

PREVENTING CHRONIC DISEASE

PUBLIC HEALTH RESEARCH, PRACTICE, AND POLICY



Health Equity in Action: Research, Evaluation, Policy, and Practice

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Preventing Chronic Disease (PCD) is a peer-reviewed public health journal sponsored by the Centers for Disease Control and Prevention and authored by experts worldwide. PCD was established in 2004 by the National Center for Chronic Disease Prevention and Health Promotion with a mission to promote dialogue among researchers, practitioners, and policy makers worldwide on the integration and application of research findings and practical experience to improve population health.

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GUEST EDITORIAL

Promoting Health Equity Through the Power of Place, Perspective, and Partnership

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PEER REVIEWED

Summary

What is known on this topic?

Health equity is an almost universal priority, yet the goals, objectives, plans, and resources required to achieve health equity remain unclear.

What is added by this report?

The concept of a “wicked problem” is a useful way to note how achieving health equity differs from other public health goals and objectives.

What are the implications for public health practice?

While there is a tendency to focus on programs and policies, the fundamental work of health equity is in the learning, unlearning, relearning, and co-learning of public health professionals, communities, and community-based participatory research partnerships.

Abstract

The 10 articles in the *Preventing Chronic Disease* (PCD) special collection on health equity highlight that a commitment to self-reflection, cultural humility, and lifelong learning are foundations of health equity science and that the field is interdependent with the perspectives and context of communities.

Three themes — place, perspective, and partnership — emerged from the PCD special collection. The articles embody the principles outlined in the Healthy People definition of health equity and CDC’s CORE Health Equity Science and Intervention Strategy. They highlight the critical role that context, qualitative methods, and community-based participatory research play in efforts to achieve health equity. However, the science of achieving health equity is rooted in antiracism principles; the “inner work” of learning, unlearning, relearning, and co-learning; and the efforts to equip communities to act, research, and intervene for

themselves. Without these added critical structural lenses, health equity science will continue to fail to achieve its goal.

Introduction

Fifty years ago, Rittel and Webber (1) coined the term “wicked problem” to describe scientific problems for which the root causes and the path for resolving problems are not clear. Wicked problems are those that do not have a definitive formulation or solution. Considered to be a symptom of another problem, wicked problems are particularly challenging because interested parties differ in the values and interests they apply to resolving them (1). Achieving health equity is complicated and can be viewed as a uniquely wicked problem because of the web of historic, geographic, economic, social, structural, political, commercial, and other health determinants that intersect dynamically, bundling even more thickly when newer threats impinge on hopes for health equity (eg, public health infectious disease emergencies, climate-related disasters). Achieving health equity is further complicated by the challenge of effectively communicating to decision makers the logic, status, and depth of the problem itself (1).

Public health struggles to conceptualize, define, and operationalize a cohesive plan to achieve health equity almost 40 years after the Heckler Report (2). The report documented inequities in key health indicators among demographic groups of the US population and launched a new generation of health disparities research and practice. Thus, despite the volume of resources committed to this goal and robust acknowledgment that health equity is important, differences persist in perspectives on the goals, objectives, plans, and resources required to achieve health equity — a state where everyone has a fair and just opportunity to attain their highest level of health (3–5).

The information needed to understand and pursue health equity are integrally intertwined, limiting the ability to characterize and define the problem in a way that enables a solution (1). Most health equity research has not grappled with this penultimate goal but has focused on identifying causal associations that describe health inequities instead of interventions that employ antiracism principles and move the nation toward health equity (6). Interven-



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tions and efforts to achieve health equity that have been tested were limited by resource, time, and other considerations external to the problem.

The Call for Papers for this special collection of *Preventing Chronic Disease* (PCD) on health equity concluded, “Health is not just the absence of disease but also the presence of resources and supports that people need to thrive.” The collection of papers herein embodies the theme, “Health Equity in Action: Research, Evaluation, Policy,” and builds on the Healthy People 2020 roadmap for health equity. This PCD collection also reflects the 3 overarching goals of Healthy People 2030: 1) “eliminate health disparities, achieve health equity, and attain health literacy to improve the health and well-being of all,” 2) “create social, physical, and economic environments that promote attaining the full potential for health and well-being for all,” and 3) “engage leadership, key constituents, and the public across multiple sectors to take action and design policies that improve the health and well-being of all” (7). In 2021, the Centers for Disease Control and Prevention (CDC) launched an agency-wide strategy to holistically reimagine their approach to health equity aligned with these goals. The agency committed to integrating health equity in all aspects of what they do (3,5) by outlining CDC’s CORE Health Equity Science and Intervention Strategy to “Cultivate comprehensive health equity science, Optimize interventions, Reinforce and expand robust partnerships, and Enhance capacity and workforce engagement” (3,5).

Review of Articles in the Special Collection

The 10 articles that comprise this PCD special collection on health equity exemplify the principles outlined in the Healthy People definition of health equity and CDC’s CORE Health Equity Science and Intervention Strategy. All the articles acknowledge social determinants of health inequities in their introductions, often attending to the PCD call for deep, rather than superficial, descriptions of this phenomenon. In reviewing the articles, 3 themes emerged: place, perspective, and partnership. Through demonstrating the roles that race-based residential segregation, food deserts, neighborhood conditions, loss of lands, and other built environmental factors play, literature on health inequities has consistently demonstrated that the “place” where people live, work, play, and engage in spiritual and religious practice has implications for their health. Although some articles in this collection focus on the importance of quantitative methods, the second theme that emerged highlighted the importance of effective communications and the strengths of qualitative research (8). Qualitative research provides insight with an “insider’s view” on injustices and the hope for ac-

tion to improve people’s health and well-being (8). The third theme to emerge was the critical role of engagement with community partners (9). In the remainder of this section, we review the groups of articles that are consistent with each of these 3 themes.

Place: the importance of geographic context

Using census tract-level rates of cardiovascular morbidity and mortality for Black residents in metropolitan Atlanta, Georgia, Kim and colleagues (10) identified 106 resilient neighborhoods and 121 “at-risk” neighborhoods where Black residents had substantially lower-than-expected and higher-than-expected rates of cardiovascular disease events, respectively, despite similarities in their neighborhood income levels. Smiley and colleagues (11) analyzed secondary quantitative data in Los Angeles, California, to understand whether the racial composition of neighborhoods is associated with exposure to menthol cigarette marketing. The highest level of exposure to marketing was in African American neighborhoods, compared with neighborhoods composed of residents from other racial and ethnic groups (11). Coats and colleagues (12) examined how race, ethnicity, and gender intersect to affect employment loss and food insecurity in St. Louis, Missouri. Cardarelli and colleagues (13) conducted focus groups in Martin County, Kentucky, that explored perceptions of the local food environment and assessed the potential acceptability of an intervention strategy to promote equity in obesity prevention in this rural Appalachian community.

