of workplace redesign and public policy and the health and well-being of workers and their families. For example, the trend toward precarious work, where people of color are overrepresented, offers little job security or benefits, discourages organized labor, and continues the proliferation of low wages. At the same time, the US workforce is increasingly diverse, some workplaces are more flexible as a result of the pandemic, the importance of paid leave is being recognized, labor efforts supporting the PRO Act (HR 842; Protecting the Right to Organize Act of 2021) are expanding, and there is more emphasis on "green jobs"; all of these provide a potentially optimistic forecast for worker health and well-being. Rapidly developing workplace redesign efforts resulting from the movement toward robotics and artificial intelligence, COVID-19 (e.g., increased hybrid work), and novel public policies on such issues as family and medical leave, safety and health, scheduling notification and work hours, and unionization should be studied to determine their impacts on worker well-being.

As Lovejoy et al. and others describe, an expanded view of traditional occupational safety and health is needed, which has demonstrated that in addition to physical hazards at work, many workers face psychosocial hazards.[1] These include aggression from co-workers and supervisors, work–family stress, heightened job demands resulting from workplace intensification, high stress associated with perceived lack of control, low workplace (e.g., supervisor) support, and less meaningful work. The increase in artificial intelligence and robotics, albeit an important tool for reducing occupational injuries, can contribute to workers' psychological stress and job insecurity.[2] Job insecurity leads to economic insecurity, food insecurity, and negative psychological and physical outcomes. Therefore, we need national policies to provide basic health care, family care, shelter, and food assistance to mitigate the impact of these stressors on workers and their families. Nonwork activities and responsibilities and quality of life must be considered in the redesign of work, as the importance of personal relationships and connections to the natural environment to health are becoming increasingly acknowledged.

Public health policies inadequately address work and its impact on well-being. For example, only 21% of the US workforce has access to paid family and medical leave through their employer, and currently no national program is in place to support workers needing leave.[3] At this time, nine states, the District of Columbia, and more than 30 cities and municipalities have instituted paid leave laws to support workers. Another example is the Seattle, Washington, Secure Scheduling Ordinance, which is one of the nation's first laws mandating schedule predictability covering hourly workers at large retail and food service establishments. Schedule predictability is important for all workers, but critical for those with multiple caregiving demands or multiple jobs.

WORK AS A SOCIAL DETERMINANT OF HEALTH

Lovejoy et al. highlight work as a key social determinant of health and well-being. It is in the interest of public health policy to address workplace redesign strategies as an approach to improving population well-being. Although these ideas are not new, we continue to see the ideological struggle between worker well-being and the financial interests of organizations (e.g., productivity) dating back to the early 20th century.[4] Consistent with the argument that poor working conditions are a root cause of poor health,[5] Lovejoy et al. offer a new framework for worker well-being. Their "work design for health framework" expands on the job demand–control–support model,[6] offering an approach to workplace redesign that requires interdisciplinary systems thinking, including the interplay with public policy. As an example, the authors note problems associated with wellness programs that focus on individual behavior change as the primary way to improve employee health and well-being and suggest refocusing on the workplace environment. Thus, targeting working conditions and identifying redesign strategies for reducing workplace stress are suggested and effective approaches for addressing social determinants of health.

As noted by Lovejoy et al., an important movement in the redesign of work in the 21st century is Total Worker Health, which was launched by the National Institute for Occupational Safety and Health in 2011.[7] This strategy is defined as policies, programs, and practices that integrate protection from work-related safety and health hazards with the promotion of injury and illness prevention efforts to advance worker well-being. Total Worker Health goes beyond traditional occupational safety and health by addressing the interaction of personal, work-related, and broader societal and economic risk factors in understanding the key issues that affect worker safety, health, and well-being. Thus, it expands beyond physical safety hazards to incorporate psychosocial hazards, such as work–life stress,[8] that directly affect worker well-being.

WORKPLACE STRATEGIES

Lovejoy et al. offer an expanded view of three work redesign strategies that use tailored interventions aimed at improving worker and family health and well-being. Strategies include increasing job control (e.g., increased schedule control and worker voice), decreasing job demands (e.g., increased staffing and resources and streamlined work), and enhancing workplace social relations (e.g., supervisor support training). As Sauter et al. and others argue, addressing psychosocial stress and worker well-being from a primary prevention approach must include job design strategies such as reducing workload and work pace, offering flexible work schedules, providing opportunities for positive social interactions at work, and creating jobs that are meaningful.[9] Furthermore, for actual changes to take place, it is critical to implement workplace redesign strategies that improve worker well-being. Despite documentation showing that workplace stress costs up to $190 billion in annual US health care costs,[10] little attention has been given to organizational uptake of existing evidence-based strategies.

Workplace redesign should be a continual process of improvement, placing priority on worker safety, health, and well-being. Over the past 30 years, we have accumulated evidence of the significant impact of work organizational changes on workers and their families and on organizational effectiveness.[11] Working conditions and workplace social relationships that contribute to the social determinants of health include, but are not limited to, work scheduling, co-worker and supervisor support, and workloads with consequences beyond the health, safety, and well-being of workers, their families, and their communities. Furthermore, as women make up a majority of workers in low-wage jobs, many of whom have caregiving responsibilities, greater attention is needed to both public policy and workplace redesign strategies targeting these most vulnerable workers. Given the many changes related to the workforce and the sociopolitical climate, public health is challenged with bringing worker well-being and work redesign front and center in the 21st century. AJPH

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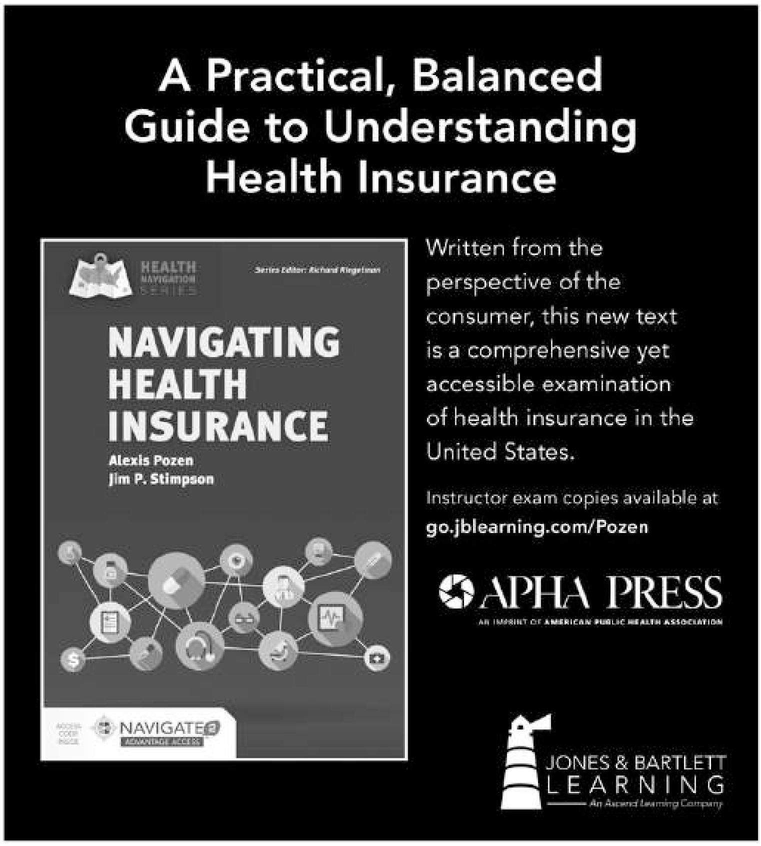

Work Redesign for the 21st Century: Promising Strategies for Enhancing Worker Well-Being

Meg Lovejoy, PhD, Erin L. Kelly, PhD, Laura D. Kubzansky, PhD, and Lisa F. Berkman, PhD

See also Hammer, p. 1784.

Work is a key social determinant of population health and well-being. Yet, efforts to improve worker well-being in the United States are often focused on changing individual health behaviors via employer wellness programs. The COVID-19 health crisis has brought into sharp relief some of the limitations of current approaches, revealing structural conditions that heighten the vulnerability of workers and their families to physical and psychosocial stressors.

To address these gaps, we build on existing frameworks and work redesign research to propose a model of work redesign updated for the 21st century that identifies strategies to reshape work conditions that are a root cause of stress-related health problems. These strategies include increasing worker schedule control and voice, moderating job demands, and providing training and employer support aimed at enhancing social relations at work.

We conclude that work redesign offers new and viable directions for improving worker well-being and that guidance from federal and state governments could encourage the adoption and effective implementation of such initiatives. (*Am J Public Health*. 2021;111(10):1787–1795. https://doi.org/10.2105/AJPH.2021.306283)

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Work is a key social determinant of population health and well-being. Work directly and indirectly shapes inequities in health and well-being by providing opportunities for economic attainment, access to benefits (including health care in the United States), and physical and social environments that profoundly shape health-relevant exposures. It is the place where most adults spend the majority of their waking hours.[1] Substantial research documents the health benefits of work, including not only income but also engagement, personal growth, opportunities for learning, and having a sense of purpose and meaning.[2]

However, the COVID-19 crisis has sharply reminded the public that workplaces are sources of many important exposures that can harm health, including not only viruses, contaminants, and other physical risks but also significant psychosocial stressors. As COVID-19 reveals in painful detail, such exposures are not trivial and how work is designed and organized matters enormously. Moreover, work contributes to the long-observed social gradient in health in the United States, with unhealthy work conditions being more common (and health-enhancing conditions less common) among socially disadvantaged populations.[3,4] During the pandemic, workplace COVID-19 outbreaks have occurred primarily among low-wage workers and migrant populations in industries ranging from agriculture to food processing and manufacturing. Research conducted before and during COVID-19 has consistently demonstrated that exposure to adverse workplace conditions (e.g., job insecurity, long hours) leads to poorer physical and mental health for individual workers and their families and communities.[5]

Despite the importance of work as a social determinant of health, our current ways of pursuing worker well-being are limited. Recent discussions related to improving worker health have focused largely on health promotion or “corporate wellness” programs, which use workplaces as venues for facilitating individual behavior change (e.g., increased exercise, practicing mindfulness). Such programs are problematic for several reasons. For example, they largely overlook the fundamental role of the work environment itself in shaping health. Also, they rest on the assumption that employees can and should manage stressful work conditions by engaging in personal wellness activities, thereby suggesting that employee stress is self-imposed.

Beyond these concerns, such approaches seem to be ineffective, with recent rigorous research revealing small or null effects for these programs on a wide range of employee health outcomes, medical expenditures, and productivity measures.[6,7] These findings, together with an understanding that the social organization of work directly and indirectly influences worker health and well-being, suggest that it is time for a new perspective.[8]

In an important commentary, Schulte et al.[9] identified organizational conditions of the workplace as critical determinants of workforce well-being and argued for a broader definition of worker well-being beyond the traditional scope of occupational health. Recent National Institute for Occupational Safety and Health (NIOSH) initiatives drawing on the Total Worker Health paradigm explicitly recognize that workplace conditions affect worker health, safety, and well-being through multiple pathways and that organizational environments may act synergistically with other health promotion efforts.[10–12] Guidelines and frameworks from Total Worker Health highlight how workplace factors affect worker well-being and identify successes with interventions derived from this approach.[10] Here we propose a work redesign approach that builds on these perspectives but explicitly shifts the focus from asking workers to adapt to their work environment regardless of how work is organized to reshaping work conditions and environments in ways that support employee well-being and improve population health.

Our redesign approach promotes identification of work conditions that affect well-being and is informed by (1) an understanding of the changing demographics of workers and working families and (2) an expanded view of health considering the full spectrum of well-being, including both negative and positive dimensions. This approach orients analyses to the everyday organization of work, with dual aims of enabling individuals to work productively and promoting health and well-being. An organizational approach to changing worker well-being is not new. A major focus on the health effects of psychosocial work environments emerged in the 1970s.[13] Since then, the “job strain model” has become highly influential in occupational health, linking the combination of high work demands with low job control and low social support to poor health and greater stress.[14] Although these ideas continue to be important, dramatic changes in the day-to-day organization of work, workforce demographics, and the relationship between labor and capital occurring in recent decades are less well accommodated by the original model.

Technological advances, global competition, and employers’ strategic responses to pressures from financial markets have radically transformed the nature of work in many organizations. For example, new technologies present employers with increased capacities to monitor and “control” the pace of work, simultaneously creating less discretion for workers in decision making. With the dominance of shareholder-centric business models and the declining power of unions in recent decades, employers have achieved greater flexibility and reduced labor costs through organizational restructuring, downsizing, outsourcing, and a shift to “nonstandard” employment contracts (i.e., temporary, contingent, and gig work).[15–17] These changes have eroded the more stable working conditions of the mid-20th century. Furthermore, many workplaces are increasingly diversified according to race, gender, ethnicity, and age.[5] In light of these changes, updating and renewing existing models of work and health is essential.

Three key dimensions of the job strain model—job demands, control, and social support—remain highly relevant to worker well-being. By considering these dimensions in light of current workplace conditions, we develop a more refined understanding of ways in which demands, control, and support influence worker well-being today. For instance, the job strain model defines control in terms of having the freedom to decide how to perform and organize tasks. However, less emphasized is where and when people work. With technology and other changes in the nature of work, where people work (home or workplace) and when have become more variable, and therefore new areas related to control must be addressed.

In addition, this model focuses primarily on psychosocial conditions in the workplace. It does not address other key features of the work environment that also significantly affect worker well-being (e.g., physical hazards, wages and benefits) or the ways in which the organization affects systems outside of the workplace (e.g., community or environment). Thus, efforts to understand the effects of work conditions on worker well-being

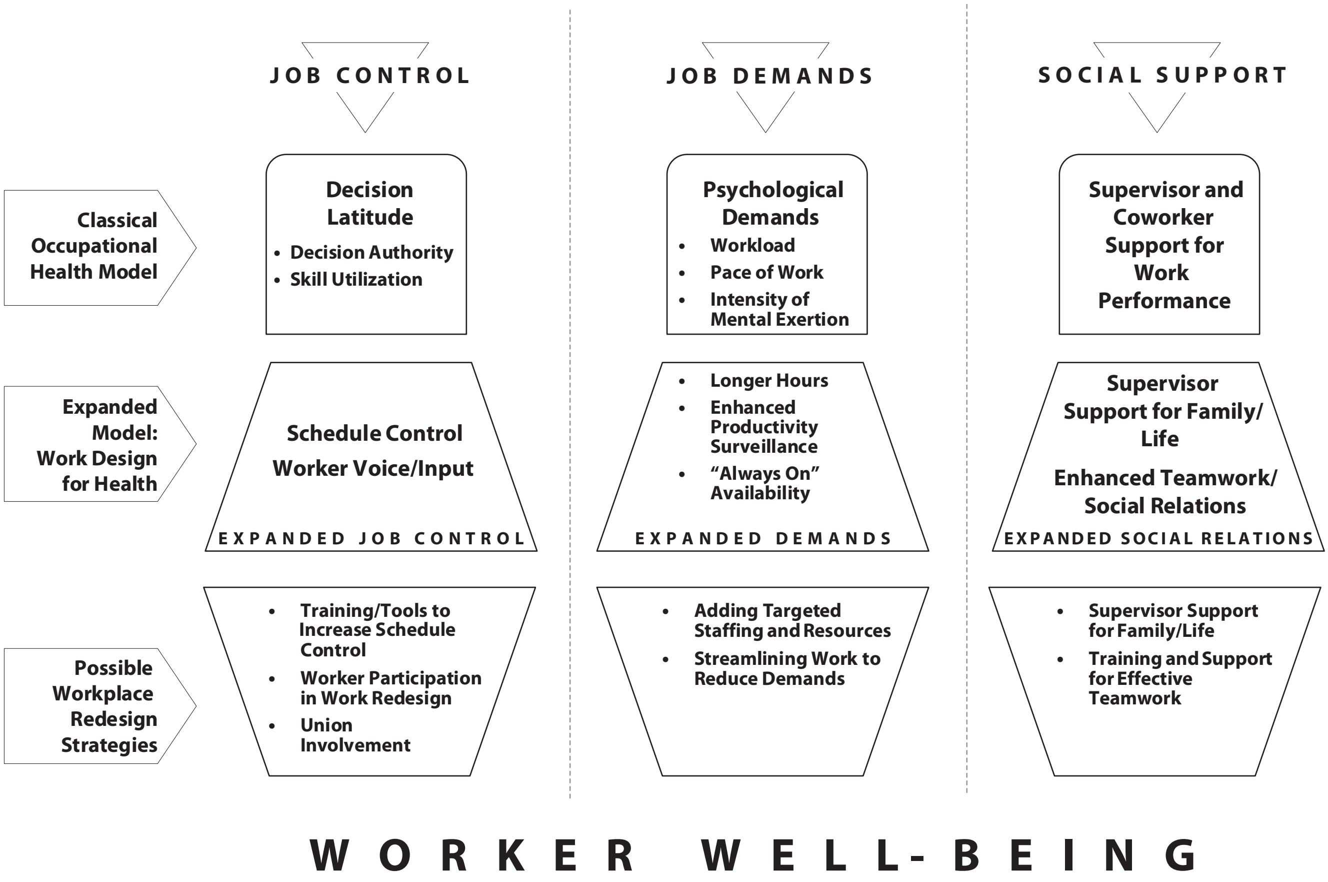

FIGURE 1— **Work Design for Health: Updating the Classical Occupational Health Model**

Source. Authors' update and expansion of the classical occupational health model.

must look beyond even an updated job strain model.

Here we present a work design for health framework and highlight evidence-based work redesign strategies focused on organizational and group-level changes to improve worker well-being. Although highly valuable, we did not consider individual- or leader-level interventions because they are less clearly focused on primary prevention and changing workplace conditions. Our framework is informed by key findings from a systematic review of experimental research on work redesign for worker well-being[8] and by a review of relevant nonexperimental research.

UPDATING THE JOB STRAIN MODEL

Figure 1 provides an overview of the original job strain model, our proposed updates to each of its three dimensions (i.e., the work design for health model), and examples of evidence-based workplace redesign strategies that effectively target expanded aspects of the framework.

Job Control: Expanding to New Forms

The level of discretion workers exercise over daily work tasks (i.e., job control) is a powerful lever for enhancing health and well-being.[14] The job strain model defines job control as the level of autonomy workers have over how they do their work, including autonomy in task-related decisions ("decision authority") and opportunities to use a wide range of job skills ("skill utilization"). Schedule control, or autonomy over when and where work happens, is also important. One aspect of schedule control is schedule flexibility, or the extent to which workers can vary their working time (e.g., start and end times, time off) and work location (i.e., office or home) to manage the work–life balance more effectively. Recent surveys document unmet needs for schedule flexibility among workers, with the strongest needs among single mothers and those with primary caregiving responsibilities.[15] Stress associated with managing the needs of both work and family has well-documented health consequences, including hypertension, sleep difficulties, and other health problems.[18]

A second aspect of schedule control is schedule predictability. Particularly relevant for low-wage workers, predictability provides stable schedules (i.e., quantity or timing of hours worked), making it possible to coordinate the demands of work with life outside of work and to have a more predictable income. Employers in service industries are increasingly using scheduling software to make "just-in-time" adjustments to workers' shifts, with hours cut or extended at a moment's notice. These practices purportedly save labor costs but can harm workers, as they are associated with adverse mental and physical health and poor family functioning.[16]

Worker voice is another important element of job control. Worker voice goes beyond task autonomy and captures the broader ability of employees to influence their work conditions. Alternative channels for worker voice are needed given the relatively weak nature of US federal labor policies and the fact that union membership has shrunk by about half since the 1980s, to 11% of US workers.[19] In a recent national survey, nearly 50% of nonunion workers reported that they would vote for a union, suggesting a sizable gap between workers' desired and actual voice in US workplaces today.[20]

Job Demands: Expanding to Reflect Intensification

Significant and broad-based intensification of work has occurred since the 1970s. Individuals are working faster and harder and are more likely to say they have "too much work to do everything well."[15(p157)] Whereas the original job strain theory characterized demands according to how fast work needs to be done and how difficult it is,[14] intensification of work is accompanied by a proliferation of new kinds of demands.

First, some employees are working longer hours than ever before, primarily driven by expanding workloads. The upswing in "overwork" among some workers largely results from downsizing and lean staffing trends among white-collar professionals;[21] however, because of employers' increased use of mandatory overtime, some blue-collar and low-wage service workers are working longer as well.[22] Long work hours are associated with an increased risk of poor outcomes, including cardiovascular disease and heightened work–family conflicts.[18,23]

Second, low-wage blue-collar and service workers are experiencing intensified time pressure as a result of the enhanced surveillance made possible by new technologies. For example, technology for tracking productivity increases the pressure to work quickly by gathering information on individuals' performance in real time.[24]

Third, work demands have become increasingly unbounded by time and place. New communication technologies permit constant connectivity, and, combined with lean staffing trends, employers often expect white-collar workers to be available for work anywhere at any time.[21] For lower-wage workers, just-in-time scheduling creates a similar unbounded effect, with unpredictable schedules and increased pressure to be available at any time.[16] If work redesign efforts are to be effective, they must tame excessive work demands and increase worker autonomy and support.

Social Support: Expanding to Social Relations

Social networks and the resources that flow from them are essential to health and well-being;[25] however, workplace relationships are less commonly seen as sources of support. Relationships between managers and employees, among employees acting in teams, and between employees and clients affect health and well-being independently and can buffer stressful conditions.[25,26] Social support was incorporated as a key component in the job strain model, with research demonstrating improved well-being among workers receiving managers' and coworkers' support.[14] However, given the growing number of workers who are also primary caregivers, the updated framework identifies new types of social resources needed to support employees' personal or family life more broadly.[26,27]

Beyond social support, informational, financial, and skill-related resources also flow through networks.[25] A recent study suggests that quality of interpersonal collaboration affects employee engagement more strongly than employee sense of purpose.[28] Moreover, because of the growth of the health care and service sectors, an increasing proportion of jobs require substantial interdependence among workers and between workers and their patients or customers. For example, health care workers' strong focus on patient care and teamwork can be rewarding but can also provide more opportunities for negative interactions.[29] As workforces become increasingly diverse, more opportunities for subtle bias arise, and diversity requires deliberate work to build close and productive teams. Thus, in our updated framework, we move beyond an emphasis on individual-level social support to emphasize a relational focus for group-level task coordination.

PROMISING WORK REDESIGN STRATEGIES

Following our model refinements and drawing on the strongest evidence available, we have identified promising organizational change strategies to improve worker health.

Enhancing Job Control

Training and tools to facilitate increased schedule control. With growth in the service sector and technology pushes for around-the-clock availability, workers need more control over schedules and location. Several rigorous studies have shown that this approach improves worker health.

For example, the Work, Family and Health Network conducted randomized controlled trials in two industries, an information technology division of a US Fortune 500 firm and a long-term care industry. The intervention aimed to increase employees' control over when they did their work and, in the information technology division, where work was done. Information technology workers in treatment groups reported better outcomes 18 months postrandomization, not only with regard to lower turnover but also across a number of health-related factors, including reductions in cardiometabolic risk.[21,27,30] In the long-term care setting, the intervention improved cardiometabolic risk and organizational engagement; however, results across other outcomes were more mixed, perhaps because there was less latitude to alter scheduling within a highly structured setting.[31] Taken together, these findings highlight the promise of increasing schedule flexibility but also point to the importance of tailoring interventions to occupational contexts.

Two other high-quality studies evaluating schedule interventions in lower-income workforces revealed positive effects.[32,33] For instance, Garde et al. found that a self-rostering system in which employees chose their own work schedule within certain parameters led to decreased distress. Several studies have shown promising effects of interventions aiming to increase schedule predictability. For example, a randomized controlled trial in Gap stores evaluated changes in multiple aspects of scheduling.[34,35] Among other practices, the treatment included increasing the consistency of associates' shifts and offering part-time employees a soft guarantee of 20 or more hours a week. Treatment group employees had more schedule stability and better sleep quality, and parents and second job-holders reported decreased stress. Notably, the new practices were good for business, resulting in better retention of experienced employees, a 7% boost in median sales, and a 5% increase in labor productivity.

Worker participation and union involvement in work redesign. Increasing worker voice is another promising strategy for improving worker well-being. Several studies have evaluated participatory approaches in which employees engage in a facilitated process of problem identification and implementation of workplace changes. Both experimental and observational research demonstrates that structured interventions incorporating a participatory process are particularly effective.[8] For example, some organizations are implementing "unit-based teams," in which union representatives and management jointly lead workers through a participatory change process designed to identify and test solutions to workplace problems in which all parties have a common interest. Preliminary evidence is promising, showing that team members are more likely than nonmembers to feel that they can influence their work environments.[36]

Taming Job Demands

Adding targeted staffing and other resources. Work demands have intensified in part as a result of lean staffing. Although employers may be reluctant to increase staffing for fear of compromising profit margins, emerging evidence suggests that strategically growing staff could be good for both business and worker well-being. Operations scholar Ton[37] has found that slack staffing (i.e., staffing with enough labor hours to meet demand at peak times), along with other operational strategies that fully engage workers, boosts profits and worker morale. The Gap study provides compelling experimental evidence for positive effects; a key intervention component was adding staff in a targeted manner. This change contributed to increased sales and labor productivity and outweighed added labor costs, producing a positive return on investment.[34,35]

Adding workplace resources strategically can also ease work demands and improve well-being. Several rigorous interventions in health care settings have alleviated staff demands by improving training and support for new hires, increasing primary care visit times, and adding support staff and a new prescription telephone line to free up nurses' time. At follow-up, clinicians in intervention groups showed reductions in psychosocial and physical demands, improvements in mental health, and reductions in intention to leave.[38,39]

Streamlining work to reduce demands. Making work processes more efficient can reduce workloads and may improve worker well-being. The health care interventions just described[38,39] included strategies to remove bottlenecks to patient care, such as standardizing certain clinical processes so that nurses could act independently of doctors. A study of Danish postal workers showed that Kaizen—a continuous improvement strategy that focuses on reducing unnecessary tasks in work processes—predicted higher job satisfaction and better mental health when it was used in promoting productivity and worker well-being.[40] However, when employing "lean management" practices, it is critical to orient toward worker well-being as a goal and to build in time for healthy socializing and some staffing slack to adjust to seasonal or other variations in work demands; otherwise, these practices can easily increase work pressure and reduce well-being.[41]

Enhancing Workplace Social Relations

Supervisor support for family and personal life. Several intervention studies that enhanced manager support for employees' family life showed promising effects on worker well-being.[27,30,31] For example, a study with supermarket workers revealed that family-supportive supervisor behaviors predicted improved job satisfaction and physical health among employees with high levels of work–family conflict. In the intervention, employees and managers discussed work–family concerns and managers were encouraged to develop new, more explicitly supportive habits.[42]

Training and support for effective teamwork. The growth of highly interdependent jobs in the 21st century has spawned work environments where employees must frequently interact with clients or patients and coordinate with each other. Experimental evaluations of initiatives designed to improve relational and team dynamics are generally promising. The ARC (Availability, Responsiveness, and Continuity) intervention improves teamwork and communication by fostering collaboration within and across related social service organizations, thereby developing trust and support. Teams work together to identify and implement processes that will improve organizational climate, reduce turnover rates, and improve the quality of client services. In randomized controlled trials conducted in two different settings, Glisson et al.[43,44] found that the study intervention led to improvements in numerous factors related to well-being and productivity, including employee morale, job satisfaction, and organizational commitment, as well as reductions in employee turnover, emotional exhaustion, and role overload.

A quasi-experimental study of health care workers revealed that various strategies designed to build teamwork and enhance communication improved employee mental health. Tactics included establishing overlapping nursing schedules to improve communication about patient conditions, revising information and messaging systems to address communication gaps between management and nurses, and instituting team meetings to discuss problems and solutions to relational issues.[39] Another line of work has identified "relational coordination" as a promising approach to improving teamwork dynamics through facilitated interventions aimed at fostering high-quality communication, shared goals, and mutual respect.[29] Although experimental work is warranted, numerous observational studies have linked training for teamwork, creating shared accountability, and coordinating information systems with multiple positive performance and well-being outcomes.[29]

REFLECTIONS

As vividly demonstrated by the COVID-19 pandemic, work conditions can have a significant impact on health. It is time for a more creative and courageous approach to improving workers' health and well-being, one that aspires not only to mitigating misery but also to fostering positive mental health. As noted by Schulte et al.[9] and outlined in the Total Worker Health approach even before the pandemic, maintaining worker well-being and paying attention to the mental and physical health consequences of work environments must be a priority, both for public policy and for employers. Work redesign points to the possibility of moving upstream to address conditions of work that contribute to ill health and foster health inequities.

Workplace intervention studies consistently demonstrate that the current organization of work is malleable and real improvements are feasible. Documented benefits of redesigning work with regard to control, job demands, and social relationships are substantial, including reduced cardiometabolic risks, improved mental health and job satisfaction, and productivity-related benefits such as reduced employee turnover.[8] That said, a key limitation of this growing field is that redesign research has tended to focus on certain industries (e.g., health care, social services) and groups of workers (e.g., higher wage, white collar); there is less research on small businesses, although emerging observational evidence suggests that useful approaches can be applied.[45,46]

Although the model should be broadly relevant, additional research is needed to be confident in stating which redesigns will be most effective for workers from different income groups or occupational contexts. Moreover, research on improving the health of individuals whose workplaces are less “fixed,” such as temporary or gig workers, is missing altogether, a significant gap given the growth of this workforce. Accordingly, NIOSH Total Worker Health now recognizes nonstandard work arrangements as a priority area for future research.[47] Furthermore, contingent workforces may require public policies that more fully incorporate them into companies as employees if redesign strategies are to gain traction.

Despite some limitations, the evidence base is sufficient to motivate action. Employers can do more than pay for new wellness programs with questionable impact. Executives and managers can look carefully at how their organizational processes and practices affect the health and well-being of workers and their families. Work redesign may be less expensive, in terms of upfront costs to a firm, than wellness initiatives. These costs usually involve a vendor and financial incentives paid to participating employees; spending on wellness programs now averages more than $700 per employee.[48] By contrast, existing staff can and do operate redesign initiatives with little or no costs incurred from vendor support. Even with outside consultants and all labor time included, one extensive redesign initiative cost $340 per employee.[49]

However, a redesign approach requires openness to scrutinizing current practices and day-to-day operations. Effective initiatives require managers’ willingness to foster participation from the bottom up, in a collective process of constructive change. Although the prospect of work redesign may seem daunting, employers should weigh its promise against the often unrecognized costs of business as usual. Such costs include reduced productivity, higher absenteeism and turnover, and higher health care expenses from stress-induced erosion of employee health.

Motivating employers to do what is right for the health and well-being of their workers will require support from federal and state governments. In one recent article, it was concluded that the United States has limited awareness of the detrimental health effects of job strain and few coordinated governmental actions to reduce it.[50] By contrast, over recent decades EU governments have initiated various effective actions, some of which could be easily adopted by US public agencies (e.g., NIOSH, state health departments), to help organizations reduce workplace stressors and create nonbinding standards for managing psychosocial workplace risks.[50] Although NIOSH has a leadership role to play in this effort, effective implementation requires public–private partnerships between federal regulatory agencies (Occupational Safety and Health Administration, Office of Management and Budget, US Department of Health and Human Services) and businesses, unions, and other voluntary organizations to develop incentives for sustaining these changes. The private sector has also begun to recognize these issues through such declarations as the Business Roundtable statement on investing in employees and communities.[51]

We will need to develop clear, publicly available tools (e.g., business case studies, toolkits, briefs) that target communications to a broad spectrum of stakeholders, including business leaders, unions, and worker advocacy groups. For the most enduring effects on worker health, voluntary work redesign initiatives must be complemented by updated labor regulations that ensure healthy workplace protections for all, such as paid family and medical leave and “fair work week laws” granting workers greater scheduling control in jobs with unpredictable hours.

CONCLUSIONS

Decades of research have documented persuasively that work is a critical social determinant of health. Now evidence is mounting that work redesign adapted for the 21st century is an important lever to improve worker well-being and health equity in this country. Leveraging an updated model—Work Design for Health—we propose a range of concrete strategies that can significantly enhance worker well-being. The need for action is ever more imperative. Although more research is needed to confirm the value of these strategies, in the meantime we can build networks of experts, labor advocates, and employers to facilitate shared learning and look to other countries and "high road" employers for effective models. In these ways, we can begin to prioritize the most promising approaches to redesigning work for well-being.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

HUMAN PARTICIPANT PROTECTION

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

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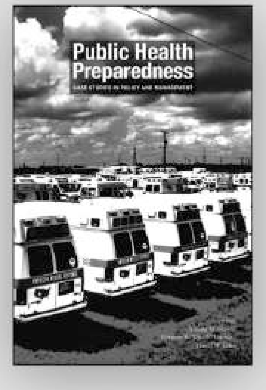

State-Level Sexism and Women's Health Care Access in the United States: Differences by Race/Ethnicity, 2014–2019

Kristen Schorpp Rapp, PhD, Vanessa V. Volpe, PhD, and Hannah Neukrug, BA

See also Galea and Vaughan, p. 1733, and Homan, p. 1725.

Objectives. To quantify racial/ethnic differences in the relationship between state-level sexism and barriers to health care access among non-Hispanic White, non-Hispanic Black, and Hispanic women in the United States.

Methods. We merged a multidimensional state-level sexism index compiled from administrative data with the national Consumer Survey of Health Care Access (2014–2019; n = 10 898) to test associations between exposure to state-level sexism and barriers to access, availability, and affordability of health care.

Results. Greater exposure to state-level sexism was associated with more barriers to health care access among non-Hispanic Black and Hispanic women, but not non-Hispanic White women. Affordability barriers (cost of medical bills, health insurance, prescriptions, and tests) appeared to drive these associations. More frequent need for care exacerbated the relationship between state-level sexism and barriers to care for Hispanic women.

Conclusions. The relationship between state-level sexism and women's barriers to health care access differs by race/ethnicity and frequency of needing care.

Public Health Implications. State-level policies may be used strategically to promote health care equity at the intersection of gender and race/ethnicity. (*Am J Public Health*. 2021;111(10):1796–1805. https://doi.org/10.2105/AJPH.2021.306455)

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Disparities in morbidity and mortality by gender and race/ethnicity persist despite overall gains in life expectancy in the United States.[1–5] Barriers to health care access, including delays in receiving care, high cost of care, and lack of health insurance, are underlying determinants of women's health.[6] Both availability (i.e., frequency and consistency of needed care) and affordability barriers (i.e., cost of insurance, prescriptions, and medical bills) govern women's ability to access care.[1] Even when women are insured, they use more health care services; out-of-pocket costs are a greater share of their income; they avoid needed health care because of cost; and they have difficulty paying medical bills compared with men.[7] Non-Hispanic Black women (hereafter, Black women) and Hispanic women also experience these barriers more frequently than non-Hispanic White women (hereafter, White women),[2,3] and the Affordable Care Act has not closed these gaps.[4,8] Therefore, examination of additional sociopolitical factors may identify a source of unmet health care needs for women of color.

Sexism, defined as gender inequalities in power and resources that systematically privilege men and disadvantage women,[9] is a significant determinant of gender gaps in access to health care. We build on Homan's[10] concept of structural sexism, which describes gender inequality in power and resources across institutional, interpersonal, and internalized levels of society. We specifically examine structural sexism as policies and institutional practices that disempower women, thereby shaping barriers to women's health care access. Structural sexism at the state level may play a role in catalyzing sociopolitical conditions important for health care access for women.[11] Following Homan,[10] we conceptualize state-level sexism as an index of economic, labor, and political inequalities between men and women, and the presence or absence of reproductive rights (i.e., abortion provider) in a given state. Research suggests that state-level voting, immigration, and employment discrimination laws can have direct and indirect consequences for health care access, particularly for Black and Hispanic women in the United States.[12]

Structural sexism is a significant determinant of women's health.[10,13] However, to our knowledge, no research examines whether racial/ethnic differences exist in the relationship between state-level sexism and access to care. According to intersectionality theory, Black and Hispanic women are at greater risk for experiencing the health-related impacts of sexism than White women, because of their position within intersecting systems of oppression by both gender and race/ethnicity.[14–16] In this way, exposure to sexism has a greater impact on the health of Black and Hispanic women compared with White women.[16] Barriers to health care access for Black and Hispanic women also vary substantially by place,[2,17] suggesting that economic and political contexts shape the extent of these disparities. State policies also create particular care barriers for Black and Hispanic women, such as disparities in accessing family planning and abortion services.[2]

The current study addresses gaps in our understanding of a structural-level factor that may contribute to intersecting racial/ethnic and gender health care disparities in the United States—state-level sexism. A core tenet of intersectionality is the rejection of a single-axis approach (i.e., only examining gender or race/ethnicity), which renders the intersection of differential positions of power and disenfranchisement invisible. Therefore, we examined associations between state-level sexism and barriers to health care access by race/ethnicity, among White, Black, and Hispanic women. In addition, we tested whether associations between state-level sexism and barriers to care differed among Black and Hispanic women compared with White women, and whether associations between state-level sexism and barriers to care differed by frequency of needing medical care.

METHODS

We compiled state-level administrative data from a variety of sources (e.g., Bureau of Labor Statistics, Guttmacher Institute) and merged them with individual-level data from the Association of American Medical Colleges' (AAMC) Consumer Survey of Health Care Access.[18] The AAMC survey is a repeat cross-sectional, online survey of adults aged 18 years and older in the United States who reported needing medical care over the past year. The AAMC used stratified sampling to collect data based on age and health insurance status, with oversamples of various subpopulations of interest (minority, rural, Medicaid recipients, etc.) in particular survey waves. We used 9 waves of the AAMC survey conducted from December 2014 to January 2019, matching survey waves with state-level data that corresponded with the year of observation.

The analytic sample included White, Black, and Hispanic women who had at least 1 medical care visit in the past year (n = 13 441). We did not have adequate sample sizes to produce reliable state-level estimates for other racial/ethnic groups. As we were unable to investigate intersections of racial and ethnic identifications for Hispanic women given small sample sizes, we grouped all Hispanic women into a single group. Among eligible participants, 17.3% (n = 2318) were missing items measuring barriers to health care access. An additional 1.7% (n = 225) were missing data for other analytic variables. We conducted listwise deletion to limit the analysis to participants with complete data for all variables of interest, resulting in a final analytic sample size of 10 898. We did not use multiple imputation to impute missing data because barriers to health care access is the primary source of missing data and imputed values for dependent variables are not typically included in regression analyses.[19]

Table A (available as a supplement to the online version of this article at http://www.ajph.org) compares the analytic sample to participants who were excluded from the analysis because of missing indicators of care barriers. Excluded participants were less likely to be White, to have a college degree, to be married, and to reside in a suburban location. Excluded participants were also younger, lower income, more likely to be Hispanic, and more likely to be uninsured. Given the relative social vulnerability of excluded study participants compared with the analytic sample, estimates of the relationship between state-level sexism and barriers to care are likely conservative.

Barriers to Health Care Access

We used 8 items from the AAMC survey to measure barriers to health care access. Four items measured availability barriers (inconsistency in ability to access care, delay in accessing care, limited choice in care, and uninsured), and 4 items measured affordability barriers (high cost of health insurance, inability to fill a prescription due to out-of-pocket cost, inability to complete a medical test or treatment due to cost, and difficulty paying medical bills). We dichotomized and summed measures to create an 8-item index of all barriers to care. Because relatively few participants reported more than 5 barriers to care, we truncated the index into 6 categories, with the lowest category indicating no barriers to care and the highest category indicating 5 or more barriers. In addition, we constructed a 4-item index of availability barriers (range = 0–4) and a 4-item index of affordability barriers (range = 0–4) to examine each domain separately. Survey items included in the barriers to care indexes are described further in Table B (available as a supplement to the online version of this article at http://www.ajph.org).

State-Level Sexism

We constructed a state-level sexism index using 7 state-level indicators from administrative data sources: ratio of (1) men's-to-women's earnings, (2) men's-to-women's employment, (3) and women's-to-men's poverty rate; (4) proportion of men in state legislature; (5) absence of a state paid family or medical leave policy; (6) absence of state law restricting gun ownership for domestic violence offenders; and (7) proportion of women residing in a county without an abortion provider (Table C; available as a supplement to the online version of this article at http://www.ajph.org). Higher scores indicate higher levels of sexism. We collected state-level measures annually and linked them to the AAMC study based on observation year. Following Homan,[10] we created a continuous index of state-level sexism by standardizing state-level measures relative to the full observation period, summing standardized scores, and dividing the summed index by the standard deviation to create a continuous index with a mean of 0 and a standard deviation of 1 (Cronbach's $\alpha = 0.70$).