Perspective: the importance of effective communication and qualitative research

Brian and Weintraub (14) remind us that prevention is a cornerstone of public health practice. Efforts to integrate dental programs within clinical care that focus on prevention, screening, and risk assessment could improve physical and mental health outcomes and help to prevent chronic diseases. Oral health care should be a public health priority, including in the response to the COVID-19 pandemic. Brian and Weintraub (14) argue that the introduction of unique barriers to reopening dental practices disproportionately affected populations at high risk for contracting and suffering serious complications and death from the virus.

Calanan and colleagues (15) described the 2-phase development of the *Health Equity Guiding Principles for Inclusive Communication (Guiding Principles)* (16). The first phase created a tool to guide the development of scientific and other communications. The *COVID-19 Health Equity Style Guide* provided guidelines for preferred terminology and other best practices from communication science literature and subject matter experts; then, the guide was shared informally with other CDC staff not directly involved in the COVID-19 response. The second phase created a

public-facing resource available for all public health practitioners and partners to apply an equity-centered approach to communicate information to improve the health of all communities respectfully. The *Guiding Principles* website covers 2 broad considerations for developing respectful, inclusive, and nonstigmatizing communications: 1) to understand and frame information in terms of social and health inequities, and 2) to apply the best culturally responsive practice for the intended audience through language use, image selection, and other guidelines. The *Guiding Principles* serve as a starting point and an approach that is not a mandate but rather an important resource that has been presented to a range of partners as public health practitioners and partners consider how to adopt these guidelines in all types of communication (15).

In addition to these perspectives of public health professionals, 3 articles highlight the importance of qualitative research (17,18). Qualitative inquiry helps to explore phenomena in context, including the natural settings of “place,” and it elevates the voices of those who experience disproportionately poor health (18). As is evident from the article by Cardarelli and colleagues (13), qualitative methods often serve as a primary source for explaining how and why inequities exist and what may work to promote equity in their communities (18). Felner and Henderson (18) present and respond to the need for additional pragmatic guidance on thoughtfully designing and conducting a robust qualitative data analytic strategy to produce findings that have implications for advancing health equity. Also, to facilitate self-reflection, Felner and Henderson (18) recommend that researchers undertake reflective “memo writing” on what they are learning, including exploring their biases.

Satterfield et al (17) elicit the perspectives of children, parents, and educators to explain the sustained appeal of Eagle Books, a series of 4 books to educate young American Indian and Alaska Native children about type 2 diabetes and related conditions. Tribal leaders guided CDC and the Indian Health Service in the development of the books to use traditional ways of teaching children how to stay healthy. The voices of volunteers participating in the qualitative evaluation allowed the researchers to identify critical themes that help explain the interest in the stories over time. A major theme from their findings was that children identified with the characters who “look like me” and with cultural values such as generosity and caring for one another. Several educators and parents shared stories of children who championed food and activity messages for their families and friends. The authors cite quantitative studies by independent Eagle Books programs that documented significant intentions to make healthier food and activity choices after exposure to the stories (17).

Partnership: the power of community engagement

Two articles illustrate the principles of community-based participatory research (CBPR), inviting the direct, equitable participation of people with relevant lived experience in all aspects of research and application of benefits (9,19,20). Ellis et al (21) argue that family-focused interventions to facilitate chronic disease management should center on racial health equity and explicitly consider family health history, sociocultural and contextual factors, and community-engaged participatory approaches to work “inside, outside, and alongside” families. They contend that deeper attention to the family relationship context for chronic disease management is essential to improving outcomes among adults who are disproportionately affected by chronic diseases (21). They recommend a framework for disciplinary self-critiques that can help examine how racism has hampered efforts to achieve health equity.

Akintobi et al (22) describe how their Prevention Research Center (PRC) relied on community wisdom and the governance of a long-established community coalition board. They described how community members taught the PRC that some terms used in COVID-19 media messaging fostered anxiety and mistrust of public health and health care systems. The community coalition board facilitated public health disaster health literacy to refine messaging about mitigating the virus to be more congruent with framing that resonates with the community. The community coalition board also prioritized patient-centered models of integrated mental health care within primary health care. They described how they learned of the toll of pandemic stressors that adversely affected mental health and recommend that public health practitioners understand and communicate the complexities of health disparities in the context of historical and current social determinants of health.

Implications for Public Health

Across this PCD health equity special collection’s themes of place, perspective, and partnership, the role of the context and focus of our public health interventions is worth noting. Since opportunities to be healthy are shaped by people’s daily environments, “place” is a critical setting for health equity science. Incorporating the characteristics of the environment provides opportunities for public health practitioners to locate their work with communities in a particular setting and to consider other social and structural determinants of health. While it is crucial to create and widely adopt behavioral practices that promote health and well-being, public health professionals recognize the unique role of place for optimizing intervention opportunities that can yield the healthiest behavioral and health outcomes (3,5).

The second theme of perspective highlights the importance of communications and qualitative research. Considered 1 of the 10

essential public health services (23,24), effectively communicating in inclusive and supportive ways is crucial (16). In addition, although quantitative research is a foundation of epidemiology and other aspects of public health, qualitative research reveals the meaning of experiences and views of participants in the context of their lives and settings (8). Qualitative findings can help identify community assets, explicit and implicit theories, and factors that affect health across levels of the social ecological framework (8).

As reflected in CDC's CORE Strategies and in arguments made by CBPR scholars for decades, improving local conditions to mitigate the implications of structural racism on health requires meaningful collaboration and work with community organizations. Building on recommendations from Ellis and colleagues (21), pursuits of health equity are bolstered when organizations and institutions share and co-create plans to acquire, mobilize, and utilize resources to work and walk "inside, outside, and alongside" communities. Creating structures and the capacity for researchers, practitioners, and communities to work in partnership is integral to improving understanding of public health problems and creating innovative strategies to solve them. Thus, a primary goal of health equity science is to increase the knowledge, skills, confidence, and motivation to fulfill one's public health role in ways consistent with the penultimate goal of achieving health equity. The efficacy to achieve health equity is not limited to public health researchers or even their agency's goals; this quality lies at the heart of community-based partnerships with academic, nonprofit, and local, state, and federal organizations built by residents dedicated to improving health outcomes for their people.

Recommendations: Toward Fundamental Principles of Health Equity Science

Antiracism provides a vision, framework, and tools to guide efforts to achieve health equity (25). Consistent with antiracism principles (19,25) and the notion of cultural humility (26), this PCD issue highlights the critical role that commitment to self-reflection, self-awareness, and redressing imbalances and injustices plays in helping to change the world to improve the odds that people can be healthy and achieve health equity (25). As we connect this PCD special collection with the larger body of literature, we offer 6 recommendations to guide health equity science. First, health equity research and practice are inclusive of the "inner work" of learning, unlearning, relearning, and co-learning and may not be reduced to the "outer work" of policies, programs, and practices to avoid unhealthy outcomes (27). Second, a significant part of the outer work and inner work reflects the cultural humility and critical awareness and commitment to redressing imbalances needed to achieve health equity. Third, while partnership may be an essential tool in the health equity science toolbox, CB-

PR is only one approach that communities, researchers, and practitioners may use to inform and guide their collaborative work. Regardless of the approach, it is critical for community, researcher, and practitioner partnerships to include tools and processes to evaluate the effectiveness of their partnership and the implications of their collaborative work for policy and practice. If the goal is to achieve health equity, it is critical to integrate CBPR and other partnership approaches with antiracism principles (19,20,25). A commitment to partnering with communities throughout the research process includes the recognition of racism as a public health problem (28) and a fundamental determinant of health inequities. A commitment to addressing racism in the partnership or mitigating and undoing racism should ensue as part of the work (19,25). Future iterations of CBPR principles should be revised to more explicitly integrate antiracism principles (19,25) and community priorities (20,29). Fourth, as the CDC CORE Strategy outlines, efforts to achieve equity should seek to enhance, or increase, the capacity of community members to define their own etiology of health problems and possible solutions (9). A critical aspect of public health professionals' work is increasing the capacity to communicate in respectful, inclusive, and nonstigmatizing ways (15,16). Building and respecting this type of community power (29) is not only fundamental to CBPR approaches to research, but also helps to create a sustained foundation once achieved. Four decades of health equity research have shown how critical it is for efforts to achieve equity not to be perpetually dependent on external partners. One of the goals of health equity science should be to equip communities to act, research, and intervene as equal partners with academic and public health partners and for themselves. Fifth, the ability to communicate meaningfully is critical to all communities, particularly those that have persistently borne a disproportionate burden of poor health outcomes. Sixth, and finally, identifying SMART (specific, measurable, acceptable, realistic, and time-bound) objectives for health equity is a critical tool to direct needed resources to see the nation through to the goal of achieving health equity. SMART objectives guide almost all other programmatic, funding, and policy efforts in the US because they provide benchmarks, motivation, and perspective on the resources needed to achieve public health goals (4). Creating SMART health equity objectives will elevate health equity science strategies and initiatives across public health practice, policy, and research to mitigate and undo racism to achieve and sustain equal health outcomes.

Conclusion

Public health is a tool to change the world (30) and a profession that "works to develop public policies that can change the odds that more people can succeed" (31). However, health inequities persist. People disagree about the trade-offs involved in achieving

health equity, the speed with which we seek to reach equitable opportunities and outcomes, and whether achieving health equity is possible given the other structural inequities characterized by the notion of structural racism (25). It is important to remember that health equity is a state that has never existed in the US; thus, health equity science has an opportunity to move beyond changes in terminology to build on and sustain efforts to achieve equity (4). Efforts to achieve equity must be rooted in a culture of commitment and accountability to the principles of fairness and justice — foundational structures that will guide us to our destination (4,29). Not simply a moral imperative, health equity is a necessary requisite to reducing the drain on our health care system, health care providers, overall economy, and collective well-being that is currently mired by inequities (4). Ensuring that the public health community collectively does the inner work necessary to decide what it is willing to do to achieve health equity will be critical.

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ORIGINAL RESEARCH

Identification of Resilient and At-Risk Neighborhoods for Cardiovascular Disease Among Black Residents: the Morehouse-Emory Cardiovascular (MECA) Center for Health Equity Study

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PEER REVIEWED

Summary**What is already known about this topic?**

Residential neighborhood and neighborhood socioeconomic status (SES) are important determinants of cardiovascular disease (CVD) outcomes. It remains understudied what types of neighborhoods promote resilience or increase risk of CVD beyond the effect of neighborhood SES, especially among black Americans, who have a disparately higher prevalence of CVD than white Americans.

What is added by this report?

In the Atlanta, Georgia, metropolitan area, using the census tract-level rates of cardiovascular mortality and morbidity for black residents during 2010–2014, we identified 106 resilient neighborhoods and 121 at-risk neighborhoods where black residents had substantially lower-than-expected and higher-than-expected rates of CVD events, respectively, despite similarities in their neighborhood income levels. Yet, certain socioeconomic indicators of inequalities remained important determinants of neighborhood-level CVD risk.

What are the implications for public health practice?

Better characterization of resilient and at-risk neighborhood for black Americans helps identify neighborhood-level factors that promote resilience to CVD and helps guide community-level interventions to improve CVD outcomes for black residents in high-risk areas.

Abstract**Introduction**

Despite the growing interest in place as a determinant of health, areas that promote rather than reduce cardiovascular disease (CVD) in blacks are understudied. We performed an ecologic analysis to identify areas with high levels of CVD resilience and risk among blacks from a large southern, US metropolitan area.

Methods

We obtained census tract-level rates of cardiovascular deaths, emergency department (ED) visits, and hospitalizations for black adults aged 35 to 64 from 2010 through 2014 for the Atlanta, Georgia, metropolitan area. Census tracts with substantially lower rates of cardiovascular events on the basis of neighborhood socioeconomic status were identified as resilient and those with higher rates were identified as at risk. Logistic regression was used to estimate the odds ratios (OR) and 95% confidence intervals (CIs) of being classified as an at-risk versus resilient tract for differences in census-derived measures.