Analysis

To describe state-level measures, we calculated the mean and standard deviation for each year of observation and averaged across years. For the AAMC study, we calculated weighted descriptive statistics separately for White, Black, and Hispanic women. We conducted Pearson's χ^2 and Kruskal–Wallis H tests to examine racial/ethnic differences.

We ran ordinal logistic regressions to test for associations between state-level sexism and barriers to health care access. We first conducted all analyses separately by race/ethnicity. To test for differences in state-level sexism and care barriers by race/ethnicity, we ran additional models using the full sample with an interaction term for state-level sexism and race/ethnicity. To test whether frequency of needing care moderated associations between state-level sexism and barriers to care within each racial/ethnic group, we ran models separately based on respondents' frequency of needing care, then included an interaction term for state-level sexism and frequency of needing care within racial/ethnic groups. All models adjusted for age, household income, education, marital status, urbanicity, state-level Gini index, and whether the state had implemented Medicaid expansion since 2014. As health insurance status is an important determinant of care availability that may also influence health care affordability, all models of state-level sexism and affordability barriers adjusted for health insurance status. We did not include health insurance status as a covariate in models predicting overall barriers to care and availability barriers because "uninsured" was already included as an item in the availability barriers index. We conducted all analyses using Stata version 15[20] and weighted analyses using US Census weights.[21] To account for possible correlation of residuals within states, we clustered all regression analyses by state.

RESULTS

Table 1 shows descriptive statistics for the analytic sample. Black and Hispanic respondents reported significantly more availability barriers, affordability barriers, and overall barriers to care compared with White respondents. We also found significant differences by race/ethnicity for age, income, education, marital status, urbanicity, and frequency of needing medical care.

Descriptive analysis for state-level sexism indicators is shown in Table C. At the state level, women had lower earnings, lower labor force participation, and higher poverty rates than

TABLE 1— Descriptive Statistics, Consumer Survey of Health Care Access: United States, 2014–2019

	Non-Hispanic White (n = 8756), Mean (SD) or %	Non-Hispanic Black (n = 1060), Mean (SD) or %	Hispanic (n = 1082), Mean (SD) or %	Racial/Ethnic Difference *P*
Barriers to health care access	1.74 (1.90)	2.04 (1.72)	2.23 (1.45)	< .001
0	32.47	27.69	24.22	
1	23.87	20.44	18.39	
2	13.81	15.09	14.82	
3	10.44	10.57	12.66	
4	9.93	14.96	16.15	
≥ 5	10.55	13.04	14.16	
Availability barriers	0.50 (0.89)	0.57 (0.77)	0.72 (0.70)	< .001
0	62.50	54.74	47.81	
1	24.66	30.21	33.91	
2	7.34	10.05	10.96	
3	3.97	3.57	6.17	
4	1.54	1.43	1.15	
Affordability barriers	1.26 (1.48)	1.46 (1.31)	1.57 (1.11)	< .001
0	39.52	33.92	30.38	
1	24.71	23.50	23.54	
2	14.06	12.77	15.13	
3	13.26	21.87	20.89	
4	8.45	7.95	10.06	
Age, y				< .001
18–24	12.8	17.48	28.27	
25–34	9.24	11.66	20.46	
35–44	12.73	17.53	20.63	
45–54	20.55	21.77	16.07	
55–64	20.16	19.95	8.55	
≥ 65	24.52	11.61	6.02	
Income, $				< .001
< 25 000	19.86	17.49	20.00	
25 000–49 999	23.34	30.95	25.71	
50 000–74 999	25.92	32.72	24.58	
75 000–99 999	11.23	8.46	9.00	
≥ 100 000	19.66	10.39	20.70	
Education				.003
Less than high school	33.8	30.33	28.31	
High school degree or equivalent	4.23	5.73	5.47	
Some college	36.29	38.32	36.07	
College or more	25.68	25.63	30.15	
Marital status				< .001
Single, never married	18.51	46.60	29.89	
Married/cohabiting	53.23	31.24	56.15	
Widowed	9.14	4.76	3.36	

Continued

TABLE 1— Continued

	Non-Hispanic White (n = 8756), Mean (SD) or %	Non-Hispanic Black (n = 1060), Mean (SD) or %	Hispanic (n = 1082), Mean (SD) or %	Racial/Ethnic Difference *P*
Divorced	17.24	14.56	9.33	
Separated	1.89	2.84	1.27	
Urbanicity				< .001
Suburban	47.75	42.37	39.64	
Urban	24.24	45.76	48.85	
Rural	28.01	11.88	11.50	
Needed care ≥ 2 times	53.38	44.53	37.28	< .001
Has health insurance	92.99	90.50	93.30	.08

Note. The sample size was n = 10 898. For barriers to health care access, availability barriers, affordability barriers, age, income, and educational attainment, we used the Kruskal–Wallis H test to test for racial/ethnic differences. For marital status, urbanicity, needed care 2 or more times, and has health insurance, we used the Pearson's χ^2 test to test for racial/ethnic differences.

men. Women were also underrepresented in state legislatures relative to men. Most states (94%) had no paid family medical leave policy during the observation period and no policy prohibiting gun ownership for people charged with domestic violence (65%). The average proportion of women residing in counties without an abortion provider was 46%. See Table D (available as a supplement to the online version of this article at http://www.ajph.org) for state-level sexism rankings.

We tested associations between state-level sexism and barriers to health care access among White, Black, and Hispanic women (Table 2). Associations between state-level sexism and barriers to health care access were nonsignificant for White women in our sample. By contrast, for each standard deviation increase in state-level sexism, Black women had 18% higher odds of experiencing an additional barrier to health care access (adjusted odds ratio [AOR] = 1.18; 95% confidence interval [CI] = 1.02, 1.36). In addition, Black and Hispanic women residing in states higher in state-level sexism reported more affordability barriers (AOR = 1.21; 95% CI = 1.06, 1.37 for Black women; AOR = 1.25; 95% CI = 1.06, 1.48 for Hispanic women). Additional analyses (Tables E and F; available as a supplement to the online version of this article at http://www.ajph.org) show that associations between state-level sexism, overall barriers to care, and affordability barriers differ significantly by race/ethnicity, particularly at higher values of state-level sexism.

Figure 1 plots predicted probabilities of experiencing barriers to health care access by degree of state-level sexism. We derived all plots from models that include the full analytic sample and sexism-by-race/ethnicity interactions, holding all other covariates at their mean values. For ease of visualization, we estimated predicted probabilities from logistic regression models with dichotomized barriers to care indicators. To dichotomize barriers to care indexes, participants in approximately the bottom 3 quartiles of each index were coded as 0, and participants in approximately the top quartile of each index were coded as 1. The predicted probability of being in the top quartile for overall barriers to care (experiencing 4 or more barriers) was 34% for Black women residing in states that were high in sexism, compared with 14% for Black women in states that were low in sexism (Figure 1a). Hispanic women also had a higher predicted probability of experiencing barriers in states that were high in sexism (26% in states with high state-level sexism vs 19% in states low in sexism), but the associations for Hispanic women and for White women did not differ significantly. Associations between state-level sexism and availability barriers (Figure 1b) did not significantly differ by race/ethnicity. Finally, the predicted probability of being in the top quartile for affordability barriers (experiencing 3 or more affordability barriers) increased from approximately 19% in states that were low in sexism to 35% in states that were high in sexism among Black and Hispanic women, but did not change significantly for White women (Figure 1c).

Follow-up analyses determined whether associations between state-level sexism and barriers to care differed by frequency of needing care

TABLE 2— Associations Between State-Level Sexism and Barriers to Health Care Access Among Non-Hispanic White, Non-Hispanic Black, and Hispanic Women: Consumer Survey of Health Care Access, United States, 2014–2019

	White (n = 8756), AOR (95% CI)	Black (n = 1060), AOR (95% CI)	Hispanic (n = 1082), AOR (95% CI)
State-level sexism and:			
Barriers to care (full index)	0.98 (0.91, 1.06)	1.18 (1.02, 1.36)	1.15 (0.96, 1.38)
Availability barriers	0.96 (0.88, 1.06)	1.07 (0.87, 1.33)	1.01 (0.84, 1.22)
Affordability barriers	0.98 (0.92, 1.05)	1.21 (1.06, 1.37)	1.25 (1.06, 1.48)

Note. AOR = adjusted odds ratio; CI = confidence interval. The sample size was n = 10 898. We calculated AORs from ordinal logistic regression models. The barriers to care index is a count index that ranges from 0 (no barriers to care) to 5 (5 or more barriers to care). Availability and affordability barriers range from 0 to 4 barriers. State-level sexism is a continuous index that was standardized to have a mean of 0 and a standard deviation of 1. All models adjust for age, state Gini coefficient, state Medicaid expansion, household income, education, marital status, and urbanicity with clustered standard errors by state. Affordability barriers models adjust for health insurance because insurance is not included in the affordability barriers index (but uninsured was included in the full barriers to care index and availability barriers index).

within each racial/ethnic group. More frequent need for care did not alter associations between state-level sexism and barriers among White and Black women. However, as shown in Table 3, high state-level sexism increased the odds of experiencing affordability barriers among Hispanic women with more frequent need for care (AOR = 1.48; 95% CI = 0.17, 1.87), but not among Hispanic women with less frequent need for care (AOR = 1.15; 95% CI = 0.93, 1.41).

DISCUSSION

This investigation examined structural-level social determinants of health, including those embedded in laws and policies, to advance health equity research.[13,22] Present research examines the role of structural oppression (e.g., racism, sexism) on disparities in morbidity and mortality, but research on health care access remains limited. We addressed this gap by examining associations between state-level sexism and both health care accessibility and affordability barriers. We took an intersectionality approach, examining these associations at the intersection of race/ethnicity and gender to understand structural-level determinants of health care access.

We found no association between state-level sexism and access to care for White women. Previous investigations of race/ethnicity in the association between state-level sexism and health drew different conclusions. Homan[10]

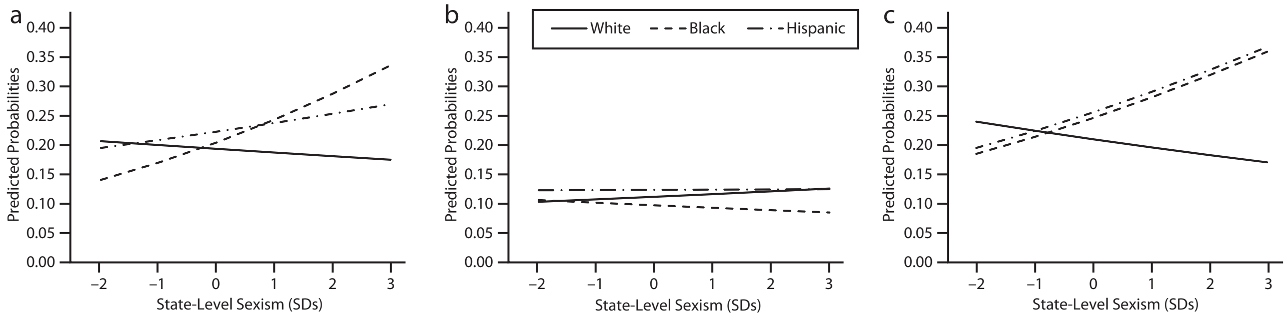

FIGURE 1— Predicted Probabilities of Experiencing Barriers to Health Care Access by State-Level Sexism Among Non-Hispanic White, Non-Hispanic Black, and Hispanic Women for (a) All Barriers to Care, (b) Availability Barriers to Care, and (c) Affordability Barriers to Care: United States, 2014–2019

Note. The sample size was n = 10 898. Figure 1a shows predicted probabilities of experiencing 4 or more barriers to care (reported by 23% of the sample) for each standard deviation of state-level sexism. Figure 1b shows the predicted probabilities of experiencing 2 or more availability barriers (reported by 14% of the sample) by state-level sexism. Figure 1c shows the predicted probabilities of experiencing 3 or more affordability barriers (reported by 24% of the sample) by state-level sexism.

TABLE 3— Associations Between State-Level Sexism and Affordability Barriers to Health Care Access Among Non-Hispanic White, Non-Hispanic Black, and Hispanic Women, Stratified by Frequency of Need for Care: Consumer Survey of Health Care Access, United States, 2014–2019

	White		Black		Hispanic	
	Needed Care 1 Time (n = 4120), AOR (95% CI)	Needed Care ≥ 2 Times (n = 4636), AOR (95% CI)	Needed Care 1 Time (n = 564), AOR (95% CI)	Needed Care ≥ 2 Times (n = 496), AOR (95% CI)	Needed Care 1 Time (n = 649), AOR (95% CI)	Needed Care ≥ 2 Times (n = 433), AOR (95% CI)
State-level sexism and affordability barriers	0.92 (0.84, 1.01)	1.04 (0.95, 1.13)	1.19 (0.98, 1.45)	1.20 (0.96, 1.48)	1.15 (0.93, 1.41)	1.48 (1.17, 1.87)

Note. AOR = adjusted odds ratio; CI = confidence interval. The sample size was n = 10 898. We calculated AORs from ordinal logistic regression models. The affordability barriers index is a count index ranging from 0 to 4 barriers. State-level sexism is a continuous index that was standardized to have a mean of 0 and a standard deviation of 1. All models adjust for age, state Gini coefficient, state Medicaid expansion, income, education, marital status, urbanicity, and health insurance with clustered standard errors by state.

did not find a significant interaction between state-level sexism and race/ethnicity on women's physical health and functioning. By contrast, Kawachi et al.[23] found that state-level sexism indicators were significantly associated with White women's mortality rates, whereas only the number of women in elected office was significantly associated with Black women's mortality rates. These studies have examined state-level sexism and health outcomes, rather than health care access outcomes. Perhaps state-level sexism affects White women's health but not access to care. Although access to care and health outcomes should be linked, access to care is only a portion of what contributes to health status.[2] From an intersectionality perspective, state-level sexism may not result in reduced access for White women because of the protection they experience as a result of their racial privilege,[24] or perhaps because US state-level policies are most often racialized, resulting in different "race-gendered" outcomes.[25] White women may not experience decremented access as a result of state-level sexism because many state-level policies privilege White women compared with women of color in terms of health care access and socioeconomic resources.[26,27] Further research is necessary to test such propositions. Differences between current results and previous studies may also be due to differences in the indicators of state-level sexism used, years of observation, and samples represented.

For Black and Hispanic women, higher state-level sexism was associated with more barriers to accessing care. Studies that examine intersectional race/ethnicity and gender effects support this finding. Brown et al.[27] found that Black and Mexican American women had worse self-rated health than White individuals, beyond the effects of race/ethnicity or gender alone, a phenomenon they refer to as "multiple hierarchy stratification" of health inequities. This may be because Black and Hispanic women experience multiple forms of structural oppression that synergistically constrain interactions with the health system and affect subsequent health outcomes.[15] In support of this notion, Manuel[8] found that health care access barriers have persisted for both Black and Hispanic women despite the Affordable Care Act, suggesting that these women face unique barriers to accessing care.

Affordability barriers appeared to drive the associations between state-level sexism and overall barriers to care for Black and Hispanic women. Black and Hispanic populations in the United States are socioeconomically disenfranchised, with overall lower socioeconomic status, mobility, and resources compared with White individuals.[28] Although we controlled for insurance status, other cost barriers may be salient for Black and Hispanic women. For example, in 1 investigation, 28.3% of Black women reported not being able to see a doctor because of cost barriers, and about 1 out of every 2 Black women owed money to a medical facility.[29] Hispanic women also report experiencing more delay in care because of cost barriers.[2] Brown et al.[27] found that Black and Mexican American women may not experience as many health gains from increased socioeconomic status indicators compared with White men and women. Although Black and Hispanic women's experiences of state-level sexism and affordability barriers may differ, our study suggests that state-level sexism may be a deleterious social determinant of health for these women. Elucidating mechanisms through which Black and Hispanic women face affordability barriers to care through state-level sexism is an important future direction.

More frequently needing care exacerbated the association between state-level sexism and affordability barriers for Hispanic women. This finding is supported by previous research finding that Hispanic women are less likely to be able to access needed follow-up care.[30] Hispanic women are less likely to have a primary care physician compared with women from other racial/ethnic groups,[2] perhaps because of social-structural barriers in culturally and linguistically appropriate services and anti-immigrant political climate, resulting in a lack of supportive services for both immigrant and nonimmigrant Hispanic women.[31,32] In this way, health care access barriers for Hispanic women may increase with continued need for care. In the AAMC sample, 17% of Hispanic women reported facing language barriers when communicating with a provider. State-level sexism may also intersect with state-level policies that uniquely affect Hispanic women, including enhanced immigration enforcement and restrictive immigration policies.[33] For example, immigration laws are a form of legal violence that restricts movement outside the home and thus limits opportunities to access formal medical care, given fear of being surveilled.[34] These laws may also affect equality for Hispanic women in the state-level sexism indicators that we measured—including restrictions on Hispanic women's employment and benefits, and limited opportunities for Hispanic women to hold legislative office.

Limitations

Several limitations of the current study should be noted. First, the AAMC sample reported relatively high levels of health care access and was restricted to individuals who had at least 1 medical care visit within the past year. Although we accounted for insurance status and other health-related covariates, results do not generalize to those who did not need care or could not access care at all. Our results may underestimate the relationship between state-level conditions and access to care because those with no access to care were excluded. In addition, over 90% of the sample reported having some form of health insurance, suggesting greater access to health care compared with the US population. The analysis employed census sampling weights to ensure demographic representativeness, but results do not represent the full spectrum of health care access barriers and needs in the US population. In addition, Hispanic individuals in the United States are a large and diverse group (e.g., differing by culture, nationality, language, nativity, immigration status). Data on these dimensions were not available, which limits our understanding of the spectrum of experiences that may be relevant for the Hispanic subsample. Furthermore, other intersectional social identity positions (e.g., race/ethnicity and sexual orientation) were not examined because of the small sample sizes, but they must be incorporated into disparities research to better understand how these identities shape health care experiences. More vulnerable populations (e.g., women of color, undocumented women, queer-identifying or transgender women) are more likely to have missing data, but they are some of the most important populations to reach. Finally, we did not have adequate data to examine gender identity (cisgender, transgender, or nonbinary identity). As trans and nonbinary populations experience substantial barriers to accessing health care because of discriminatory policies,[13,35] further research is needed to understand health care disparities at these intersections. Future research should also consider incorporating additional reproductive rights indicators of state-level sexism.

Public Health Implications

Krieger[13] emphasizes the power of systems in creating and upholding health inequities. The current study suggests that state-level sexism, as one such system, is important for the health care access of women of color. State-level sexism may be a less central social determinant of health care access for White women, but it may be especially salient for Black and Hispanic women. Higher state-level sexism was specifically associated with affordability barriers for Black and Hispanic women, suggesting that equitable state-level policies across economic, labor force, political, and reproductive rights realms may be especially impactful public health interventions to increase women's availability of socioeconomic resources for health care. The relationship between state-level sexism and Hispanic women's barriers to accessing care was also strongest among those who needed more frequent care, suggesting that examination of state policies that directly or indirectly affect Hispanic women will be fruitful for reducing health care disparities.

This study implicates state-level indicators of sexism that may together affect equitable health care access for women, especially those most marginalized in our society. Evaluation, revision, and creation of state-level policies may be used more strategically to support women's health care access if leaders are committed to ensuring gender equity in power and resources, and if they approach policymaking with an intersectionality framework. Public health professionals are instrumental in leading and supporting these efforts to achieve health equity.

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The authors declare no conflicts of interest.

HUMAN PARTICIPANT PROTECTION

Because the current study used secondary data without identifiers, it was ruled exempt by the Roanoke College institutional review board.

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"Do Their Own Thing": Radical Health Care and the Fair Haven Community Health Center

Ezra S. Lichtman, MD

Radical health reform movements of the 1960s inspired two widely adopted alternative health care models in the United States: free clinics and community health centers. These groundbreaking institutions attempted to realize bold ideals but faced financial, bureaucratic, and political obstacles. This article examines the history of Fair Haven Community Health Care (FHCHC) in New Haven, Connecticut, an organization that spanned both models and typified innovative aspects of each while resisting the forces that tempered many of its contemporaries' progressive practices. Motivated by a tradition of independence and struggling to address medical neglect in their neighborhood, FHCHC leaders chose not to affiliate with the local academic hospital, a decision that led many disaffected community members to embrace the clinic. The FHCHC also prioritized grant funding over fee-for-service revenue, thus retaining freedom to implement creative programs. Furthermore, the center functioned in an egalitarian manner, enthusiastically employing nurse practitioners and whole-staff meetings, and was largely able to avoid the conflicts that strained other community-controlled organizations. The FHCHC proved unusual among free clinics and health centers and demonstrated strategies similar institutions might employ to overcome common challenges. (*Am J Public Health*. 2021;111(10):1806–1814. https://doi.org/10.2105/AJPH.2021.306417)

Fair Haven Community Health Center (FHCHC, recently renamed Fair Haven Community Health Care) in New Haven, Connecticut, is one of almost 1400 federally qualified health centers in the United States that, in 2019, delivered primary care to 29.8 million patients.[1] Now ubiquitous within US health care, these institutions (at points called neighborhood health centers and community health centers [CHCs], how they will be referred to here) first rose to prominence in the 1960s. Building on earlier iterations of health care for the poor and underserved—including 19th-century dispensaries, prepaid group practices championed by mid-20th-century labor organizers, and municipal medical systems such as New York's 1950s Gouverneur Health Services Program—the CHC model was also born out of the country's shifting health needs and prevailing sociopolitical forces.[2]

After World War II, medicine in US cities became increasingly research-oriented and hospital-based, and many communities faced a primary care shortage.[3] As this need worsened, civil rights and Black Power activists, feminist health proponents, and many within health care began to vocally criticize racist, sexist, and classist discrimination in medicine.[4] In 1965, for example, health sciences students founded the Student Health Organizations (SHOs). An ideological cousin of the Medical Committee for Human Rights and Health Policy Advisory Center—other associations of progressive health professionals—SHOs hoped to apply the antihierarchical principles espoused by political organizations such as Students for a Democratic Society and the Student Nonviolent Coordinating Committee to the realm of health care. The SHO chapters around the country published newspapers and led protests against hierarchy and White racial hegemony within medical education.[5] All these groups voiced a growing skepticism of medical authority and demanded that health care empower individuals and communities to take charge of their own health.

Also in 1965, physicians Jack Geiger and Count Gibson and community organizer John Hatch founded the first modern, federally funded CHCs in Dorchester, Massachusetts, and Mound Bayou, Mississippi. These men drew on knowledge Geiger had acquired working in South African health centers, Hatch's organizing and social work expertise, and their experiences in the civil rights movement. They hoped to create multidisciplinary institutions that would provide affordable care, actively involve constituents in governance, and administer projects to improve patients' circumstances beyond individual medical problems.[6] This vision coincided with President Lyndon Johnson's War on Poverty. The Johnson administration created the Office of Economic Opportunity (OEO) in 1964 and required "maximum feasible participation" by poor communities in projects meant to serve them. Though government officials and grassroots activists often contested what constituted "participation," the new agency provided federal funding to numerous programs that were at least partially community-controlled, including CHCs.[7]

In 1967, San Francisco's Haight-Ashbury Free Clinic pioneered a different health care model that also grew into a nationwide movement. Free clinics, somewhat limited in scope compared with CHCs, aimed to provide free and accessible health care in deprofessionalized and community-controlled settings.[8] Some free clinics treated counterculture youths, and others created by feminist groups and organizations such as the Black Panthers had broader political objectives, but the majority resulted from underserved communities' attempts to secure basic medical services.[9] They relied on volunteer labor, small fundraisers, and donations from nearby medical institutions.[10]

The FHCHC, which launched in August 1971 as a free clinic and grew into a CHC in subsequent years, drew on these models while developing its own particular identity. The organization took a distinctive path regarding academic medical center affiliation, funding and programming priorities, community control, and workplace culture, issues that frequently led to conflict and policy compromises at other institutions. Here, I will first discuss the Fair Haven neighborhood's demographics and tradition of independence. Next, I will lay out the inadequate, discriminatory health care options that were available to its population. I will then consider why FHCHC leadership prioritized autonomy over partnership with the nearby university medical center and sought grants over fee-for-service revenue, as well as the consequences of these decisions. Finally, I will examine interrelated aspects of the environment at FHCHC—the role of nurse practitioners (NPs), gender dynamics, and egalitarian functioning—that distinguished the organization.

INDEPENDENT FAIR HAVEN

Fair Haven, located across the Mill River from downtown New Haven, operates as a neighborhood of the larger city, but its longtime status as a destination for working-class, Catholic immigrants has ensured its cultural distinctiveness. The first half of the 20th century saw an influx of Italian and Irish residents who were joined in the 1960s by an increasing proportion of Puerto Rican citizens. By 1970, Fair Haven was 75% White (mostly Italian), 15% Hispanic, and 10% Black.[11]

The neighborhood's cultural makeup was notable, as was the fiercely independent spirit of its residents. The zeitgeist of 1960s movements, from OEO programming to Black Power and Young Lord activism, reflected a desire for community control that Fair Haven organizations also embodied.[12] A predominantly Italian group of citizens, mobilized by their participation in OEO-funded programs, formed the Fair Haven Neighborhood Corporation (FHNC) in the late 1960s to push for community-controlled projects.[13] The FHNC received support from a New Haven government antipoverty agency, which channeled OEO monies, but as a 1970 *New Haven Register* article argued, the group retained an autonomous ethos:

> Fair Haven Corporation officials have an almost populist-like philosophy of operation. Change, they feel, must come from the bottom . . . not from the top or from city hall. . . . They don't feel anybody downtown knows the experiences of neighborhood people so that it's up to the neighborhood people themselves to "do their own thing."[14]

FHNC partnered with another local group, the Alliance for Latin American Progress (ALAP), to establish FHCHC one year later. According to Peter Blasini, former organizer for ALAP, the Corporation's attitude reflected a common feeling among Fair Haveners that, because of the neighborhood's geographic isolation and poor, immigrant, and Catholic population, it "had always been underserved and always overlooked" by the city's influential institutions.[15]

HEALTH NEEDS OF THE NEIGHBORHOOD

Fair Haven's neglect was particularly conspicuous when it came to health care. As physician specialists concentrated in hospitals in the postwar decades, preventive and basic services became scarce in surrounding areas.[16] Fair Haven suffered from this redistribution of medical resources: by 1969, only two general practitioners had offices in the neighborhood.[17]

Because of the expense and inconvenience of traveling across town, many Fair Haveners delayed seeking treatment, resorting to the Yale-New Haven Hospital (YNHH) emergency department only when their conditions became dire.[18] In 1968, the New England SHO chapter coordinated a summer health project, during which participants assisted neighborhood groups in assessing community health needs.[19] Data collected by SHO members demonstrated the financial costs, transportation difficulties, and lack of available services faced by Fair Haveners.[20]

Project participants were also struck by the distrust toward YNHH expressed by many neighborhood residents. A letter from SHO chapter leader and Yale medical student Lawrence Horowitz to university president Kingman Brewster noted

> Being accepted by community groups as no other Yale people ever have, we were in a position to learn what the people in [Fair Haven] really think of Yale. . . . And what they think of Yale is not very much. And the large majority of the people have formed that negative opinion . . . in the emergency room of the Yale-New Haven Hospital.[21]

Moreover, a 1968 sociological study of the hospital found that YNHH doctors often exploited poor patients as teaching or research material "and offered little apology."[22]

YNHH, along with many academic medical centers in the 1960s and 1970s, also paid limited attention to language barriers faced by patients. A 1971 survey showed that more than half of New Haven's Puerto Rican residents required an interpreter for medical visits.[23] Despite this, in 1974, YNHH employed only six Spanish-speaking interpreters and did not actively recruit Hispanic staff.[24]

Like members of poor and minority communities nationwide who faced inaccessible, unaffordable, and discriminatory medical care at teaching hospitals, Fair Haveners decided to "do their own thing."[25] With assistance from the FHNC, ALAP spearheaded the effort to bring health services to the neighborhood.[26] The Alliance was led by Maria Melendez, who moved to New Haven from Puerto Rico in 1967 and began volunteering for ALAP in 1969. In 1970, Melendez broached the possibility of opening a clinic, and Blasini took on the project. Blasini had grown up in a Puerto Rican family in New York City. After graduating from Yale College in 1969, he accepted a position at ALAP. He secured seed money from the philanthropic New Haven Foundation, negotiated with the principal of a local elementary school for space to operate the clinic, and sought advice from Moreson Kaplan, medical director at the Black Panthers' recently opened New Haven free clinic who later volunteered at FHCHC.[27] In August 1971, FHCHC opened under the name Fair Haven Clinic.

AUTONOMY AT THE FAIR HAVEN CLINIC

The FHCHC began as a twice-weekly evening clinic for minor ailments. Despite its modest start—one nursing volunteer recalled performing well-baby examinations on school cafeteria tables—by the early 1970s, the clinic offered free family planning, prenatal, and ambulatory medical services four nights per week.[28] The FHCHC also recruited Spanish-speaking clinicians and translators and enlisted outreach workers, such as Melendez and two local Italian women, who promoted the clinic around the neighborhood.[29]

The Panther clinic across town, also launched in 1971, served the largely poor, Black residents of the Dixwell neighborhood under similar circumstances and with substantial success.[30] However, according to Kaplan, the clinic struggled to expand as the Party's New Haven presence declined, and it closed within a few years.[31] The Fair Haven Clinic, meanwhile, continued to grow beyond the limited medical care typical of free clinics. The FHCHC's 1973 annual report declared that it meant to "provide community services" and help Fair Haveners "understand the health delivery system and control their own health care."[32] Toward this end, FHCHC established educational programs on nutrition, sickle cell anemia, thalassemia, and elderly health. It also hired neighborhood residents, ensured its board was majority-community, and arranged health care system training for lay board members.[33]

Above all, FHCHC placed a premium on autonomy. In 1968, another clinic named the Hill Health Center (HHC) had opened near the Yale School of Medicine. HHC had been demanded by dissatisfied activists and represented a significant step toward community-controlled health care for Black residents of the Hill neighborhood who were mistreated at YNHH.[34] However, Blasini recalled that in Fair Haven, HHC was perceived as "a top-down organization" under Yale's thumb.[35] A representative from YNHH sat on the HHC board, and the clinic, although a community resource, also served as a teaching and research site for the university and hospital.[36] HHC received financial benefits, including startup money, from this partnership.[37] Though the new clinic became a CHC independent from Yale in 1971, a funding request submitted by HHC's executive director to President Brewster in 1974 alluded to the continuing transactional nature of their relationship: "We have . . . been responsive to the legitimate research and academic needs of [Yale's] students and teachers. . . . Now we are calling upon Yale for assistance."[38]

Witnessing these dynamics, FHCHC's founders feared relying on the university would mean losing autonomy. "Yale wanted to control whatever they put their money into," recalled Marilyn Burlenski, early FHCHC nursing volunteer and board member, "and Fair Haven Clinic was not about to be controlled."[39] Elizabeth Magenheimer, who began volunteering at FHCHC in 1974 and was hired in 1976 as one of the center's first full-time NPs, agreed that "financial input from Yale . . . was going to mean a loss of independence, [and] we always saw ourselves as completely independent."[40]

The arrangement at HHC was typical of many free clinics and CHCs. Free clinics were intended to function outside the existing medical establishment, but the majority ended up relying on hospitals and medical schools for resources and staff.[41] By 1972, many former free clinic supporters believed they had failed to substantially alter health care delivery and had, in fact, "become a part of organized medicine."[42] Similarly, while CHC proponents often shared Fair Haveners' uneasiness toward university hospitals, few centers maintained independence from them.[43] HHC thrived early on with Yale's support while FHCHC's financial status was perpetually precarious, delaying its growth. The Fair Haven organization's determination to put ideological independence into practice was notable. Choosing not to affiliate with Yale, FHCHC's leaders drew on the model of a small group of similar institutions—such as New York's North East Neighborhoods Association (NENA) Health Center, created in 1968 by organizers from low-income, immigrant, Lower East Side neighborhoods who rejected reliance on large medical centers—which were truly "community initiated, community controlled."[44]

The FHCHC gradually expanded its suit of programs throughout the 1970s and, in 1977, converted its medical services from an evening free clinic in borrowed elementary school space to a full-time CHC model with sliding-scale payments and a standalone building. Though it took time to build patient trust in the quality of FHCHC services, especially among Fair Haveners with the means to seek care elsewhere, Melendez believed the clinic's grassroots nature was central to its success. "That's probably why it was so well taken by the community," she said, "because it was a project from the community. It wasn't . . . imposed."[45] The center drew on Yale physicians as volunteers and collaborated with YNHH on various initiatives over the years, but by existing largely outside of the university's umbrella, it was able to win over Fair Haveners suspicious of Yale facilities.[46] Supporting Melendez's assessment, FHCHC saw steady growth in patient visits from 450 in 1971 to 17 550 a decade later, and a 1980 survey found that patients had "an overwhelmingly positive impression of the Clinic."[47]

GRANTS AND PROGRAMS

Eschewing the financial support that came with institutional affiliation, FHCHC's leaders opted instead to pursue grants from a variety of sources. The 1973 hiring of Katrina Clark as executive director reinforced this decision. Clark was a Yale School of Public Health graduate and not a native Fair Havener, but she had developed an understanding of the neighborhood while participating in the 1968 summer health project.[48] She was soon esteemed by her colleagues. Burlenski lauded Clark as "the best thing that ever happened to the clinic," and Anne Camp, an endocrinologist who started working at FHCHC in 1994, characterized Clark as a prolific, skilled grant writer who secured funds that allowed the center to focus on innovative projects.[49]

The same year Clark was hired, a nationwide shift in CHC functioning began. In 1973, Richard Nixon transferred health center administration from OEO to the more traditional Department of Health, Education, and Welfare (HEW). HEW policies, in combination with funding cuts initiated by Nixon and continued by Ronald Reagan, pushed CHCs to become financially self-sufficient through fee-for-service revenue.[50] As a consequence, many CHCs were forced to curtail their innovative preventive health and community engagement efforts in favor of individual clinical care.[51]

The FHCHC started as a free clinic and, though it began operating as a CHC in 1977, did not receive direct OEO/HEW health center funding until 1980.[52] In part because it established itself before becoming bound by HEW policies, and in part because of Clark's aptitude for winning grants, FHCHC joined a contingent of CHCs that bucked the trend toward limited clinical care and continued to introduce inventive extramedical projects. In 1974, with Department of Agriculture funds, the center began enrolling patients in the Women, Infants, and Children Supplemental Food Program and hired a dietitian to counsel participants.[53] That year, Clark secured $100 000 from the Connecticut state government to purchase the building on Fair Haven's main thoroughfare that became FHCHC's permanent site in 1977 (Figure 1).[54] In 1978, FHCHC launched a Self-Care Project funded by the Kellogg Foundation that involved classes on exercise, cardiopulmonary resuscitation, stress management, and women's health, as well as the publication of a Spanish–English health newsletter.[55] Three years later, FHCHC established a daycare at a local high school to allow adolescent parents to return to their classes, a venture that, supported by the Robert Wood Johnson Foundation, grew into Connecticut's first school-based health center.[56] In 1982, just 29% of FHCHC's $765 000 budget came from fee-for-service reimbursements.[57]

This approach had its own set of problems, including inconsistency of funding, inability to offer competitive salaries, and reliance on Clark's personal talents. For example, Camp recalled that, through the early 1990s, positions at FHCHC paid less than comparable jobs at HHC and elsewhere.[58] And Clark's efforts were barely sustainable: "She did the job of four people," according to Magenheimer.[59] Recognizing these challenges, FHCHC's 1979 annual report stated, "A future goal of the Clinic is to move away from such dependency upon grants and to stabilize our funding."[60] As FHCHC continued to serve more patients amid shifts in governmental policy, the center increasingly focused resources on individual clinical encounters throughout the 1980s. From 1994 onward, fee-for-service funds constituted more than half of FHCHC's budget. However, Clark's strategy delayed this transition and made it possible for FHCHC to invest in bolder programs than many of its contemporaries.

WORKPLACE CULTURE

FHCHC was also a trailblazer in its elevation of NPs, a relatively new class of health care providers in the 1970s who shared the clinic's dedication to offering community-focused care, addressing social drivers of health, and filling the primary care gap left by doctors who gravitated toward specialty practices.[61] By 1972, the Yale School of Nursing (YSN) had established midwifery, pediatric, and family NP tracks, but graduates of such programs struggled to gain professional acceptance in a medical world dominated by physicians.[62] Many health centers, including FHCHC, had difficulty recruiting doctors who could earn higher salaries elsewhere.[63] Responding to this staffing challenge and reflecting the good relations between FHCHC and YSN, Clark developed a number of programs with the school to expand the education and utilization of NPs at the center.[64] Moreover, Magenheimer recalled frequent trips Clark made to the state capitol in Hartford to advocate for "the political struggle of midwifery within the healthcare system."[65] In 1977, the staff included two full-time NPs and a nurse-midwife, and six YSN students trained at the center.[66] FHCHC quickly became an "oasis" for NPs.[67] According to Camp, when she was hired in 1994, "doctors were almost looked down upon."[68]

Reflecting the robust role of NPs, a mostly female profession at the time, was the notable gender balance at FHCHC, both in terms of leadership and numbers. As of 1977, 16 of 18 paid positions were held by women, including executive director; the only two men on the payroll were part-time physicians.[69] According to staff members, the predominance of women—illustrated in a 1979 clinic portrait (Figure 2)—was not explicitly intended but followed from the organization's female directorship, progressive workplace and health care philosophies, and partnership with YSN.

FIGURE 1— Fair Haven Community Health Care's Original Cramped Administrative Office at 388 Grand Avenue, in Which Maria Melendez Recalled "Nine People Working Back to Back" From 1971 to 1977 (Left), and the Large Former Funeral Home at 374 Grand Avenue That Became the Center's Permanent Site for Clinical and Administrative Operations in 1977 (Right)

Source. 1978 Annual Report of the Fair Haven Community Health Clinic (1979), 4, Fair Haven Community Health Care Records, Fair Haven Community Health Care, New Haven, CT.

The decreased authority of doctors and the gender dynamics at FHCHC mirrored trends within many CHCs and free clinics. CHCs were often headed by women and hired NPs in order, according to Geiger, to do away with "the classic physician-centered, physician-run team."[70] At the same time, feminist activists created numerous free clinics run for and by women.[71] Though not unique, the circumstances at FHCHC represented the realization of broader objectives to democratize health care, redistribute power, and upend gender hierarchies that were central to 1960s health reform and social activist movements.[72]

Intertwined with these goals were the often-thorny issues of community control and professional–nonprofessional relationships, but FHCHC skirted the extensive power struggles and debates over representation in leadership that similar health centers, like NENA, experienced.[73] The FHCHC had meaningful community participation in its governance, even before receiving OEO funding that mandated such participation. Through 1986, seven of the 19 board positions at FHCHC were filled by "patient-representatives," six by "community members at large," and one by a FHNC member (ALAP had since dissolved).[74] Because of the lack of professional expertise among volunteer board members, Clark assumed the majority of fundraising responsibilities, but her commitment to serving the Fair Haven community was widely affirmed.[75]

FHCHC was also able to navigate the animosity between professional and nonprofessional staff that sometimes troubled community-controlled institutions.[76] Clark actively involved herself in day-to-day operations, personally running the clinic for three hours each week to keep abreast of issues faced by staff. According to two physicians who worked at both HHC and FHCHC, this accessibility of the executive director promoted a genial atmosphere that distinguished the Fair Haven clinic.[77] Tension still arose, for example, when medical providers were unprepared to see patients on time, delaying nonprofessional staff's workflow. But conflicts such as these were addressed at FHCHC's Friday morning meetings, which were chaired by a different person each week and allowed the entire staff a chance to air grievances and participate in collective decision-making regarding everything from the color of a new carpet to the reassignment of responsibilities during visits to increase efficiency. Magenheimer recalled that "the equalizing of a voice was monumental" and resulted in "people staying [at FHCHC] for twenty and twenty-five and thirty years."[78] Melendez and Camp similarly lauded the meetings for democratizing the workplace and promoting staff retention. However, they noted that it was "expensive and time consuming" to close the clinic for a half day every week, becoming untenable as FHCHC grew.[79]

Throughout the 1990s and 2000s, FHCHC increased its patient load, conducting more than 42 000 visits in 1993 and 56 000 in 2002, by which time the Friday meetings had been shortened and compartmentalized into department-specific issues.[80] Though expansion improved FHCHC's ability to provide needed health care to its patients, longtime employees lamented the changes in culture they witnessed with organizational growth, including increased staff turnover, lack of familiarity among coworkers, and a diminished sense of ownership over the center.

FIGURE 2— **Because of Fair Haven Community Health Care's Progressive Practices, Utilization of Nurse Practitioners, and Collaboration With Yale School of Nursing, as Well as Katrina Clark's Leadership, Mainly Women Worked at the Organization, as Shown in This 1979 Photo of the Clinic Staff**

Source. 1979–1980 Annual Report of the Fair Haven Community Health Clinic (1980), 5, Fair Haven Community Health Care Records, Fair Haven Community Health Care, New Haven, CT.

CONCLUSION

Eventually, organizational enlargement, regulations that came with federal funding, and doubtless other factors altered FHCHC's identity. By the early 2000s, FHCHC relied most heavily on Medicaid reimbursements and federal CHC funding, partnered more often with YNHH, and had ceased its weekly whole staff meetings.[81] Some of the center's distinguishing characteristics had faded as it matured. Nonetheless, in the last decade of Clark's tenure (she retired in 2013 and passed away in 2017), FHCHC remained, by many metrics, successful: it maintained a majority-community board representing its largely Hispanic and low-income patient population, opened new office locations and school-based health centers, and continued to pursue creative projects, such as its 2012 partnership with a Fair Haven–based urban farm as part of a Diabetes Prevention Program. Reflecting the broader CHC and free clinic movements, the center, born from a radical reimagination of the purview and structure of health care, became a standard, if indispensable, fixture in New Haven.

Underserved and discriminated against, Fair Haveners created their own free clinic that catered to local patients' needs and was guided by the principle of community control. The organization hired neighborhood residents, instituted wide-ranging extramedical programs, and bolstered its clinical capabilities by embracing NPs. Free clinics and CHCs around the country emerged from similar situations and employed parallel practices.

But FHCHC was more than a local manifestation of national circumstances. Reflecting insight into New Haven's institutional dynamics and Fair Haveners' priorities, the vision of a gifted leader, and a dedication to democratic functioning, FHCHC was also remarkable. It expanded beyond the bounds of most free clinics and outlasted many contemporaries, including the Panthers' nearby clinic. FHCHC founders also earned support within the community by rejecting academic medical center affiliation. This was rare, if not unheard of, and differentiated FHCHC from HHC, though both continue to function today. In addition, a substantial portion of the center's funding came, for many years, from grants its director secured. While this approach had drawbacks, it allowed FHCHC to continue ambitious education, prevention, and outreach efforts after OEO/HEW policy changes forced some comparable centers to focus primarily on fee-for-service care. Finally, FHCHC cultivated an equitable, collaborative climate and retained staff for decades as a result of meaningful community representation and inclusive weekly staff meetings.

This history imparts a critical understanding of the origins and operations of free clinics and CHCs with relevance to current community-based health care efforts. Many health care institutions still struggle to implement community control, to balance a desire for autonomy with the need for financial security, and to foster an egalitarian workplace culture. FHCHC took noteworthy approaches to these common issues, approaches that may be adapted by modern-day community health advocates and inspire inventive thought as to the future of radical health care.

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CONFLICTS OF INTEREST

I have no conflicts of interest to disclose.

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The 1918 Influenza Pandemic Versus COVID-19: A Historical Perspective From an Italian Point of View

Andrea Cozza, MD, Giuseppe Maggioni, MD, Gaetano Thiene, MD, and Maurizio Rippa Bonati, MD

See also Ewing, p. 1715.

The ongoing COVID-19 pandemic has a major precedent almost exactly a century ago: the world-famous H1N1 influenza virus pandemic, sometimes known to the general public as the Spanish flu. From a history of medicine perspective, it is possible to underline many potential common traits between the two. In this article, hygiene and prophylaxis strategies are analyzed in a review of the most popular Italian general medical journals at the time of Spanish flu, *Il Policlinico* being the most representative of them. The analysis included 40 original journal articles as well as important references to the most influential coeval national manuals and international journals. The main issues in the context of public hygiene are prophylaxis with quinine and quinine derivatives, vaccinations, face masks, disinfection, and social distancing. We draw a comparison between these and the most recent international World Health Organization and Italian national guidelines on the topic. Sadly, little has changed since those times in terms of most of the prevention techniques, even with technical improvements, showing how shortsighted doctors and physicians can be when dealing with medical history. (*Am J Public Health*. 2021;111(10):1815–1823. https://doi.org/10.2105/AJPH.2021.306412)

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From a medical history perspective, it is possible to underline many similarities and differences between the COVID-19 pandemic and the 1918 influenza pandemic, sometimes known to the general public as the Spanish flu.[1] Between 1918 and 1920, the influenza pandemic killed an estimated 50 million people worldwide—circa 460 000 in Italy alone, according to a recent Italian study—a greater death toll than the recently ended World War I.[2]

Because the US experience in 1918 to 1919 has been well reviewed in the historical literature, for a comparative view, we reviewed the most important Italian medical journals on the 1918–1919 pandemic outbreak onward, to assess the state-of-the-art knowledge at the time, notably focusing on public health and prophylaxis issues in terms of plans and measures put in place to fight the advance of the infection. A comparison with the most recent international World Health Organization (WHO) and Italian national guidelines on the topic is drawn to consider the evolution of knowledge in the field.

THE SOURCES

We considered many authoritative Italian and international sources, and those that we chose we did so on the basis of their availability and scale of distribution.

We investigated four Italian journals: *La Riforma Medica* (*LRM*), *La Gazzetta degli Ospedali* (*LGdO*), *Il Giornale di Clinica Medica* (*IGCM*), and *Il Policlinico* (*IP*). Because these journals are almost a century old and not indexed, a manual research on original issues and paper journals was performed at our Medical School Library "V. Pinali"—antiquities section.

Their publication frequency and years of edition differ significantly: *LRM* was a weekly medical update journal (1885–1997); *LGdO* was a medical update journal published twice a week, and weekly since 1924 (1894–1969); and *IGCM* was a monthly medical clinical update journal (1920–1990). The main source, *IP*, is a weekly medical update journal published from 1893 and still in press. The journal structure was made up of original articles, brief communications, discussions, and summaries, and reviews of foreign journal articles. It had three sections: surgical—"*Sezione Chirurgica*," clinical—"*Sezione Medica*," and general practice—"*Sezione Pratica*," which was by far the most important.

The review methodology is briefly outlined as follows. We carefully manually examined all journal issues, according to two eligibility criteria:

1. That there was listed in the yearly edited general index for the volume:
    a. At least one direct or explicit reference to Spanish flu or 1918 influenza pandemic and
    b. Inclusion of the words "hygiene" and "prophylaxis" or "preventive medicine" or "vaccinations" or "serotherapy," and
2. That it contained original and relevant contribution (new or previously unpublished in Italian) to the topic. Cross-references were excluded.

We performed a second manual review of all issues to not miss significant articles mistakenly indexed. We arbitrarily chose temporal limits between 1918 (first relevant articles) and 1925 (last retrieved relevant article) covering, when possible, a time span of eight years.

The number of articles or contributions included from *IP* (between September 1918 [issue no. 35] and December 1925 [issue no. 51] covering a time span of eight years—375 issues) was 18, out of 135 criteria-satisfying articles; from *LRM* (selected between 1918 and 1925; 375 issues): eight out of 133; and from *LgdO* (selected between 1918 and 1952): three of 63 articles. No relevant article or contribution from *IGCM* was found between 1920 and 1925. All material was read, summarized, and critically discussed within the group.

We arbitrarily took another three articles from *IP* into account because of their concise overview on the pandemic's general aspects; indeed, we considered three lists and guidelines edited by public health and hygiene committees, but these do not count as original contributions.

In addition, we examined some authoritative coeval Italian manuals of hygiene and prophylaxis, leading to a circumscribed synopsis with punctual insights. We analyzed cited articles and original manuscripts, including those published in international journals: *The Lancet*, *Journal of the American Medical Association*, and the *British Medical Journal.* Recently, a similar research was conducted mainly using newspaper articles in a more limited geographical context—Milan city and metropolitan area.[3]

We retrieved modern-day guidelines using the official Web sites of the involved institutions.

INSIGHTS

After the research phase, we included 29 articles in this final review: 13 articles (45%) included quinine or quinine prophylaxis as the main topic, 11 (38%) vaccinations, three (10%) face masks, four (14%) disinfection, four (14%) social distancing, and four (14%) were guidelines. Because the same article could cover more than one aspect, the total percentage does not equal 100%.

General Aspects

Many physicians and hygienists took part in the dispute about the nature and the prevention of the spreading 1918 pandemic foci. Hygienist Lorenzo Verney drew a comprehensive, systematic review of all the possible aspects of the contrast to the contagion.[4] According to him, the key point of all these speculations was the etiological pathogen demonstration. At the time, in fact, the existence of viruses as biological entities was still in debate.[5]

The main measures outlined by his contemporaries included pharmaceutical interventions such as quinine-based chemoprophylaxis and vaccinations and nonpharmaceutical interventions including face masks, disinfection, social distancing, and behavioral guidelines.[6]

Pharmaceutical Interventions

Quinine prophylaxis. At the beginning of the century, there was a major debate about quinine and quinine-derived drugs as a prophylactic chemotherapy. Quinine had been commonly used for decades as a generic remedy for febrile syndromes (mainly associated with infectious diseases of unknown etiology).[7] Its importation and distribution were such a strategic asset in the Italian public health scenario, especially regarding endemic malarial areas (quite common at the time), that this drug had been subject to a state monopoly for almost 50 years, since the late 19th century until the 1950s.[8]

Its use split the medical community into two parties, one supporting and one discrediting. Essentially, in infective disease wards dedicated to malaria-affected patients, very few got superinfected with the influenza virus. This common observation constituted the major argument in favor of quinine prophylaxis. Many medical officers in military hospitals throughout Italy—for example, Betti, Masciardi, Camerano, and Vico—observed this phenomenon with varying frequency and outcomes.[9] Other authors, including Roccavilla and Silvestri, agreed to recognize only a relative efficacy of quinine.[10]

In Italian literature, numerous recipes of preventive quinine-based medications against seasonal influenza were also recorded.[11] Analogous remarks came from other physicians, especially from North America, like H. A. Klein in Chicago, Illinois.[12] These observational clues were unfortunately not supported by any scientific proof or trial, including pharmacological ones. This lack by itself was the main counterargument.

Several dissenting opinions were recorded. Camillo Artom a priori expressed his skepticism about quinine therapy efficacy, without any further substantiation.[13] His position was shared by other physicians, who added further empirical observations: medical officer Nicola Colalè stated that between October and November 1918, of 118 malaria-suffering patients admitted, 115 contracted influenza, 50 of them also showing bronchopulmonary complications with a 36.52% mortality rate.[14]

Pietro Castellani, medical chief officer of a field hospital in Durazzo (modern day Durrës), in Albania, firmly stated that even in operative antimalarial campaigns, both healthy individuals and those suffering from malaria under full quinine therapy were not protected from influenza. His first-hand experience was based upon more than 1000 patients affected by both malaria and the 1918 influenza.[15] Verney personally expressed skepticism, too: "prophylactic use of quinine in this [kind of] influenza seems not to be encouraged."[16]

A peculiar, as well as hazardous, treatment of the 1918 influenza-related pneumonia was originally proposed by T. H. Oliver and D. V. Murphy and quoted by Azeglio Filippini. The authors designed an intravenous therapy against influenzal pneumonic toxemia composed of two ounces of 10% hydrogen peroxide, eight ounces of physiological solution, and five droplets of ammonia. An Indian platoon (25 individuals) was administered the solution from June to July 1919: 13 recovered and 12 died. No clear clinical signs of gas embolism were described. These extremely poor results were, surprisingly, well received by the authors, who stated that "the mortality (48 per cent.) compares very favorably with the 80 per cent in similar cases not so treated, and more so when it is remembered that we only treated the most severe and apparently hopeless."[17]

Vaccinations. At the time, vaccinations and the derived long-lasting immunization were seen, since their discovery, as the only solution for epidemic outbreaks, representing a public health priority in any health service. Verney's opinion was driven by the common perception that mass immunization was the leading way to control the contagion: previously exposed patients would not acquire the disease—at least in a more severe form. According to him, the only technically feasible solution was to design vaccines against the bacterial agent causing the superinfection leading to the most severe and deadly form of the disease, as there was some skepticism about a possible viral etiology.[18]

Many vaccines were designed in the Anglo-Saxon world and described by Verney himself. He mentioned the English "triple vaccine" (against streptococcus, pneumococcus, and Pfeiffer's bacillus), the "polyvalent vaccine" by Eyre and Lowe (against the same agents of the triple vaccine plus anticatarrhalis, staphylococcus, and pneumobacillus), and the "American" vaccine by Fox (against hemolytic streptococcus, nonhaemolitic streptococcus, pneumococcus type I, and pneumococcus type IV), and he strongly wished that these would be rapidly produced by Italian authorities (as it was later done).[19]

According to the dermatologist Domenico Barduzzi, president of the Siena Academy of Sciences (Accademia dei Fisiocritici) and founder of the Italian Society for the History of Medicine, this, sometimes blind, enthusiasm in vaccine therapy should have been guided by a more rational and accurate criteria "since, until now, an empirical approach disguised as science prevailed" even though the viral etiological agent was unknown.[20]

Since the very beginning of the 1918 pandemic, the therapeutic value of human hyperimmune serum (given that at the time the most common source of hyperimmune sera was immunized animals) injection was questioned and was believed to be impractical, especially by Verney.[21] Notwithstanding these skeptical observations, it was recently reported that the first plasma injections were performed on convalescent patients at the beginning of the 20th century, but a more effective and extensive usage was carried out during the 1918 pandemic.[22]

The mass production of a vaccine or hyperimmune serum was not possible at that time. Despite this, many physicians did not stop being optimistic: "these results lead [us] to believe that, in Spanish flu as in other infections, vaccines could generate possible positive effects to some extent."[23]

Hygienist Filippini was inspired by a fierce confidence in science and specifically in vaccinations: "This states the strong rationale in an artificial immunization. Negative results in animal models do not have the same importance and only acknowledge the impossibility of a hyperimmune serum in short time."[24] As always, dissenting voices about serotherapy efficacy were recorded.[25]

Nonpharmaceutical Interventions

Face masks. Protective face masks for health care providers were another topic of scientific debate. According to German physicians Flügge and von Mikulicz, infected persons (incidentally, the young people) could convey microbial-bearing mucous particles while speaking, coughing, and sneezing in the vicinity of healthy ones.[26]

Materials and manufacturing techniques were deeply debated and tested; nevertheless, physicians generally agreed upon their use both for patients and health care personnel. Many others agreed with these pioneering studies.

Among all the experiments conducted on the efficacy of face masks in microbiological filtering, Filippini quotes an interesting original article from *The Lancet*.[27] In this experiment, bacterial colonies of coccal species, namely "*staphylococcus pyogenes aureus* [sic]" were used as the prototypic infective agent ("whatever form it [the virus] may be") to test the potential of the face masks to filter the particles. Using a special machinery, De Villbiss Atomiser n16, these colonies were atomized from a distance of nine inches (approximately 22 centimeters) against different kinds of masks, made of different materials, chosen for their light weight and absorption properties (namely surgical gauze and butter muslin), using different numbers of layers of tissue for each (ranging from 2 to 10 or 12, respectively), before and after wetting with water. A Petri dish behind the filtering material gathered all the remaining bacteria, which could eventually grow into colonies to be counted. The authors concluded that surgical gauze is an "unsatisfactory material" for making masks, whereas butter muslin is effective but only with "at least 4 layers," better if "6 or 8" with an "air-tight manner" to be worn in the "immediate vicinity of an infected patient." Dump masks ("worn for any length of time") permanently lost their filtering potential. The masks are suitable for "any disease . . . conveyed by air-borne droplets."[28]

Disinfection. Another paramount debate issue concerned drugs and chemicals for personal use and disinfectants for objects and surfaces, similar to what happened during 19th century epidemics in metropolitan areas.[29] It is possible, for instance, to mention the manual by internist Alfredo Rubino, *Le Infezioni Mediche*, where these disinfectants are listed.[30] One of them is lime milk (one kilogram of slaked lime in four liters of water), considered effective in disinfecting all kinds of exudates, urine, and other suspected infective fluids (whose documented use as a veterinary disinfectant dates back to Lancisi in the 18th century).[31]

Other effective reagents were soda lye, used to clean clothes and laundry, and sulfuric acid, despite its hazardous caustic effects. Phenol, lysol, creolin, and copper (II) sulfate were considered safer products with the same efficacy. Corrosive sublimate (mercuric chloride) was also another popular solution, although dangerous and not completely effective against organic material.

To disinfect spit, sputum, or mucus in general, phenol or 5% lysol or corrosive sublimate solutions were recommended. These were also common disinfectants for everyday objects, such as metal tools; pottery; glass; leather and rubber; paper including books, newspapers, and banknotes; and any other belongings considered contaminated. Bedding and laundry were disinfected by steam heating.[32]

Other practical examples of large-scale disinfection in high-risk contexts came from World War I as is mentioned in the manual of hygiene and prophylaxis by Valfredo Chiodi, edited for the Royal Italian Army. He suggested very strict personal and environmental (i.e., in the trenches) care to lessen the risk of infective outbreaks, using the same aforementioned chemicals (e.g., slaked lime, phenolic solutions, soda, or lime milk).[33]

During the 1918 pandemic, large-scale disinfection was considered as a potentially valuable but not readily feasible option. However, in public buildings and in urban public means of transport (e.g., the metro, trams), sanitization was recommended (in terms of "wet disinfection" with the same compounds previously mentioned, including a cresylic acid solution), as well as individual procedures (such as hand washing).

Individual procedures were aimed to protect body gateways: hands, mouth, pharynx, and upper airways. Thus, frequent hand washing throughout the day (intended as bare mechanical hand washing with water, without any specific antiseptic) was recommended. Personal antisepsis of the nasopharynx was investigated: some authors proposed using menthol powder or oxygenated water; others, like F. T. Marchant in *The Lancet*, suggested cinnamon oil vapors, while others recommended a 1% resorcin ointment.[34]

Filippini, on the other hand, quoted Riff, a prominent French physician, according to whom the prevention of influenza in the oral cavity–pharyngeal region with sodium tetraborate with or without hydrogen peroxide and with or without potassium chlorate mouthwashes three times a day was effective.[35] Such mixed measures were adopted for many years after the 1918 pandemic.[36]

Social distancing. Social distancing issues were broadly discussed, as peculiar "epidemic hotbeds" were noticed in crowded urban contexts such as industrial plants and barracks. Crowding turned out to be the paramount risk factor in the pandemic and was therefore strongly advised against, even if 21st-century social distancing measures were thought about but never implemented, at least not in the most dramatic that way occurred a century later in the current pandemic.

It was considered possible to temporarily stall a large-scale contagion but not completely halt its progress. Therefore, many contemporaries thought that more resources should have been spent on individual protection rather than on the collective measures (meaning large-scale surface disinfection in public spaces) that were regarded as merely a public health propaganda campaign rather than an effective protocol.

Domenico Falcioni summarized three contagion categories.[37]

1. Chance of exposure: Banning of social meeting occasions—no visiting or common meals among friends or acquaintances. On a smaller scale, isolation of single families and single suspected or confirmed affected individuals within the household itself in a separate room, detached from other family members. The closure of schools was seen as a necessary, even though an extreme, measure.
2. Direct exposure: Face masks strongly recommended for everyone, especially those that were sick. Falcioni claimed that contamination via clothes and other objects was theoretically possible but improbable, so masks were considered the main defense against the infection.
3. Indirect exposure: Hand and food washing to prevent indirect forms of contamination.

Overview on Individual and Collective Guidelines

Public health and hygiene committees in various Italian cities listed progressively more detailed guidelines about practices to be adopted by the population. The following points were published by Torino council in 1918[38]:

> Individual hygiene standards to be observed during the influenza epidemic.
>
> 1. Do not change your living standards. Do not take unnecessary drugs for preventive purposes. Do not use purgatives. Do not use the train if not strictly necessary.
>
> 2. Personal hygiene: wash your hands frequently with soap and do not use disinfectants. Keep your nails short. Brush your teeth and wash your mouth in the morning and in the evening. Do not bring your work clothes back home.
>
> 3. Clean and ventilate your house, especially the bathroom and the kitchen. Clean your shoes before entering the house.
>
> 4. Eat simple, well-cooked foods. Boil the milk. Wash well fruit and vegetables.
>
> 5. Avoid any dietary excess.
>
> 6. Do not visit sick or convalescent patients, or recently deceased patients, unless strictly necessary. Avoid gathering in the street, on public transport and in closed rooms. Do not visit convalescents.
>
> 7. Avoid strong drafts, especially if sweaty.
>
> 8. In a common workplace everyone must contribute to keep the premises well-cleaned and ventilated. Do not spit on the floors.
>
> 9. Don't waste money on unnecessary disinfectants. It is suggested that highly frequented spaces must be cleaned with a 0.5% [corrosive] sublimate solution.
>
> 10. Those who experience symptoms such as headaches, sore throats, joint pains, general malaise, and chills must not go to work and instead must go home and immediately call the doctor. The recently recovered patients must not leave the house during convalescence.
>
> 11. Ventilate patients' rooms. Used linen must be washed with 0.2% sublimate. In the room, there must be a 0.1% sublimate solution available to allow doctors and other caregivers to wash their hands with. Relatives and friends are not allowed to visit the patient. More severe cases are managed in the hospital.

Indeed, many comparable editions, with no significant differences, were concomitantly published in 1918 for civilians and for military personnel.[39]

Ultimately, according to Verney, prevention had its foundations in individual and collective prophylaxis (Table 1).[40]

All these aforementioned measures were considered by many contemporaries to be extremely expensive in social, economic, and lawful terms; as such, they were deemed to be used only on the occasion of extraordinary hazardous public health issues.

Modern-Day Guidelines

Once more during the COVID-19 pandemic, the World Health Organization,

TABLE 1— The Pillars of Individual and Collective Prophylaxis: 1919

Individual Prophylaxis	Collective Prophylaxis
Avoid crowding	[Provide] efficient public places [for] hygiene and cleanness [up to], if necessary, their temporary closure
Avoid overwork and cold	Disinfections [of places], to be performed in all complicated and lethal cases
Care about self-cleanness	Public health campaigns
Behave weak-heartedly [literally], concerning about themselves and staying in bed if suspicious symptoms arise	Anti-influenzal vaccinations

Source. Verney.[40]

founded in 1948, showed the importance of an international consensus on health care–related topics. According to WHO and its interim guidance, two main measures are required to break the contagion chain:

1. identification, isolation, testing, and clinical care for all cases, and
2. tracing and quarantine of all contacts.

Public health and other social measures, as part of infection prevention and control strategies, contribute to achieve this goal while vaccines or specific therapeutics are not readily available[41]:

1. Personal measures: limit person-to-person contamination or direct spread via frequently touched surfaces (hand hygiene, physical distancing, respiratory etiquette, masks, environmental and domestic disinfection).
2. Physical and social distancing measures in public spaces: physical distancing (at least one meter recommended), reduction and avoidance of gatherings (public transport, restaurants, bars, and theaters), domestic smart working, and distance learning.
3. Movement measures: physical movement of the virus prevention via transportation, as far as the setting up of forms of *cordon sanitaire* (physical means to prevent people from entering or leaving the country).
4. Special protection measures for vulnerable groups: elderly, refugees, homeless, groups living in closed settings, and health care workers.

The transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) had not been conclusively linked to contaminated surfaces. However, as fomite transmission with other coronavirus species was previously reported in literature, general infection prevention principles were adapted to be applied during the pandemic. Outside specific health care environment–related infections, the precise fomite role in viral transmission still remains unclear.[42]

Both for the health care and non–health care setting, it is recommended to first perform a mechanical surface clean with water and either soap or detergent to remove as much organic matter as possible, followed by active disinfectants: those suggested are, in a nonhealth care environment, chlorine-based products like sodium hypochlorite 0.1% or, alternatively, alcohol 70% to 90%; in a health care setting, the same product types should be used (with increased concentrations for blood or bodily fluids) or, alternatively, hydrogen peroxide greater than 0.5%.[43]

A periodically updated list—List N—of approved disinfectants for surfaces is published by the US Environmental Protection Agency.[44] They include, among many others, quaternary ammonium, hydrogen peroxide, isopropanol, ethanol, tetraacetylethylenediamine, phenol-based compounds, and sodium hypochlorite.

WHO also provides specific indications in personal hygiene and sanitization of domestic and working or public spaces. Hand washing with hand hygiene materials, listed in order of availability in different socioeconomic contexts, is mandatory: water and soap or alcohol-based hand rub (≥ 60%), are preferable.[45]

Masks are another line of defense as part of the personal infection prevention and control strategies.[46]

Italian guidelines for infection prevention and control edited by Istituto Superiore di Sanità (the leading technical–scientific body of the Italian National Health Service) do not differ much from the WHO guidelines under these general aspects.[47]

Guidelines regarding microbiological testing are available, and they address specific pathways of prevention and quarantine according to the different results of the test.[48]

CONCLUSIONS

Not much has changed after a century: most of the prevention techniques are almost identical, albeit with technical improvements, or differing only slightly from those implemented at the time of the 1918 pandemic. For example, there are no significant differences in hand washing, physical distancing in domestic and public settings, and the disinfection of surfaces.[49]

Minor differences are noted regarding disinfectants and their efficacy: the role of cheap and stable chlorine-derived compounds and hydro-alcoholic solutions is far more important than in the past.

Quinine-derived chemoprophylaxis, at least in Italy at the time of writing, still remains a hotly debated scientific matter, without any approval of hydroxychloroquine, either as an on-label or off-label drug.[50]

Similarly, the use of face masks in the general population is a critical topic. At the beginning of the pandemic, their use was recommended for specific circumstances, whereas their use in the later phase of the pandemic is widespread and diffuse.[51] Even during the 1918 pandemic, there were different points of view regarding the recipients of this measure (only health care providers or the whole general population) and on mask types and fabric.[52]

The major, and probably the only, substantial difference is the microbiological swab and antigenic and molecular testing. In fact, in the past, there was no possibility at all to identify asymptomatic but potentially contagious persons. These tests ensure relatively rapid and secure results to correctly identify positive individuals (then subject to isolation and quarantine measures) and, eventually, to epidemiologically investigate the contagion chain.

Thanks to the studies on nonpharmaceutical interventions conducted throughout the 1918 pandemic, we know what is effective in “flattening the contagion curve” and helping to prevent health care systems from going beyond their surge capacity, and this explains why they have been once again implemented during the COVID-19 pandemic.

Probably the most straightforward observation, despite its pessimistic (or perhaps realistic) tone, about the 1918 pandemic comes from Filippini. Shocking in his prescience, we would like to fully reproduce it:

> Mankind forgets easily, even us, who personally experienced it [Spanish flu]. The memory of the pandemic ’19–’20 will progressively fade and the new generations of physicians and doctors will consider it as a mere, ordinary outbreak. In 30–40 years’ time in a hypothetical new pandemic awakening our emergency response system would only be a dusty archive machine and these medical journals would unlikely be looked through, whose ideas would only be considered outdated.[53]

Hopefully, with our work, his words will not be forgotten.

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CONFLICTS OF INTEREST

The authors have no conflict of interest to declare.

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Runa Soncco, the Defunct Journal of the *Rijcharismo* Movement in Peru (1935–1945)

Excerpts From *Runa Soncco*, the Defunct Journal of the Rijcharismo Movement in Peru (1935–1945)
[*Note: Runa Soncco* is the defunct journal of the *Rijcharismo* (to awaken) movement in Peru (1935–1945). Manuel Núñez Butrón was the editor and principal writer, often using pseudonyms or writing in the third person. His sanitary brigade shared the messages within Runa Soncco with the Indigenous of the *altiplano* (high Andes), the intended audience. The translated excerpts here were written by Núñez Butrón and illustrate critical elements of *Rijcharismo*. Terms are translated as originally printed (e.g., "Indian," "Indigenous," and "aboriginal"), though today we use the word "Indigenous." Digitized editions of *Runa Soncco* are viewable at https://scholarsarchive.byu.edu/runasoncco.]

From *Runa Soncco* 3 (1935): 12.

Bibliographical Notes: Runa Soncco.

Doctor Manuel Núñez Butron [sic: Butrón], who is in the city of Juliaca, an important railway and business hub in southern Peru, publishes a journal called *Runa Soncco* (Indian Heart), the third issue of which has reached our hands.

The project that Doctor Manuel Núñez Butrón has undertaken is a highly praiseworthy cultural effort. It disseminates rural health information to the indigenous population of the Puno region, where more than half a million sons and daughters of the soil reside. The *Rijcharys* ("Awakeners"), a group of pioneers devoted to Indian physical and intellectual improvement, have expanded this mission to monitor all forms of progress in the aboriginal race. To a large extent, *Runa Soncco* is the public face of these Indians who are committed to the task of eliminating the vices that reduce their peers to ruin. It combats their illiteracy and ignorance, their customary attitude of resignation, and their lack of hygiene as it strives to strengthen and empower them.

The issue we have includes the work of the *Rijcharis*, or community organizers, in their crusade to improve local living standards; it also features an article entitled "Impressions of an Indian", a noteworthy insight into the Indian mindset.

The effort clearly employed by *Runa Soncco* reflects in turn the work being done in the *altiplano* of Puno by a group of men who are deeply involved in the generous task of educating the Indians. It deserves whole-hearted approval and support, as it is of great importance to our nation and its people.

From *Runa Soncco* 3 (1935): 6.

The Head Community Physician.

The epidemics that do the most to decimate our people find their origin in our most ignorant masses. These masses need educating to achieve peace in civilized areas. *Prevention is better than cure, and prevention requires education.*

For example, in San Román over the last 3 years or so, we have vaccinated around 22 000 people against smallpox and we can say that smallpox is soon to disappear from the province. If we could vaccinate the entire province, we would surely triumph.

Now we are left with typhus. To exterminate it, we must exterminate lice, and to do this we must fight its main sources. However, doctors need the support of educated people, yet many are waging a campaign against us.

The idea of exterminating lice may seem like a dream, but there are countries where endemic typhus is unknown and medical books do no more than mention it in passing. We should all fight the danger of typhus as we would go to war against enemies attempting to flatten our borders, or as we would fight a powerful river that has set out to sweep away our towns or a fire that is trying to turn all the dwellings in our neighborhoods to ash. . . .

From *Runa Soncco* 6 (1937): 159.

RIJCHARY, which translates as AWAKE, is the herald of our acts, with which we say *RIJCHARY!* to those who are overcome by vice and ignorance, those who carry the banner of filth and bear the label of the louse-ridden. *RIJCHARY!* is what we say to those who think they are cultured, because we know that they still have a long way to go. *RIJCHARY!* is what we say to those who pretend to have a new personality and don't realize that only a mirror is the best jury to teach them the culture of their ancestors. *RIJCHARY!* is what we say to the child, the youth, and the elder — whether rich or poor — because we need to wake up every hour and every minute of our lives.

From *Runa Soncco* 7 (1937): 27.

The Rijchary appointment, 1937.

A *Rijchary* [Awake!] must speak to those who are poor, ragged, louse-ridden, unwashed, and devoid of will to encourage them to work, stay clean, and have the increased initiative that they need to progress.

A *Rijchary* must speak to those who have already acculturated so they don't forget who their people are. This is because it is so often true that the worst enemy of an Indian is an acculturated Indian.

A *Rijchary* must say and demonstrate that even the most humble person in an *ayllu* [Indigenous cultural community] can, through honest work and perseverance, become the most distinguished person in our nation. Similarly, someone who is acculturated but focuses only on his or her own future can fall from the highest echelons to the lowest rank of any *ayllu* or any town.

A *Rijchary* must speak out to make people aware of the origin of their own people and prove that we are among the most intelligent and strongest societies in the world.

A *Rijchary* must speak out to demonstrate that thousands of years ago here in our Altipampa [high plateau of Andes] we were left monuments that are now admired by the whole world. These show us by example how we can become like our forebears.

A *Rijchary* must teach pride in being an Indian, a cultured Indian worthy of respect anywhere in the world.

A *Rijchary* must be against excesses of alcohol and coca, and instead in favor of pencils, paper, and soap.

A *Rijchary* must show that unclean Indians get kicked around, clean Indians are treated with respect, and those who can read are treated with even more respect.

A *Rijchary* respects property and stands against any form of scheming.

A *Rijchary* teaches strict compliance with the laws of the country; and if any laws are not suitable for our region, we must study so that someday we can show people what it is that we require.

A *Rijchary* teaches a love for our land, our heritage, and everything that makes up our nationality; at the same time we support mixing with other cultures for the sake of improvement; cultures are like plants that need to be transplanted to increase their yield.

Those who act in accordance with these concepts are true *Rijcharys*. Now they can become official administrators of vaccines; they can speak out against lice; they can shave bearded faces; they can proclaim the importance of schools; they can reform housing; and they can encourage the masses so that we may regrow. . . .

From *Runa Soncco*, 8 (1945): 2.

Runa Soncco Returns.

Following a lengthy forced silence, the periodical by Indians, and for Indians only, is back. . . . Once again, *Runa Soncco* will awaken us from our solitary lives. It encourages us to turn every house into a school; all who can read into teachers; and every teacher into an apostle. AJPH

Manuel Núñez Butrón (1900–1952): *Rijcharismo* and Rural Social Medicine in Peru

Alisha H. Redelfs, DrPH, MPH, CHES, Paola G. Donoso Naranjo, MD, MPH, and María del Pilar L. Guillén Núñez, PhD, MS

Manuel Núñez Butrón is considered a leader of rural social medicine in Latin America of the interwar period (1919–1939). He dedicated his life to improving the health of the Indigenous persons of the *altiplano* (high Andes) of Peru. At the time, social medicine was on the rise in Latin America. It addressed social structural determinants of disease,[1] "defin[ing] problems and seek[ing] solutions with social rather than individual units of analysis."[2(p1594)]

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FIGURE 1— Manuel Núñez Butrón, ca. 1940s

Source. Manuel Núñez Butrón Papers Collection, in possession of the Guillén Núñez family, Arequipa, Peru. Printed with permission.

Núñez Butrón is virtually unknown to the current generation of English-speaking public health professionals (because of language barriers and anglocentrism[3]) despite significant posthumous honors. We may learn much from the methods used by this pioneer in his "crusade to elevate the quality of life of the [Indigenous]."[4(p12)]

BACKGROUND

During Núñez Butrón's lifetime, the Indigenous of the *altiplano* were hypermarginalized. Peru still used a form of feudal society, with land, power, and money held by gamonales (estate owners similar to the Spanish Dons who owned Mexican haciendas) who exploited Indigenous laborers.[5] The government primarily benefited those in geographic proximity to the capitol and those with status or political influence (e.g., wealth, ancestry). Rural, distant, and primarily Indigenous provinces were financially ignored (e.g., funds for roads or schools) and the people stigmatized (e.g., believed degenerate, lazy, and backward).[6] Health of the Indigenous was disregarded, converting medicine into an instrument of social control.[7] Very few doctors per capita in the *altiplano* (1 per 25 000 inhabitants[8]) and no functional public health system caused significant negative health effects.[9]

Access to education and fluent Spanish were further delimiters of the classes: only 14% of people in the region were literate, and 83% spoke only the native Quechua or Aymara languages (14% spoke Spanish).[10] Núñez Butrón was privileged enough to receive an education yet experienced social marginalization because of his rural roots and mixed Indigenous and Spanish ancestry.[11]

EARLY LIFE

Núñez Butrón was born in 1900 in Samán (Azángaro), Perú, in the *altiplano* (see Figure 1). He moved with his mother to Juliaca for primary school, then to Puno for secondary school (San Carlos). In 1918, he completed a year of premedicine (San Agustín, Arequipa), then enrolled in medical school (San Marcos, Lima). However, San Marcos closed temporarily in 1919, so Manuel continued his studies in Barcelona, Spain, graduating in 1925.

Shortly after returning to Peru, Núñez Butrón chose to return to the *altiplano* where he became the official government physician assigned to the provinces of Azángaro, Huancané, Lampa, and San Román (a combined area nearly the size of the state of New Jersey) bordering Lake Titicaca in the *departamento* (state) of Puno (see Figure 2). Puno was primarily rural (87% of the population) and Indigenous (94.1%).[12] Poor sanitary conditions, crowding, and unhygienic customs created a perfect environment for infectious diseases to thrive.[13] Núñez Butrón arrived in the midst of a typhus epidemic, now responsible for impoverished Indigenous persons who simultaneously experienced high rates of smallpox and other diseases (e.g., gonorrhea and syphilis), as well as alcoholism.

RIJCHARISMO

In 1931, Núñez Butrón began the first steps toward building a "sanitary brigade" through community participation in health. He visited his patients in their own communities and realized a traditional medical model would not bring success. Núñez Butrón began to engage community stakeholders who lived in Juliaca: Seventh Day Adventists (educators), ex-soldiers, and *curanderos* (Indigenous healers).

Núñez Butrón's early attempts to better understand and to connect with trusted local leaders would prove the foundation of a social approach to improve health within the Indigenous populations for which he was responsible. The Indigenous of the *altiplano* were not educated, largely did not speak Spanish, did not understand or believe in Western theories of disease transmission and medicine, and experienced an inequitable burden of disease. Without supplanting traditional healing practices, he began to introduce scientific ideas such as hygiene, vaccination, and germ theory of disease to his growing circle of supporters, called *rijcharis* ("awakeners" in Quechua).

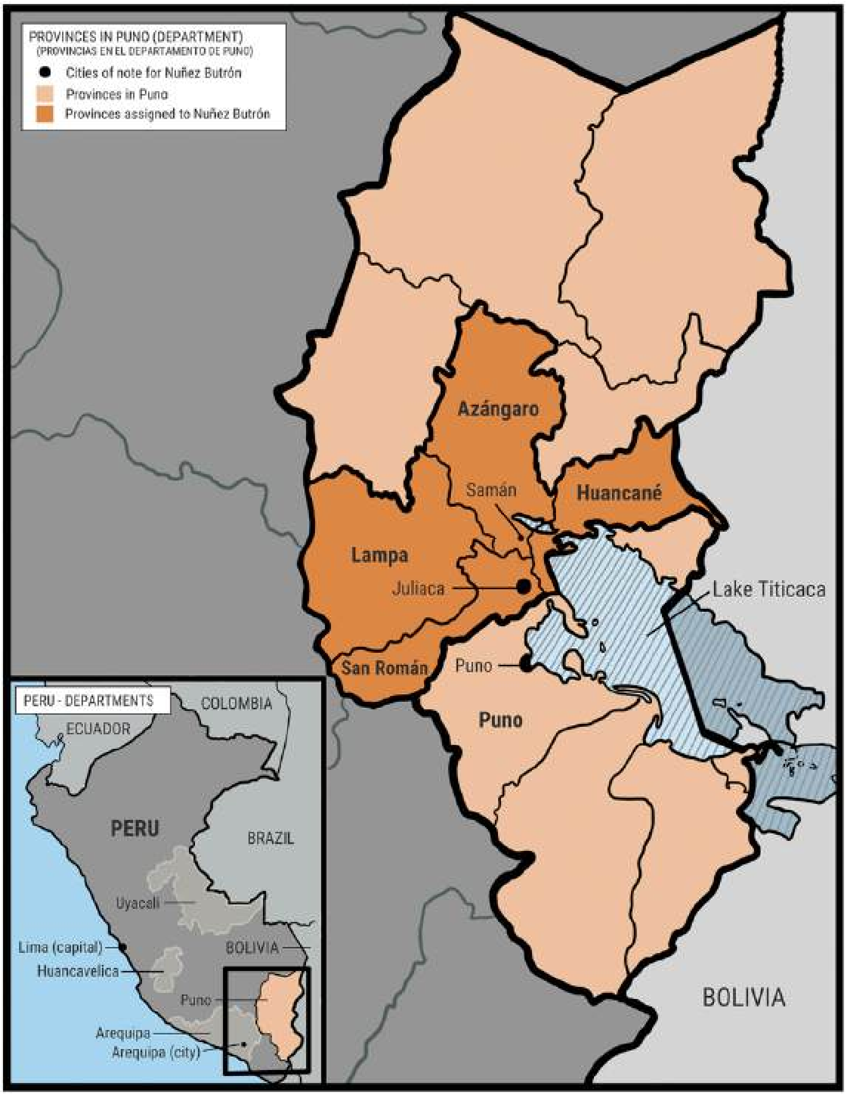

FIGURE 2— **Map of Peru and Important Locations in the Life of Manuel Núñez Butrón**

By the mid-1930s, Núñez Butrón's efforts grew into a movement called *Rijcharismo* ("to awaken" in Quechua) with a much-expanded reach. *Rijcharismo* was represented symbolically by water, a comb, soap, and a pencil.[14] Initially, Núñez Butrón taught messages of *rijcharismo* in Sunday meetings, first in his home in Juliaca and then in the town square. Next, *rijcharis* trained by Núñez Butrón began to form sanitary brigades nearby. The *rijcharis* traveled widely across the *altiplano* in threes by foot and bicycle, treating illness and "preaching" about health and the prevention of disease. Then in 1935, Núñez Butrón published the first edition of the journal *Runa Soncco* (Quechua for "the one who loves the Indian with all his heart"[15]—see https://scholarsarchive.byu.edu/runasoncco).