Results

We identified 106 resilient and 121 at-risk census tracts, which differed in the rates per 5,000 person years of cardiovascular outcomes (mortality, 8.13 vs 13.81; ED visits, 32.25 vs 146.3; hospitalizations, 26.69 vs 130.0), despite similarities in their median black income (\$46,123 vs \$45,306). Tracts with a higher percentage of residents aged 65 or older (odds ratio [OR], 2.29; 95% CI, 1.41–3.85 per 5% increment) and those with incomes less than 200% of the federal poverty level (OR, 1.19; 95% CI, 1.02–1.39



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per 5% increment) and greater Gini index (OR, 1.56; 95% CI, 1.19–2.07 per 0.05 increment) were more likely to be classified as at risk than resilient neighborhoods.

Discussion

Despite matching on median income level, at-risk neighborhoods for CVD among black populations were associated with a higher prevalence of socioeconomic indicators of inequality than resilient neighborhoods.

Introduction

Despite the recent, overall reduction in cardiovascular events in the United States, cardiovascular disease (CVD) rates are still higher among black Americans than among white Americans (1,2). Although this interracial disparity in CVD is a public health concern, a substantial degree of intraracial heterogeneity exists within the black population that is often overlooked. More than 50% of black Americans have no form of CVD or cardiovascular risk factors (3). Nevertheless, the factors that promote resilience to CVD among blacks are understudied.

Factors that confer cardiovascular resilience are likely multifactorial, consisting of individual and environmental elements (3). Recent studies have demonstrated residential “place” as a determinant of cardiovascular outcomes (4–7). For example, neighborhood characteristics such as food access, aspects of the built environment, safety, and social cohesion have been individually linked with the cardiovascular health of the residents (7). Furthermore, across racial groups, there is significant variability in CVD by national (6,8) and regional geographic locations (5,9). This geographic variability suggests that certain residential contexts promote cardiovascular health while others increase cardiovascular risk and disease. A better characterization of the spatial contexts that positively promote cardiovascular health (ie, areas with cardiovascular resilience, particularly for black residents), is important in understanding the CVD burden for black Americans and guiding interventions to improve outcomes among them.

We investigated the resilience of neighborhoods against expected CVD rates among black adults in Atlanta, Georgia. By using census tract-level cardiovascular mortality and morbidity rates, we identified neighborhoods that were resilient or at risk for CVD among black residents. Specifically, we identified resilient and at-risk neighborhoods that were not predominantly confounded by differences in neighborhood socioeconomic status (SES), an established determinant of cardiovascular outcomes (7,10–12). Lastly, we conducted an ecologic-level analysis of the census-derived measures to identify the characteristics that distinguish resilient and at-risk areas.

Methods

Geographic region of the study. This study was completed as part of the Morehouse–Emory Cardiovascular (MECA) Center for Health Equity project. Census tract was used as the unit of analysis. Data were obtained and analyzed for the 992 census tracts in the 36-county Atlanta–Athens–Clarke–Sandy Springs combined statistical area that makes up the Atlanta metropolitan area (Figure 1).

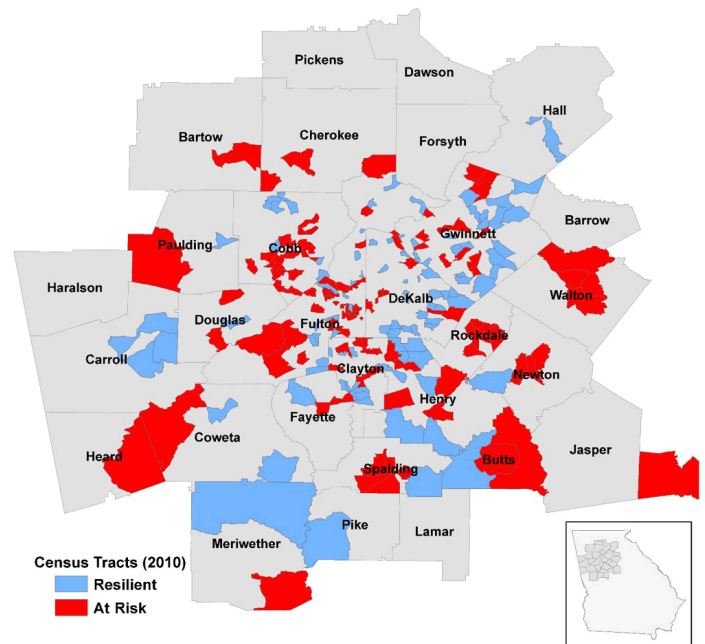


Figure 1. Study region of the Morehouse–Emory Cardiovascular Center for Health Equity project conducted in the Atlanta, Georgia, metropolitan area with 2010 census tract boundaries. Resilient and at-risk census tracts identified by the residual percentile method are indicated.

Mortality data. Cardiovascular mortality data for the 5-year period from 2010 through 2014 were obtained from the Georgia Department of Public Health. We received the counts of all deaths attributable to cardiovascular causes (identified as ICD 10 codes I00–I78, from the *International Classification of Diseases, Tenth Revision* [13] or ICD 9 codes 390–434 and 436–448 from the *International Classification of Diseases, Ninth Revision* [14]) for blacks aged 35 to 64, the age group that captured most of the population with CVD risk while excluding those aged 65 or older to minimize the confounding by noncardiac comorbidities. Counts for census tracts with fewer than 5 deaths were censored for confidentiality reasons, which resulted in a total of 347 census tracts with uncensored data. Additionally, to minimize the number of census tracts censored because of few events and to ensure stable

events rates over the 5-year period, only the tracts with at least 200 black adults aged 35 to 64 were included (N = 346). Counts of deaths were then divided by the black population aged 35 to 64 living in the respective census tracts (2010 US Census data) (15) to generate the mortality rate for each census tract. The rates were reported as the number of events per 5,000 person-year (per 1,000 people over the 5-year period).

Morbidity data. Cardiovascular morbidity data from 2010 through 2014 were obtained from the Georgia Hospital Association. We obtained aggregated counts of emergency department (ED) visits and hospitalizations for cardiovascular reasons, identified with ICD 10 codes I00–I78 (13) or ICD 9 codes 390–434 and 436–448 (14) for blacks aged 35 to 64 from 2010 through 2014. Census tracts with fewer than 6 events were censored for confidentiality reasons, resulting in 802 tracts with uncensored data for ED visit and 763 tracts for hospitalization data. As with mortality, only tracts with at least 200 black adults aged 35 to 64 were included (N = 693 for ED visits; N = 675 for hospitalizations). Counts of ED visits and hospitalizations were divided by the population of blacks aged 35 to 64 living in the respective census tract (2010 US Census data) (15) to calculate the rates of hospitalization and ED visits for each census tract. The rates were reported as the number of events per 5,000 person-year.