Rijcharismo took a holistic view of health, addressing both behavioral and social determinants.[8] Sanitary brigades spread across the *altiplano* and *rijcharis* promoted health by using open-air theater, music, gymnastics, and dance. *Rijcharis* taught practices to reduce disease vectors: bathing with soap and water, cutting hair, and regularly washing clothes. More than 20 schools were also constructed with Adventist support where children were taught literacy, hygiene, and skills (e.g., agriculture, weaving, or shoemaking).

Runa Soncco was "the voice of the Indians and for the Indians" (see Figure 3). Published in Spanish, *rijcharis* often shared its messages aloud in Quechua and Aymara. Articles described the principal diseases of the times, how to prevent them, and practices favoring disease. Through *Runa Soncco*, Núñez Butrón empowered the populace to take pride in their Indigenous heritage and humanity (like the concurrent *indigenismo* movement) and to seek education to escape poverty, while criticizing those benefiting from the status quo.

A charismatic leader,[16] Núñez Butrón became a trusted and hugely popular figure in the *altiplano* with a massive Indigenous following. Thousands would flock to attend mega-events such *Día del Indio* where *rijcharismo* events were paired with the annual festival of the summer solstice (*Inti Raymi*, an Incan religious ceremony).[17] Local leaders frequently supported events in their villages.[18]

Photos and family histories paint a picture of Núñez Butrón as a humble man who fell unintentionally into power; a man adored by the masses yet feared by those at the top of the social ladder.[19] As Peru was a primarily Catholic nation, ecclesiastical leaders were suspicious of his active collaboration with the Adventists.[20] Merchants were resentful of *rijcharismo*'s campaigns against alcohol, and lawyers and *gamonales* feared an upset of their livelihoods because of education.[21] An

RUNA SONCCO

JULIACA 24 DE JUNIO DE 1935

FIGURE 3— Front Cover of the Third Edition of *Runa Soncco*

Source. Manuel Núñez Butrón Papers Collection, in possession of the Guillén Núñez family, Arequipa, Peru. Printed with permission.

order from Núñez Butrón's superiors in 1937 conveniently reassigned him as physician for the distant provinces of Huancavelica and Uyacali.[22] Without his direction, *rijcharismo* began to stagnate.

After four years in unofficial exile, Núñez Butrón returned to Juliaca in 1941, and began to reinvigorate the movement. He published the 8th through 10th editions of *Runa Soncco* and the *rijcharis* resumed vaccinations (smallpox; see Figure 4), administered antiparasitics, and distributed hygiene promotion (typhus).

However, the momentum of *rijcharismo* faded again relatively quickly. In 1946, Núñez Butrón ran for representative of the province of San Román, intending to enact social change. However, the social elite opposed him, and he lost the election by a few votes.[23]

FIGURE 4— Manuel Núñez Butrón at a Smallpox Vaccination Event, ca. 1940s

Note. Manuel Núñez Butrón is near the center pointing toward the table—the photo bears a mark near his hat.
Source. Manuel Núñez Butrón Papers Collection, in possession of the Guillén Núñez family, Arequipa, Peru. Printed with permission.

Shortly thereafter, Núñez Butrón began to step away from the spotlight and his health declined. The *rijcharismo* movement waned, and the sanitary brigades slowly disappeared.[24] Núñez Butrón worked as a private physician and pharmacist until his death in Juliaca on December 7, 1952. He was buried in Arequipa.

HONORS

Núñez Butrón did not receive much national recognition during his life, but *rijcharismo* did attract the attention of public health officials in neighboring Chile and Argentina.[25] In 1978, the World Health Organization (WHO) and the United Nations International Children's Emergency Fund named Núñez Butrón a "pioneer of Primary Health Care" (Alma-Ata, now Belarus). Other honors followed; he was named "a Pioneer of Social Medicine" (Peruvian Medical College and Peruvian Health Academy, 2000) and a "Public Health Hero" (WHO and Peruvian Ministry of Health, 2002).

CONCLUSION

The practices within *rijcharismo* are still relevant for public health. Cueto and Palmer[26] identified three foundational principles of social medicine that were also used by Núñez Butrón that apply today:

1. View health holistically by addressing social and structural factors, not just behavior.[27]
2. Emphasize community participation in health.
3. Seek to complement, not replace, existing cultural practices.

Marginalized groups across the world are still oppressed and underserved. They shoulder inequitable burdens because of COVID-19, police violence, and structural racism. As public health practitioners, let us join the "crusade to elevate" by applying these principles in our communities. AJPH

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CONTRIBUTORS

A. H. Redelfs and P. G. Donoso Naranjo are co–first authors. M. P. L. Guillén Núñez collected all original source material and provided context throughout the project. A. H. Redelfs conceptualized and led the project. P. G. Donoso Naranjo led thematic analyses of *Runa Soncco* (editions 3 through 10). A. H. Redelfs drafted the article together with P. G. Donoso Naranjo.

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Note. *Runa Soncco* editions 3 through 10 are part of the Manuel Núñez Butrón document collection in the possession of the Lourdes Guillén Núñez family. Digital versions of these editions are now available via Scholars Archive at the Harold B. Lee Library at Brigham Young University (https://scholarsarchive.byu.edu/runasoncco). In addition, a complete collection of the *Runa Soncco* journal editions is kept at the National Library in Lima, Peru (per Marcos Cueto, "'Indigenismo' and Rural Medicine in Peru: The Indian Sanitary Brigade and Manuel Núñez Butrón," *Bulletin of the History of Medicine* 65, no. 1 [1991]: 22–41).

CONFLICTS OF INTEREST

Manuel Núñez Butrón is the maternal grandfather of the third author of this article.

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A Novel Imputation Approach for Sharing Protected Public Health Data

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Objectives. To develop an imputation method to produce estimates for suppressed values within a shared government administrative data set to facilitate accurate data sharing and statistical and spatial analyses.

Methods. We developed an imputation approach that incorporated known features of suppressed Massachusetts surveillance data from 2011 to 2017 to predict missing values more precisely. Our methods for 35 de-identified opioid prescription data sets combined modified previous or next substitution followed by mean imputation and a count adjustment to estimate suppressed values before sharing. We modeled 4 methods and compared the results to baseline mean imputation.

Results. We assessed performance by comparing root mean squared error (RMSE), mean absolute error (MAE), and proportional variance between imputed and suppressed values. Our method outperformed mean imputation; we retained 46% of the suppressed value's proportional variance with better precision (22% lower RMSE and 26% lower MAE) than simple mean imputation.

Conclusions. Our easy-to-implement imputation technique largely overcomes the adverse effects of low count value suppression with superior results to simple mean imputation. This novel method is generalizable to researchers sharing protected public health surveillance data. (*Am J Public Health*. 2021; 111(10):1830–1838. https://doi.org/10.2105/AJPH.2021.306432)

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In this information age, increasing availability of public health surveillance data is catalyzing groundbreaking research while presenting new challenges related to data privacy and completeness. For example, protected government surveillance data cannot be shared without suppressing small values to protect the confidentiality of individuals,[1] which may adversely affect the subsequent analyses. Inference from the analytical results using suppressed data may be subject to bias because of the removal of small count values, yielding potential loss of statistical power because of the reduced sample size. Analyses using data with suppressed values may not produce reliable results for areas with low population counts, for minority population groups, or for rare outcomes.[2] Suppression is particularly troublesome for geomapping and spatial analytic methods that rely upon joined data across multiple data sets. Suppressed small cell data disproportionately affect rural and small population areas, may discourage research comparing smaller subsets of the population, and leave large spatial areas with unknown or unreportable risk.[2] We describe a novel and practical method that can provide imputed values for protected government data that would otherwise have limited analytic utility because of cell suppression.

Our imputation approach was motivated by a public health study using administrative surveillance data that employed geographic information systems and spatial epidemiological analyses to investigate spatial and temporal patterns of opioid overdoses in Massachusetts. For this purpose, surveillance data provided researchers the opportunity to evaluate unknown or lesser-known determinants of opioid overdose, misuse, and other adverse outcomes of inappropriate opioid prescribing.[3] However, because of required data suppression, as much as 39% of our zip code–level data were missing for some measures, which had the potential to hamper a precise characterization of the breadth and complexity of these data.[2] In Massachusetts, the recent availability of enhanced administrative public health data has spurred innovative analysis techniques,[3,4] which have highlighted the need to incorporate small cell values. To overcome this issue, we developed an approach to create a "complete" data set by imputing the missing cells before sharing, so that the subsequent spatial analysis could use an imputed but complete data set.

Our goal was to develop an imputation approach that produced unbiased, reliable, and replicable estimates for suppressed values within an aggregated de-identified opioid prescription data set from the Massachusetts Prescription Monitoring Program. The standard in public health research has been complete case deletion,[5] or use of basic single imputation methods such as mean imputation (i.e., substituting the suppressed observations with the mean value of the nonsuppressed observations) and last value carried forward (i.e., substituting the suppressed observations with the value from last time point when unsuppressed value was available),[5–8] which have been found to introduce bias and reduce statistical power. More sophisticated imputation methods, including Bayesian spatiotemporal modeling[8] and multiple imputation,[9–12] are known to produce superior results to simple methods but are not routinely used in epidemiological research, in part because of their steep learning curve and lack of tools and expertise required to conduct them.[8,13] In addition, left-censored data like ours are the most difficult to model[5,7] because assumptions are made on unverifiable observations. Most multiple imputation methods assume missingness is not related to the observed values and incorporate characteristics of the full data set. For our data, the imputation method must include assumptions and adjustments for the suppressed value range to allow precision and minimize bias.[5,7]

We tested and compared combinations of several strategies developed from simple imputation methods[8,9,14] and a modified multiple imputation. We developed an imputation method that gleaned information from the zip code of residence, including previous- and future-year values in the zip code as well as the population size, to predict missing values more precisely. A unique attribute of this imputation process is that, as the owner of the data, we knew the characteristics of the suppressed values and we were able to accurately assess the performance of our modeling methods. We incorporated the sum and mean of the suppressed values in our process to improve imputation precision. The method does not require advanced statistical knowledge or programming skills, paving the way for our approach to be applied with protected public health data in various settings, including those with limited resources. Our analysis enables innovative and insightful approaches to better understand key components of prescription opioid misuse in Massachusetts.

METHODS

We employed 35 statewide data sets in the Massachusetts Prescription Monitoring Program that identify individuals with possible opioid prescription misuse through records of all controlled substances dispensed by Massachusetts pharmacies or delivered to a Massachusetts resident by mail to individuals aged 18 years or older.

We evaluated these data within a larger analysis that required all nonzero values less than 11 to be suppressed when the data were shared. The data sets included 5 categories of prescriptions that identified individuals with potential opioid prescription misuse, aggregated by year and by zip code. The 35 data sets included variables representing 5 types of potential opioid misuse with 1 annual summary count per 538 zip codes, across 7 years, 2011 to 2017. These 5 types, defined in previous analyses as potentially inappropriate prescribing (PIP),[3] were

PIP1: high-dose opioid prescriptions—receipt of opioid prescriptions greater than 100 morphine milligram equivalents per day in 3 separate months;
PIP2: receipt of opioid and benzodiazepine prescriptions that overlapped by at least 1 day in at least 3 months;
PIP3: receipt of opioid prescriptions from 4 or more prescribers in any quarter;
PIP4: receipt of opioid prescriptions from 4 or more pharmacies in any quarter; and
PIP5: cash payments for opioid prescriptions on 3 or more separate occasions in any quarter.

Imputation Process

For these protected government data, observed counts from zip codes with values between 1 and 10 must be suppressed before sharing. We incorporated the mean, sum, and the standard deviation of the redacted values in our imputation technique to more precisely estimate values to use in the suppressed cells. In addition, we capitalized upon the longitudinal structure of our data to compare previous and future-year results in the same zip codes as the missing values. We considered that social, demographic, and physical characteristics within communities that are likely to contribute to prescription opioid misuse among residents remain similar from year to year during the study period. We inferred that we could more accurately predict the missing values by using values from the previous and next year in the same zip code and by incorporating the zip code population size in the method.

We developed and tested a 3-step imputation process for longitudinal variables (Figure 1). We used SAS version 9.3 (SAS Institute, Cary, NC) to conduct the statistical analyses, model the process, and produce the final imputed results. The steps included a modified previous or next substitution using the suppressed data, followed by mean imputation, and finally a count adjustment based on the actual values. The input was a suppressed data table with each row i representing zip code ($i = 538$) and column t consecutive years of data ($t = 7$).

1. Compare previous and next values (modified previous or next substitution). Let xi,t denote a suppressed value x for year t at zip code i. We assumed that previous ($xi,t–1$) and future ($xi,t+1$) values in zip code i would be related to the missing suppressed value and could be used to predict the range of the imputed value. When both $xi,t–1$ and $xi,t+1$ were available (not suppressed), we assumed the suppressed value (xi,t) would be close to the suppression limit, and we assigned it a value of 10; where either $xi,t–1$ or $xi,t+1$ was present but the other suppressed or a zero, we assigned $xi,t = 1/2(xi,t–1 + xi,t+1$; i.e., half of the available value); and when the previous and next values were missing or zero (i.e., [$xi,t–1$] and [$xi,t+1$] = 0), we would assume the missing value close to zero and hence assigned $xi,t = 1$. This imputation procedure aims to simulate the dispersion of the suppressed values. The downside with this method is errors up to a value of 9 can result (i.e., a 1 is used as the imputed value when the true value was 10).
2. Mean imputation. Following step 1, for the remaining missing values, we took advantage of the longitudinal structure of the data and substituted the mean of the suppressed values by year. In this case, we assigned all missing xi,t with value $\bar{x}\ t$ where $\bar{x}\ t$ was the average for all n zip codes of the suppressed values for year t.

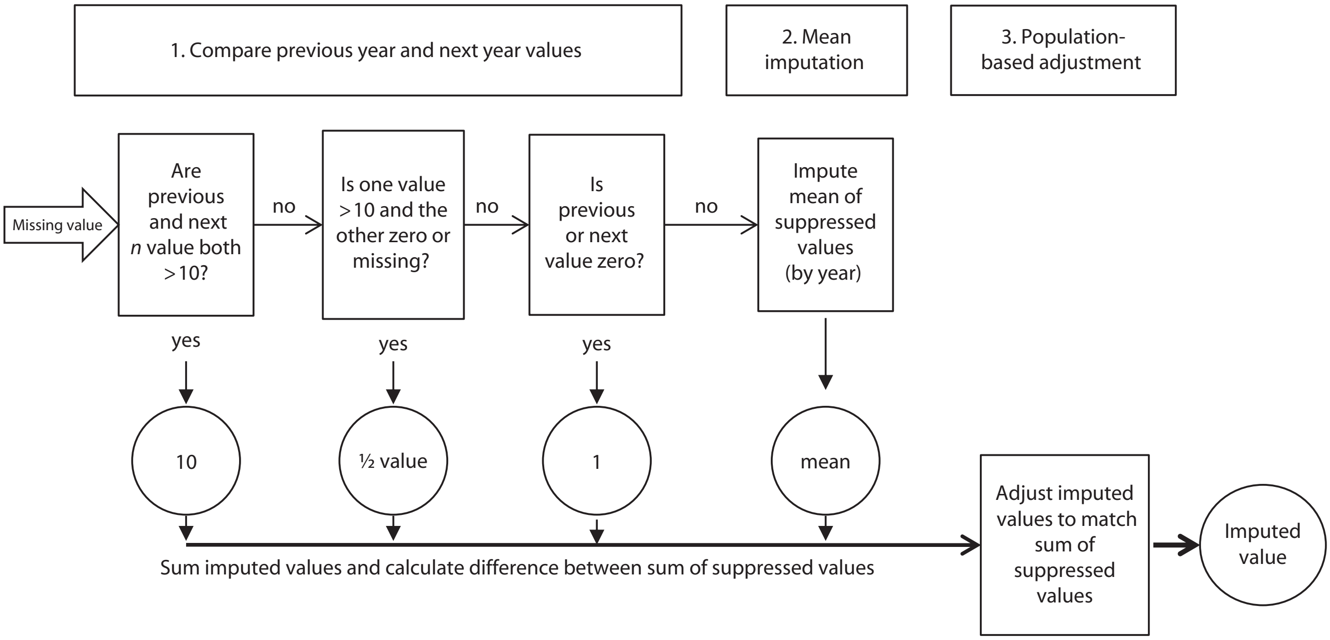

FIGURE 1— Three-Step Imputation Method Decision Process

Note. The decision process was as follows: (1) data were compared with previous and next year's value in the same zip code and an imputed value was assigned; (2) if cell value was still missing, the mean of the suppressed values for that year was imputed; and (3) the difference between the sum of the imputed values and the suppressed values was computed; each imputed value was then modified using a population-based modifier to match the sums of suppressed values. The result is the final imputed value.

3. Population-based adjustment to refine impute values. Following step 2, the sum of the imputed values did not match the original suppressed values. We then developed a zip code–level population-based modifier using American Community Survey[15] population counts to adjust all the imputed values, so the sum matched the sum of the suppressed values. To adjust the sum, we chose an auxiliary variable, the population count per zip code. The correlation between the population counts by zip code and the test data set values by zip code was 0.75, indicating a strong relationship between zip code population size and the test data values.

We calculated the population modifier for each zip code as the ratio of the total population (on log scale) and the average of the statewide zip code log population, shown in formula 1. The resulting population modifier summed to 1 across the 538 zip codes and ranged from 0.26 for the lowest zip code population count of 10 to 1.27 for the largest zip code population of 60 725.

$$(1)\ \text{Population modifier}[t] = \frac{\log(\text{zip code population count}[t])}{\text{mean}(\log(\sum \text{zip code population count}[t]))}$$

$$\text{Count adjustment}[t] = (\text{population modifier}[t]) * \frac{\text{count difference } [t]}{\text{n imputed values } [t]}$$

Modeling

To assess the performance of our approach, we implemented 4 imputation methods using a single year, 2016, within a longitudinal data set of high-dose opioid prescriptions, of which 19% of 538 zip codes were suppressed values. We chose this test variable because it represented the average missing amount (19%) for these data. We created 5 models to compare combinations of the imputation methods. Examples are provided in Table A (available as supplement to the online version of this article at http://www.ajph.org).

Model 0 – baseline: mean imputation (M0). The mean of each year's suppressed values was imputed where missing values existed. This method was intended to create an analysis baseline employing a frequently used and simple imputation method.

Model 1 – mean minus 1 standard deviation imputation (M1). The mean of each year's suppressed value minus 1 standard deviation of the mean was imputed where missing values existed.

Model 2 – 2-step imputation (M2). A 2-step imputation approach was employed. A longitudinal previous and next comparison was used to substitute either a 10, half of the existing value, or a 1 in the missing cell. For the remaining missing values, we imputed the mean of the suppressed values for that year.

Model 3 – 3-step imputation (M3). Model 3 adds a third step to model 2, a population-based count modifier. In this final step, the difference between the original values and suppressed values was calculated. Then the imputed values were multiplied by a ratio of the zip code–based population modifier and the difference so that the sum of the imputed values closely matches the sum of the suppressed data set by year.

Model 4 – modified multiple imputation (M4). This was a 3-step process using multiple imputation instead of the longitudinal previous and next approach. We started with the multiple imputation model using SAS statistical software and the previous and next year's data as parameters and a minimum of 1 and maximum output of 10 to create 5 imputed data sets. For the remaining missing cells, we imputed the mean of the suppressed values for the year and added the population modifier to adjust the imputed sum to closely match the actual suppressed values.

We compared the modeling results to the original unsuppressed values, which are available within the Massachusetts Department of Public Health but cannot be shared externally because of legal suppression requirements. To evaluate the performance of the imputation models, we calculated the root mean squared error (RMSE), the mean absolute error (MAE), and the proportional variance (PV) where

$$(2)\ RMSE = \frac{\sqrt{\sum(imputed - actual)^2}}{n\ imputed}$$

$$MAE = \sum \frac{|\ imputed - actual\ |}{n\ imputed}$$

$$PV = \frac{variance\ imputed}{variance\ suppressed}$$

RMSE and MAE summarize the differences between the imputed and actual values and provide measures of the precision of the imputation; MAE gives equal weight to all errors while RMSE gives extra weight to large errors. For MAE and RMSE, a smaller value indicates smaller errors and, hence, better imputation performance. PV compares the variance between the imputed and suppressed values and is a measure of how well the variance is preserved. A PV of 1 is the goal, less than 1 implies the imputed values are underdispersed, and greater than 1 implies that they are overdispersed.

To further analyze the model result and suitability for spatial analysis, we created maps visualizing the original data including suppressed cells, the imputed values for each model's suppressed cells, and the final "complete" data set showing the original data with the imputed values. We subjectively evaluated whether the maps incorporating the imputed values preserved the spatial patterns and range in the actual suppressed values.

RESULTS

We compared results for the 4 models, M1 through M4, with the baseline M0, and present them in Table B (available as a supplement to the online version of this article at http://www.ajph.org). We observed that the PV differed considerably among the 4 models. M0 and M1 modeled results were underdispersed with a PV near zero; while they provide a "complete" data set, the imputed values tell us little about the nuances between the zip codes they represent. M2, the 2-step method, had lower RMSE and MAE than M0 and retained 29% of the variance of the data, yet the sum of the opioid prescription imputed values in model M2 was 18.26 lower than the actual suppressed values. M3, the 3-step method, had the best results, with 22% lower RMSE (2.27 vs 2.92) and 27% lower MAE (1.88 vs 2.56) than the baseline M0. Model M3 nearly matched the sum of the actual suppressed values (–1.44 less) and retained 34% of the variance of the suppressed values. Of the 5 multiple imputation–based results, we selected multiple imputation 1, which had the lowest errors and highest proportional variance as the values to be used in M4. The results showed model M4 was less dispersed than M2 and M3, retaining only 17% of the variance, and had slightly higher errors than M3 (2.65 RMSE vs 2.27 and 2.26 MAE vs 1. 88). Ultimately, we used M3, the 3-step method, to impute values for all our study variables.

After choosing the 3-step imputation approach as our final imputation model, we performed it on all 35 variables (i.e., 5 opioid prescription misuse variables across 7 years). The method produced similar errors as the modeled result (RMSE of 2.34; 95% confidence interval [CI] = 2.28, 2.40 vs 2.27 and MAE of 1.91; 95% CI = 1.85, 1.97 vs 1.88) with slightly improved PV over the test results (0.46 [95% CI = 0.37, 0.55]) vs 0.34 PV). The stratified results summarized in Table 1 show that as the percentage of imputed values increased, the errors decreased (from 2.37 [95% CI = 2.26, 2.48] to 2.20 [95% CI = 2.13, 2.27] RMSE and 1.95 [95% CI = 1.83, 2.07] to 1.76 [95% CI = 1.70, 1.64] MAE), while the PV increased (from 0.46 [95% CI = 0.36, 0.56] to 0.52 [95% CI = 0.43, 0.61]). The variables with 30% to 39% of values imputed had the best results. Precision, of which dispersion is a measure, is particularly important for spatial analysis, in which differences between small cells can be used to identify areas with emerging and subsiding risks, known as hot and cold spots.

Table 1 compares the modeled and the overall imputed values and

TABLE 1— Modeled Results for High-Dose Opioid Prescriptions, 2016, and Imputed Statistical Results for 35 Suppressed Opioid Prescription Variables: Massachusetts, 2011–2017

	% Imputed	RMSE	MAE	PV
Model results				
M0: mean imputation	19	2.92	2.56	0.00
M1: mean–1 SD	19	4.06	3.17	0.00
M2: 2-step	19	2.53	2.11	0.29
M3: 3-step	19	2.27	1.88	0.34
M4: mean imputation plus 2-step	19	2.65	2.26	0.17
Imputed results[a]				
17 data sets	10–15	2.37 (2.26, 2.48)	1.95 (1.83, 2.07)	0.46 (0.36, 0.56)
11 data sets	16–20	2.37 (2.30, 2.44)	1.93 (1.82, 2.04)	0.43 (0.34, 0.52)
7 data sets	30–39	2.20 (2.13, 2.27)	1.76 (1.70, 1.82)	0.52 (0.43, 0.61)
All 35 data sets, mean	19	2.34 (2.28, 2.40)	1.91 (1.85, 1.97)	0.46 (0.37, 0.55)

Note. MAE = mean absolute error; PV = proportional variance; RMSE = root mean squared error.

[a] Includes 95% confidence interval.

statistical results. We stratified the imputed data by the percentage of the data imputed (10%–15%, 16%–20%, and 30%–39%) and provided the overall results and 95% CIs for the imputed results. The full results are provided in Table C (available as a supplement to the online version of this article at http://www.ajph.org).

Figures 2a through 2c present the statistical measures of the imputed values categorized by percentage of values imputed. The charts illustrate that errors (RMSE and MAE) converge at lower values as the percentage imputed increases, and as the imputed proportion increases, the values become less dispersed (PV). This clustering as the proportion of imputed values increases results from more instances in which the mean value is inserted in the imputation algorithm. As the percentage missing increased, the variability in errors and the variance decreased, showing that, with up to 39% missing values, this method maintains similar precision and variance preservation as data missingness increases.

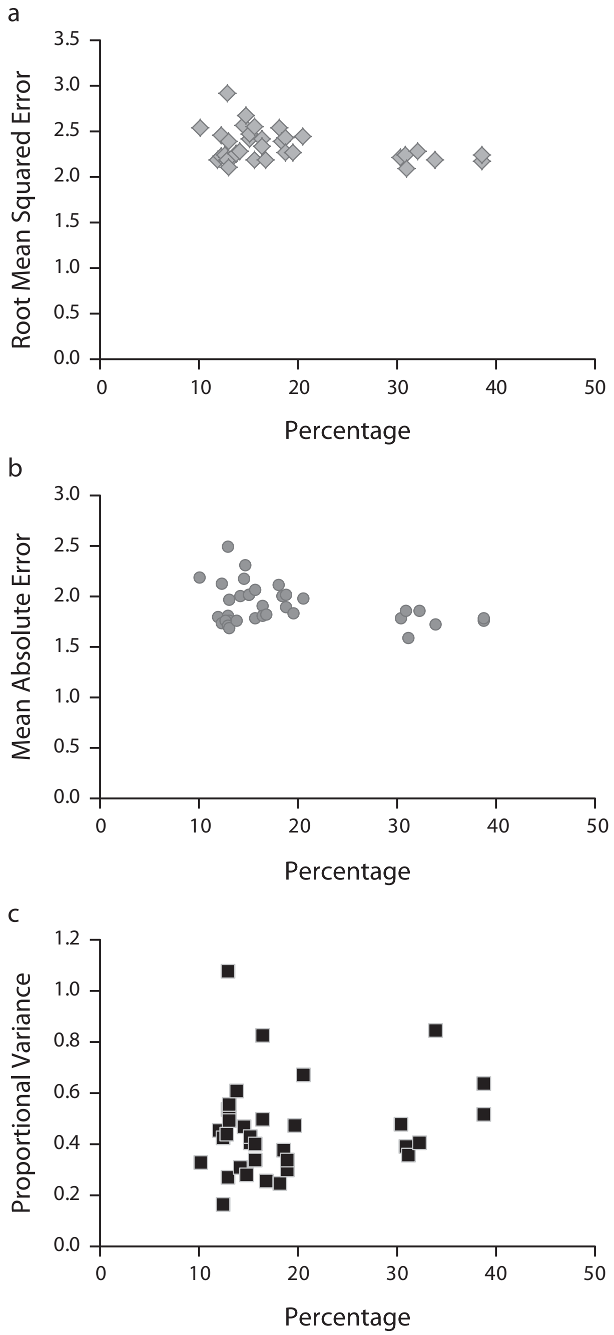

FIGURE 2— **Error Results for Imputed Values in 35 Potentially Inappropriate Opioid Prescription Variables for (a) Root Mean Squared Error, (b) Mean Absolute Error, and (c) Proportional Variance of Imputed Values: Massachusetts, 2011–2017**

DISCUSSION

We developed an imputation approach for longitudinal data that largely overcame the adverse effects of the suppression of small cell sizes. The imputed data set can then improve the subsequent statistical and spatial analyses conducted with public health surveillance data.

Our imputed variables retained the mean and sum of the suppressed values and, on average, preserved nearly half (46%) of the variance. In addition, we found that the 3-step imputation method produced lower errors than mean imputation (19% lower RMSE and 25% lower MAE). This technique allows inclusion of variables at lower aggregation levels enhancing analytic precision for rare outcomes, particularly in rural areas, while preserving data confidentiality. This novel imputation method is generalizable to public health practitioners and researchers using protected data with design features similar to ours. We also

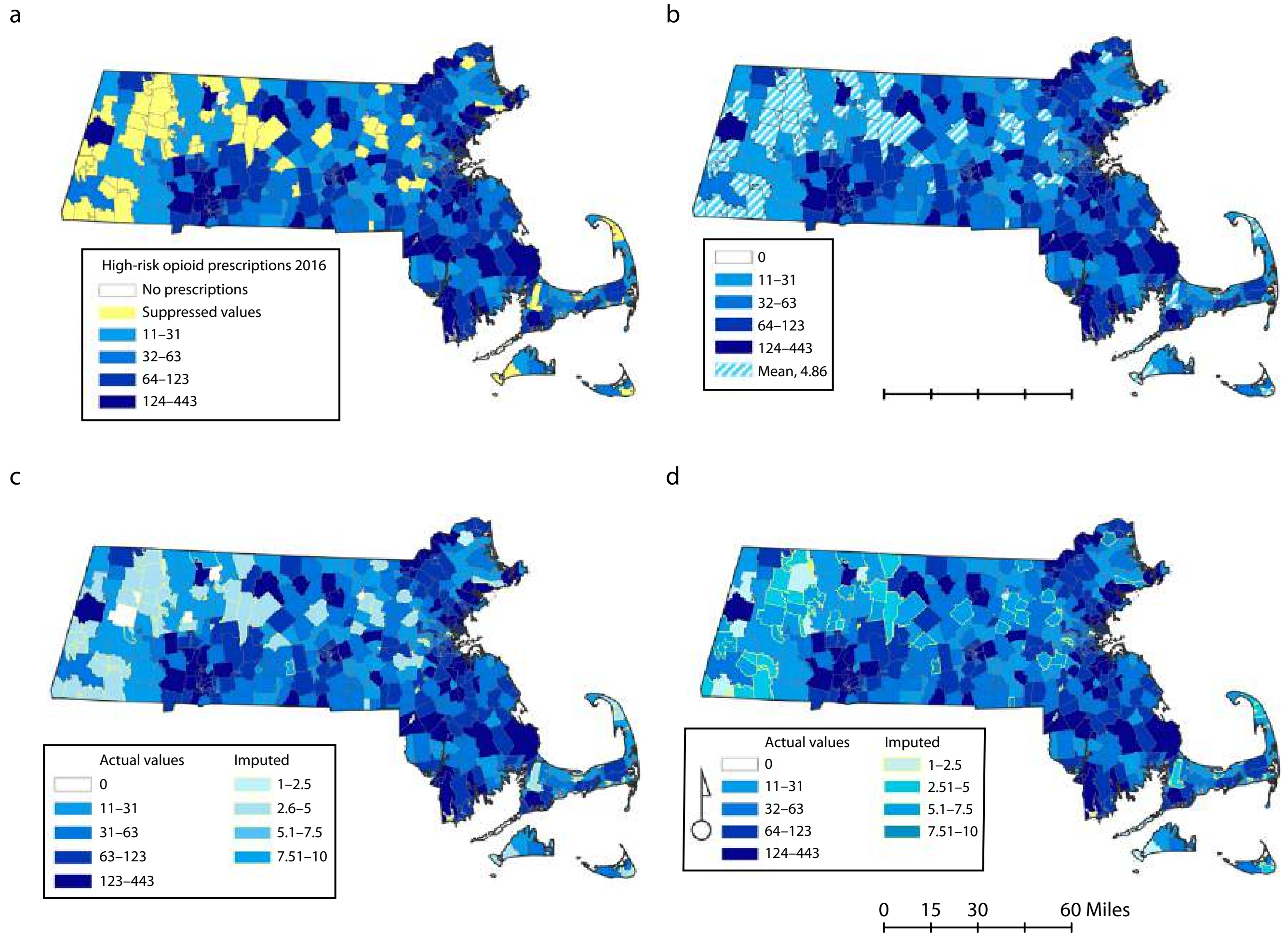

FIGURE 3— Illustrative Example of Thematic Maps of a Test Data Set "High-Dose Opioid Prescription" Count by Zip Code for (a) Initial Data With 19% Values Missing Because of Suppression, as Denoted by Yellow Shading; (b) Mean Imputation Shown With Original Values; (c) Modified Multiple Imputation Results Shown With Original Values; and (d) "Complete" Final Data Showing Original Data With Imputed Results Together: Massachusetts, 2016

suggest that researchers can modify multiple imputation results by adding mean imputation and a population modifier to produce useable data.

The value of spatial analyses that utilize data from an imputed and complete data set, free of suppressed area-level measures (or "holes" in the map), cannot be understated. As demonstrated in Figure 3a (with yellow suppressed polygons), nearly 1 in 5 (19%) low-count areas (i.e., zip codes) would be "omitted" from standard maps that rely on suppressed data, leaving most of the western part of the state mapped with a lack of heterogeneity. Although the data visualized in Figures 3b and 3c allow analysis of the full data set, they do little to draw out the nuances between small areas and may not produce adequate precision for small cells and areas. Meanwhile, Figure 3d (with imputed polygons) presents a more comprehensive range of values, allowing for a closer approximation of the spatial distributions of the outcome in small cells while distinguishing the imputed values from the true values. As the data visualized in Figures 3a and 3d are very different, the imputed values will allow an examination of the small cell data, up to 39% of the values in these data.[9,13] Recently, Bayesian spatiotemporal modeling has gained popularity in analyzing synthetic data for public use.[12] However, the complex statistical expertise[8,9] to conduct these models may exceed the benefit compared with this straightforward method. Our proposed approach, admittedly less sophisticated, is easy to carry out, and can be utilized by a wide range of researchers with nonstatistical background and without geospatial software.

Limitations

Our findings should be considered in light of several limitations. We conducted our test approaches on a single outcome variable, high-dose opioid prescriptions, and our method might produce different results with other longitudinal outcomes depending on the characteristics of the data set. For example, our imputation method resulted in an average of 24% of values imputed in the first step and 76% in the second step, mean imputation. Another data set may result in a different proportion of cells imputed in each step, hypothetically producing much different variance and errors in the imputed values. In addition, our results required that summary statistics for the complete and unsuppressed data be available; the method is best performed by the data sharer, or a researcher who has access to summary statistics of the suppressed values. Third, we used these data for a geospatial analysis project and had the benefit of reviewing the results in geographic information systems maps. Researchers should include a method to assess the imputation results such as mapping the data or comparing the unimputed analysis findings to the imputed analysis results.

Public Health Implications

This novel multistep imputation approach provides a method to obtain reliable measures for key opioid prescribing measures, which had up to 39% suppressed cells. Our computationally efficient approach enhances precision of small area estimates for rare events and less populated areas, facilitating more accurate risk mapping, spatial epidemiological, and statistical modeling approaches while preserving confidentiality. These results warrant further application of the imputation method to refine the approach, to assess whether this approach can function accurately when used with more diverse longitudinal data, and to compare the results with more sophisticated modeling methods.

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CONTRIBUTORS

E. A. Erdman and D. L. Bernson developed the concept for the method. E. A. Erdman wrote the imputation code and developed the test models. T. J. Stopka provided oversight to the project. T. J. Stopka, L. D. Young, C. Bauer, and K. Chui contributed to the analysis and interpretation of results. All authors contributed to the article and revision writing.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest.

HUMAN PARTICIPANT PROTECTION

Institutional review board approval was not required for this research, as no human participants were involved.

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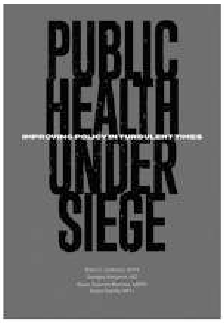

Excess Mortality During the COVID-19 Pandemic in Guatemala

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See also Aburto, p. 1721.

Objectives. To describe excess mortality during the COVID-19 pandemic in Guatemala during 2020 by week, age, sex, and place of death.

Methods. We used mortality data from 2015 to 2020, gathered through the vital registration system of Guatemala. We calculated weekly mortality rates, overall and stratified by age, sex, and place of death. We fitted a generalized additive model to calculate excess deaths, adjusting for seasonality and secular trends and compared excess deaths to the official COVID-19 mortality count.

Results. We found an initial decline of 26% in mortality rates during the first weeks of the pandemic in 2020, compared with 2015 to 2019. These declines were sustained through October 2020 for the population younger than 20 years and for deaths in public spaces and returned to normal from July onward in the population aged 20 to 39 years. We found a peak of 73% excess mortality in mid-July, especially in the population aged 40 years or older. We estimated a total of 8036 excess deaths (95% confidence interval = 7935, 8137) in 2020, 46% higher than the official COVID-19 mortality count.

Conclusions. The extent of this health crisis is underestimated when COVID-19 confirmed death counts are used. (*Am J Public Health*. 2021;111(10):1839–1846. https://doi.org/10.2105/AJPH.2021.306452)

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The COVID-19 pandemic directly caused at least 2 million confirmed deaths worldwide during 2020. During the first months of the pandemic, the strongest mortality impacts occurred in England and Spain, with excess mortality of 37% and 38%, respectively, between mid-February and May 2020.[1] However, the Latin American region has been considerably affected during the rest of the pandemic, despite having a much younger population compared with Europe.[2] Fragmented health systems, wide social inequalities, and a high prevalence of chronic conditions may have contributed to the high COVID-19 toll in Latin America.[3] Guatemala, one of the poorest countries in Latin America, reported its first COVID-19 case on March 13, 2020. In response, the Guatemalan government implemented several control measures such as mobility restrictions, stay-at-home orders, prohibition of alcohol consumption, and national lockdowns. These policies were subsequently revised in periods of 15 days and were tightened or loosened depending on the number of COVID-19 cases in the country.

Studying the impact of the COVID-19 pandemic by looking only at confirmed COVID-19 deaths provides an incomplete picture of the burden of the pandemic. First, confirmed death counts usually require laboratory confirmation of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection,[4] which has been limited in Guatemala.[5] Second, COVID-19 may exacerbate other health conditions causing deaths that may not be classified as directly caused by COVID-19.[6] Third, the disruptions to the provision of health services because of COVID-19 may cause a delay in the care of other conditions leading to an increase in mortality attributable to other causes.[7] Fourth, measures to control COVID-19 (including lockdowns and other physical distancing measures) may aggravate conditions, especially those related to mental health[8] and intimate partner violence.[9] Last, there may also have been a decrease in other causes of death because of a decrease in other respiratory infections,[10] mobility,[11] homicides,[12] and pollution.[13]

Excess mortality, which we define as the relative difference between observed mortality rates and a baseline mortality rate calculated from previous years, is a general measure of the impact of mortality crises like seasonal influenza or hurricanes.[14] Excess mortality provides a better way to estimate the overall impact of the pandemic than confirmed COVID-19 deaths alone, which may be underascertained because of the presence of limited testing, indirect mortality effects, and changes in other environmental factors. To advance further preparedness, we aimed to describe excess mortality patterns in Guatemala during the COVID-19 pandemic in the period of March 13 to December 31, 2020.

METHODS

Guatemala is part of the Central American region, with a population of 16.9 million inhabitants. It ranks among the poorest countries in Latin America. To mitigate the COVID-19 pandemic, the Guatemalan government announced a number of public health measures on March 14, 2020, including the suspension of schools and sport activities and travel restrictions. These measures were further strengthened on March 16, including complete air travel bans and curfews, followed shortly after by restrictions to internal mobility and stricter lockdowns. These policies were loosened during early June, and the lockdowns and travel restrictions were lifted in September 2020, based on a local system of alerts using the number of COVID-19 cases and the test positivity ratio for each municipality.

Data Sources

We analyzed de-identified individual-level mortality data from the National Registry of Persons (RENAP, for *Registro Nacional de Personas*), the national vital registration system of Guatemala, from January 1, 2015, to December 31, 2020. RENAP is a centralized institution with national coverage that collects information about civil registration (births, deaths, marriages, divorces. and naturalization processes). RENAP provided data on date of death and registration, sex, age, nonstandardized causes of death, region (*departamentos*) of occurrence, and place of death (e.g., home, public spaces, hospital). These data did not include the deaths of infants younger than 1 year.

There is a known delay in death registration, as deaths are not registered immediately. To account for this, we estimated the delay in registration by comparing date of registration and date of occurrence. We found that 50% of deaths were registered within 1 week and 90% of them within 4 weeks after occurrence. See Appendix, Figures A–D (available as supplements to the online version of this article at http://www.ajph.org) for more details on the analysis of delays in reporting. Based on this analysis, we used data on deaths reported up until February 28, 2021. This ensured that almost all deaths that occurred up to December 31, 2020, were included, even if registration was delayed, providing for a nearly complete picture of deaths in 2020. We conducted all of the analyses using the date of occurrence, categorized in epidemiological weeks.

We used population counts as denominators from the population projections calculated by the National Institute of Statistics.[15] We also obtained the official number of confirmed COVID-19 deaths by week from the Ministry of Health of Guatemala (https://tablerocovid.mspas.gob.gt), defined as deaths of people who had a confirmed COVID-19 laboratory test.

Statistical Analysis

The main objective of this analysis was to describe excess mortality during the first calendar year of the COVID-19 pandemic in Guatemala and to explore temporal trends and patterns by age, sex, and place of death. We calculated weekly mortality counts by using standardized epidemiological weeks as defined by the Centers for Disease Control and Prevention. We also estimated crude weekly mortality rates, using population projections as denominators.

We defined excess mortality as the absolute difference in weekly crude mortality rate in 2020 compared with the average weekly mortality rate in 2015 to 2019 (mortality rate in 2020–average mortality rate in 2015 to 2019). We also calculated the weekly mortality rate ratio (mortality rate in 2020/average mortality rate in 2015 to 2019) expressed as a percentage. We further stratified all the analyses by sex (male or female), place of death (home, hospital, public spaces, health centers, and other), and age groups (1–4, 5–19, 20–39, 40–59, 60–74, and ≥ 75 years).

We estimated years of life lost as a measure of the overall impact of the COVID-19 pandemic in Guatemala. For this, we summed over all residual life expectancies at each age of death. We obtained these from sex-specific abridged life tables for Guatemala for the 2015–2020 period produced by the 2019 Revision of the United Nations World Population Prospects. We then converted these to single-age life tables using penalized composite link model graduation,[16] as implemented in the DemoTools R package (https://github.

com/timriffe/DemoTools). For example, every death of a male aged 15 years meant losing 58.5 years of life, as this was the life expectancy for males aged 15 years in Guatemala for the 2015–2020 period.

To estimate the total number of excess deaths during 2020, we computed a smoothed estimate of expected death counts for each week of 2020 by fitting a negative binomial generalized additive model, as detailed in Basellini et al.[17] This model takes into consideration variations in mortality within the year, by using week-specific coefficients, and secular trends, by using a smoothed time component that captures long-term mortality trends.[17] We fitted this model using data from 2015 to 2019, and then predicted the expected number of deaths in each week of 2020, which we compared with the actual observed number of deaths. We then summed over the weekly excess deaths for the whole year to obtain an estimate (and 95% confidence interval [CI]) for the total excess mortality in 2020. As a sensitivity analysis, we fitted the initial baseline model using data for 2015 to 2017 and repeated the calculation of excess mortality in 2020. We also show more parsimonious estimates of excess mortality, where we calculated the expected number of deaths in 2020 by fitting a generalized linear model of the negative binomial family to the 2015–2019 yearly data with a linear coefficient for year.

All the analyses were performed in R version 4.0.3 using the tidyverse and mcgv packages (R Foundation, Vienna, Austria).

RESULTS

Starting at week 11 of 2020, when the first COVID-19 case was detected and the initial public health measures were implemented in Guatemala, there was a drop in all-cause mortality (Figure 1, Table 1, and Appendix, Figure E). The lowest mortality was in mid-April (week 15), with around 7.53 deaths per week per 100 000 inhabitants, as compared with an average of 9.96 deaths per week per 100 000 inhabitants in previous years. Starting in early May (week 19), mortality started increasing, reaching previous years' levels in early June (week 22), and peaking in July (week 28), with a weekly mortality rate of 17.42 per 100 000, as compared with an average of 10.05 per 100 000 in previous years, a 73% relative mortality increase. From thereon, mortality decreased progressively, reaching an average of 10.87 deaths per 100 000 in October and December compared with 9.77 deaths per 100 000 in previous years, making for an 11% relative increase in mortality from October to December 2020. Overall, we found that there were 4 099 700 years of life lost in 2020, compared with an average of 3 731 446 in 2015 to 2019, resulting in an increase of 368 255 years of life lost, or a 9.9% relative increase.

We also observed a similar shape of weekly mortality rates for females and males, with some differences (Figure 2, Table 1, and Appendix, Figure F). First, mortality rates have been higher in males, with a weekly mortality rate of 11.17 per 100 000 inhabitants in the 2015–2019 period, as compared with 8.65 per 100 000 in females. Second, the decrease in mortality during weeks 11 through 21 was stronger in males, with mortality rates dropping to 8.80 per 100 000 inhabitants, compared with 11.29 per 100 000 inhabitants in previous years, a sharper drop than for females (7.36 per 100 000 inhabitants, compared with 8.75 in previous years). Third, the increase in mortality rates was much steeper for men than for women. During week 28, the weekly mortality rate was 22.16 per 100 000 inhabitants in males and 12.84 per 100 000 inhabitants in females, compared with 11.25 and 8.89 in previous years, representing a relative increase of 96.9% and 44.4%, respectively.

We observed distinct weekly mortality patterns by age group (Table 1 and Appendix, Figures G and H). First,

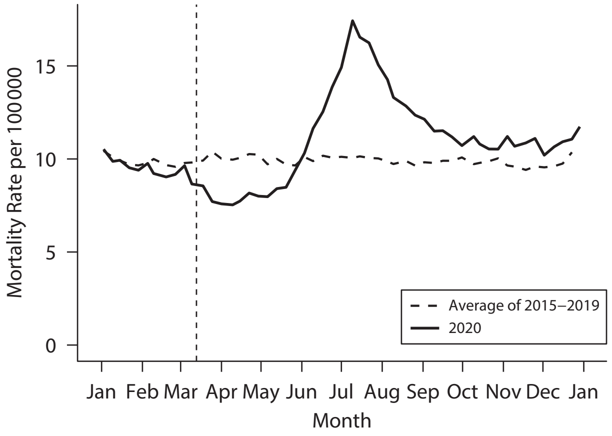

FIGURE 1— Weekly Crude Mortality Rate: Guatemala, January 2015–December 2020

Note. Vertical dashed line represents week 11, when the first case was detected in Guatemala. Line for 2015–2019 represents the average weekly mortality rate for that period.

TABLE 1— Average Monthly Deaths, Overall, and by Sex, Age, and Place of Death: Guatemala, January 2015–December 2020

		Monthly Deaths, Thousands												Population, Millions
	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Overall	2015–2019	7.09	6.33	7.06	6.99	7.02	6.90	7.19	7.01	6.77	7.04	7.09	6.33	16.1
	2020	7.29	6.51	6.37	5.65	6.34	8.97	12.15	9.87	8.28	8.02	7.29	6.51	16.9
Sex														
Male	2015–2019	3.97	3.51	3.93	3.88	3.88	3.80	3.97	3.90	3.76	3.91	3.97	3.51	7.93
	2020	4.10	3.63	3.46	3.03	3.41	5.28	7.48	5.90	4.74	4.59	4.10	3.63	8.30
Female	2015–2019	3.12	2.82	3.13	3.10	3.13	3.10	3.21	3.10	3.00	3.13	3.12	2.82	8.16
	2020	3.19	2.88	2.91	2.63	2.93	3.69	4.67	3.96	3.54	3.43	3.19	2.88	8.56
Age, y														
1–4	2015–2019	0.15	0.16	0.21	0.23	0.25	0.24	0.24	0.22	0.19	0.18	0.15	0.16	1.50
	2020	0.13	0.13	0.12	0.11	0.11	0.14	0.14	0.13	0.11	0.11	0.13	0.13	1.51
5–19	2015–19	0.31	0.28	0.34	0.32	0.34	0.32	0.34	0.32	0.32	0.33	0.31	0.28	5.41
	2020	0.31	0.25	0.23	0.21	0.24	0.23	0.25	0.28	0.25	0.25	0.31	0.25	5.41
20–39	2015–2019	0.98	0.86	0.96	0.93	0.97	0.93	1.01	0.96	0.94	0.95	0.98	0.86	5.24
	2020	0.89	0.85	0.73	0.65	0.78	0.92	1.10	0.98	0.92	0.95	0.89	0.85	5.61
40–59	2015–2019	1.28	1.13	1.27	1.25	1.25	1.24	1.25	1.24	1.18	1.26	1.28	1.13	2.42
	2020	1.32	1.15	1.18	1.05	1.31	2.04	2.70	2.06	1.64	1.57	1.32	1.15	2.67
60–74	2015–2019	1.50	1.34	1.49	1.46	1.45	1.45	1.48	1.46	1.42	1.45	1.50	1.34	0.82
	2020	1.64	1.51	1.54	1.36	1.61	2.49	3.67	2.74	2.27	2.07	1.64	1.51	0.91
≥ 75	2015–2019	2.24	2.00	2.13	2.11	2.05	2.03	2.13	2.09	2.02	2.17	2.24	2.00	0.32
	2020	2.44	2.05	2.09	1.90	1.92	2.74	3.87	3.26	2.71	2.69	2.44	2.05	0.36
Place of death														
Home	2015–2019	4.45	3.98	4.37	4.28	4.27	4.24	4.34	4.27	4.17	4.33	4.45	3.98	NA
	2020	4.58	3.96	4.02	3.72	4.14	5.73	7.88	6.51	5.59	5.33	4.58	3.96	NA
Hospital	2015–2019	2.01	1.83	2.08	2.12	2.15	2.05	2.21	2.15	2.02	2.07	2.01	1.83	NA
	2020	2.18	2.05	1.96	1.63	1.84	2.81	3.80	2.86	2.25	2.22	2.18	2.05	NA
Health center	2015–2019	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	NA
	2020	0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.03	0.03	NA
Public spaces	2015–2019	0.46	0.39	0.45	0.44	0.43	0.43	0.47	0.43	0.43	0.46	0.46	0.39	NA
	2020	0.37	0.33	0.27	0.19	0.22	0.28	0.29	0.33	0.29	0.34	0.37	0.33	NA
Other	2015–2019	0.13	0.11	0.14	0.12	0.14	0.14	0.14	0.13	0.13	0.15	0.13	0.11	NA
	2020	0.13	0.13	0.11	0.10	0.12	0.13	0.14	0.14	0.13	0.11	0.13	0.13	NA

Note. NA = not applicable. 2015–2019 refers to the average monthly death count or yearly population from 2015 to 2019.

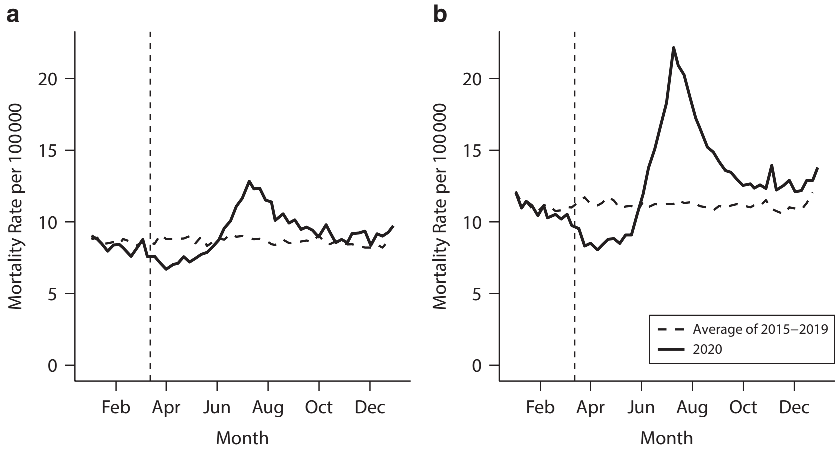

FIGURE 2— Weekly Mortality Rate Among (a) Women and (b) Men: Guatemala, January 2015–December 2020

Note. Vertical dashed line represents week 11, when the first case was detected in Guatemala. Line for 2015–2019 represents the average weekly mortality rate for that period.

among age groups 1 to 4 years and 5 to 19 years, we observed a consistent drop in mortality from week 11 onward, and this drop has continued through the end of the study period. Specifically, during 2020, we observed an average weekly mortality rate of 1.88 and 1.05 per 100 000 inhabitants in people aged 1 to 4 and 5 to 19 years, respectively, compared with an average of 3.03 and 1.35 per 100 000 inhabitants in 2015 to 2019 (38% and 22% relative drop in mortality). Mortality patterns among people aged 20 to 39 years followed an initial decline in mortality from week 11 to week 22, and a return to previous years' average from thereon. Lastly, age groups 40 to 59, 60 to 74, and 75 years or older saw an initial decline in mortality from week 11 to week 21, followed by a large increase. Specifically, we observed a 49.4%, 66.9%, and 36.4% increase in relative mortality from week 21 onward for those age groups, respectively.

We observed distinct patterns by place of death in the mortality rates during 2020 (Table 1 and Appendix, Figures I and J). First, deaths in public spaces, such as streets or parks, declined at week 11 and persisted at lower levels than previous years. Second, deaths at home and in hospitals saw an initial decline from week 11 to week 21, with a 13.8% and 22.3% drop in mortality during that period, compared with previous years. Third, there was a large increase in deaths at home and in hospitals from weeks 22 to 52, with an excess mortality rate ratio of 34.4% and 20.5% for deaths at home and in hospitals, respectively. The higher mortality rates were found typically at home, followed by deaths in hospitals, public spaces, and health centers.

Figure 3 and Appendix, Figure K, show the results of the generalized additive model to estimate the number of excess deaths after considering seasonality and secular trends. Specifically, we found an initial mortality decline of 26% in late March, followed by a peak increase of 73% in mid-July. Compared with official confirmed COVID-19 deaths, we found a higher initial count of confirmed deaths (given that overall mortality was declining at this point), followed by a large increase in all-cause excess mortality that was higher than the confirmed death count. Compared with mortality between 2015 and 2019, we found that Guatemala had experienced a total of 8036 excess deaths (95% CI = 7935, 8137) in 2020, which is higher than the 5487 confirmed COVID-19 deaths officially reported. This means that excess mortality in Guatemala during the COVID-19 pandemic was 46.4% higher (95% CI = 44.6%, 48.3%) than the official death count. Alternative model specifications rendered similar estimates (Appendix, Table A), and the model fitted using 2015–2017 data showed a good fit to 2018–2019 data (Appendix, Figure L).

DISCUSSION

In this study examining mortality patterns in Guatemala during the COVID-19 pandemic, we found that by December 31, 2020, Guatemala had experienced a total of approximately 8000 excess deaths, 46% higher than the official confirmed COVID-19 death count of 5487. However, this overall number obscures 4 distinct patterns. First, we observed an initial decline in mortality from the date that the first public health measures were implemented until early June 2020. This was followed by a sharp increase in mortality, reaching 73% higher mortality compared with previous years. Second, while excess mortality affected both sexes, both the decline and the subsequent increase in mortality were steeper among men. Third, we observed a consistent lower mortality among Guatemalans younger than 20 years that lasted through the entire study period, while people aged 40 years or older saw a

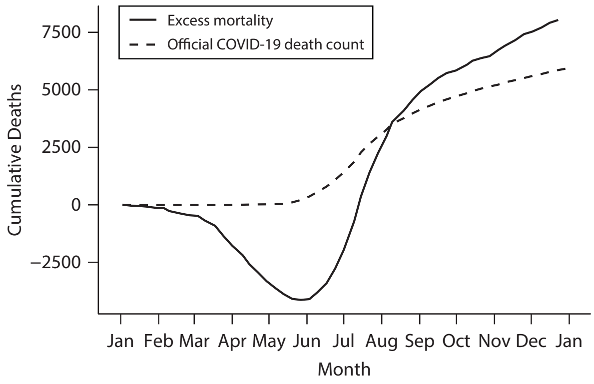

FIGURE 3— Cumulative Excess Mortality Versus Official COVID-19 Mortality Count: Guatemala, 2020

Note. Vertical dashed line represents week 11, when the first case was detected in Guatemala. Line for 2015–2019 represents the average weekly mortality rate for that period.

mortality peak during July. Lastly, we found that consistent with previous years, most deaths occurred at home, followed by hospitals, and these locations saw the highest increases in mortality, both relative and absolute. Deaths in public spaces declined and stayed low during the entire period.

These results are consistent with preliminary reports on excess mortality in Guatemala.[18] Other studies have reported similar trends in other countries in Latin America[19,20] and elsewhere,[21,22] including large differences in COVID-19 mortality by age.[23] Mortality differences by sex, with higher mortality among males, have been reported in other settings[24] but are not universal.[25] A deeper understanding of the sex differentials in COVID-19 mortality, including differences in sex biology or gendered behaviors, or differences in access to care or underlying diseases by either sex or gender, should be explored in future studies.

The length of the period of decreased mortality, spanning 3 months, is a unique finding of our study. This decline is unlikely to be caused by delays in registration, as we utilized mortality data registered up until February 28, 2021, allowing for a several month period of delay in registration. Although we did not have information on cause of death, it seems plausible that initial declines in mortality may be related to reductions in risk factors that account for main drivers of death in Guatemala. This reduction could be caused by many of the public health recommendations or measures introduced to mitigate the COVID-19 pandemic. For example, both reductions in air pollution[26] and increases in social distancing[10] may have an impact on other respiratory diseases, the second cause of death among children younger than 5 years in Guatemala.[27] In the case of adolescents and young adults, and given the overall high levels of mortality from homicides and other injuries in Guatemala in previous years,[28] a decline in these causes may be driving these patterns. Other Latin American countries have reported a reduction in homicides, traffic injuries, and other external causes of death during the pandemic.[29] Changes in mobility could explain the same reduction in mortality in Guatemala, as there was a sharp decline in traffic (see Appendix, Figure M, for trends in mobility to transit stations and residences in Guatemala, as obtained from Google Mobility Reports). In summary, given the low case fatality of COVID-19 among children and youths,[30] the potential reduction in factors driving respiratory deaths (i.e., air pollution and social distancing measures), and the potential reductions in external causes of death (the main cause of death among children and adolescents[31]), these reductions in mortality are not surprising.

By mid-May, the decrease in mortality was reverted, overlapping with the time when the official number of COVID-19 deaths started to increase. The highest mortality occurred at home compared with hospitals, even before the current pandemic. This phenomenon brings to the attention potential barriers such as access to health care and limited hospital capacity.[32] This could be exacerbated because of restricted mobility policies including prohibition of public transportation and limited number of ambulances. Restrictions to mobility, along with lockdowns, may have affected mortality in public spaces, which stayed low during the entire study period. We also found that individuals aged 40 to 59 years were the youngest group with a strong excess mortality, a relatively younger population compared with other settings.[21,33] This difference may have arisen because of a higher prevalence of chronic diseases and limited access to health services that might interrupt the access to chronic disease treatment.

Limitations

Our study had some limitations. First, RENAP has a delay in registration, which we accounted for by including 2 extra full months of death registration data (January and February 2021), to capture deaths that occurred in 2020 but were registered with a delay. However, we cannot rule out longer delayed times toward the end of the study period, or differential delays by age, sex, or place of death. Appendix Figures A through D show registration delays over time, and by age, sex, and place of death, suggesting differences at the beginning of the pandemic.

Second, while the coverage of death counts in Guatemala is generally high,[34] we cannot rule out an increase in undercounting[35] during the pandemic. However, if undercounting was to have increased during the pandemic, our results would be representing a conservative estimate of excess mortality.

Third, RENAP does not include data for deaths among infants younger than 1 year. Given the high infant mortality of Guatemala[36] compared with other Latin American countries, this precludes us from showing the complete mortality picture during the pandemic. While mortality among children stayed low during the entire period, we cannot rule out increases in mortality among infants, especially neonatal deaths, which are highly affected by quality of health care and early access to health care, which could have been delayed because of mobility restrictions.

Fourth, we could not analyze data by cause of death, because RENAP does not codify causes of death, and this is a resource-intensive process that limits timely analyses during the pandemic. The process of coding causes of death is done by the National Institute of Statistics, which usually releases these data a year later.

Fifth, toward the end of 2020, hurricanes Iota and Eta impacted Guatemala, causing at least 60 confirmed deaths. This could cause an overestimation of the excess mortality from the COVID-19 pandemic during the few last months of 2020.

Lastly, the usual caveats about the calculation of years of life lost, including decisions about discounting of years of life lost depending on age and the choice of a reference life table, apply here.[37]

Conclusions

In summary, we found that the COVID-19 pandemic has created a mortality crisis in Guatemala, similar to other countries in the world. The extent of this crisis is underestimated when confirmed COVID-19 death counts are used, as we found that excess mortality was 46% higher than confirmed counts. We also identified specific age-, sex-, and place-specific patterns of death, highlighting the vulnerability of middle-aged adults (40–59 years). As mitigation measures are lifted, and vaccine rollout continues, consideration must be paid to this group, which is also highly exposed from their economic participation. Lastly, gaining a better understanding of deaths at home, including addressing potential barriers to accessing health care, may provide clues to mitigation strategies.

Public Health Implications

In Guatemala, high vulnerability was found not only in the elderly but also in middle-aged adults (40–59 years), who are also highly exposed to COVID-19 because of their active participation in the economy and high prevalence of noncommunicable chronic diseases. Key stakeholders need to consider middle-aged adults with noncommunicable chronic diseases as priority for vaccination purposes and to plan a national chronic disease survey to quantify the prevalence of noncommunicable chronic diseases in this population. AJPH

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CONTRIBUTORS

K. Martinez-Folgar and U. Bilal led the conceptual development, analysis, and writing of the article. D. Alburez-Gutierrez, A. Paniagua-Avila, and M. Ramirez-Zea supported the interpretation of results and reviewed the article. All authors approved the final version.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

HUMAN PARTICIPANT PROTECTION

This research was deemed exempt from institutional board review under 45 CF 46.104(d)(4)(ii).

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Excess Deaths in Mexico City and New York City During the COVID-19 Pandemic, March to August 2020

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Objectives. To estimate all-cause excess deaths in Mexico City (MXC) and New York City (NYC) during the COVID-19 pandemic.

Methods. We estimated expected deaths among residents of both cities between March 1 and August 29, 2020, using log-linked negative binomial regression and compared these deaths with observed deaths during the same period. We calculated total and age-specific excess deaths and 95% prediction intervals (PIs).

Results. There were 259 excess deaths per 100 000 (95% PI = 249, 269) in MXC and 311 (95% PI = 305, 318) in NYC during the study period. The number of excess deaths among individuals 25 to 44 years old was much higher in MXC (77 per 100 000; 95% PI = 69, 80) than in NYC (34 per 100 000; 95% PI = 30, 38). Corresponding estimates among adults 65 years or older were 1263 (95% PI = 1199, 1317) per 100 000 in MXC and 1581 (95% PI = 1549, 1621) per 100 000 in NYC.

Conclusions. Overall, excess mortality was higher in NYC than in MXC; however, the excess mortality rate among young adults was higher in MXC.

Public Health Implications. Excess all-cause mortality comparisons across populations and age groups may represent a more complete measure of pandemic effects and provide information on mitigation strategies and susceptibility factors. (*Am J Public Health*. 2021;111(10):1847–1850. https://doi.org/10.2105/AJPH.2021.306430)

New York City (NYC; population: 8 398 748) and Mexico City (MXC; population: 9 041 395) are the largest North American cities. The first confirmed COVID-19–associated fatality in NYC occurred on March 11, 2020, and the first such fatality in MXC occurred a week later. Stay-at-home orders were put in place in both cities on March 22 and 23, 2020. Although age distributions, social determinants of health, and health care capacities differ, a direct comparison of excess deaths in the populations of these 2 cities can provide insights into the dynamics of disease spread as well as pandemic preparedness and response. NYC has an electronic rapid death surveillance system to address delays in reporting of vital statistics, and MXC implemented a similar system. Leveraging these rapid death surveillance systems, we estimated all-cause excess deaths in both cities from March to August 2020.

METHODS

For MXC, we obtained all-cause deaths occurring between January 1, 2017, and August 29, 2020, from https://datos.cdmx.gob.mx. A comparison between Mexico's finalized 2017 vital statistics and MXC's rapid death reporting system based on death certificates showed a difference of less than 1% (Table A, available as a supplement to the online version of this article at http://www.ajph.org). NYC all-cause deaths were obtained from the NYC Department of Health and Mental Hygiene (https://www1.nyc.gov/site/doh/providers/reporting-and-services/evital.page), which collects and reports deaths independently of New York State.

First, we estimated the baseline number of deaths among residents of both cities in the absence of COVID-19 by fitting a log-linked negative binomial regression model for weekly death counts from January 1, 2017, to February 29, 2020 (see the Appendix, available as a supplement to the online version of this article at http://www.ajph.org). Second, using this baseline, we projected expected deaths forward until August 29, 2020. Excess mortality was defined as the difference between the observed deaths in each week and the expected deaths in that week according to a baseline that was adjusted for seasonality and time trends. We estimated 95% prediction intervals (PIs) for the baseline and used them to calculate intervals for excess deaths. We also calculated excess deaths (and rates) for age groups (0–24, 25–44, 45–64, ≥ 65 years). We age standardized estimates using NYC's age distribution and the world standard population (see the Appendix). We repeated our analyses including deaths among nonresidents.

RESULTS

Between March 1 and August 29, 2020, we found 259 excess deaths per 100 000 (95% PI = 249, 269) in MXC and 311 excess deaths per 100 000 (95% PI = 305, 318) in NYC relative to what would be expected at that time of year (Table C, available as a supplement to the online version of this article at http://www.ajph.org). When we age standardized excess deaths in MXC using NYC's age distribution, there were 326 (95% PI = 317, 335) excess deaths per 100 000. Excess mortality peaked in NYC during the week ending on April 11, 2020 (7-fold increase over baseline), and a month later in MXC (2.5-fold increase over baseline; Figure 1). Excess deaths were not detected in NYC during July and August. In MXC, there were 2600 excess deaths in August.

Excess death age patterns differed between cities. Among individuals 25 to 45 years old, the excess mortality rate was 126% higher in MXC (77 per 100 000; 95% PI = 69, 80) than in NYC (34 per 100 000; 95% PI = 30, 38). Similarly, among individuals 45 to 64 years of age, excess mortality was 77% higher in MXC (467 per 100 000; 95% PI = 453, 482) than in NYC (263 per 100 000; 95% PI = 253, 272; Figure A, available as a supplement to the online version of this article at http://www.ajph.org). Among adults 65 years or older, excess death rates were 1263 per 100 000 (95% PI = 1199, 1317) in MXC and 1581 per 100 000 (95% PI = 1549, 1621) in NYC (Table C). Excess mortality appeared to be lagged by a month in MXC relative to NYC among those 65 years or older, and 75% of excess deaths in NYC occurred among adults in this age group, compared with 50% of excess deaths in MXC. Overall, MXC saw 7600 excess deaths among nonresidents, whereas NYC had only 500 (Figure B, available as a supplement to the online version of this article at http://www.ajph.org).

DISCUSSION

We observed a higher excess mortality rate in NYC than in MXC. Excess deaths peaked and dropped rapidly in NYC. The rise was less pronounced in MXC, but excess deaths were still occurring in August 2020. We observed higher rates of excess death in MXC among young adults.

Several factors may explain the higher overall rates of excess death observed in NYC relative to MXC. First, older individuals are at a higher risk of COVID-19 severity. Although the percentage of the population 45 to 64 years of age is similar in the 2 cities, the percentage of people 65 years or older is higher in NYC than in MXC (15% vs 10%). Second, the spring wave of COVID-19 cases in NYC led to a significant surge in health care demand that, coupled with uncertainties about transmission and infectiousness as well as the severity of this novel coronavirus, may have resulted in avoidance of care. Individuals with acute conditions requiring immediate care (e.g., stroke) may have been reluctant to activate emergency services or visit a hospital for fear of SARS-CoV-2 exposure.[1]

Third, the dramatic epidemic wave in NYC, which was not seen in MXC, may be explained in part by higher population density (10 716 residents/km^2 in NYC vs 6202 in MXC)[2] and the rapid spread of SARS-CoV-2 in long-term care facilities.[3] Nursing homes for older adults are more common in NYC, whereas most older adults in Mexico live with their families.[4] Finally, the timing of stay-at-home directives in MXC may have been early enough to mitigate widespread community transmission before a rapid increase, particularly among the elderly. Even though SARS-CoV-2 testing was mostly limited to hospitalized patients in MXC, there were 868 laboratory-confirmed COVID-19 cases by April 7, whereas NYC had recorded 76 876.[5,6]

The 1918 influenza pandemic autumn wave also resulted in somewhat higher excess respiratory mortality in NYC relative to MXC (518 vs 470 deaths per 100 000).[7,8] However, in contrast to NYC and other cities, older adults in MXC were not spared. Obesity and obesity-related chronic conditions

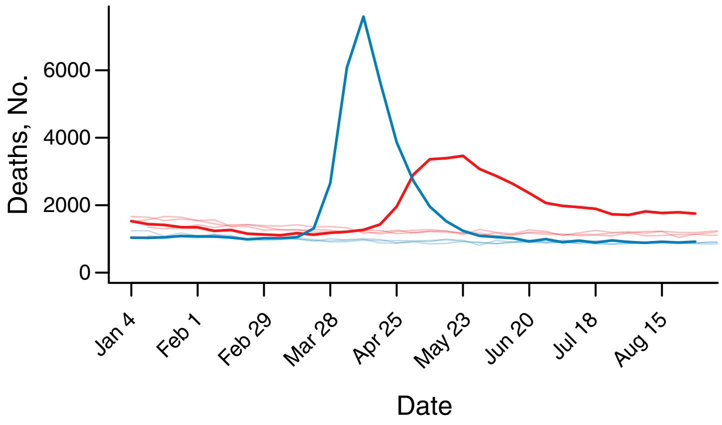

FIGURE 1— Excess Deaths in New York City and Mexico City, 2020

Note. The observed numbers of deaths in Mexico City (red) and New York City (blue) are indicated by darker lines, and the expected numbers of deaths after adjustment for seasonality and variation between years are indicated by lighter lines. The area between the solid and dashed lines represents the total number of excess deaths.

predict greater COVID-19 severity.[9] The unexpectedly high excess mortality among younger adults in MXC may reflect Mexico's obesity epidemic (38.9% of individuals 25–44 years of age in MXC are obese, compared with 24.1% in NYC) and the increasing prevalence of diabetes in this age group.[10,11] Differences in the distribution of susceptibility factors may explain age patterns in excess mortality during pandemics.

In MXC, although SARS-CoV-2 test positivity and COVID-19 hospitalizations were dropping in August and had stabilized, excess deaths were not contained.[6] Community spread in MXC may have continued during stay-at-home orders because adherence may have been challenging for households dependent on informal employment. Also, MXC converted 52 hospitals to COVID-19-only facilities. Although this measure increased access to COVID-19 care (and averted virus-related deaths), displacement of care for other conditions (e.g., cancer) may have resulted in non-COVID-19 deaths.

Excess deaths reflect increased mortality due to the virus as well as increases (and declines) in other causes. Although initial estimates show that 66% of excess deaths in MXC[6] and 78% in NYC were attributable to COVID-19 during this period,[12] we were limited by our use of surveillance systems rather than finalized official vital statistics in which causes of death are accurately coded. Our analysis was also limited because data on influenza epidemics to adjust baseline deaths in MXC and on nonresident population estimates to calculate excess death rates were unavailable. Also, we did not have information on the number of residents who left and died outside the 2 cities and the number who moved in and subsequently died. These issues will likely be best understood once the pandemic has ended.

PUBLIC HEALTH IMPLICATIONS

Comparisons of excess all-cause mortality across populations and age groups may allow a more complete assessment of pandemic effects and provide important information on mitigation strategies and susceptibility factors. Timely mortality surveillance systems, an essential component of pandemic preparedness, can be effectively implemented as part of the pandemic response. AJPH

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CONTRIBUTORS

M. Lajous conceptualized and designed the study, interpreted results, and wrote the article. R. Huerta-Gutiérrez obtained and processed data, conducted analyses, interpreted results, and reviewed the article. J. Kennedy obtained and processed data and reviewed the article. D. R. Olson designed the study, obtained data, interpreted results, and reviewed the article. D. M. Weinberger designed and implemented the analytic strategy, interpreted results, and reviewed the article.

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CONFLICTS OF INTEREST

M. Lajous received a nonrestricted investigator-initiated grant for cardiovascular health research from AstraZeneca that ended in 2017. M. Lajous is the institutional representative for collaborative agreements between Instituto Nacional de Salud Pública and Mexico City's Agencia Digital de Innovación Pública and Secretaria de Salud for work unrelated to this article. D. M. Weinberger has received consulting fees from Pfizer, Merck, GSK, and Affinivax for work unrelated to this article, and he is a principal investigator on research grants from Pfizer and Merck to Yale University for work unrelated to this article.

HUMAN PARTICIPANT PROTECTION

No protocol approval was needed for this study because de-identified, publicly available data were used.

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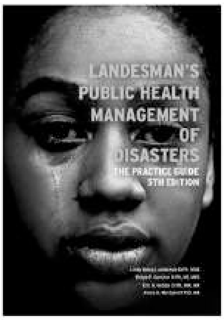

Disparities in Opioid Overdose Death Trends by Race/Ethnicity, 2018–2019, From the HEALing Communities Study

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Objectives. To examine trends in opioid overdose deaths by race/ethnicity from 2018 to 2019 across 67 HEALing Communities Study (HCS) communities in Kentucky, New York, Massachusetts, and Ohio.

Methods. We used state death certificate records to calculate opioid overdose death rates per 100 000 adult residents of the 67 HCS communities for 2018 and 2019. We used Poisson regression to calculate the ratio of 2019 to 2018 rates. We compared changes by race/ethnicity by calculating a ratio of rate ratios (RRR) for each racial/ethnic group compared with non-Hispanic White individuals.

Results. Opioid overdose death rates were 38.3 and 39.5 per 100 000 for 2018 and 2019, respectively, without a significant change from 2018 to 2019 (rate ratio = 1.03; 95% confidence interval [CI] = 0.98, 1.08). We estimated a 40% increase in opioid overdose death rate for non-Hispanic Black individuals (RRR = 1.40; 95% CI = 1.22, 1.62) relative to non-Hispanic White individuals but no change among other race/ethnicities.

Conclusions. Overall opioid overdose death rates have leveled off but have increased among non-Hispanic Black individuals.

Public Health Implications. An antiracist public health approach is needed to address the crisis of opioid-related harms. (*Am J Public Health*. 2021;111(10):1851–1854. https://doi.org/10.2105/AJPH.2021.306431)

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Opioid overdose deaths continue to increase in the United States, reaching 49 860 in 2019, the highest ever recorded.[1] Non-Hispanic White individuals were disproportionately affected in the wave of prescription opioid deaths at the turn of the century; however, recent increases driven by heroin and fentanyl have been greater for non-Hispanic Black and Hispanic individuals.[2,3] Racial inequities in US drug policy are well chronicled.[4] These inequities include more severe criminal penalties for crack cocaine, more commonly used by Black individuals, compared with those for powder cocaine, more commonly used by non-Hispanic White individuals. Furthermore, the increase in opioid overdose deaths among non-Hispanic White individuals was associated with a shift toward a public health approach encompassing compassion and treatment.[4]

The Helping to End Addiction Long-term Communities Study (HCS) is an ongoing multisite, parallel-group, cluster-randomized, wait list–controlled trial in 67 communities disproportionately affected by opioid overdose deaths in 4 states (Kentucky, Massachusetts, New York, and Ohio).[5] HCS, the largest addiction implementation study ever conducted, is evaluating the impact of a community engagement intervention to reduce opioid overdose deaths. In the planning stage, community coalitions requested data by race/ethnicity to focus on equity. HCS created the infrastructure to provide data on opioid overdose deaths by race/ethnicity at the community level in a more timely and detailed manner than available through publicly available resources.[6] We reported trends in opioid overdose deaths by race/ethnicity from 2018 to 2019 during the preintervention baseline period in the 67 HCS communities. These trends directly informed community intervention planning.

METHODS

We identified opioid overdose deaths for individuals aged 18 years or older for the 67 communities enrolled in HCS. We used death certificate records from the offices of vital statistics in Kentucky, Massachusetts, Ohio, and New York, consistent with the recommended approach of the Centers for Disease Control and Prevention ([CDC]; Appendix [available as a supplement to the online version of this article at http://www.ajph.org]).[6] We analyzed race/ethnicity to capture unmeasured social factors, including the experience of racism. We assigned individuals to 1 of 4 mutually exclusive race/ethnicity categories (non-Hispanic White, non-Hispanic Black, Hispanic, or other) using death certificate data. We obtained HCS community population size estimates stratified by race/ethnicity for individuals aged 18 years or older using the 2018 National Center for Health Statistics bridged-race population estimates and the 2014 to 2018 American Community Survey population estimates (Appendix).

We calculated opioid overdose death rates per 100 000 adults for calendar years 2018 and 2019 overall and stratified them by race/ethnicity and state. We used Poisson distribution to model deaths and Poisson regression with the logarithm of population as an offset variable to estimate the significance of changes in opioid overdose death rates by year and race/ethnicity.[7,8] In each racial/ethnic group, we calculated the ratio of the 2019 versus 2018 annual rates and its 95% confidence interval (95% CI). To determine whether changes in annual opioid overdose death rates differed by race/ethnicity, we calculated a ratio of rate ratios (RRR), comparing the rate ratio (RR) for each racial/ethnic group to non-Hispanic White individuals as a reference.

RESULTS

The total population aged 18 years or older across the 67 HCS communities was 8 316 922. The race/ethnicity distribution was 73% non-Hispanic White, 15% non-Hispanic Black, 7% Hispanic, and 6% other races/ethnicities. We identified 3188 opioid overdose deaths in 2018 and 3282 deaths in 2019, corresponding to opioid overdose death rates of 38.3 and 39.5 per 100 000 for 2018 and 2019, respectively. We identified no statistically significant difference in the overall opioid overdose death trend from 2018 to 2019 (RR = 1.03; 95% CI = 0.98, 1.08; Table 1). We observed a 14% decrease in the opioid overdose death rate in New York HCS communities (RR = 0.86; 95% CI = 0.77, 0.96) but no significant changes in other states.

We observed a 38% overall increase in the opioid overdose death rate for non-Hispanic Black individuals from 2018 to 2019 (RR = 1.38; 95% CI = 1.21, 1.57) but no change overall among the other racial/ethnic groups. We found opioid overdose death rate increases among non-Hispanic Black individuals in Kentucky (RR = 1.46; 95% CI = 1.01, 2.11) and Ohio (RR = 1.45; 95% CI = 1.24, 1.70) and a nonstatistically significant 26% increase among non-Hispanic Black individuals in Massachusetts (RR = 1.26; 95% CI = 0.73, 2.18). Although opioid overdose death rates were unchanged for non-Hispanic Black individuals in New York (RR = 1.03; 95% CI = 0.72, 1.48), this is amid an 18% decline among non-Hispanic White individuals (RR = 0.82; 95% CI = 0.72, 0.93).

Compared with non-Hispanic White individuals, there was a significant increasing trend in opioid overdose deaths among non-Hispanic Black individuals across all HCS communities (RRR = 1.40; 95% CI = 1.22, 1.62; Table 1). Although these trends were observed in all 4 states, statistically significant differences were identified only in Kentucky and Ohio.