Census-derived measures. We obtained census tract data from the 2010 US Decennial Census (15) to characterize the demographic and socioeconomic composition of the identified at-risk and resilient census tracts. The variables selected included factors that have been previously linked with CVD, such as SES and housing-related indicators (5,10,16), and measures of demographic composition. Demographic data obtained were percentage female, black median age, percentage aged 65 or older, percentage aged 17 or younger, percentage minority population, percentage black population, percentage speaking English less than well, percentage of single-parent households, and percentage civilians with a disability. For the measures of SES, we obtained median black household income, percentage education certifications (high school, college), percentage unemployed, percentage with incomes below the federal poverty level, percentage with incomes below 200% of the federal poverty level (ie, percentage of the population with income below twice the federal poverty level, as an index of the proportion in or near poverty), and Gini index (17) (a measure of income inequality from perfect equality [0], where everyone receives the same income, to perfect inequality [1], where a single person receives the total income of the community). For housing-related measures, median home value, percentage living in multi-unit structures, percentage living in mobile homes, percentage living in crowded units (defined as housing units occupied by more

than 1 person per room), and percentage living in group quarters. Finally, the percentage of households without a vehicle was assessed as a measure of transportation accessibility.

Identification of resilient and at-risk census tracts. We identified census tracts that were resilient and at risk based on the aforementioned measures of cardiovascular outcomes: deaths, ED visits, and hospitalizations. First, we identified low-rate and high-rate census tracts solely on the basis of the distribution of the outcome measures. A census tract was considered low-rate on one of the 3 measures if its rate was in the bottom quartile of the measure and high-rate if its rate was in the highest quartile of the measure. Then, if a census tract was considered low-rate on at least 2 of the 3 measures and not high-rate for any measure, the tract was classified as a low-rate census tract. Similarly, being labeled as a high-rate tract on at least 2 of the 3 measures and not low-rate on any measure classified the tract as high-rate.

Because it is well documented that neighborhood SES is a strong determinant of cardiovascular outcomes (5,10,11), we identified areas that were not predominantly confounded by differences in neighborhood SES. We used the residual percentile method, which is similar to a method used to by Fry-Johnson et al (18) to identify counties with low infant mortality rates independent of county-level SES. By using this method (Figure 2), we identified census tracts that had substantially lower or higher rates of CVD outcomes than the rates that would be expected on the basis of their neighborhood SES. Census tracts with lower than expected CVD outcome rates were defined as resilient, and those with higher than expected CVD rates were defined as at-risk. To do so, a negative binomial model was built for each of the 3 measures. Each model was adjusted for census tract-level socioeconomic variables for blacks, including age distribution (in 5-year age groups), percentage male, and median black household income. Census tracts without any missing covariate were included in the model (N = 346 for mortality; N = 689 for ED visits; N = 671 for hospitalizations). Census tracts with model residuals in the highest 25% (substantially higher rates than predicted) were considered at risk for the measure. Similarly, tracts with model residuals in the lowest 25% (substantially lower rates than predicted) were considered resilient for the measure. Census tracts at risk or resilient on at least 2 of 3 measures were finally labeled as at-risk or resilient census tracts, respectively, and included in our analysis. Any census tract designated at risk for one measure but resilient for any other measures, or vice versa, was excluded.

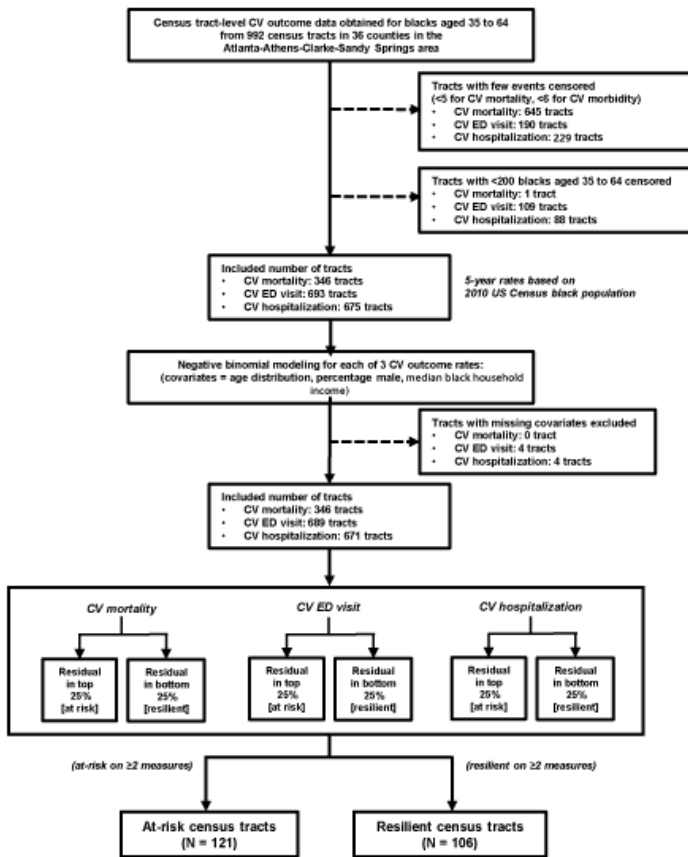


Figure 2. The steps in the identification of at-risk and resilient census tracts by the residual percentile method. Census tract-level CV outcome data for blacks aged 35 to 64 from 992 census tracts in 36 counties in the Atlanta–Athens–Clarke–Sandy Springs combined statistical area were used to identify 121 at-risk and 106 resilient census tracts. Abbreviations: CV, cardiovascular; ED, emergency department.

Statistical analysis. We used *t* tests to compare demographic and socioeconomic measures of at-risk and resilient census tracts, which we identified by the residual percentile method. The measures that were significantly different were subsequently analyzed by using logistic regression models. The OR and 95% CI for being labeled at-risk census tracts compared with resilient tracts were estimated in bivariate and multivariable models, for 5% increment in the included census tract measures. We verified absence of any major collinearity among the explanatory variables by computing the condition index (19) in the fully adjusted model (27.49). $P < .05$ was considered significant. Statistical analyses were performed by using SAS version 9.3 (SAS Institute Inc).