DISCUSSION

Across the 67 HCS communities, opioid overdose death rates were flat between 2018 and 2019. However, in these communities highly affected by opioid overdoses, we identified marked disparities by race/ethnicity, with a 38% increase in opioid overdose deaths among non-Hispanic Black individuals. Unfortunately, these data confirm that disparities in opioid overdose fatality trends by race/ethnicity observed through 2018 in previous studies continue to widen.[2,3]

Public health leaders have called for the use of critical race theory to intentionally address structural racism in the development and execution of policy, practice, and research to ensure that gains from addressing opioid use disorder are achieved equitably.[4] The director of the National Institute on Drug Abuse highlighted the impact of structural racism on emerging overdose disparities and the need for research to ameliorate these disparities.[9] HCS recognizes that interventions aimed at reducing opioid overdose deaths may worsen underlying disparities and has made an explicit commitment to equity.[10]

TABLE 1— Trends in Opioid Overdose Death Rates by Race/Ethnicity, Across HEALing Communities Study Communities: Kentucky, New York, Massachusetts, and Ohio, 2018–2019

			Rate Change 2018–2019		Comparison of Rate Change 2018–2019 by Race/Ethnicity, Ratio of RRs (95% CI)
	2018 Rate[a]	2019 Rate[a]	Absolute	RR (95% CI)	
All research sites combined	38.3	39.5	1.1	1.03 (0.98, 1.08)	
Non-Hispanic White	41.7	41.0	−0.7	0.98 (0.93, 1.04)	1 (Ref)
Non-Hispanic Black	31.3	43.2	11.9	1.38 (1.21, 1.57)	1.40 (1.22, 1.62)
Hispanic	41.1	41.6	0.5	1.01 (0.84, 1.22)	1.03 (0.85, 1.25)
Other	7.5	6.0	−1.5	0.80 (0.49, 1.31)	0.81 (0.49, 1.34)
Kentucky	43.6	43.9	0.3	1.01 (0.90, 1.13)	
Non-Hispanic White	48.5	47.5	−1.1	0.98 (0.87, 1.10)	1 (Ref)
Non-Hispanic Black	27.2	39.7	12.5	1.46 (1.01, 2.11)	1.49 (1.01, 2.19)
Hispanic	19.5	7.8	−11.7	0.40 (0.13, 1.28)	0.41 (0.13, 1.31)
Other	16.7	16.7	0.0	1.00 (0.40, 2.52)	1.02 (0.40, 2.60)
Massachusetts	54.1	52.5	−1.6	0.97 (0.84, 1.12)	
Non-Hispanic White	57.9	52.0	−6.0	0.90 (0.75, 1.07)	1 (Ref)
Non-Hispanic Black	36.4	45.9	9.5	1.26 (0.73, 2.18)	1.41 (0.79, 2.50)
Hispanic	64.6	73.1	8.5	1.13 (0.85, 1.50)	1.26 (0.90, 1.76)
Other	15.2	9.5	−5.7	0.63 (0.20, 1.91)	0.70 (0.22, 2.16)
New York	29.5	25.4	−4.2	0.86 (0.77, 0.96)	
Non-Hispanic White	31.9	26.0	−5.9	0.82 (0.72, 0.93)	1 (Ref)
Non-Hispanic Black	21.4	22.2	0.7	1.03 (0.72, 1.48)	1.27 (0.87, 1.86)
Hispanic	31.0	31.0	0.0	1.00 (0.72, 1.40)	1.23 (0.86, 1.75)
Other	10.3	10.3	0.0	1.00 (0.43, 2.31)	1.23 (0.53, 2.86)
Ohio	38.6	43.4	4.8	1.12 (1.05, 1.20)	
Non-Hispanic White	42.0	45.2	3.1	1.07 (0.99, 1.16)	1 (Ref)
Non-Hispanic Black	35.5	51.6	16.1	1.45 (1.24, 1.70)	1.35 (1.14, 1.61)
Hispanic	41.3	39.3	−2.1	0.95 (0.66, 1.37)	0.88 (0.61, 1.28)
Other	2.8	1.2	−1.6	0.43 (0.11, 1.66)	0.40 (0.10, 1.55)

Note. CI = confidence interval; RR = rate ratio.

[a] Rates expressed per 100 000 population aged 18 years or older.

HCS is striving to increase evidence-based practices, including overdose education and naloxone distribution and enhanced delivery of medications for opioid use disorder.[5] Disparities in overdose education and naloxone distribution and medications for opioid use disorder delivery by race/ethnicity are well documented.[11,12] When HCS community coalitions began to develop action plans, they asked for community-specific data by race/ethnicity. The data infrastructure from HCS permitted the sharing of the community-specific opioid overdose death trends presented here, well in advance of when statewide data from the same period were made publicly available.[6] These community-specific data were instrumental in informing consideration of an equitable approach to selecting which evidence-based practices and venues to target.

Limitations of this study are potential misclassification of cause of death and race/ethnicity on death certificates and differences in death investigation practices by state. However, we are not aware of contemporaneous classification changes that would explain observed trends. Death counts for New York in 2019 are preliminary and may be revised upward. Data to calculate age-adjusted rates were unavailable; however, a comparison with statewide crude and age-adjusted rates from CDC's WONDER (Wide-ranging ONline Data for Epidemiologic Research) produced similar estimates (Appendix).

PUBLIC HEALTH IMPLICATIONS

These data add to the evidence of worsening disparities in opioid overdose deaths by race/ethnicity. In the context of HCS, these data highlight the importance of timely, local data to inform an equitable approach for developing community-tailored strategies to reduce opioid overdose deaths. An antiracist public health approach that explicitly examines the role of racism is urgently needed in research, public health, and policy approaches to address the crisis of opioid-related harms.

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CONTRIBUTORS

M. R. Larochelle conceptualized the study and led its execution. S. Slavova, E. Root, and D. J. Feaster collaborated on the study design and analysis. All of the authors made substantial contributions to this brief and were involved in editorial preparation and review.

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CONFLICTS OF INTEREST

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HUMAN PARTICIPANT PROTECTION

This study protocol (Pro00038088) was approved by Advarra, the HCS single institutional review board.

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Mental Disorders, Gun Ownership, and Gun Carrying Among Soldiers After Leaving the Army, 2016–2019

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See also Katz, p. 1718.

Objectives. To examine associations of current mental and substance use disorders with self-reported gun ownership and carrying among recently separated US Army soldiers. Veterans have high rates of both gun ownership and mental disorders, the conjunction of which might contribute to the high suicide rate in this group.

Methods. Cross-sectional survey data were collected in 2018–2019 from 5682 recently separated personnel who took part in the Army Study to Assess Risk and Resilience in Servicemembers. Validated measures assessed recent mood, anxiety, substance use, and externalizing disorders. Logistic regression models examined associations of sociodemographic characteristics, service characteristics, and mental disorders with gun ownership and carrying.

Results. Of the participants, 50% reported gun ownership. About half of owners reported carrying some or most of the time. Mental disorders were not associated significantly with gun ownership. However, among gun owners, major depressive disorder, panic disorder, posttraumatic stress disorder, and intermittent explosive disorder were associated with significantly elevated odds of carrying at least some of the time.

Conclusions. Mental disorders are not associated with gun ownership among recently separated Army personnel, but some mental disorders are associated with carrying among gun owners. (*Am J Public Health*. 2021;111(10):1855–1864. https://doi.org/10.2105/AJPH.2021.306420)

An estimated 250 000 people died in 2016 worldwide as a result of firearm injuries.[1] Globally, homicide accounted for nearly two thirds of all firearm-related deaths. By contrast, suicide accounts for nearly 60% of firearm-related deaths in the United States.[2] Access to lethal means[3,4] and mental illness[5] are leading risk factors in suicides. Limiting access to firearms has been associated with significant reductions in gun-related mortality, resulting in several policies proposed to limit firearms access among members of high-risk populations,[6] although the effects of such policies have not been widely studied.[7]

To date, large epidemiological studies have not revealed associations of most mental disorders with gun ownership or carrying,[8–12] although some studies have shown relationships between heavy alcohol use and gun-related outcomes.[13–15] An important exception is that several studies have shown associations of gun ownership with intermittent explosive disorder (IED), a mental disorder characterized by impulsive aggression and anger.[12,16] This association is concerning because impulsivity, aggression, and anger are also associated with both suicide and interpersonal violence.[17,18]

A better understanding of gun ownership, gun carrying, and their relationships with mental disorders among recently separated service members is needed to enhance understanding of risks for gun-related suicide and interpersonal violence. Veterans are more likely to die by suicide than civilians.[19] Suicide rates are especially high after separation from active duty service.[20] Veterans have high levels of access to firearms,[21] and suicides in this group are much more likely than those in the general population to result from firearm injuries.[22]

Veterans also have comparatively high rates of posttraumatic stress disorder (PTSD), depression, and anxiety.[23–25] Exposure to traumatic stress and associated PTSD may result in a heightened sense of vulnerability[26] that predisposes veterans to gun ownership and gun carrying, resulting in high levels of ownership and carrying among veterans with mental disorders. There is evidence that feelings of vulnerability secondary to PTSD decrease over time after separation from active duty service, highlighting the importance of risk management during the period of transition out of service and back into the civilian world.[27] In addition, transition from active duty military service to civilian life is a period of complex psychosocial change with the potential for heightened feelings of vulnerability and distress independent of PTSD and associated traumatic exposures.[28]

Our overarching objective in this study was to examine associations of current mental disorders with self-reported gun ownership and carrying among recently separated US Army veterans.

METHODS

Data were derived from the wave 2 interview of the Study to Assess Risk and Resilience in Servicemembers—Longitudinal Study (STARRS-LS), the only STARRS-LS survey asking about gun ownership and carrying. The initial STARRS-LS sampling frame consisted of 72 387 soldiers who participated in one of the baseline Army STARRS surveys and consented to having their survey data linked to administrative data.[29] The Army STARRS design has been detailed elsewhere[30]; briefly, the design consisted of 8 coordinated component studies, including 3 large surveys: the All-Army Study (AAS), the Pre-Post Deployment Study (PPDS), and the New Soldiers Study (NSS).

The initial STARRS-LS sampling frame included all participants in the 3 Army STARRS surveys, with the sample divided into 3 strata: Army STARRS participants with a history of suicidality or any clinically significant mental disorder (stratum 1; n = 22 176); participants in a population segment of high importance to Army leadership, such as Special Forces members, National Guard or Reserve soldiers, and female soldiers (stratum 2; n = 26 833); and the remaining participants (stratum 3; n = 23 378). The final STARRS-LS wave 1 (LS1) target sample included all of the baseline participants from stratum 1, all of the Special Forces soldiers, a probability sample of 67% from the remainder of stratum 2, and a probability sample of 50% from stratum 3 (a total of 51 963 soldiers). LS1 included both soldiers still in the Army and those who had separated at the time of LS1, which was carried out between September 2016 and April 2018. LS1 participants were given the option to complete the interview by telephone or self-administration online.

As in the earlier Army STARRS surveys,[31] the final LS1 survey data were weighted for nonresponse on the basis of a range of demographic and administrative variables; they were also weighted for Army STARRS survey responses and to adjust for the differential sampling by stratum just described. Weights were computed separately for soldiers who were part of the NSS and those who were part of the AAS or PPDS. We distinguished the NSS from the other surveys because it was administered exclusively to new soldiers during their first few days of service and before the start of basic training. The AAS and PPDS, in comparison, were administered to probability samples of soldiers no longer in training: the AAS in a sample of soldiers across the world, including those in combat deployments in Afghanistan, and the PPDS in a series of combat arms units just before their deployment to Afghanistan and then again shortly after their return.

Initial LS1 nonrespondents were subsampled in subsequent increased recruitment efforts to complete the LS1 survey and were upweighted to adjust for the underrepresentation of difficult-to-recruit participants in the final sample. A total of 14 508 soldiers completed the LS1 interview, resulting in a weighted response rate of 35.6% (Figure A, available as a supplement to the online version of this article at http://www.ajph.org). All LS1 respondents were eligible to complete LS2, which was administered from April 2018 through July 2019 according to the same field procedures used in LS1. The 12 156 LS2 participants (5172 from the NSS and 6984 from the AAS and PPDS) represented a conditional response rate of 83.7% (Figure B, available as a supplement to the online version of this article at http://www.ajph.org). We included in our study the 5682 LS2 participants (3558 originally from the AAS or PPDS, 2124 originally from the NSS) who had separated from the Army at the time LS2 was administered.

Measures

Firearm ownership and carrying. Respondents were asked about the number of firearms they kept in or around their home (response options were 0, 1, 2, 3–5, and ≥6) and, if they had a firearm, how often they carried it with them (or in their vehicle) when going out in the neighborhood (response options were none of the time, a little of the time, some of the time, most of the time, and all or almost all of the time). No attempt was made to quantify these response categories more objectively. Nor was a recall period defined. We dichotomized reports of carrying into ever versus never and dichotomized carrying into often (most of the time or more) and not often (less frequent). Other indicators of accessibility were not assessed.

Mental disorders. The LS2 survey screened for *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)* mental disorders[32] with a short form of the Composite International Diagnostic Interview[33–35] that assessed major depressive disorder, panic disorder, generalized anxiety disorder, IED, and substance use disorders (alcohol and drug abuse and dependence, including misused prescription drugs and illicit drugs) in the preceding 30 days; attention-deficit/hyperactivity disorder in the preceding 6 months; and lifetime bipolar disorder. Bipolar disorder was assessed over respondents' lifetime because of concerns that veterans with recent episodes of mania or hypomania might be underrepresented in the survey. The PTSD Checklist was used to assess PTSD over the preceding 30 days.[36] All disorders were assessed in the absence of *DSM-5* diagnostic hierarchy or organic exclusion rules. Diagnoses derived from the Composite International Diagnostic Interview and the PTSD Checklist have demonstrated good concordance with independent clinical diagnoses.[34,35,37]

Anger attacks. As part of the IED assessment, participants reported the number of days in the preceding 30 days they had experienced attacks of anger in which they lost control and yelled at someone, had heated arguments or threatened someone (verbal anger attacks), or had attacks of anger in which they lost control and hurt someone, hurt an animal, or broke something of value (physical anger attacks).

Sociodemographic and Army career characteristics. Data on sociodemographic and Army career characteristics were derived from the LS2 interview and administrative records. They included age, sex, race/ethnicity, sexuality, region of residence, education, marital history, and current employment. Army career characteristics included a history of being in the regular Army versus only in the National Guard or Reserve, lifetime combat deployment, rank, years in regular Army service, and total years in service (whether on active duty or in the nonactivated National Guard or Reserve).

Statistical Analysis

Analyses were conducted separately for the NSS and the AAS and PPDS given that NSS participants had been in service no more than 2 terms before separation. In each subsample, we initially estimated the prevalence of gun ownership and carrying and then examined univariate associations of sociodemographic and Army career characteristics with ownership and carrying in a series of 6 models. Model 1 predicted any gun ownership (yes or no). Model 2 predicted number of guns owned. Model 3 predicted history of carrying a gun among gun owners. Model 4 predicted often carrying a gun often among those who had ever carried. Models 5 and 6 predicted history of carrying in the total sample (model 5) and carrying often in the total sample (model 6) to examine combined predictors of (1) ownership and (2) carrying conditional on ownership. Simple logistic regression was used in each model other than model 2, which involved a discrete-event survival analysis with a logistic link function and 3 transitions for ownership of more than 1, 2, and 5 guns; slopes were constrained to be constant across transitions.[38]

We next added information about mental disorders as predictors in each model separately for each mental disorder to avoid the problem of high correlations among disorders. We then instead used data on number of disorders as predictors. Logits and their confidence intervals (CIs) were exponentiated and are reported here as odds ratios (ORs) with their 95% confidence intervals. Statistical significance was evaluated with .05-level 2-sided tests. Given the large number of predictors and models considered, we adjusted for the false discovery rate[39,40] to control the expected proportion of falsely positive coefficients (which we set at .05) rather than, as in the Bonferroni method, controlling the familywise error rate; thus, we were able to increase statistical power while still guarding against false positives. Finally, on the basis of evidence in prior research, we decomposed the associations of IED with the outcomes by distinguishing between verbal and physical anger attacks. SAS version 9.4 (SAS Institute Inc, Cary, NC) was used for all of the analyses.

RESULTS

As noted, LS2 was the third survey administered to individuals who participated initially in the baseline Army STARRS NSS (or AAS/PPDS) and then in LS1. The baseline survey samples were poststratified to match the population of all eligible soldiers on a wide range of sociodemographic and Army career variables recorded in Army administrative systems.[31] The LS1 sample was then reweighted to the weighted baseline sample distributions, and the LS2 sample was reweighted again to the weighted LS1 sample distributions. All weighting was carried out via 1/p weights based on propensity score analyses with logistic regression. Weight trimming of the upper and lower 5% of each sample distribution was used to avoid extreme weights, a procedure known to improve inferences in propensity score modeling based on logistic regression when the model is well specified.[41]

Comparisons of the weighted LS2 sample with the original population used in NSS and AAS or PPDS weighting showed generally good consistency with sociodemographic distributions but somewhat of an overrepresentation of non-Hispanic Whites and soldiers with higher levels of education in both samples (Table A, available as a supplement to the online version of this article at http://www.ajph.org). In addition, the weighted LS2 subsamples from the AAS and PPDS exhibited good consistency with population distributions of Army career characteristics as of the time of recruitment.

Variable Distributions

The distribution of firearms owned was similar across the subsamples (Table 1). Approximately half of all participants (50.8% in the AAS/PPDS, 48.5% in the NSS) reported owning at least 1 gun, with 12.9% to 13.5% owning exactly 1 and 10.3% to 12.3% owning 6 or more. Similar proportions of gun owners in the 2 subsamples reported they had ever carried a gun (49.6% in the AAS/PPDS, 54.3% in the NSS), but the proportion of gun owners reporting carrying often was significantly lower in the AAS and PPDS than in the NSS (29.9% vs 36.9%; $t = 3.0$; $P = .003$).

Sociodemographic and Army Career Predictors

The odds of history of carrying and often carrying were similar in the AAS and PPDS subsample, with significantly elevated odds for participants who were young (22–29 years of age), male, sexually active, residents of the South or Midwest (significant only for history of carrying), and enlisted (as opposed to being officers) and for those with comparatively few years in service before separation (Table 2). Other sociodemographic characteristics were not related to the outcomes (Table B, available as a supplement to the online version of this article at http://www.ajph.org). The significant aggregate associations were due for the most part to elevated odds of gun ownership among all participants and of history of carrying among owners rather than elevated odds of often carrying among those who had ever carried. The exceptions were being sexually active, being enlisted, and having few years of service, all of which were associated only with elevated odds of history of carrying among owners.

Two of these predictors, young age and male sex, were also significant in the NSS (Table 3). In the case of male sex, disaggregation showed the significant components observed in the ASS and PPDS (i.e., elevated odds of gun ownership among all participants and history of carrying among owners) but did not show elevated odds of often carrying among those who had ever carried. The same components were important for 2 other significant predictors not found in the AAS and PPDS: being a student or employed and history of combat deployment. In the case of young age, however, the significant components were elevated odds of carrying among owners and of often carrying among those who had ever carried as opposed to elevated odds of gun ownership among all participants. These components were also important for the 2 remaining significant predictors not found in the AAS and PPDS: less than a college education and history of being married. Other sociodemographic characteristics were not related to the outcomes (Table C, available as a supplement to the online version of this article at http://www.ajph.org).

Mental Disorder Predictors

We considered mental disorders one at a time and combined as predictors of gun ownership and carrying after adjustment for sociodemographic and Army career characteristics. The combined measure of having any mental disorder was not associated significantly with any of the outcomes (Table D, available as a supplement to the online version of this article at http://www.ajph.org). A summary measure of number of disorders was associated with only one of the 12 outcomes (often carrying among gun owners who had ever carried in the AAS and PPDS), and this association was nonmonotonic owing to a high odds ratio among veterans with exactly 1 mental disorder (OR = 2.2; 95% CI = 1.3, 4.0) but

TABLE 1— Firearm Ownership and Carrying Among Recently Separated US Army Soldiers in the AAS/PPDS and NSS: 2018–2019

	AAS/PPDS (n = 3558)		NSS (n = 2124)	
	% (SE)	No.	% (SE)	No.
No. of firearms owned				
None	49.2 (1.4)	1651	51.5 (1.4)	1063
1	12.9 (1.1)	454	13.5 (0.9)	291
2	9.0 (0.9)	316	9.3 (0.7)	221
3–5	16.6 (1.2)	610	15.3 (1.1)	325
≥ 6	12.3 (0.9)	527	10.3 (1.0)	224
Firearm carrying frequency among gun owners				
Never	50.4 (1.9)	927	45.7 (1.7)	505
Some of the time	19.8 (1.6)	373	17.4 (1.2)	196
Most or all of the time	29.9 (1.7)	607	36.9 (1.6)	360

Note. AAS = All Army Study; NSS = New Soldiers Study; PPDS = Pre–Post Deployment Study. Data are weighted but reported sample sizes are unweighted.

nonsignificantly elevated odds ratios among veterans with 2 or more disorders.

In addition, none of the individual disorders considered one at a time predicted gun ownership in the AAS and PPDS and only one did so (and inversely) in the NSS: generalized anxiety disorder (OR = 0.6; 95% CI = 0.5, 0.8). Only one mental disorder was associated significantly with ever carrying in either subsample, and another was associated with often carrying; however, neither remained significant after adjustment for the false discovery rate. In the AAS and PPDS, panic disorder was the predictor of history of carrying a firearm (OR = 1.4; 95% CI = 1.0, 2.0). This was a result of a significant association with history of carrying among owners (OR = 2.0; 95% CI = 1.2, 3.1) as opposed to elevated odds either of owning or of history of carrying among owners.

One mental disorder was also associated significantly with often carrying: IED in the NSS (OR = 2.3; 95% CI = 1.0, 4.9). Inspection of models 1, 3, and 4 showed that this significant association was a result of consistently positive but nonsignificant associations of IED with ownership (OR = 1.4; 95% CI = 0.7, 2.9), history of carrying among owners (OR = 1.4; 95% CI = 0.6, 3.5), and carrying often among those who had ever carried (OR = 2.7; 95% CI = 0.6, 11.2). It is noteworthy that PTSD was associated with history of carrying among gun owners in both subsamples (AAS/PPDS: OR = 1.5; 95% CI = 1.0, 2.2; NSS: OR = 1.8; 95% CI = 1.0, 3.0), even though PTSD was not associated significantly in either sample with history of carrying among all participants or with frequent carrying among all participants.

Given evidence in prior research that IED predicts gun carrying,[11,12] we looked more closely at the components of IED involving number of verbal and physical attacks as predictors of gun ownership and carrying (Tables E and F, available as supplements to the online version of this article at http://www.ajph.org) but found no compelling evidence for significant associations. None of these disaggregated predictors were significant in predicting history of carrying or frequently carrying either in the AAS and PPDS or in the NSS (the only coefficient significant in predicting the latter outcome in the NSS was no longer significant after adjustment for the false discovery rate).

DISCUSSION

Our finding that participants with mental disorders were not more likely to own guns than those without mental disorders is consistent with the results of general population epidemiological studies assessing similar associations.[8–11] Importantly, a higher proportion of veterans than civilians are known to own firearms.[42] However, we found that veterans with mental disorders did not differ from other veterans in terms of owning or carrying firearms. The combination of these factors means that veterans with mental disorders, particularly panic disorder,

TABLE 2— Associations of Sociodemographic and Army Career Characteristics With Firearm Ownership and Carrying Among Recently Separated US Army Soldiers in the AAS/PPDS: 2018– 2019

	Distribution, Estimate[a] (SE)	Model 1[b]: Any Firearm Ownership in the Total Sample, OR (95% CI)	Model 2[c]: No. of Firearms Owned in the Total Sample, OR (95% CI)	Model 3[b]: History of Carrying a Firearm Among Gun Owners, OR (95% CI)	Model 4[b]: Often Carry a Firearm Among Gun Owners Who Have Ever Carried, OR (95% CI)	Model 5[b]: History of Carrying a Firearm in the Total Sample, OR (95% CI)	Model 6[b]: Often Carry a Firearm in the Total Sample, OR (95% CI)
Sociodemographic characteristics							
Age, y							
22–24	5.6 (0.6)	1.8 (1.0, 3.1)	1.1 (0.7, 1.5)	4.0 (1.5, 10.5)	0.9 (0.4, 2.0)	3.3 (1.8, 6.3)	2.5 (1.3, 4.6)
25–29	20.8 (1.4)	1.1 (0.7, 1.8)	0.9 (0.7, 1.2)	1.8 (1.1, 2.7)	1.7 (0.9, 3.0)	1.6 (1.1, 2.3)	1.9 (1.2, 3.0)
30–34	27.9 (1.5)	0.8 (0.6, 1.0)	0.8 (0.6, 1.0)	1.2 (0.9, 1.7)	1.7 (0.8, 3.9)	1.0 (0.7, 1.3)	1.2 (0.8, 2.0)
35–39	13.8 (1.0)	0.9 (0.6, 1.4)	0.9 (0.7, 1.1)	1.3 (0.8, 1.9)	1.3 (0.6, 2.8)	1.2 (0.8, 1.8)	1.3 (0.7, 2.4)
≥40	32.0 (1.6)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)
F_4[d]		2.9*	1.3	3.4*	1.1	3.7*	3.1*
Male	85.1 (1.1)	1.5 (1.1, 2.1)	1.5 (1.2, 1.9)	2.4 (1.5, 3.9)	1.6 (0.6, 4.0)	2.5 (1.7, 3.8)	2.9 (1.6, 5.0)
Sexuality							
Heterosexual	86.5 (1.2)	1.0 (0.7, 1.5)	1.0 (0.8, 1.3)	0.9 (0.5, 1.5)	1.8 (0.9, 3.7)	0.9 (0.6, 1.5)	1.3 (0.8, 2.1)
Sexually inactive	3.1 (0.6)	0.6 (0.2, 1.4)	0.6 (0.3, 1.1)	0.2 (0.1, 0.6)	1.0 (0.1, 8.0)	0.2 (0.1, 0.6)	0.2 (0.1, 0.8)
Gay, lesbian, or bisexual (ref)	10.4 (0.9)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)
F_2[d]		0.9	1.9	4.0*	1.6	4.5*	4.6*
Region of residence							
South	50.1 (1.7)	1.7 (1.0, 2.9)	1.3 (1.1, 2.0)	1.9 (1.0, 3.8)	1.3 (0.5, 3.7)	2.3 (1.2, 4.3)	2.4 (1.1, 5.2)
Midwest	15.2 (1.0)	2.1 (1.3, 3.4)	1.7 (1.1, 2.4)	2.0 (0.9, 4.1)	0.7 (0.2, 2.3)	2.6 (1.3, 5.1)	2.0 (0.9, 4.6)
West	23.9 (1.7)	1.2 (0.8, 1.9)	1.2 (0.9, 2.1)	1.4 (0.6, 3.0)	0.8 (0.3, 2.6)	1.4 (0.8, 2.6)	1.3 (0.5, 3.0)
Northeast	7.2 (0.8)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)
F_3[d]		4.2*	3.9*	2.4	1.4	4.2*	5.5*
Army career characteristics							
Highest rank obtained							
Junior enlisted	42.2 (1.6)	0.9 (0.6, 1.3)	0.8 (0.6, 1.0)	2.4 (1.5, 3.6)	1.5 (0.7, 3.0)	1.7 (1.1, 2.6)	2.1 (1.3, 3.3)
Senior enlisted	44.3 (1.4)	1.1 (0.6, 1.3)	0.9 (0.7, 1.2)	2.1 (1.4, 3.1)	1.2 (0.6, 2.7)	1.7 (1.1, 2.7)	1.9 (1.1, 3.2)
Warranted officer	3.2 (0.6)	1.0 (0.5, 2.1)	1.0 (0.5, 2.1)	1.4 (0.4, 4.8)	0.3 (0.0, 1.4)	2.4 (1.1, 5.0)	0.5 (0.1, 2.0)
Commissioned officer	10.3 (0.8)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)

Continued

TABLE 2— Continued

	Distribution, Estimate[a] (SE)	Model 1[b]: Any Firearm Ownership in the Total Sample, OR (95% CI)	Model 2[c]: No. of Firearms Owned in the Total Sample, OR (95% CI)	Model 3[b]: History of Carrying a Firearm Among Gun Owners, OR (95% CI)	Model 4[b]: Often Carry a Firearm Among Gun Owners Who Have Ever Carried, OR (95% CI)	Model 5[b]: History of Carrying a Firearm in the Total Sample, OR (95% CI)	Model 6[b]: Often Carry a Firearm in the Total Sample, OR (95% CI)
F_3[d]		0.4	2.2	5.9*	2.0	2.4	4.3*
F_2[d]		0.6	2.0	1.0	2.6	0.5	2.2
Total years of Army enlistment (mean)	11.6 (0.3)	1.0 (1.0, 1.0)	1.0 (1.0, 1.0)	1.0 (0.9, 1.0)	1.0 (0.9, 1.0)	1.0* (1.0, 1.0)	1.0* (1.0, 1.0)

Note. AAS = All Army Study; CI = confidence interval; OR = odds ratio; PPDS = Pre-Post Deployment Study. Distributions and model estimates reflect weighted data.

[a] Percentages for categorical variables and means for continuous variables.

[b] Based on logistic regression models that were calculated separately for each variable and did not include any controls.

[c] Based on a discrete-event survival analysis with a logistic link function and 3 transitions for ownership of more than 1 gun, more than 2 guns, and more than 5 guns, with slopes constrained to be constant across transitions.[38]

[d] Numerator degrees of freedom.

*$P < .05$ (2-sided test).

IED, and PTSD, are more likely to own and carry a firearm than their civilian peers but are not more likely to do so than other veterans.

Furthermore, most of the mental disorders we assessed were not associated with gun carrying among gun owners. However, there were some minor exceptions, the most notable of which were PTSD associated with history of carrying a gun among gun owners in both samples, IED associated with often carrying among those who had ever carried in the AAS and PPDS sample, and IED associated with often carrying in the total NSS sample. Because IED is associated with both suicide and interpersonal violence[12,17] and has been linked to increased gun ownership or carrying in previous studies,[12,16,43] our findings regarding IED might warrant further consideration in future research. Neither alcohol nor substance use disorder was significantly associated with firearm ownership or use, although it is possible that broader measures of alcohol and substance use not available in the STARRS-LS may have yielded different findings.

Our study has several important strengths. First, we used a large, contemporary epidemiological sample of separated Army personnel. Second, we used *DSM-5* diagnoses. Third, because of the rich data in the Army STARRS-LS, we were able to adjust for numerous sociodemographic and Army career characteristics that might otherwise confound associations.

The study also involved some noteworthy limitations, however. Information on gun ownership and carrying was self-reported, which may have resulted in misclassification if participants did not accurately report these variables. The response rate for LS1 was comparatively low and may have

TABLE 3— Associations of Sociodemographic and Army Career Characteristics With Firearm Ownership and Carrying Among Recently Separated US Army Soldiers in the NSS, 2018–2019

	Distribution, Estimate[a] (SE)	Model 1[b]: Any Firearm Ownership in the Total Sample, OR (95% CI)	Model 2[c]: No. of Firearms Owned in the Total Sample, OR (95% CI)	Model 3[b]: History of Carrying a Firearm Among Gun Owners, OR (95% CI)	Model 4[b]: Often Carry a Firearm Among Gun Owners Who Have Ever Carried, OR (95% CI)	Model 5[b]: History of Carrying a Firearm in the Total Sample, OR (95% CI)	Model 6[b]: Often Carry a Firearm in the Total Sample, OR (95% CI)
Sociodemographic characteristics							
Age, y							
22–24	46.8 (1.3)	1.2 (0.9, 1.5)	1.2 (1.0, 1.5)	1.8 (1.2, 2.9)	2.1 (1.2, 3.7)	1.6 (1.1, 2.4)	2.2 (1.4, 3.3)
25–29	35.5 (1.1)	1.3 (1.0, 1.8)	1.4 (1.1, 1.6)	1.7 (1.0, 2.7)	1.8 (1.0, 3.1)	1.7 (1.1, 2.5)	2.1 (1.3, 3.2)
≥ 30	17.6 (0.9)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)
F_4[d]		2.0	5.3*	3.7*	3.4*	4.0*	7.2*
Male	78.7 (1.1)	2.0 (1.6, 2.6)	1.7 (1.4, 2.2)	2.5 (1.7, 3.9)	1.0 (0.6, 1.7)	3.1 (2.1, 4.5)	2.9 (1.8, 4.5)
Lifetime marital history							
Currently married	37.2 (1.2)	1.7 (1.4, 2.1)	1.4 (1.1, 1.6)	1.1 (0.8, 1.5)	1.6 (1.0, 2.5)	1.5 (1.2, 2.0)	1.8 (1.3, 2.4)
Previously married	15.0 (1.0)	1.0 (0.7, 1.3)	1.0 (0.8, 1.2)	1.7 (1.1, 2.9)	2.1 (1.1, 4.2)	1.3 (0.9, 1.9)	1.7 (1.2, 2.5)
Never married	47.9 (1.2)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)
F_2[d]		12.5*	6.8*	2.5	3.3*	4.9*	7.6*
Current employment							
Full-time student	21.7 (1.1)	1.6 (1.1, 2.4)	1.3 (1.0, 1.8)	1.8 (1.0, 3.4)	1.4 (0.6, 3.4)	2.1 (1.3, 3.3)	2.3 (1.2, 4.3)
Employed	67.7 (1.1)	1.7 (1.2, 2.4)	1.3 (1.0, 1.7)	1.7 (1.0, 2.8)	1.7 (0.8, 3.8)	2.1 (1.4, 3.1)	2.4 (1.4, 4.4)
Other	10.6 (0.8)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)
F_2[d]		4.8*	2.1	2.2	1.0	6.0*	4.7*
Army career characteristics							
Lifetime combat deployment	21.2 (1.1)	1.8 (1.3, 2.4)	1.3 (1.1, 1.5)	1.5 (1.1, 2.2)	0.9 (0.6, 1.4)	1.9 (1.4, 2.5)	1.7 (1.2, 2.3)

Note. CI = confidence interval; NSS = New Soldiers Study; OR = odds ratio. Distributions and model estimates reflect weighted data.

[a] Percentages for categorical variables and means for continuous variables.
[b] Based on logistic regression models that were calculated separately for each variable and did not include any controls.
[c] Based on a discrete-event survival analysis with a logistic link function and 3 transitions for ownership of more than 1 gun, more than 2 guns, and more than 5 guns, with slopes constrained to be constant across transitions.[38]
[d] Numerator degrees of freedom.
*$P < .05$ (2-sided test).

led to biased estimates of mental health disorders or their associations with firearm ownership and carrying behaviors. Mental disorder diagnoses also were derived from self-report symptom scales rather than clinical diagnoses, although diagnoses derived from the screening measures used here have demonstrated good concordance with diagnoses from independent clinical interviews.[34,35,37]

In addition, as a result of the cross-sectional and observational nature of our study, we cannot determine the temporal order of variables or infer causality. Previous research has suggested that veterans are more likely to own guns than their civilian peers.[21] It is also possible that gun owners or those with characteristics such as impulsivity may be more likely to volunteer for military service. Future research should consider how baseline patterns of gun ownership and use and characteristics associated with high-risk behaviors might predict or be modified by active duty military service. The measures of firearm ownership we used did not assess whether the firearms were acquired by the veteran or by others in the household, whether they were acquired before or after the onset of psychiatric disorders, or recency of acquisition. Finally, although mental disorders and access to firearms are potent risk factors for suicide, we did not examine suicidality in our study. Future research should examine joint associations between mental disorders, firearm access, and suicidal thoughts and behaviors.

PUBLIC HEALTH IMPLICATIONS

Our results align with previous studies that have not revealed associations between mental disorders and gun ownership. Our findings indicate that separated Army personnel with panic disorder, IED, or PTSD may be more likely to carry guns, potentially increasing the risk for firearm injury. Screening for gun carrying behaviors and reducing access to lethal means during periods of distress among those with access to firearms may be indicated for veterans diagnosed with some, but not all, psychiatric disorders. Future research should investigate the potential costs and public health effects of routine screening for access to firearms among individuals diagnosed with panic disorder, PTSD, or IED.

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CONTRIBUTORS

All of the authors made substantial contributions to the conception of the article, worked on interpretation of data, and worked on revising the text for important intellectual content. R. M. Bossarte, H. N. Ziobrowski, A. J. King, N. A. Sampson, and R. C. Kessler drafted the text. R. M. Bossarte, H. N. Ziobrowski, A. J. King, N. A. Sampson, and R. C. Kessler worked on the analysis of the data. N. A. Sampson, M. B. Stein, R. J. Ursano, and R. C. Kessler worked on the acquisition of the data. R. C. Kessler agreed to be accountable for all aspects of the work in terms of ensuring that questions related to the accuracy or integrity of any part of the article are appropriately investigated and resolved.

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CONFLICTS OF INTEREST

In the past 3 years, M. B. Stein has been a paid consultant for Actelion, Aptinyx, Bionomics, Genentech, GW Pharma, Janssen, Neurocrine Biosciences, Nobilis Therapeutics, and Oxeia Biopharmaceuticals. In the past 3 years, R. C. Kessler has been a consultant for Datastat Inc, Sage Pharmaceuticals, and Takeda. C. L. Dempsey and D. M. Benedek received a grant from the Centers for Disease Control and Prevention for work unrelated to this article.

HUMAN PARTICIPANT PROTECTION

This study was approved by the institutional review boards of the Army STARRS collaborating institutions. Participants provided written informed consent to participate in the surveys and were asked separately for consent to link their survey responses to their Army/Department of Defense administrative records.

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Rebuilding a US Federal Data Strategy After the End of the "Community Health Status Indicators"

Robert L. Phillips Jr, MD, MSPH, Norma F. Kanarek, PhD, MPH, and Vickie L. Boothe, MPH

See also Hutchins and Mayberry, p. 1728.

For nearly 2 decades, the Community Health Status Indicators tool reliably supplied communities with standardized, local health data and the capacity for peer-community comparisons. At the same time, it created a large community of users who shared learning in addressing local health needs.

The tool survived a transition from the Health Resources and Services Administration to the Centers for Disease Control and Prevention before being shuttered in 2017.

While new community data tools have come online, nothing has replaced Community Health Status Indicators, and many stakeholders continue to clamor for something new that will enable local health needs assessments, peer comparisons, and creation of a community of solutions. The National Committee on Vital and Health Statistics heard from many stakeholders that they still need a replacement data source. (*Am J Public Health*. 2021;111(10):1865–1873. https://doi.org/10.2105/AJPH.2021.306437)

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Healthy communities do not happen by accident. After decades of research, neighborhood factors that determine health and well-being are increasingly understood as captured by "zip code is destiny."[1,2] Programs designed to influence these factors need to work at all levels: federal, state, and local.[3,4] Increasingly, community health improvement work targets the local level, where meaningful impact through effective engagement can be achieved with relatively modest investment.

Data used to monitor and track health determinants are essential to ensuring programmatic resources are targeted where need is greatest and benefit most impactful. In the mid-1990s, Claude Earl Fox, MD, Alabama's public health officer, became the administrator of the Health Resources and Services Administration (HRSA) and brought this understanding of local data needs. He appreciated the tremendous need for readily accessible data at a granular level to enable communities to design the best possible use of federal support—appreciating that communities with greatest need had the least capacity to find and use data to inform their work. His understanding led to the development of the Community Health Status Indicators (CHSI) tool, which launched in 2000. The CHSI tool engaged stakeholders who played a significant role in its formation, distribution, and maintenance via a HRSA-led collaboration with the Centers for Disease Control and Prevention (CDC), the National Institutes of Health, and National Library of Medicine, creating a public–private collaboration of organizations committed to data support for local action to improve public health. The HRSA administered the project through a cooperative agreement with the Public Health Foundation, Association of State and Territorial Health Departments and National Association of County and City Health Officials, the National Association of Local Boards of Health, and the Johns Hopkins School of Public Health.[5]

Advisory organizations included community-based organizations and nonprofit public health organizations to provide the end-user perspective. The partnership created a data resource for more than 3100 counties (or equivalents) nationwide.[6] The CHSI measures supported local health assessment in a format that transformed the data into meaningful, actionable information.

The CHSI project was a first-of-its-kind, timely source of local data produced from several federal sources. Federal data accessibility in that era was greatly fragmented. The goal of the CHSI project was to make data readily available on a broad set of metrics, based at the county level, that "tell a story" about each county's health. The genius of CHSI is that a singularly focused, federally led effort, with appropriate stakeholder participation, made data accessible and benchmarkable for every county in the nation. The pandemic has demonstrated the critical role that federal leadership needs to play in making data tools and resources available for federal, state, and local decision-making.[7] The CHSI tools provided the proof of concept.

The CHSI project was recognized as being visionary but was not necessarily valued within the federal sphere. During CHSI's life span (2000–2003, 2008–2009, 2012–2017), there were periods when it was unplugged and the report data were not updated or made available. In 2008, Ed Sondik, Director of the National Center for Health Statistics, claimed the CHSI to be an important, ongoing response to reports by the Institute of Medicine and National Committee on Vital and Health Statistics (NCVHS) about the importance of reliable community-level data for supporting public health.[8] He also echoed CDC director Julie Gerberding who, at the time, raised concerns about the nation's "mission-critical health statistics" being "on life support."[8] In 2012, at the urging of representatives from multiple public health professional organizations, HRSA passed the torch to CDC, deciding that CHSI was no longer an agency priority, though the related HRSA Data Warehouse was maintained.[9] The HRSA Data Warehouse offered a wider array of community data elements, but it lacked the standardization and peer-comparison capacity of CHSI—so it was an insufficient supplement, and the transition to CDC sustained this important function. In 2015, CDC invested in major CHSI updates but then discontinued it in 2017. The closure of CHSI at this time was not because of better or competing tools, but rather the loss of leader-champions and funding at the change of presidential administrations.

The ever-present universal need for data at an increasingly granular level remains compelling.[10] In the years since the launch of CHSI, dozens of indicator projects launched ("a thousand flowers blooming"), the most renowned being County Health Rankings and Roadmap, the Neighborhood Atlas, HealthLandscape, Community Commons, and others. At the same time, CDC's inheritance and termination of CHSI was compounded by discontinued support for other major community-oriented data resources, most notably the Health Indicators Warehouse. To provide clarity on the significance of these events, the NCVHS, with its ability to convene a broad array of stakeholders, discovered that communities were "drowning" in indicators, yet "thirsty" for useful data and information, meaning that interest in and indicators for tracking community health have grown while the data needed to populate them became more difficult to access.[11] While the individual data elements remain accessible in National Center for Health Statistics Data Resource Centers, NCVHS heard that most communities are not sophisticated enough to access these resource centers or to analyze the data to produce useable information (i.e., the CHSI reports).

Given this state of affairs, together with the recent Federal Data Strategy put forth by the Department of Health and Human Services and the launch of the CDC PLACES Project, now seems a good time to reflect and learn from where we have been to assess how best to design a future that will serve data-driven efforts for improving well-being throughout the nation.[12] The recent executive order producing a Public Health Data Systems workgroup, cochaired by CDC and the Office of the National Coordinator (ONC) for Health Information Technology, is also a promising vehicle for re-establishing a community data resource.

In this article, while acknowledging the end of CHSI, we note the process and features that made it a significant advance and major contribution to the field. We then discuss the opportunity presented by the Federal Data Strategy to ensure that communities continue to have access to granular data to enable targeted health improvement efforts in light of today's resource constraints.

INDICATOR DEVELOPMENT AND DESEMINATION

The HRSA and the original CHSI development team worked collaboratively to produce a user-friendly report design and companion document to make methods and definitions clear for the user. The team developed the CHSI guiding principles, including a framework for measure inclusion; worked through measure selection and development; moved to database development, data acquisition, and compilation; then finalized display of data and measures and disseminated the CHSI reports. This occurred as federal data resources were migrating to the Internet, and reports ultimately were made available online at the time of launch.

Design and Development

A key principle for each indicator was that data needed to be available for every county or county aggregate, although they were not reported for some counties with small sample sizes. For each measure, the most recent data available were provided. Measure calculations were documented to improve understanding and transparency.

Selection of original CHSI indicators was based on traditional categories of public health measures such as summary measures of health, use of health services, size of vulnerable populations, risk factors for premature death, birth- and death-related outcomes derived from Healthy People 2000 objectives, infectious diseases, child and adult preventive services use, leading causes of death by age, environmental health, a measure of county data–based public health priorities, and county demographics. County measures were also compared with the United States overall as favorable or unfavorable to enable assignment of data-based priorities to county health needs.[13] Initial CHSI indicators were modified with the CHSI update by CDC.[9] Two measures were included in the original CHSI report when there was no expectation of inclusion because of data-sharing rules—active tuberculosis and AIDS cases—because they were deemed critical for local health department evidence-based intervention.

To encourage wise use of the CHSI data, each county's report included references to peer counties to help users put findings into context. The design team intentionally chose this approach rather than the use of rankings from "best to worst" to encourage broader contextual understanding—viewing one's data through the lens of demographically similar jurisdictions. This approach provided more relevant comparisons than indicated by rankings, especially on measures in which a county was showing poor outcomes relative to all US counties. A mapping utility augmented displays of HRSA indicators by peers, state, and neighbors and was featured in the CHSI update by CDC.[9,14]

The original CHSI peer county framework was designed with 88 strata that served as peer groupings. Frontier status, population size, poverty, age distribution, and population density—variables determinative of health service use and delivery—served as membership criteria for each peer group.[15] Each county had an average of 35 peer counties, with a range of 14 to 58. Peers could be from any part of the United States, and each county's set of peer counties was included in each county's report for this context.[16] Despite the intentional focus on peer comparisons, CHSI leaders at CDC also looked at 14 elements as a way to compare and rank large, nonfrontier counties as the County Health Rankings project was launching. The lessons gleaned from that effort included that it was difficult to rank across so many elements given the diversity across counties, but that this diversity was valuable for assessing differences in health needs across counties. It validated the CHSI approach and differentiated it from the purposes and processes of the Health Rankings project.[17]

Report Design

The final report design combined additional contextual information with a county's data and peer county context. Sections entitled "Public Health in America" and "What's Really Killing Us," which included a data graphic with determinants of health and causes of death together with "selected terms" with definitions and explanations, provided foundational understanding to support use by locally based officials and community members without public health training.

Comparison with one's peers was dichotomous: "better than or equal to" or "worse than" one's peers. In the report design, an icon of an apple indicated favorable comparison while a magnifying glass conveyed a less-favorable outcome on a measure to send the message that "a closer look" was indicated. The "Relative Health Importance" table succinctly compared a county's health status, using rates on key indicators from both peer counties and the United States overall. This section pinpointed a county's successes—by listing indicators in the "favorable" cell—and areas where attention was needed within the context of peer counties—by listing these indicators in the "unfavorable" cell. The goal of this approach was to quickly identify both successes and areas where attention was needed.

Dissemination

The dissemination of CHSI evolved out of the gate, shifting from a paper report to the addition of a Web-based publication in the months leading up to the launch. By the time CHSI measures were selected, data obtained and cleaned, and the report design completed, Internet access had expanded. More than half of health departments had Internet access in early 2000, according to a National Association of County and City Health Officials survey, so in addition to paper reports sent to each local health department, electronic versions of reports were made available on the HRSA Web site together with the Companion Document and materials to facilitate dissemination. The CHSI Companion Document was issued at the launch documenting all methodology and technical caveats, including details of data sources, calculations, peer group stratification, and additional methods.[15]

COMMUNITY HEALTH STATUS INDICATOR EVOLUTION

In 2003, a new HHS and HRSA administration took down the Web site, deeming it a low priority. CHSI report data were only updated and disseminated again in the 2008 and 2009 online releases, made possible with funding from the Robert Wood Johnson Foundation.[6] In response to HRSA's announced plan to take down the Web site yet again, representatives from Public Health Foundation, Association of State and Territorial Health Departments, and National Association of County and City Health Officials brokered an agreement for primary responsibility for CHSI to be transferred from HRSA to CDC in August of 2012. From 2012 to 2014, CDC facilitated a customer-driven, transparent process to redesign CHSI with ongoing and ad hoc input from many stakeholders including several of the original CHSI architects, representatives from the original partner organizations, and subject matter experts both internal and external to CDC. This collaboration produced multiple changes primarily driven by transition from a health service delivery framework to one reflecting a population health model originally developed in 1990, which was modified in 2008 to improve population health planning.[18,19] Significant changes to the CHSI methodology, format, and content included

- Population health–based peer groupings determined through a k-means cluster analysis using 19 equally weighted economic and social determinants of health variables (population size, growth, density, and mobility; percentage of children and elderly; sex ratio; percentage of foreign-born persons, high-school graduates, and single-parent households; median home values; housing stress; percentage of owner-occupied housing units; median household income; receipt of government financial assistance; income inequality; overall and elderly poverty; and unemployment;[20,21] Figure A, available as a supplement to the online version of this article at http://www.ajph); and
- Additional indicators identified through a systematic review of the most important modifiable determinants of population health organized by categories of medical care (i.e., preventable hospitalizations), personal behavior (i.e., alcohol use), demographics (i.e., not proficient in English), the social environment (i.e., on-time graduation, housing costs, violent crime, inadequate social support), and the physical environment (i.e., unhealthy ozone days, unhealthy $PM_{2.5}$ [particulate matter with diameters of 2.5 micrometers or smaller] days, annual $PM_{2.5}$ concentrations, access to parks, access to recreational facilities, vacant residential properties;[5] Figure 1).

COMMUNITY IMPACT AND USE

The NCVHS heard from stakeholders in 2018 that the loss of CHSI data and reports plus several other community-level data resources made it hard for them to conduct community health needs assessments.[11] These assessments are required of all nonprofit hospitals, public health departments seeking accreditation, and federally qualified health centers under different statutes and regulations. Needs assessments are also frequent requirements for federal health care payment demonstrations. Many communities, counties, states, and federal agencies rely on these assessments to understand need, to develop policy, and to assess outcomes. Besides CHSI, other valuable and well-utilized federal data tools that were discontinued around the same time include the Health Indicators Warehouse, Health Data Interactive, and the Behavioral Risk Factor Surveillance System multiyear data roll ups. In 2018, the NCVHS Subcommittee on Population Health disseminated a request for information about access to these and other health data resources, specifically asking how disruptions in data access had affected ability to conduct health needs assessments.[11] The Committee received several responses and, in September 2018, held a hearing on the issue of data access featuring some of the stakeholders who had responded to the committee's request for information. The

FULTON COUNTY SUMMARY COMPARISON TABLE			
	Better 🟢	Average 🟡	Worse 🔴
MORTALITY	Chronic Lower Respiratory Disease (CLRD) Death Coronary Heart Disease Death Suicide Death	Alzheimer's Disease Death Cancer Death Diabetes Death Influenza and Pneumonia Death Motor Vehicle Traffic Death Unintentional Injuries	Chronic Kidney Disease Death Female Life Expectancy Firearm Mortality Homicide Death Male Life Expectancy Stroke Death
MORBIDITY	Adult Obesity Adult Overall Health Status Older Adult Asthma Prevalence Older Adult Depression Prevalence	Cancer Rates Diabetes Prevalence Older Adult Alzheimer's/Demential Prevalence	Chlamydia Gonorrhea HIV/AIDS Preterm Births Syphllis
HEALTH CARE ACCESS		Adult Physcian Use Delay Older Adult Preventable Hospitalizations Primary Care Provider Uninsured	
HEALTH BEHAVIORS	Adult Smoking Routine Pap Tests	Adult Binge Drinking Adult Physicial Inactivity Nutrition Seatbelt Use Adolescent Pregnancy	
SOCIAL FACTORS		High Housing Costs Inadequate Social Support	Children in Single-Parent Households On-Time Graduation Overall Poverty Unemployment
PHYSICAL ENVIRONMENT		Housing Stress Limited Access to Healthy Food PM2.5 Annual Concentrations Populations Living Near Highways	Access to Parks Drinking Water Quality

FIGURE 1— County Health Ranking Report Card

Note. $PM_{2.5}$ = particulate matter with diameters of 2.5 micrometers or smaller.

purpose of the hearing was to deepen the committee's understanding of the current challenges to assessing small-area population health and the data resources that are relied upon for delivering those, and to learn about activities that the Department of Health and Human Services is undertaking to expand access to these data with the goal of identifying feasible data-delivery options.

The Community Hospital Corporation testified that CHSI data enabled them to communicate the depth of health concerns in rural communities through peer comparisons.[22] Rural communities, they said, have disproportionate challenges with accessing and analyzing health data, and the lack of actionable data leads to barriers in addressing persistent community health needs and leaves rural hospitals to make decisions based on assumptions.

The American Public Health Association (APHA) provided comments stating that CHSI and other data were used by APHA members for research and to provide background information for advocacy efforts.[11] Public health practitioners used the data to plan health programs, to identify priorities for action, and to collaborate with other providers in the health system. They added that reliable data are important for public health because they enable decision-making based on emerging health issues and determining whether current public health initiatives are effective.

The Public Health Accreditation Board accredits nearly 500 health departments and testified that public health departments need community-level data to generate population health metrics, to do community benchmarking, to develop improvement plans, and to undertake longitudinal outcome tracking.[23] The CHSI was an important report tool and data source for these functions. The NCVHS also heard from Trilogy Integrated Resources, which was contracted by the state of California to integrate information on behalf of states and local counties to better engage local communities in their own health and well-being.[24] They also support public health departments with health data integration delivered via the Network of Care for Public Health Assessment and Wellness. This platform draws on more than 30 data sources, and CHSI was a major component.

NCVHS heard clearly that CHSI was an important and reliable resource for many communities, hospitals, health departments, and federally qualified health centers in assessing the health of their communities and intervening to improve health outcomes. The loss of CHSI increased the difficulty of these assessments, increased costs because of the need for novel data collection, and reduced the reliability, trend utility, and ability to evaluate interventions.

IMPLICATIONS AND OPPORTUNITIES

The loss of CHSI and other online federal data resources, including the Health Indicators Warehouse, the Health Data Interactive, and the Behavioral Risk Factor Surveillance System (with 7-year, rolling average data) has handicapped community health assessments generally.[11,12] There is tangible need for new federal data resources that can support communities in assessing health needs. There is also an opportunity to improve upon CHSI, not simply replace it, and specifically to assemble data tools for assessing smaller geographies. The NCVHS Subcommittee on Population Health undertook a rigorous assessment of the data elements commonly used across the country by communities and vetted these in a public stakeholder meeting to develop a framework for subcounty measures. The purpose of the NCVHS Measurement Framework for Community Health and Well-Being was to strengthen multisectoral health and well-being improvement efforts at the local level; support HHS, other federal agencies, and private-sector partners to identify and close gaps in the accessibility of data at a subcounty level; offer communities a blueprint of the key issue areas—domains and subdomains—to stimulate and inform dialogue across sectors on barriers, opportunities, and approaches for improvement; and to promote public–private collaboration that builds on the successes of numerous metrics efforts already in development or in use.[4]

The NCVHS effort was responsive to the Institute of Medicine 2012 report *Primary Care and Public Health: Exploring Integration to Improve Population Health,* which recommended that, "the National Committee on Vital and Health Statistics advise the Secretary on integrating policy and incentives for the capture of data that would promote the integration of clinical and public health information."[25(p14)] That report advised HRSA and CDC that the 2 agencies, "join efforts to undertake an inventory of existing health and health care databases and identify new data sets, creating from these a consolidated platform for sharing and displaying local population health data that could be used by communities."[25(p13)] The loss of CHSI and other health data tools is contrary to this recommendation and the existing need.

The NCVHS Measurement Framework stopped short of naming specific measures, as this was not within the committee's scope.[4] Subsequently, NCVHS identified a partner in the Institute for Health Improvement 100 Million Healthier Lives, which convened hundreds of public- and private-sector experts, stakeholders, and federal agencies to assess the framework to identify, select, and test measures through a Delphi, iterative process. The outcome of this effort, the Well Being in the Nation (WIN) framework, was released on June 3, 2019, and is a set of national multisector measures of population health with a social determinant lens.[26] This effort received dozens of endorsements and became a network of organizations and institutions moving to use and promote the measures.[12] The collaboration produced a *Health Affairs* blog and *Milbank Quarterly* article that highlighted the Foundations for Evidence-Based Policymaking Act of

2018, which gave direction to the Federal Data Strategy for creating access to federal data assets to help inform or guide policymaking at all levels of government.[3,12] Both offered WIN as a vetted framework for matching community measures to federal (and other) data assets, defining an automated routine for analyzing relevant data sets, and offering the analytic outputs publicly and equitably.

THE NEED FOR RELIABLE DATA SOURCES

In late 2019, the Assistant Secretary for Planning and Evaluation (ASPE) and Agency for Healthcare Research and Quality (AHRQ) announced a project, "to develop a consolidated set of national standardized databases on valid and reliable [social determinants of health] factors at the small-area and other geographic levels, building on existing databases developed by federal agencies."[27] This potential for a National Small-Area Social Determinants of Health Data Platform is worth attention. The US Census Bureau is experimenting with using clinical data to fill geographic voids in survey data with one outcome potentially being a public deprivation index that is more reliable and valid at small geographies.[28] Both efforts highlight the lack of a singular, coordinated effort across federal agencies to meet community and public health data needs. At the close of 2020, the CDC, Robert Wood Johnson Foundation, and the CDC Foundation launched the PLACES Project offering data imputed from national health surveys on 27 prevention, health behavior, and health outcome measures, enabling small-area comparisons.[29] The PLACES Project extends the previous 500 Cities Project to all areas of the country but has limitations as a health planning tool as the imputed data can be at odds with locally collected data and cannot support tracking of intervention-related changes.[30] Its importance for local health assessment and intervention efforts may be the platform and its functionality on which needed community data elements could be loaded.

The Federal Data Strategy recently finalized the 2020 Action Plan, which is focused largely on the management and governance functions necessary to get started. We see an opportunity in the Federal Data Strategy to support community health data needs that fit the intentions of the Evidence-Based Policymaking Act.[12] We believe that the public health community, state, and territorial health officers should advocate that this be the next priority of the Federal Data Strategy. The efforts by AHRQ, ASPE, the Census Bureau, and CDC could replace CHSI as a platform for a broader array of small-area community data if embraced as a Federal Data Strategy priority that drew in more agency data resources.

Related to this, a recent executive order on Ensuring a Data-Driven Response to COVID-19 and Future High-Consequence Public Health Threats launched a Public Health Data Systems Task Force as a subcommittee of the ONC Health Information Technology Advisory Committee[7] to

- identify and prioritize policy and technical gaps associated with the effectiveness, interoperability, and connectivity of information systems relevant to public health (This would include a focus on surveillance systems, infrastructure improvements, health equity, clinical engagement, long-term service and support systems, research and innovation, and educating and empowering individuals), and
- identify characteristics of an optimal future state for information systems relevant to public health and their use.

It is important to recognize that CHSI met very important data and information needs within communities across the nation. As a "proof of concept," CHSI reduced the cost of assessing and addressing population health and provided standardized comparative assessments and related prioritization of local, state, and federal resources. This resource is gone; however, its loss serves to highlight its value. The roles of HRSA and CDC in its demise and lack of a federal replacement is concerning and contrary to the recommendations of the National Academy of Medicine.[25] The public tools we highlighted are helpful but insufficient, and there remains an important federal role. The recent data work of AHRQ, ASPE, the US Census, and CDC will not fill the void left by the loss of CHSI, but they offer a platform and a core set of data that could be built upon by the Federal Data Strategy if made a priority. The new ONC Task Force could be a timely vehicle for reconsidering what was lost with the closure of CHSI and what could be built better. Ideally, the WIN framework offers the ONC Task Force a giant head start on the elements of a future information system for public health and community assessment. The Federal Data Strategy could become the steward of these tools under the leadership of CDC and, specifically, the National Center for Health Statistics, producing the next-generation CHSI. AJPH

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CONFLICTS OF INTEREST

N. F. Kanarek and V. L. Booth were both involved in development and maintenance of CHSI.

HUMAN PARTICIPANT PROTECTION

This article does not describe a study involving human participants.

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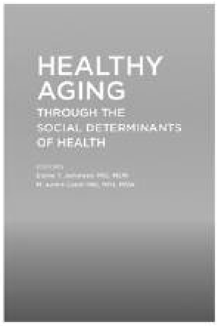

Prevention of Sexually Transmitted Diseases and Pregnancy Prevention Among Native American Youths: A Randomized Controlled Trial, 2016–2018

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Objectives. To evaluate the efficacy of the Respecting the Circle of Life program (RCL) among Native American youths 11 to 19 years of age residing in a rural reservation community in the southwestern United States.

Methods. Between 2016 and 2018, we conducted a randomized controlled trial of the RCL program with 534 Native youths. Participants completed assessments at baseline and 9 and 12 months after the intervention. We conducted intention-to-treat analyses based on study group randomization.

Results. At 9 months, intervention participants had significantly better condom use self-efficacy ($P < .001$), higher intentions to use condoms ($P = .024$) and abstain from sex ($P = .008$), and better contraceptive use self-efficacy ($P < .001$) than control participants, as well as better condom use ($P = .032$) and contraceptive use ($P = .002$) negotiation skills. At 12 months, intervention participants had significantly better sexual and reproductive health knowledge ($P = .021$), condom use self-efficacy ($P < .001$), contraceptive use self-efficacy ($P < .001$), and contraceptive use negotiation skills ($P = .004$) than control participants. Intervention participants reported significantly more communication with their parents about sexual and reproductive health than control participants at both 9 and 12 months ($P = .042$ and $P = .001$, respectively).

Conclusions. The RCL program has a significant impact on key factors associated with pregnancy prevention among Native youths and should be used as an adolescent pregnancy prevention strategy.

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Despite recent decreases, US rates of adolescent pregnancy are higher than those of other developed nations.[1] The consequences of adolescent pregnancy are vast. Adolescent mothers are less likely to earn a high school diploma than nonadolescent mothers (50% vs 90%), and only 2% of all US adolescent mothers earn a college degree.[2,3] Babies born to adolescent mothers are more likely to be premature or have a low birth weight, to live in poverty, to drop out of high school, to be incarcerated as adolescents, and to themselves become adolescent parents.[4] There is also an immense societal cost of adolescent births: in 2015 alone, declines in adolescent births saved an estimated $4.4 billion.[5]

Within the United States, Native American (Native) adolescents have the highest adolescent birth rate of all racial/ethnic groups (33 births per 1000 girls).[6] This rate is nearly double the US adolescent birth rate (19 births per 1000 girls) and more than double the rate among non–Hispanic White girls (13 births per 1000 girls).[6] Nearly one third (32%) of all Native girls begin having children as adolescents, and the prevalence of repeated adolescent births is highest in this group.[6,7] National data show that Native youths are more likely to initiate sex before the age of 13 years than all other groups with the exception of African American youths.[7]

Despite these disparities, Native communities and ways of life are laden with strength-based practices that promote overall health and well-being.[8,9] In most Native communities, there is strong familial, cultural, and community attachment and an inherent support system for youths during adolescence.[10,11] Key factors protecting against sexual risk specific to Native communities include positive cultural identities, self-esteem, having future aspirations, and an absence of internalizing and externalizing behaviors.[12–14] Research shows that programs building on these strengths are both desirable and impactful in Native communities.[15]

In addition to being strength based, programs targeting the sexual behaviors of Native youths need to work across well-established key precursor domains of behavior change, including knowledge, self-efficacy, intention, partner negotiation skills, and communication.[16–24] Measuring the effects of sexual and reproductive health programming on these domains is especially important for evaluations conducted with youths who may not yet be sexually active, as the behaviors of interest may not be observed across follow-ups.[25]

For most US adolescents, school-based programming is a primary means of receiving medically accurate sexual and reproductive health information. However, in Arizona, where the current study took place, school-based sexual health education is optional; the state does not require this type of instruction in school and, if it is available, parents may opt their children out.[26] Moreover, only 31% of Arizona school districts provide sexual health education at all, and of those the majority use abstinence-only curricula that do not offer instruction on methods of pregnancy and sexually transmitted infection (STI) prevention.[27] Thus, developing evidence-based comprehensive sexual health promotion programs that take a strength-based approach, work across established precursors for behavior change, and operate in nonschool settings is essential for adolescent pregnancy and STI prevention in Native communities.

The US Department of Health and Human Services established the national Teen Pregnancy Prevention Program with the goals of replicating existing evidence-based adolescent pregnancy prevention programs (tier 1) and rigorously evaluating new, promising approaches (tier 2).[28,29] This federal program is widely touted as a bipartisan, evidence-based policy-making initiative.[30]

In the present study, we assessed the Johns Hopkins Center for American Indian Health's Respecting the Circle of Life: Mind, Body and Spirit (RCL) program. In 2015, the center was awarded a Teen Pregnancy Prevention Program tier 2 grant to implement and rigorously evaluate this innovative and promising program in partnership with a tribal community. (To respect community confidentiality, we do not name the tribe here but, rather, describe the setting: a rural reservation in Arizona.) The tribe and the center have been working together to develop and evaluate RCL since 2011 (as described subsequently). Here we describe 9- and 12-month outcomes from the 5-year (2015–2020) evaluation to determine the impact of RCL.

METHODS

Youths were enrolled in this randomized controlled trial across 3 cohorts (2016, 2017, and 2018); each cohort was followed for 12 months. Youths selected a parent or trusted adult participant (e.g., grandparent, aunt or uncle) to enroll with them in the study. All participants were blinded to their randomization status.[31]

Intervention

The Johns Hopkins Center for American Indian Health adapted RCL in 2011 from an evidence-based STI and HIV risk reduction intervention called FOY + ImPACT.[22] We conducted 11 focus groups with Native youths and 7 with Native parents and led a community-engaged curriculum adaptation process. This effort included input and collaboration from tribal stakeholders through a community advisory board composed of diverse members of tribal governance groups, the Indian Health Service, and community-based organizations.[32,33]

We learned that the best method for RCL implementation was an 8-day summer basketball camp in addition to a lesson delivered at home to the youths together with their parents or trusted adults. Native paraprofessionals from the community were selected as facilitators and trained in RCL content.

The first 8 RCL lessons are delivered to peer groups organized according to gender (male or female) and age group (e.g., 11–12, 13–15, and 16–19 years), with 8 to 12 youths per peer group. Lessons are taught daily at the camp by 2 facilitators per group. The ninth lesson is delivered 3 months or less after the completion of the camp by a youth peer-group leader.

The RCL curriculum involves comprehensive sexual and reproductive health education and covers anatomy, puberty, how pregnancy occurs, how HIV and other STIs are spread, effective methods for prevention of pregnancy and STIs or HIV (including condoms and all forms of contraception), and how to identify and reduce related risk behaviors. RCL incorporates development of soft skills such as problem solving, communicating with sexual partners and parents or trusted adults, and goal setting. The program includes modeling of learned skills, a "family tree" to contextualize abstract concepts, culturally appropriate interactive activities, and extensive practice of condom and contraceptive use skills.

RCL is expected to produce both short- and long-term outcomes because it reflects Native cultural knowledge, traditional practices, and family and individual values and beliefs and is specific to the local context. RCL emphasizes individual-, family-, and community-level responsibility for preventing STIs, HIV, and unintended pregnancies. Curriculum content and activities take a positive youth development approach and teach skills young people need to make healthy choices, including role-playing, sexual partner negotiation skills, and decision making. RCL is delivered to youths in peer groups and a private session with their parent or trusted adult to effect behavior change across key influencers.

Control Group

The control group received 9 educational lessons on nutrition, fitness, outdoor recreation, and nature; topics were selected by community stakeholders to provide benefit to all participants. The format of the control program was the same as that of RCL (e.g., 8 peer-group lessons at camp and a ninth session at home with the parent or trusted adult) to rule out intervention effects attributable to program delivery. Each program was delivered in a separate camp facility to avoid contamination.

Participants

Participants were recruited at local events, with flyers, and via radio announcements. Youths were eligible if they were (1) 11 to 19 years of age, (2) of Native American ethnicity (self-identified), (3) enrolled members or residents of the participating tribal community, (4) willing to be randomized, and (5) able to participate in the program and the evaluation. Participants who were minors had parental permission and provided assent; young adult participants (those 18 years or older) provided informed consent. Youths self-sorted into peer groups after individual randomization.

Data Collection

We collected self-report data at baseline and 9 and 12 months after program completion via culturally adapted versions of the Youth Health Risk Behavior Inventory, the Parent Adolescent Communication Scale, and the Parental Monitoring Scale.[22,31] Baseline surveys were administered before randomization during 2 precamp registration days. Follow-up surveys were administered at a private location (e.g., participant's home, local study office). We used the audio computer-assisted self-interviewing technique[31] to administer surveys on a laptop or tablet or via hard copy. All assessments were administered by independent evaluators to limit response bias.

All outcome data were collected and analyzed for the full sample to avoid endogenous subgroups. Primary outcomes included (1) history of vaginal sex (yes or no question: "Have you ever had vaginal sex?"), assessed at baseline and all follow-up time points; (2) sexual and reproductive health knowledge (number of correct responses on a 30-question knowledge assessment); (3) condom use self-efficacy (mean on a 6-item Likert scale ranging from 1 [no, I could not] to 5 [yes, I could]; Cronbach $\alpha = 0.8680$); and (4) intention to use a condom if having sex in the next 6 months (on a dichotomized Likert scale; maybe, don't know, probably not, and no were coded as 0 and yes was coded as 1).

Secondary outcomes included (1) intention to have sex in next 12 months (on a dichotomized Likert scale; no, definitely not and no, probably not were coded as 0 and yes, definitely and yes, probably were coded as 1); (2) contraceptive use self-efficacy (mean on a 6-item Likert scale ranging from 1 [no, I could not] to 5 [yes, I could]; Cronbach $\alpha = 0.9085$); (3) perceived partner negotiation skills regarding condom use (yes or no: "I could refuse to have sex if my partner will not use a condom"); (4) perceived partner negotiation skills regarding contraceptive use (yes or no: "I could refuse to have sex if my partner will not use birth control"); (5) parent–adolescent communication (sum of 32 dichotomized items focusing on youths' openness or problems in communication with their parent or trusted adult around sensitive topics, originally coded as a Likert scale ranging from 1–5 [higher = better]; Cronbach $\alpha = 0.9323$); (6) frequency of talking with parent about sexual and reproductive health, specifically how to use condoms or contraception and how to access various methods (mean on a 7-item Likert scale ranging from 1–4 [higher = more]; Cronbach $\alpha = 0.9159$); and (7) talking with parents specifically about drugs and alcohol in the past 3 months (yes or no).

Analyses

Intention-to-treat analyses were performed based on study group randomization regardless of level of participation. We conducted equivalence testing of sociodemographic and outcome variables for the full analytic sample at baseline and at the 9- and 12-month follow-ups (Table 1). We defined baseline equivalence as no statistically significant difference ($P < .05$) between groups in baseline values for a given outcome in the analytic sample at each time point. Intervention impact was assessed at the 9- and 12-month follow-ups via logistic regression for binary outcomes and linear regression for continuous outcomes. All models controlled for gender and age at baseline. For the outcomes of parent–adolescent communication and talking with parent about sexual and reproductive health, we controlled for baseline levels owing to statistically significant ($P < .05$) differences in baseline equivalence at the 9- or 12-month follow-up.

Missing data for history of vaginal sex were logically imputed on the basis of available data. If a participant reported having had vaginal sex at a previous time point, that response was carried forward. Likewise, missing data were logically imputed if a participant reported not ever having vaginal sex at a later time point and there were no contradictory data at a previous time point. Four missing values (2 intervention and 2 control values) were imputed at baseline, 28 (9 intervention and 19 control values) at 9 months, and 27 (13 intervention and 14 control values) at 12 months. Because missing values were imputed, the sample sizes at 9 and 12 months for this variable exceeded those presented in Table 1 for these time points. No other outcomes required logical imputation, and retention was sufficiently high that multiple imputation was not warranted.

Regression-adjusted means and percentages are reported along with between-group adjusted mean differences or odds ratios and 95% confidence intervals (CIs). We report P values using 2-tailed testing with a .05 threshold for significance. We did not adjust for multiple comparisons because each outcome was reflective of a unique, distinct domain of a necessary precursor to sexual behavior change.[16–24]

In sensitivity analyses, results were examined without control for age or gender, with control for cohort, with exclusion of cohort 3, and with exclusion of siblings of the enrolled participant in each family (when more than 1 youth from the same family enrolled in the same cohort). Results of the models presented in Tables 2 and 3 are comparable with results with these alternative specifications.

At 12 months, given the sample sizes (223 in the intervention group and 223 in the control group) and the observed values in the control group, we had 80% power to detect (at the 5% significance level) a 10.7-percentage-point between-study group difference in the percentages of participants who reported ever having had sex, a 2-point difference in mean sexual and reproductive health knowledge scores, a 0.29-point difference in mean condom use self-efficacy scores, and a 13.5-percentage-point difference in condom use intention.

Unfortunately, there was a major disruption in the evaluation between years 3 and 4 caused by threatened termination before grant end. To deliver programming to cohort 3, we hosted the third camp in June 2018 (as opposed to July, when the cohort 1 and cohort 2 camps were hosted). In this community, there are scheduling conflicts in June with respect to study enrollment, including summer school, other camps, and off-reservation activities. Hosting the final camp in June resulted in a smaller and younger sample than planned for in cohort 3, as well as a smaller and younger sample overall.[34]

In addition, a smaller proportion of youths were sexually active than assumed for our power analyses. Our assumption that approximately 20% of control youths would be sexually active was based on a prior evaluation of RCL in the same community (in which the average age was 15.4 years).[34,35] In this study, the average age (13.27 years) and the low prevalence of sexual activity (13.3% in the intervention group and 12.5% in the control group at 12 months) diminished our power to detect significant differences in one of the primary outcomes (percentage of participants who had ever had vaginal

TABLE 1— **Demographic Characteristics and Baseline Unadjusted Primary and Secondary Outcomes: Respecting the Circle of Life Program, Arizona, 2016–2018**

	Baseline Analytic Sample, % (No.) or Mean (SD)		9-Month Analytic Sample, % (No.) or Mean (SD)		12-Month Analytic Sample, % (No.) or Mean (SD)	
	Intervention (n = 266)	Control (n = 268)	Intervention (n = 219)	Control (n = 231)	Intervention (n = 223)	Control (n = 223)
Demographic characteristics						
Age category, y						
11–12	38.3 (102)	37.3 (100)	38.8 (85)	36.8 (85)	39.0 (87)	36.8 (82)
13–14	38.0 (101)	41.0 (110)	37.0 (81)	42.0 (97)	37.2 (83)	42.6 (95)
15–19	23.7 (63)	21.6 (58)	24.2 (53)	21.2 (49)	23.8 (53)	20.6 (46)
Gender						
Male	47.7 (127)	47.0 (126)	48.4 (106)	47.2 (109)	47.1 (105)	47.1 (105)
Female	52.3 (139)	52.6 (141)	51.6 (113)	52.8 (122)	52.9 (118)	52.9 (118)
Transgender	0.0 (0)	0.4 (1)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Race/ethnicity						
American Indian or Alaska Native	100.0 (266)	100.0 (268)	100.0 (219)	100.0 (231)	100.0 (223)	100.0 (223)
Asian	0 (0.0)	0 (0.0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Native Hawaiian or Pacific Islander	0 (0.0)	0 (0.0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Black or African American	0 (0.0)	0 (0.0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
White	0 (0.0)	0 (0.0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
>1 race	0 (0.0)	0 (0.0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Unknown or not reported	0 (0.0)	0 (0.0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Baseline unadjusted primary and secondary outcomes						
Primary outcomes						
Ever had sexual intercourse[a,b]	8.3 (22)	5.6 (15)	8.2 (18)	6.1 (14)	8.5 (19)	5.4 (12)
Sexual/reproductive health knowledge[c]	15.71 (6.89)	15.19 (7.42)	15.65 (6.80)	15.39 (7.45)	15.78 (6.63)	15.36 (7.28)
Condom use self-efficacy[d]	3.08 (1.17)	3.08 (1.07)	3.12 (1.16)	3.08 (1.08)	3.09 (1.16)	3.04 (1.08)
Intend to use condom in next 6 months[e]	31.0 (78)	29.8 (76)	31.6 (66)	30.7 (67)	30.7 (65)	27.0 (57)
Secondary outcomes						
Intend to have sex in next year[f]	87.4 (221)	90.7 (225)	86.0 (178)	91.6 (195)	85.9 (182)	91.8 (189)
Contraceptive use self-efficacy[g]	3.07 (1.14)	3.18 (1.11)	3.12 (1.10)	3.18 (1.12)	3.09 (1.11)	3.16 (1.12)
Perceived partner negotiation skills regarding condom use[h]	39.9 (97)	43.9 (107)	38.1 (77)	42.5 (88)	38.1 (78)	42.8 (86)
Perceived partner negotiation skills regarding contraceptive use[c]	27.8 (74)	33.0 (88)	27.4 (60)	32.2 (74)	26.9 (60)	31.5 (70)
Parent–adolescent communication	2.46 (4.55)	1.97 (3.43)	2.40 (4.41)	2.02 (3.44)	2.52* (4.51)	1.77* (2.99)

Continued

TABLE 1— Continued

	Baseline Analytic Sample, % (No.) or Mean (SD)		9-Month Analytic Sample, % (No.) or Mean (SD)		12-Month Analytic Sample, % (No.) or Mean (SD)	
	Intervention (n = 266)	Control (n = 268)	Intervention (n = 219)	Control (n = 231)	Intervention (n = 223)	Control (n = 223)
Talking with parent about sexual/ reproductive health[i]	1.59 (0.76)	1.48 (0.65)	1.60* (0.75)	1.47* (0.64)	1.60* (0.77)	1.44* (0.63)
Talking with parent about drugs/alcohol[j]	23.5 (62)	28.5 (75)	24.3 (53)	29.2 (66)	23.9 (53)	28.0 (61)

[a] Refers to vaginal sex only.

[b] Intervention group is missing 1 value at baseline.

[c] Control group is missing 1 value at all time points.

[d] Intervention group is missing 11 values at baseline and 10 values at the 9- and 12-month follow-ups. Control group is missing 9 values at baseline and the 9-month follow-up and 8 values at the 12-month follow-up.

[e] Intervention group is missing 14 values at baseline, 10 values at the 9-month follow-up, and 11 values at the 12-month follow-up. Control is missing 13 values at baseline and the 9-month follow-up and 12 values at the 12-month follow-up.

[f] Intervention group is missing 13 values at baseline, 12 values at the 9-month follow-up, and 11 values at the 12-month follow-up. Control group is missing 20 values at baseline, 18 values at the 9-month follow-up, and 17 values at the 12-month follow-up.

[g] Intervention group is missing 16 values at baseline and 14 values at the 9- and 12-month follow-ups. Control group is missing 17 values at baseline and the 9-month follow-up and 16 values at the 12-month follow-up.

[h] Intervention group is missing 23 values at baseline, 17 values at the 9-month follow-up, and 18 values at the 12-month follow-up. Control group is missing 24 values at baseline and the 9-month follow-up and 22 values at the 12-month follow-up.

[i] Intervention group is missing 12 values at baseline, 9 values at the 9-month follow-up, and 10 values at the 12-month follow-up. Control group is missing 12 values at baseline, 11 values at the 9-month follow-up, and 10 values at the 12-month follow-up.

[j] Intervention group is missing 2 values at baseline and 1 value at the 9- and 12-month follow-ups. Control group is missing 5 values at all time points.

*$P < .05$.

sex). We had sufficient statistical power to detect significant differences in the remaining primary and secondary outcomes.

RESULTS

Of the 703 participants who provided informed consent, 80.5% (n = 566) completed the baseline portion of the study and 76.0% (n = 534) were randomized. The age and gender of those who provided consent but did not complete baseline and randomization were similar to those who did (age: 13.22 vs 13.27 years; percentage male: 53.5% vs 47.7%).

A total of 534 youths completed baseline and were randomized between May 13, 2016, and June 7, 2018 (intervention: 266; control: 268), 154 in cohort 1 (2016), 245 in cohort 2 (2017), and 135 in cohort 3 (2018). At the 9-month follow-up, differential attrition was 3.9% and overall attrition was 15.7%. At the 12-month follow-up, differential attrition was 0.6%, with 16.5% overall attrition (Figure 1). At baseline, the mean age was 13.27 years, 52.4% of the participants were female, and all of the participants' self-reported race/ethnicity was Native American; 6.9% of participants reported having ever had sexual intercourse.

Youths attended an average of 6.57 of the 8 peer-group sessions (intervention mean = 6.43, SD = 2.10; control mean = 6.71, SD = 1.90), and most completed the parent–youth session (intervention: 82.3%; control: 86.9%). The time between the final peer-group session and the ninth session ranged from 1 to 125 days, with an average of 41.99 days (intervention mean = 42.5, control mean = 41.3).