Results

In our initial analyses, unadjusted for neighborhood SES, we identified 130 low-rate and 137 high-rate census tracts. Tracts selected using this approach differed in their CVD outcome measures as expected (mortality: 6.27 for low-rate tracts vs 15.75 for high-rate tracts; ED visits: 27.67 for low-rate tracts vs 159.70 for high-rate tracts; hospitalizations: 21.60 for low-rate tracts vs 165.10 for high-rate tracts; per 5,000 person-year), but they also had substantial difference in the median black household income levels (\$60,980 for low-rate tracts vs \$29,015 for high-rate tracts). By using the residual percentile method, we identified 106 resilient and 121 at-risk census tracts. The resilient census tracts had lower rates of cardiovascular mortality, hospitalization, and ED visits than the at-risk census tracts, but the median black household income levels of the resilient and the at-risk census tracts did not differ from each other substantially (Table 1). Furthermore, resilient and at-risk census tracts were located throughout the metropolitan Atlanta area without clustering of either resilient or at-risk tracts, and resilient and at-risk census tracts were also often adjacent to one another (Figure 1).

The median age of black residents was similar in resilient and at-risk census tracts, but the proportion of residents aged 65 or older was significantly lower in resilient census tracts than in at-risk census tracts ($P < .001$) (Table 2). The proportion of women and black residents were also similar in both neighborhood types. However, fewer civilians with a disability resided in resilient census tracts than in at-risk tracts ($P < .001$).

For socioeconomic measures, resilient census tracts had a higher percentage of college graduates and those with some college education than at-risk census tracts ($P = .01$ and $.007$, respectively). Similarly, there were more people with high school diploma or less in at-risk census tracts than in resilient tracts ($P < .001$). Though the median black household income was similar and the percentage of people with incomes below the federal poverty level were similar in the 2 groups, resilient census tracts had fewer residents with incomes below 200% of the federal poverty level than at-risk census tracts and had significantly lower Gini index than at-risk census tracts (0.38 vs 0.42, $P < .001$). Other housing measures did not differ significantly between resilient and at-risk tracts, but more households in at-risk census tracts had no vehicle than in resilient tracts ($P = .02$).

Six measures that differed significantly ($P < .05$) between resilient and at-risk census tracts were included in regression analyses: percentage aged 65 or older, percentage of civilians with a disability, percentage with no high school diploma, percentage with incomes below 200% of the federal poverty level, Gini index, and percent-

age with no vehicle in household (Table 3). After simultaneous adjustment in the model, census tracts with a 5% increment in the proportion aged 65 or older were 2.29 times (95% CI, 1.41–3.85) more likely to be categorized as at-risk tracts. Similarly, tracts with 5% increment in the percentage below 200% poverty were 1.19 times (95% CI, 1.02–1.39) more likely to be designated as at-risk tracts. Finally, tracts with a 0.05 higher Gini index were 1.56 times (95% CI, 1.19–2.07) more likely to be classified as at-risk tracts.

Discussion

We identified several demographic and socioeconomic indicators of income and education inequality at the ecologic level that distinguished at-risk neighborhoods from resilient neighborhoods; having a higher proportion of residents aged 65 or older and residents with income below 200% of the federal poverty level and greater income inequality were independent factors that separated at-risk neighborhoods from resilient neighborhoods. To our knowledge, this study is the first to use census tract-level data to identify areas resilient to and at risk for CVD for black residents in a large US metropolitan area.

Our approach to identify resilient and at-risk neighborhoods was unique in that we quantified the deviation of cardiovascular mortality and morbidity for neighborhoods from what would be predicted on the basis of their neighborhood SES. Over the past 2 decades, studies have demonstrated that living in socioeconomically disadvantaged neighborhoods is associated with a greater burden of cardiovascular risk and disease (7,12). This association has been demonstrated not only with cardiovascular risk factors (11,20,21), but also with incidence of CVD (5,22) and cardiovascular mortality (10,23). However, despite the growing interest in neighborhoods as a determinant of health, less is known about outlier communities that have an unusually lower or higher burden of CVD than what would be expected given their socioeconomic composition. Understanding of those outlier communities will elucidate neighborhoods' health-promoting factors better than using SES.

Reports of such outlier communities date back as early as the 1960s (24), but contemporary data from the United States is still largely lacking. The bulk of available evidence on resilient neighborhood comes from research in Europe (25–28) and New Zealand (29), in which neighborhoods with higher or lower rates of all-cause mortality and morbidity than predicted from neighborhood SES were identified, similar to the approach we used in this analysis. However, our analysis differed from these reports in 2 major aspects. First, we examined cardiovascular-specific mortality and morbidity whereas the other studies examined all-cause mor-

tality or morbidity. As previously reported (27), the resilience of neighborhoods may differ depending on the etiologies of mortality, and examination of cause-specific mortality and morbidity as in our analysis helps identify potential mechanistic pathways between neighborhood characteristics and CVD more directly. Second, previous studies extracted mortality and morbidity data from the entire population of the examined communities, potentially masking the racial/ethnic differences in the association between neighborhoods and individuals. On the other hand, we focused on a specific racial group, blacks, to explore the intraracial differences between types of neighborhood on CVD and eventually to help design effective interventions to improve neighborhoods for better cardiovascular outcomes of among black residents.

We also identified several independent features that distinguished resilient and at-risk neighborhoods for CVD in black residents. Not only do these factors illustrate the primary ecologic-level determinants of neighborhood resilience or risk for CVD for black residents, but they also could provide insights into policy design or community-level interventions to improve cardiovascular outcomes among blacks. First, despite similarities in the median age and the proportion of population aged 17 or younger, at-risk census tracts had a higher proportion of residents aged 65 or older than resilient census tracts. A similar finding was also previously reported in relation to all-cause mortality (26). Interestingly, the cardiovascular outcome data used in our analysis did not include people aged 65 or older. Thus, although an older age is a known risk factor for cardiovascular mortality and morbidity (30), the proportion of those aged 65 or older likely represents a proxy for contextual factors of the at-risk neighborhood environment. For example, a higher proportion of elderly residents may correlate with a stagnant or declining overall population with fewer middle-aged working residents, whereas a greater influx of residents, likely with more economic opportunities, may be associated with resilient neighborhoods (29,31). Further characterization of the population composition with trajectory may help further elucidate the significance of the percentage of the elderly in the CVD resilience and risk of the overall neighborhood.

Secondly, both a higher proportion of those with incomes under 200% of the federal poverty level and greater income inequality were also independently associated with at-risk neighborhoods compared with resilient neighborhoods. Although the median black income and percentage of those under the poverty level were similar in resilient and at-risk neighborhoods, our results suggest that even moderate deprivation of income (ie, those in the near-poverty and the resultant income equality despite similarities in the median income) could adversely affect CVD outcomes among black residents. In addition to the level of neighborhood income it-

self (7,12), income inequality has been previously associated with CVD burden (32,33). Thus, our findings reconfirm that socioeconomic deprivation, even at a moderate degree, may affect cardiovascular resilience and risk at the ecologic level. Whether income deprivation and inequality represent proxies for other contextual factors of neighborhoods remains to be investigated. Although limited in our analysis, further characterization of people with incomes at the poverty or near-poverty level would be important, because they may be the vulnerable population that would most benefit from the appropriate aid to improve their cardiovascular outcomes or prevention measures.

Our study has limitations. Because of its cross-sectional design, any inference of causation from the observed findings is limited. Longitudinal analyses of the neighborhood resilience and the neighborhood-level cardiovascular outcomes would be needed. Furthermore, the definition of neighborhood in a fixed unit of census tracts may have masked variability of smaller communities and residential contexts. Similar analysis in smaller units, such as census block, may be informative to validate or augment our analysis. Third, because the data examined were limited at the ecologic level, the subjective, contextual factors of living in a given neighborhood are not accounted for in our analysis. However, our work was undertaken as the first cornerstone of the larger MECA project, which aims for a multilevel exploration of cardiovascular resilience of US black adults and lays a foundation for continued investigation. In the subsequent stages of the MECA project, we plan to examine the characteristics of the identified at-risk and resilient neighborhoods at the individual level, which would enable us to better understand the contextual versus compositional factors contributing risk or resilience to the residents of the selected tracts.

In conclusion, by using neighborhood-level data on cardiovascular mortality and morbidity for black residents, we identified resilient and at-risk neighborhoods for CVD among black adults in a large southern US city. These resilient and at-risk neighborhoods substantially differed in the rates of cardiovascular mortality and morbidity despite their similar income levels, suggesting that they represent a distinct residential context, or place, that promotes or jeopardizes the cardiovascular health of its black residents beyond the effect of neighborhood SES. However, even with our definitions of resilient and at-risk neighborhoods, certain socioeconomic indicators of inequality remained important predictors of CVD risk at the neighborhood level. Further exploration of contextual factors other than neighborhood SES are needed to fully characterize the factors that constitute a residential place that either promotes or threatens the cardiovascular health of its black residents.

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Tables

Table 1. Mean Rates of Cardiovascular Outcomes and Median Household Income for Black Residents in Resilient and At-Risk Census Tracts^a, Atlanta, Georgia, 2010–2014

| Variable | Resilient Tract (n = 106) | At Risk Tract(n = 121) | PValue |
|--|---------------------------|------------------------|--------|
| Mortality rate ^b | 8.1 | 13.8 | <.001 |
| Emergency department visits ^b | 32.3 | 146.3 | <.001 |
| Hospitalization rate ^b | 26.7 | 130.0 | <.001 |
| Median household income, \$ | 46,123 | 45,306 | .79 |

^a Selected by the residual percentile method.

^b Number of events per 5,000 person-year.

Table 2. Comparison of Demographic, Socioeconomic, Housing and Transportation Characteristics of Resilient and At-Risk Census Tracts, Atlanta, Georgia^a

| Variable | Resilient Tract (n = 106) | At-Risk Tract (n = 121) | P Value |
|---|---------------------------|-------------------------|---------|
| Demographic characteristic | | | |
| % Female | 54.8 | 55.6 | .29 |
| Median black age, y | 32.3 | 32.1 | .77 |
| % Aged ≥65 y | 7.8 | 10.4 | <.001 |
| % Aged ≤17 y | 26.4 | 25.3 | .19 |
| % Racial/ethnic minority population | 67.7 | 62.5 | .14 |
| % Black population | 48.8 | 45.3 | .38 |
| % Speaking English less than well | 4.8 | 4.0 | .34 |
| % Single-parent households | 13.9 | 14.0 | .88 |
| % Civilians with a disability | 9.7 | 12.0 | <.001 |
| Socioeconomic status of residents | | | |
| Median black income, \$ | 46,123 | 45,306 | .79 |
| % With no high school diploma | 13.3 | 16.3 | .02 |
| % With high school diploma or less | 34.8 | 43.3 | <.001 |
| % With some college | 35.8 | 32.4 | .007 |
| % College graduate | 29.4 | 24.4 | .01 |
| % Unemployed | 13.2 | 13.4 | .85 |
| % With income below federal poverty level | 20.2 | 22.8 | .14 |
| % With income below 200% of federal poverty level | 33.7 | 40.7 | .003 |
| Gini index ^b | 0.38 | 0.42 | <.001 |
| Housing | | | |
| Median home value, \$ | 181,761.00 | 176,008.00 | .62 |
| % Multi-unit structure | 18.3 | 13.8 | .10 |
| % Mobile home | 2.5 | 2.5 | .97 |
| % Crowded unit | 3.2 | 3.1 | .96 |
| % Living in group quarter | 0.9 | 1.7 | .27 |
| Transportation: % with no vehicle in household | 7.6 | 10.8 | .02 |

^a Values are mean values of percentage values unless noted otherwise.

^b A measure of income inequality from perfect equality (0), where everyone receives the same income, to perfect inequality (1), where a single person receives the total income of the community.

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Table 3. Predictors of Census Tracts Being At Risk Versus Resilient (N = 227), Atlanta Metropolitan Area^a

| Variable | Crude | Adjusted |
|--|--------------------------------------|-------------------------------|
| | Odds Ratio (95% Confidence Interval) | |
| % Aged ≥65 y | 2.11 (1.51–3.03) ^b | 2.29 (1.41–3.85) ^b |
| % With disability | 1.77 (1.31–2.43) ^b | 1.12 (0.70–1.81) |
| % With no high school diploma | 1.19 (1.03–1.38) ^b | 0.98 (0.79–1.22) |
| % With annual income below 200% of federal poverty level | 1.12 (1.04–1.22) ^b | 1.19 (1.02–1.39) ^b |
| Gini index ^c , per 0.05 increment | 1.59 (1.28–2.02) ^b | 1.56 (1.19–2.07) ^b |
| % With no vehicle in household | 1.17 (1.02–1.35) ^b | 0.82 (0.66–1.02) |

^a Crude and adjusted odds ratios of being classified as an at-risk census tract versus a resilient census tracts are shown for 5% increments in each of the examined factors except for Gini index (per 0.05 unit increment).