Primary Outcomes

There were no significant differences in history of vaginal sex between the intervention and control groups at the 9- or 12-month follow-up (9-month adjusted odds ratio [AOR] = 1.51; 95% CI = 0.83, 2.76; 12-month AOR = 1.08; 95% CI = 0.63, 1.86; Table 2). Youths in the intervention group had significantly better sexual and reproductive health knowledge at the 12-month follow-up (adjusted mean difference [AMD] = 1.22; 95% CI = 0.18, 2.25) than youths in the control group. RCL youths had significantly better condom use self-efficacy than control youths at both 9 months (AMD = 0.56; 95% CI = 0.41, 0.72) and 12 months (AMD = 0.40; 95%

TABLE 2— Effects of the Respecting the Circle of Life Program on Primary Outcomes: Arizona, 2016–2018

	No., Intervention/ Control	Intervention,[a] % (No.) or Mean (SE)	Control,[a] % (No.) or Mean (SE)	OR or AMD (95% CI)
Ever had vaginal sex[b]				
Baseline	265/268	4.7 (22)	2.9 (15)	1.66 (0.80, 3.47)
9 months	236/238	10.1 (37)	6.9 (28)	1.51 (0.83, 2.76)
12 months	224/220	13.3 (42)	12.5 (39)	1.08 (0.63, 1.86)
Sexual/reproductive health knowledge				
Baseline	266/267	15.71 (0.41)	15.19 (0.41)	0.52 (−0.62, 1.66)
9 months	218/230	21.37 (0.40)	21.48 (0.39)	−0.11 (−1.21, 0.98)
12 months	220/223	22.31 (0.37)	21.09 (0.37)	1.22 (0.18, 2.25)
Condom use self-efficacy				
Baseline	255/259	3.08 (0.06)	3.08 (0.06)	−0.00 (−0.17, 0.17)
9 months	211/224	4.06 (0.06)	3.50 (0.06)	0.56 (0.41, 0.72)
12 Months	217/216	4.04 (0.06)	3.63 (0.06)	0.40 (0.25, 0.56)
Intend to use condom in next 6 months				
Baseline	252/255	28.9 (78)	27.3 (76)	1.08 (0.72, 1.63)
9 months	208/222	57.8 (120)	46.8 (104)	1.55 (1.06, 2.28)
12 months	216/217	59.9 (129)	52.5 (114)	1.35 (0.92, 1.98)

Note. AMD = adjusted mean difference; CI = confidence interval; OR = odds ratio.

[a] All models controlled for gender and age at baseline. Means and proportions represent regression-adjusted estimates.

[b] Data were logically imputed. If a participant reported having had vaginal sex at a previous time point, that response was carried forward. Likewise, missing data were logically imputed if a participant reported not ever having vaginal sex at a later time point and there were no contradictory data at a previous point. Four values were imputed at baseline, 28 at 9 months, and 27 at 12 months.

CI = 0.25, 0.56). In addition, intention to use a condom in the next 6 months was significantly higher among intervention youths than control youths at 9 months (AOR = 1.55; 95% CI = 1.06, 2.28).

Secondary Outcomes

Intention to have sex in the next year was significantly lower among RCL youths than among control at 9 months (AOR = 0.56; 95% CI = 0.37, 0.86; Table 3). Intervention youths had significantly better contraceptive use self-efficacy than control youths at both 9 months (AMD = 0.39; 95% CI = 0.23, 0.56) and 12 months (AMD = 0.35; 95% CI = 0.18, 0.52). Perceived partner negotiation skills regarding condom use were significantly better among RCL youths than control youths at 9 months (AOR = 1.55; 95% CI = 1.04, 2.31). Perceived partner negotiation skills regarding contraceptive use were significantly better among intervention youths than control youths at 9 months (AOR = 1.87; 95% CI = 1.27, 2.75) as well as 12 months (AOR = 1.76; 95% CI = 1.20, 2.58).

Overall, between-group differences in parent–adolescent communication did not reach significance at 9 months (AMD = −0.03; 95% CI = −1.01, 0.96) or 12 months (AMD = 0.91; 95% CI = −0.11, 1.94). Intervention youths reported significantly more frequent conversations with their parent or trusted adult about sexual and reproductive health than control youths at both 9 months (AMD = 0.16; 95% CI = 0.01, 0.31) and 12 months (AMD = 0.26; 95% CI = 0.11, 0.41). The analyses did not reveal between-group differences in frequency of talking with parents or trusted adults about drugs and alcohol.

DISCUSSION

Our results show that the RCL program had significant, long-term effects on 3 of our 4 primary outcomes: sexual and reproductive health knowledge, condom use self-efficacy, and condom use intention. Two primary outcomes were sustained 12 months after program

TABLE 3— Effects of the Circle of Life Program on Secondary Outcomes: Arizona, 2016–2018

	No., Intervention/ Control	Intervention,[a] % (No.) or Mean (SE)	Control,[a] % (No.) or Mean (SE)	OR or AMD (95% CI)
Intend to have sex in next year				
Baseline	253/248	92.0 (221)	94.3 (225)	0.70 (0.38, 1.29)
9 months	209/214	63.0 (131)	75.1 (160)	0.56 (0.37, 0.86)
12 months	213/211	53.1 (113)	51.1 (108)	1.08 (0.74, 1.59)
Contraceptive use self-efficacy				
Baseline	250/251	3.08 (0.07)	3.18 (0.07)	−0.10 (−0.28, 0.08)
9 months	211/225	3.83 (0.06)	3.44 (0.06)	0.39 (0.23, 0.56)
12 months	216/216	3.87 (0.06)	3.53 (0.06)	0.35 (0.18, 0.52)
Perceived partner negotiation skills regarding condom use				
Baseline	243/244	39.5 (97)	42.9 (107)	0.87 (0.59, 1.27)
9 Months	211224	64.6 (134)	54.1 (121)	1.55 (1.04, 2.31)
12 months	216/216	64.8 (138)	56.3 (121)	1.43 (0.96, 2.13)
Perceived partner negotiation skills regarding contraceptive use				
Baseline	266/267	27.0 (74)	32.2 (88)	0.78 (0.53, 1.14)
9 months	217/229	57.7 (124)	42.2 (98)	1.87 (1.27, 2.75)
12 months	221/223	56.4 (124)	42.3 (95)	1.76 (1.20, 2.58)
Parent–adolescent communication[b]				
Baseline	266/268	2.46 (0.25)	1.97 (0.25)	0.49 (−0.20, 1.18)
9 months	219/231	3.42 (0.36)	3.45 (0.35)	−0.03 (−1.01, 0.96)
12 months	223/223	3.62 (0.37)	2.71 (0.37)	0.91 (−0.11, 1.94)
Talking with parent about sexual/reproductive health[b]				
Baseline	254/256	1.59 (0.04)	1.48 (0.04)	0.11 (0.00, 0.23)
9 months	207/223	1.87 (0.06)	1.71 (0.05)	0.16 (0.01, 0.31)
12 months	216/218	1.90 (0.05)	1.63 (0.05)	0.26 (0.11, 0.41)
Talking with parent about drugs/alcohol				
Baseline	264/263	23.3 (62)	28.4 (75)	0.77 (0.52, 1.14)
9 months	214/228	30.3 (65)	25.3 (58)	1.28 (0.85, 1.95)
12 months	222/222	32.7 (73)	28.1 (63)	1.24 (0.83, 1.86)

Note. AMD = adjusted mean difference; CI = confidence interval; OR = odds ratio.

[a] All models controlled for gender and age at baseline. Means and proportions represent regression-adjusted estimates.
[b] Controlled for baseline level of outcome variable owing to differences in baseline equivalence at the 9- or 12-month follow-up.

completion: sexual and reproductive health knowledge and condom use self-efficacy. Also, RCL had significant 9-month effects on 5 of our 7 secondary outcomes: intention to have sex, contraceptive use self-efficacy, perceived partner negotiation skills regarding condom use, perceived partner negotiation skills regarding contraceptive use, and talking with a parent or trusted adult about sexual and reproductive health. Three secondary

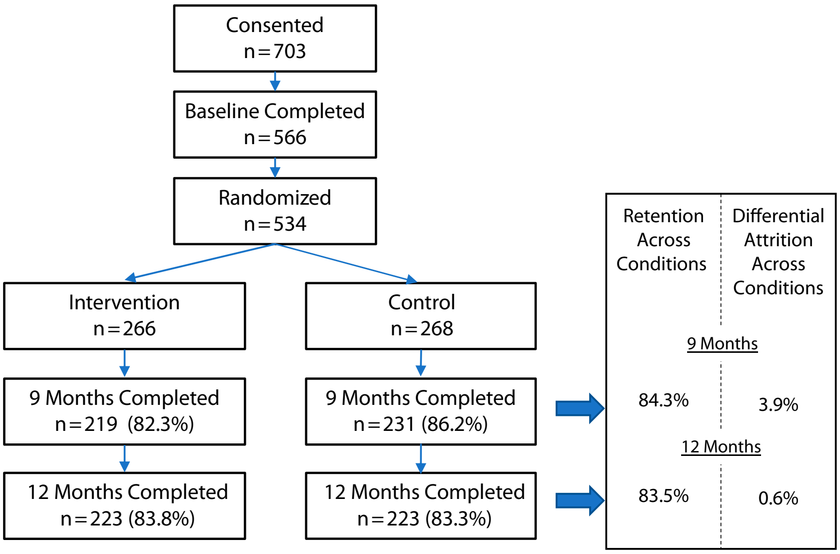

FIGURE 1— Enrollment and Follow-Up Diagram: Respecting the Circle of Life Program, Arizona, 2016–2018

outcomes were sustained at 12 months: contraceptive use self-efficacy, perceived partner negotiation skills regarding contraceptive use, and talking with a parent or trusted adult about sexual and reproductive health. Taken together, these results strengthen the evidence that the RCL program significantly affects several domains associated with prevention of pregnancy and STIs among Native American youths and adolescents.[16–24,35]

In a previous randomized controlled trial of the RCL peer-group lessons only, we found significant 6-month intervention effects on condom use self-efficacy, sexual health knowledge, condom beliefs, and talking with a parent or trusted adult about HIV/AIDS; however, all of these effects with the exception of condom use self-efficacy had attenuated by 12 months.[35] This impact analysis indicates how inclusion of the parent or trusted adult lesson has the potential to broaden intervention effects produced from the peer-group lessons to include intention to have sex, intention to use a condom, contraceptive use self-efficacy, perceived partner negotiation skills regarding both condom and contraceptive use, and talking with a parent or trusted adult about sexual and reproductive health. Furthermore, inclusion of that lesson may be key for sustaining RCL effects on sexual and reproductive health knowledge, contraceptive use self-efficacy, perceived partner negotiation skills regarding contraceptive use self-efficacy, and talking with a parent or trusted adult about sexual and reproductive health longitudinally through 12 months.

Noteworthy are the significant improvements in talking with a parent or trusted adult about sexual and reproductive health at 12 months. Our results suggest that implementation of RCL with Native youths and families can promote healthy conversations around sex during a critical period of development when youths may become sexually active. These findings mimic those of Stanton et al. (the developers of FOY + ImPACT, from which RCL was adapted), who showed that FOY intervention effects could be extended with the addition of ImPACT, and support the literature demonstrating the importance of parents and family in Native youths' decision making.[12,19,22]

As described, this impact evaluation was funded by a Teen Pregnancy Prevention Program tier 2B grant. Tier 2B grantees were expected to conduct their evaluations according to the quality assessment criteria set forth in the US Department of Health and Human Services evidence review. To achieve a high rating, evaluations were expected to (1) involve rigorous research designs, (2) involve no reassignment of participants, (3) demonstrate low attrition or differential attrition, (4) maintain baseline equivalence between groups, and (5) include no confounding factors. Our impact evaluation met all of the evidence review criteria necessary for this study to be designated as of high quality. Further, our analyses showed statistically significant favorable effects on 3 primary outcomes and 5 secondary outcomes.

Thus, there is strong evidence the RCL program is effective according to the evidence review criteria. That our evaluation was conducted at a high level of quality in a rural reservation-based context and able to demonstrate evidence in spite of the disruption caused by threatened grant termination is a testament to the strength of our tribal–academic partnership and the commitment of the participating community to this research.

Limitations

This study involved limitations. As a result of the young mean age of the sample and lower than originally anticipated prevalence of sexual activity, we did not have sufficient statistical power to examine one of our primary outcomes (the percentage of youths who reported ever having had vaginal sex). This study was conducted in partnership with a single tribal community; thus, our results are not representative of the entire US Native youth population. Data were collected via self-report and are subject to social desirability bias. Contamination was possible in this reservation community; to limit this bias, we delivered each program in separate camp facilities.

Conclusions

The RCL program, designed specifically for Native communities, shows evidence of improving numerous precursor domains necessary for prevention of pregnancy and STIs among Native youths. Future research should examine whether RCL can have an impact on behaviors related to sexual initiation, pregnancy, and STIs and establish the extent to which the domains it does affect are sufficient for long-term behavior change. There is also a need for examinations of differential RCL effects among subgroups, a responder–nonresponder analysis, and cost-effectiveness assessments. RCL addresses the needs and assets of Native communities, takes advantage of young people's availability during summer, and accounts for diverse caregivers in Native families. Thus, the program may be particularly suitable for replication in other rural reservation communities. In conclusion, our impact evaluation makes an important contribution to the field of adolescent pregnancy prevention.

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CONTRIBUTORS

L. Tingey led the study design and implementation and the original drafting of the article. R. Chambers managed study implementation and training and assisted with the original drafting of the article. H. Patel managed data collection systems, assisted with training and the original drafting of the article, and reviewed the article. S. Littlepage assisted with data cleaning, contributed to coding and quality assurance, and reviewed the article. S. Lee and D. Susan assisted with data collection and quality assurance and reviewed the article. A. Lee managed study implementation and team supervision and reviewed the article. L. Melgar and A. Slimp delivered programming, assisted with fidelity monitoring, and reviewed the article. S. Rosenstock conducted all of the data analyses and assisted with the original drafting of the article.

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CONFLICTS OF INTEREST

None of the authors report potential or actual conflicts of interest from funding- or affiliation-related activities.

HUMAN PARTICIPANT PROTECTION

This study was approved by the institutional review board of the Johns Hopkins University School of Public Health. The study was reviewed and approved by the participating tribal community's Health Advisory Board and Tribal Council. All participants provided informed consent.

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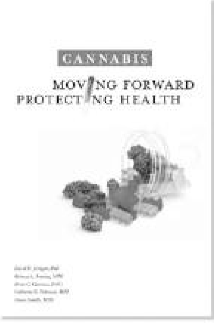

Adolescent Police Stops, Self-Harm, and Attempted Suicide: Findings From the UK Millennium Cohort Study, 2012–2019

Dylan B. Jackson, PhD, Alexander Testa, PhD, Rebecca L. Fix, PhD, and Tamar Mendelson, PhD

See also Del Toro, p. 1723.

Objectives. To explore associations between police stops, self-harm, and attempted suicide among a large, representative sample of adolescents in the United Kingdom.

Methods. Data were drawn from the 3 most recent sweeps of the UK Millennium Cohort Study (MCS), from 2012 to 2019. The MCS is an ongoing nationally representative contemporary birth cohort of children born in the United Kingdom between September 2000 and January 2002 (n = 10 345). Weights were used to account for sample design and multiple imputation for missing data.

Results. Youths experiencing police stops by the age of 14 years (14.77%) reported significantly higher rates of self-harm (incidence rate ratio = 1.52; 95% confidence interval [CI] = 1.35, 1.69) at age 17 years and significantly higher odds of attempted suicide (odds ratio = 2.25; 95% CI = 1.84, 2.76) by age 17 years. These patterns were largely consistent across examined features of police stops and generally did not vary by sociodemographic factors. In addition, 17.73% to 40.18% of associations between police stops and outcomes were explained by mental distress.

Conclusions. Police-initiated encounters are associated with youth self-harm and attempted suicide. Youths may benefit when school counselors or social workers provide mental health screenings and offer counseling care following these events. (*Am J Public Health*. 2021;111(10):1885–1893. https://doi.org/10.2105/AJPH.2021.306434)

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Law enforcement is the primary—and often only—criminal justice contact youths experience.[1,2] Indeed, youth–police encounters are quite common,[3] and when one considers that such encounters are often defined by disparities in age, status, and power that disadvantage youths, they can be experienced as stressful and yield deleterious mental health repercussions.[4–8] Recent studies suggest that these outcomes may be most pronounced in the face of officer intrusiveness and procedural injustice,[5,9] and augmented among young people of color.[4,8,9] In light of the trauma associated with more-adverse youth–police encounters, the risk of self-harming behaviors and even attempted suicide may also increase, as these can be understood as maladaptive coping responses to emotional distress.[10,11]

Despite the known mental health repercussions of adverse youth–police contact, current knowledge is limited in key respects. First, the bulk of this research focuses on the US criminal legal system,[4–9] which is distinct given its size,[12] particularly heavy reliance on proactive policing,[13] and long history of unfair treatment of people of color relative to other democratic countries.[14] Despite initial evidence that police–citizen encounters outside of the United States may worsen emotional well-being,[15] the particular health impacts of youth–police encounters in non-US contexts remain unexplored. To be sure, there are reasons to expect that such findings may generalize to other countries, particularly other advanced democracies like the United Kingdom that, similar to the United States,[13,14] have deployed proactive policing strategies such as frisks and searches during stops.[16,17] In London, England, moreover, there has also been documented use of force associated with personal-issued Tasers among frontline officers.[18]

While there is some evidence that UK police disproportionately deploy proactive strategies with people of color—especially Black and Asian individuals[17]—other national studies suggest that such racial disparities are inconsistent across regions.[19]

Previous research on youth–police encounters typically overlooks youths' maladaptive coping responses to severe psychological distress, such as self-harm and attempted suicide. This gap is significant when one considers that adolescent suicide is a global public health crisis,[20] accumulating stressors make youths vulnerable to suicidal ideation,[10] and evidence indicates an elevated risk of attempted suicide among police violence–exposed adults in the United States.[21] In 2017 to 2018, a nonnegligible portion of UK youths—approximately 7% of those aged 17 years—attempted suicide.[22] Even so, it remains unknown whether adolescent–police encounters—particularly adverse encounters—might be associated with heightened risks of self-harm and attempted suicide among youths, especially in non-US settings. Finally, in light of some evidence of social and demographic disparities in exposure to proactive policing in the United Kingdom,[17] as well as the patterning of suicidal ideation across demographic lines,[22] there is a need to assess the police stop–mental health nexus among youths across sociodemographic contexts.

We analyzed data from a nationally representative sample of UK youths to investigate associations between adolescent police stops (and their features), self-harm, and attempted suicide, and the degree to which mental distress explains these associations. In ancillary analyses, we investigated these relationships across key sociodemographic factors.

METHODS

Data for the current study were drawn from the UK Millennium Cohort Study (MCS). The MCS is a large, nationally representative study that follows 18 818 young people born in the United Kingdom (i.e., England, Scotland, Wales, and Northern Ireland) at the start of the new century—between September 2000 and January 2002. To date, 7 sweeps of data have been collected, when cohort members were aged approximately 9 months (2001), 3 years (2004), 5 years (2006), 7 years (2008), 11 years (2012), 14 years (2015), and 17 years (2018). The focus of the current study is on the 3 most recent sweeps (at ages 11, 14, and 17 years), with the most recent sweep of data being collected between January 2018 and March 2019. The MCS data were obtained by using a stratified, clustered random sample design and oversampled from areas that were disadvantaged or had high non-White populations. Because of this sampling strategy, the sample includes a larger-than-average number of families and children with significant mental health needs and disproportionate exposure to various hardships and risk factors, including police encounters. For more details on the study design and variables, see https://cls.ucl.ac.uk. In the current study, we restricted the sample to youths who participated in the young person self-completion questionnaire during the year-17 data collection effort ($n = 10\,345$).

Outcome Measures

Self-harm. At the year-17 data collection, youths were asked in the young person self-completion questionnaire about several intentional self-harming behaviors during the previous year. Specifically, youths were asked, "During the last year, have you hurt yourself on purpose in any of the following ways? 1. Cut or stabbed yourself?, 2. Burned yourself?, 3. Bruised or pinched yourself?, 4. Taken an overdose of tablets?, 5. Pulled out your hair?, or 6. Hurt yourself in some other way?." Response options to each of these items included "yes" (=1) and "no" (=0). Following recent research[22] and for the purposes of this analysis, we calculated a count measure of engagement in these diverse forms of self-harm ranging from 0 to 6 (Kuder--Richardson $\alpha = 0.71$).

Attempted suicide. Immediately following the questions pertaining to intentional self-harm, youths were asked, "Have you ever hurt yourself on purpose in an attempt to end your life?" Following the lead of recent research,[22] youths who responded "yes" were coded as 1, whereas youths who responded "no" were coded as 0.

Police Stops

At year 14 of data collection, youths were asked, "Have you ever been stopped and questioned by the police?" Youths who responded "yes" were coded as 1, whereas youths who responded "no" were coded as 0. In a subset of models, additional details about police stop features obtained from follow-up questions pertaining to officer warnings or cautions (i.e., "Have you ever been given a formal warning or caution by a police officer?") and youth arrest (i.e., "Have you ever been arrested by a police officer and taken to a police station?") were also employed.

Mental Distress

Finally, mental distress was explored as a potential explanation of the associations examined in the present study. At year 14 of data collection, youths were asked to respond to 6 items pertaining to their mental distress. Specifically, youths were asked, “On a scale of 1 to 7 where ‘1’ means completely happy and ‘7’ means not at all happy, how do you feel about the following parts of your life: How do you feel about 1. School work?, 2. The way you look?, 3. Your family?, 4. Your friends?, 5. The school you go to?, and 6. Life as a whole?.” These items were summed into an index of mental distress ($\alpha = 0.86$), where higher scores indicated reduced levels of mental health. Notably, these items have been employed as indicators of youth mental health in previous MCS research.[23]

Covariates

The following covariates were included in each of the multivariate models to minimize the likelihood of spurious results: youth age, youth gender (male = 1), youth race (White [reference], Asian, Black, multiracial, and other), maternal nativity (mothers born in United Kingdom = 1), urbanicity (urban = 1), sexual minority youths (= 1 if youth identified as nonheterosexual or lesbian, gay, bisexual, or other sexual minority),[22] property delinquency, substance use, school disengagement, self-esteem, internalizing behavior (emotional symptoms and peer problems subscales of the Strengths and Difficulties Questionnaire),[24] externalizing behavior (hyperactivity or inattention and conduct problems subscales of the Strengths and Difficulties Questionnaire),[24] parent education based on National Vocational Qualification (NVQ; NVQ1 [reference], NVQ2, NVQ3, NVQ4, NVQ5, overseas or other education, and none),[23] household income (first quintile [reference], second quintile, third quintile, fourth quintile, and fifth quintile), single-parent household, and low neighborhood safety. All time-varying covariates were derived from sweep 5 (year 11), with the exception of age, which was derived from sweep 7 (year 17).

Analytic Strategy

First, we calculated descriptive statistics for key study variables, examining differences in these variables by youth gender, youth race, maternal nativity, and urbanicity. Second, we estimated unadjusted and adjusted multivariate zero-inflated negative binomial and logistic regression models to examine associations between police stops, self-harm, and attempted suicide among youths in the sample. Third, we used the Karlson–Holm–Breen (KHB) method to examine the extent to which adolescent mental distress explained associations between police stops, self-harm, and attempted suicide.[25] We used the KHB method given our nonlinear outcomes, as coefficients across nested nonlinear models cannot be directly compared because of a rescaling of the model that occurs after additional variables are added. The KHB method corrects for this rescaling and provides an estimate of how a given variable (e.g., mental distress) attenuates the association between the independent (police stops) and dependent variable (self-harm, attempted suicide). Fourth, we also subdivided police stops into categories based on key stop features (i.e., stopped and questioned, warned or cautioned, arrested) to estimate associations between police stops, self-harm, and attempted suicide across these categories.

In ancillary models, we further investigated the robustness of these findings using inverse probability–weighted regression adjustment, an analytical strategy that addresses bias attributable to confounding by accounting for pretreatment selection effects with propensity scores and allows for the inclusion of multiple treatment groups (for more details, see the Appendix, available as a supplement to the online version of this article at http://www.ajph.org).[26,27] Additional ancillary models also examined key findings across sociodemographic groups (i.e., youth gender, youth race, maternal nativity, and urbanicity). We conducted all analyses in Stata version 16.1 (StataCorp LP, College Station, TX) using multiply imputed data (chained equations, 20 imputations), and we employed weights to account for sample design.

RESULTS

Table 1 displays select descriptive statistics for the full sample (n = 10 345) as well as several subsamples stratified by the following sociodemographic factors: youth gender, youth race, maternal nativity, and urbanicity. The full sample was aged on average 17.17 years at sweep 7, 48.75% male, 10.01% sexual minority, and 78.76% White (for more details, see Table A, available as a supplement to the online version of this article at http://www.ajph.org). The average number of self-harm behaviors in the sample was 0.45; still, nearly 1 in 4 youths had self-harmed in some form in the past year. Suicide attempts were reported by 7.48% of youths and police stops were reported by 14.77% of youths. As expected, a large majority of youths experienced police stops in the absence of an arrest, with only approximately 6% of stopped youths reporting an arrest. Descriptive statistics among sociodemographic subgroups generally revealed that rates of self-harm and the

TABLE 1— Select Descriptive Statistics by Youth Gender, Youth Race, Maternal Nativity, and Urbanicity: Millennium Cohort Study, United Kingdom, 2012–2019

		Youth Gender		Youth Race					Mother Native Born		Urban	
	All Youths (n = 10 345)	Male (n = 5043)	Female (n = 5302)	Asian (n = 1228)	Black (n = 340)	Mixed (n = 489)	Other (n = 141)	White (n = 8147)	Yes (n = 8770)	No (n = 1575)	Yes (n = 7621)	No (n = 2724)
Variables												
Self-harm (S7), mean	0.45	0.31***	0.59	0.24**	0.19**	0.50	0.53	0.49	0.48**	0.31	0.45	0.47
Attempted suicide (S7), %	7.48	4.36**	10.45	3.25**	4.12**	10.20	9.93	8.05	8.05**	4.31	7.57	7.22
Stopped by police (S6), %	14.77	18.50**	11.23	8.22**	15.88	18.78*	21.99*	15.35	15.67**	9.76	15.10	13.86
Police stop features (S6), %												
Stopped and questioned	7.90	9.61**	6.27	4.23**	7.94	9.18	13.48*	8.27	8.39**	5.13	7.88	7.96
Warned or cautioned	6.05	7.84**	4.35	3.34**	7.35	8.16	7.80	6.25	6.40**	4.12	6.37*	5.17
Arrested or taken into custody	0.82	1.05*	0.60	0.65	0.59	1.43	0.71	0.82	0.88	0.51	0.85	0.73

Note. S = sweep. We conducted the difference-of-means *t* test (for continuous items) and χ^2 test (for categorical items) to examine significant differences across groups.

$*P < .05$; $**P < .01$.

likelihood of attempted suicide were significantly higher among female, White, mixed race, and other race youths (vs Black and Asian youths), and youths with native-born mothers. In addition, police stops were significantly more common among male, mixed race, and other race youths (vs White youths) and youths with native-born mothers. By contrast, the prevalence or rate of police stops, self-harm, and suicide were generally similar across urban and rural contexts.

Results of unadjusted and adjusted multivariate zero-inflated negative binomial and logistic regression models examining associations between police stops, self-harm, and attempted suicide are displayed in Table 2. Being stopped by police was associated with a 52% increase in the rate of past-year self-harm among youths (incidence rate ratio = 1.52; 95% confidence interval [CI] = 1.35, 1.69) and a 125% increase in the odds of attempted suicide (odds ratio = 2.25; 95% CI = 1.84, 2.76). Follow-up analyses displayed in Table 2 revealed that these findings were robust to the inclusion of potential confounders, including household income and parental education, previous delinquency, substance use, self-esteem, and internalizing and externalizing behaviors. We also conducted ancillary analyses examining interactions between police stops and the various sociodemographic factors displayed in Table 1. The interactions were consistently null with 1 exception: the association between police stops and suicide attempts was significantly attenuated in urban (vs rural) contexts (Table B, available as a supplement to the online version of this article at http://www.ajph.org).

Table 3 displays results of analyses using the KHB method to examine the

TABLE 2— Association Between Police Stops, Self-Harm, and Attempted Suicide: Millennium Cohort Study, United Kingdom, 2012–2019

	Self-Harm (S7), IRR[a] (95% CI)	Attempted Suicide (S7), OR[a] (95% CI)
Variables		
Stopped by police (S6)	1.52[b] (1.35, 1.69)	2.25[b] (1.84, 2.76)
Stopped by police (S6)	1.41 (1.23, 1.60)	1.79 (1.42, 2.25)
Covariates		
Age in years	0.90 (0.77, 1.05)	1.23 (1.00, 1.51)
Male	0.56 (0.50, 0.63)	0.37 (0.30, 0.46)
Race (Ref: White)		
Asian	0.61 (0.47, 0.80)	0.35 (0.21, 0.58)
Black	0.50 (0.28, 0.88)	0.62 (0.31, 1.22)
Mixed	0.96 (0.79, 1.18)	1.32 (0.89, 1.95)
Other	1.05 (0.66, 1.64)	0.95 (0.44, 2.04)
Mother native born	0.96 (0.79, 1.17)	1.11 (0.77, 1.60)
Urban	0.92 (0.83, 1.03)	0.98 (0.79, 1.21)
Sexual minority youth	2.08 (1.81, 2.38)	2.25 (1.79, 2.84)
Property delinquency (S5)	1.11 (0.95, 1.29)	1.14 (0.84, 1.55)
Substance use (S5)	1.22 (1.07, 1.39)	1.62 (1.28, 2.06)
School disengagement (S5)	1.17 (1.05, 1.32)	1.05 (0.84, 1.32)
Self-esteem (S5)	0.80 (0.71, 0.90)	0.63 (0.51, 0.78)
Internalizing behavior (S5)	1.30 (1.11, 1.53)	1.80 (1.35, 2.40)
Externalizing behavior (S5)	1.12 (0.95, 1.32)	1.21 (0.90, 1.63)
Parent education (S5; Ref: NVQ 1)		
NVQ 2	1.35 (1.05, 1.72)	0.87 (0.61, 1.24)
NVQ 3	1.39 (1.07, 1.80)	0.80 (0.54, 1.19)
NVQ 4	1.32 (1.03, 1.70)	0.78 (0.53, 1.14)
NVQ 5	1.33 (0.99, 1.78)	0.72 (0.44, 1.17)
Other	1.10 (0.77, 1.57)	0.86 (0.45, 1.65)
None	1.17 (0.87, 1.56)	0.74 (0.46, 1.17)
Household income (S5; Ref: first quintile)		
Second quintile	1.13 (0.96, 1.34)	0.82 (0.61, 1.11)
Third quintile	1.00 (0.83, 1.20)	0.67 (0.48, 0.93)
Fourth quintile	0.95 (0.78, 1.16)	0.51 (0.35, 0.74)
Fifth quintile	0.99 (0.80, 1.24)	0.49 (0.32, 0.73)
Single-parent household (S5)	1.16 (1.02, 1.32)	1.16 (0.91, 1.47)
Low neighborhood safety (S5)	1.08 (1.01, 1.16)	1.08 (0.94, 1.25)

Note. CI = confidence interval; IRR = incidence rate ratio; NVQ = National Vocational Qualification; OR = odds ratio; S = sweep. The sample size was n = 10 345. We examined self-harm by using zero-inflated negative binomial regression, and we examined attempted suicide by using logistic regression.

[a] Adjusted except as indicated.
[b] Unadjusted.

extent to which adolescent mental distress explained associations between police stops, self-harm, and attempted suicide. Mental distress at age 14 years significantly attenuated associations between lifetime police stops at age 14 years, self-harm at age 17 years, and attempted suicide by age 17 years. Mental distress explained anywhere from 17.73% to 40.18% of the association between police stops and each form of self-harm, as well as 31.67% of the association between police stops and attempted suicide.

TABLE 3— Examining Mental Distress as a Mediator Between Adolescent Police Stops, Self-Harm, and Attempted Suicide: Millennium Cohort Study, United Kingdom, 2012–2019

	Forms of Self-Harm						Suicide Attempt (Yes = 1)
	Cut or Stab	Burn	Bruise or Pinch	Overdose	Pull Hair	Other	
Mental distress							
% reduction	26.48	17.73	40.18	26.81	27.38	25.19	31.67
z score	7.98**	7.30**	7.92**	7.00**	7.67**	4.90**	8.31**

Note. We used the Karlson–Holm–Breen method to examine mediation.

**$P < .01$.

Finally, Table 4 displays the results of models examining whether key findings varied by specific features of police stops. The findings indicate that police stops, regardless of their features, were significantly associated with self-harm and attempted suicide. Even so, associations—particularly with attempted suicide—appear to be somewhat stronger in circumstances in which youths were warned or cautioned by police or arrested or taken into custody. Ancillary robustness checks employing the counterfactual, propensity score–based method of inverse probability–weighted regression adjustment yielded a similar pattern of results wherein police stops (regardless of features) were consistently and significantly associated with attempted suicide, and police stops involving either officer questioning or warnings or cautions (in the absence of arrest) were significantly associated with self-harm (Table C, available as a supplement to the online version of this article at http://www.ajph.org).

DISCUSSION

Police stops are a common experience among adolescents, with potentially serious mental health repercussions. By nature, police–youth encounters are characterized by discernable differences in age, status, and power that disadvantage youths and, as a result, may increase the stress-related mental health sequelae of these encounters. Building on extant knowledge from US-based findings linking youth police stops to mental health outcomes, the current study is the first to examine associations between adolescent police stops, self-harm, and suicide attempts in the United Kingdom. Findings suggest that adolescent encounters with police are associated with significantly higher rates of self-harm and significantly higher odds of attempted suicide among youths. These patterns were largely consistent across examined features of police stops and generally did not vary by sociodemographic factors. In addition, 17.73% to 40.18% of associations between police stops and outcomes were explained by mental distress. Robustness checks using the inverse probability–weighted regression adjustment approach that better addresses selection effects largely yielded similar

TABLE 4— Association Between Police Stop Features, Self-Harm, and Attempted Suicide: Millennium Cohort Study, United Kingdom, 2012–2019

	Self-Harm (S7)		Attempted Suicide (S7)	
	IRR (95% CI)	AIRR (95% CI)	OR (CI)	AOR (95% CI)
Police stop features (S6)				
Stopped and questioned	1.30 (1.12, 1.51)	1.25 (1.06, 1.46)	1.73 (1.32, 2.28)	1.43 (1.06, 1.93)
Warned or cautioned	1.74 (1.51, 2.00)	1.59 (1.32, 1.89)	2.73 (2.06, 3.62)	2.08 (1.51, 2.86)
Arrested or taken into custody	1.77 (1.15, 2.73)	1.75 (1.05, 2.92)	4.61 (2.43, 8.73)	3.58 (1.64, 7.81)

Note. AIRR = adjusted incidence rate ratio; AOR = adjusted odds ratio; CI = confidence interval; IRR = incidence rate ratio; OR = odds ratio; S = sweep. The sample size was n = 10 345. We examined self-harm by using zero-inflated negative binomial regression, and we examined attempted suicide by using logistic regression. Covariates were included but are not shown to conserve space.

findings, revealing that, even in the absence of arrests, stops involving (for instance) officer warnings or cautions remain significantly associated with both self-harm and attempted suicide. While causal relationships cannot be definitively determined from these data, findings echo extant work revealing psychological distress and mental health challenges following youth–police encounters.[5–9] For some youths, such distress may be linked to a heightened risk of maladaptive coping strategies, namely self-harm and suicide attempts.

The findings of the current study build upon previous research by examining the adolescent police stop–mental health nexus outside of the US context, as well as illuminate whether this work has implications for specific maladaptive coping responses to mental health challenges (i.e., self-harm, suicide attempts). Also, given the longitudinal structure of the data, we were able to examine whether mental distress at age 14 years explains any of the association between adolescent police stops (experienced by age 14 years) and self-harm at age 17 years, providing initial evidence that the mental health challenges stemming from police stops in previous research may have downstream implications for behaviors intended to harm oneself.[4–8] Ours is the first youth-focused study to examine self-harm or attempted suicide in the context of police stops, and among the first to examine youth police stops using data representative of the United Kingdom.

Despite the contribution of the present study, there are multiple ways to expand upon this work and further elucidate the processes through which police stops may be associated with maladaptive coping behaviors. For instance, given the considerable likelihood that youths are in the presence of peers when stopped by police,[28] youths may "find it difficult to show police officers deference" under such circumstances, especially when "adhering to the tenets of the street code (i.e., displaying toughness, commanding respect)."[29(p428)] Given the risk of social stigma following youth exposure to aggressive policing,[5] future work should explore youth stigmatization stemming from police encounters with peers present—including those that may not be particularly hostile—and whether such stigma has specific implications for self-harm and suicide.[6]

In addition, the precise pathways from police stops to self-harm and suicide attempts may be contingent on nuanced stop contextual features not explicitly captured here (e.g., youth perceptions of procedural injustice, specific acts of officer aggression). Despite our examinations of some police stop features, additional research is needed to elucidate how and under what conditions police stops may lead to distress, self-harm, and suicide attempts, as well as which features of the police encounter may be most impactful for youth mental health outcomes. For instance, despite uniformly significant findings, point estimates pertaining to "warned or cautioned by police" were consistently higher than those pertaining to "stopped and questioned by the police." It may be that, for some youths, "warned or cautioned" more strongly correlates with (or acts as a proxy for) greater officer aggression or hostility, which has been connected to the mental health impacts of youth–police encounters in US-based research.[5,9] Future research with additional details is needed (in the United Kingdom and elsewhere) to further unpack these connections.

Limitations

Despite its contribution, the present study has several limitations. First, while data were weighted to be nationally representative of the United Kingdom, results cannot be generalized to adolescents outside the United Kingdom. Follow-up research testing similar associations in other countries is warranted.

Second, causal relationships between these factors cannot be definitively determined given the observational design of the study. Despite our efforts to rule out selection effects using a quasi-experimental approach in ancillary models, the possibility of an unknown degree of omitted variable bias nonetheless remains. It is also possible that, for some youths, the suicide attempt(s) reported may have preceded police stops, given that these were lifetime reports. By contrast, youths reported past-year self-harm at age 17 years and lifetime police stops by age 14 years, enhancing the likelihood that police stops were antecedent to self-injurious behaviors. Still, future studies (including those in the United Kingdom) should collect data on the precise timing and frequency of police stops and mental health–related symptoms and behaviors. Relatedly, there may be gender differences in how youths approach questions around their mental health given gender norms encouraging or discouraging reporting of depression or mental distress. When possible, future research should seek to validate self-report measures of mental health using other approaches.

Third, the duration of time between police stops and outcomes remains unknown given that police stop measures were lifetime reports. Still, stops and outcomes were (at a minimum)

3 years apart, highlighting the potential for mental health repercussions of stops to persist over several years.

Finally, the available details on police stop features were limited (youth questioned, warned or cautioned, or arrested by officer). Future research should incorporate additional contextual features, including factors examined in US studies (e.g., officer intrusiveness, youth perceptions of procedural justice).[5,8,9] As alluded to previously, a critical direction for future research—particularly in non-US contexts—will be to capture the full spectrum of police–youth interactions to better determine whether police stops marked by greater intrusiveness and injustice are particularly harmful.

Public Health Implications

Results provide initial directionality for interventions and supports specific to youths who have experienced police stops. Efforts to strengthen social support systems in the wake of adolescent police stops will likely prove critical in mitigating adverse mental and behavioral health consequences of these stops. Such efforts might include physicians or school counselors inquiring about police encounters when students present as disengaged from school, their families, their communities, or with mental health needs.[30,31] Those who have had 1 or more negative experiences with police should receive appropriate interventions or supports. Furthermore, in screening for psychological distress, self-harm, and suicide risk,[30,31] future research should assess whether clinical utility is enhanced by adding items specific to the features of police encounters. It may also be worthwhile to include information on police encounters in existing suicide prevention modules focusing on bullying and violence exposure, given that social exclusion, bullying, and violence exposure are risk factors correlated with police stops[32,33] and are, therefore, frequently targeted in suicide prevention efforts.[34]

Policies focused on primary prevention of suicide may also be enhanced by including a focus on police training related to positive interactions with youths. Police agencies should train officers to use conflict resolution skills, trauma-informed approaches, and knowledge about youth development to reduce the risk of adverse mental health outcomes in the wake of adolescent police stops.[35] Beyond officer training, it may be worthwhile to consider policy reform efforts aimed at reducing police surveillance of young persons and investing more fully in youth attachment to civic life to ultimately enhance mental well-being. One possibility is to invest in community infrastructure to empower youths in heavily policed communities to become more fully engaged in local health-promoting initiatives.

Ultimately, the current study addressed 2 critical gaps in research on policing and adolescent health by investigating the association between youth–police encounters and mental health outcomes outside of the United States and extending this work to examine 2 serious public health problems among adolescents—self-harm and suicide attempts. Consistent with, yet building on, US-based research, police stops in the United Kingdom were associated with self-harm and suicide attempts among youths. Despite evidence generally revealing significant effects across stop circumstances, future research should further interrogate additional police-stop details to better elucidate the nature of these associations. Furthermore, rigorous evaluation of trauma-informed, developmentally appropriate strategies for identifying and intervening on mental distress and self-harm behaviors following police encounters should be prioritized.

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The authors have no conflicts of interest to disclose.

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