^b Significant ($P < .05$) results.

^c A measure of income inequality from perfect equality [0], where everyone receives the same income, to perfect inequality [1], where a single person receives the total income of the community.

ORIGINAL RESEARCH

Retail Marketing of Menthol Cigarettes in Los Angeles, California: a Challenge to Health Equity

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PEER REVIEWED

Summary**What is already known about this topic?**

Previous research shows that menthol cigarettes contribute to tobacco-related racial/ethnic health disparities.

What is added by this report?

To inform novel policy strategies restricting sales of menthol cigarettes and other flavored tobacco products in the retail environment, our study investigated whether retail marketing strategies for menthol cigarettes differed by neighborhood racial/ethnic composition (ie, African American, Korean American, Hispanic, non-Hispanic White) in Los Angeles County.

What are the implications for public health practice?

Retail marketing of menthol cigarettes was highest among stores in predominantly African American neighborhoods. Findings underscore the need to account for racial/ethnic neighborhood differences when developing, implementing, and evaluating novel policy strategies restricting menthol cigarette sales.

Abstract

Introduction

Sales of menthol cigarettes continue to increase, accounting for a third of the US cigarette market. Retail marketing of menthol cigarettes is a contributing factor to tobacco-related health disparities. To inform regulation to address associated disparities, we examined retail marketing strategies for menthol cigarettes and their features and characteristics in relation to neighborhood racial/ethnic composition.

Methods

We used multilevel regression models to examine associations of neighborhood racial/ethnic composition and store type with menthol cigarette sales outcomes, including availability, exterior advertising, price promotions, and price in a sample of tobacco retailers (N = 673) in Los Angeles County neighborhoods with a median or below-median household income. We also recorded the prices of Newport cigarettes (the highest selling menthol cigarette brand in the United States) and blu disposable menthol e-cigarettes.

Results

Overall, 94.5% of retailers sold menthol cigarettes, 31.2% displayed menthol cigarette price promotions, and 30.2% displayed at least one menthol cigarette advertisement on their exterior. Adjusting for racial/ethnic zip code cluster and store type, stores located in predominantly African American neighborhoods showed significantly higher odds in the availability of Newport cigarettes than stores in Hispanic neighborhoods (OR = 0.21; 95% CI, 0.09–0.53; $P = .001$) or non-Hispanic White (OR = 0.12; 95% CI, 0.05–0.31; $P < .001$) neighborhoods. Stores located in predominantly African American neighborhoods displayed significantly higher odds of having price promotions for menthol cigarettes and storefront advertisements than those in Hispanic neighborhoods (OR = 0.51; 95% CI, 0.30–0.88; $P = .02$ and OR = 0.25; 95% CI, 0.13–0.48; $P < .001$, respectively).

Conclusion

In 2016 and 2017, menthol cigarettes were widely available in Los Angeles County across racial/ethnic neighborhoods. We found a disproportionate number of storefront advertisements and price promotions for menthol cigarettes in stores located in predominantly African American neighborhoods along with the lowest advertised pack price. This evidence supports tobacco control policies that restrict menthol cigarette sales in the retail environment.



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Introduction

Menthol as a characterizing flavor in cigarettes is a continuing challenge to health equity. Menthol cigarette sales accounted for 36% of the US cigarette market in 2017, an upsurge from 26% in 2015 (1). As sales of nonmenthol cigarettes steadily decline (1), the increase in menthol cigarette sales is consistent with longitudinal data documenting the rise in past-30-day use of menthol cigarettes from 2002 through 2014, among non-Hispanic White, Asian, and Hispanic smokers (2). African Americans have the highest percentage of menthol cigarette use among all racial/ethnic groups, nearly 90% (3). Additionally, past-30-day use of menthol cigarettes is higher among adolescent smokers aged 12 to 17 years (56.7%) than among young adult smokers aged 18 to 25 (45%) or smokers 26 years or older (30.5%–34.7%) (3). Menthol cigarettes are considered more appealing than nonmenthol cigarettes, particularly by novice smokers, in part because of the anesthetic effects of the menthol flavor additive, which reduces harshness and improves the taste of cigarette smoke (4). For alternatives to cigarettes, smokers are also attracted to the appealing characteristics of e-cigarettes, including menthol-flavored types (5–7).

Evidence from the retail environment indicates that neighborhood demography influences retailer location and tobacco marketing (8,9). The 1998 Master Settlement Agreement and the 2009 Family Smoking Prevention and Tobacco Control Act (Tobacco Control Act) resulted in significant restrictions on tobacco industry marketing activities aimed at youth, such as prohibiting advertising of cigarettes and smokeless tobacco and the distribution of free samples of tobacco products (1,10,11). In response, retail settings like neighborhood convenience stores became major channels for the tobacco industry to market both menthol and nonmenthol cigarettes (1). For example, in 2017, the tobacco industry spent more than 90% of its \$8.64 billion cigarette marketing budget on retail advertising and promotion, such as consumer coupons, price discounts to retailers, and shelving displays (1). Price discounts to retailers accounted for more than 70% (\$6.18 billion) of the tobacco industry's cigarette marketing budget in 2017 (1). Furthermore, spending on exterior advertising of cigarettes, including signage placed on storefronts, increased from \$1.7 million in 2016 to \$1.8 million in 2017 (1).

Exposure to retail tobacco marketing is a risk factor for smoking initiation among adolescents (12,13) and increased smoking among adults (9,14). The literature (15–17) on tobacco marketing disparities in the retail environment is growing, and findings indicate that low-income and majority non-White neighborhoods have high densities of tobacco retailers and are disproportionately exposed to marketing of cheap, harmful, combustible tobacco products, including menthol cigarettes. In a national sample of to-

bacco retail outlets, Mills et al (16) found reduced pricing of the Newport brand (manufactured by R.J. Reynolds) in neighborhoods with a high proportion of youths, African American residents, and low-income households. Newport is the highest selling menthol cigarette brand in the United States and the second-largest selling cigarette brand (18).

The 2009 Tobacco Control Act restricted all flavorings in cigarettes except menthol. The Act also granted the Food and Drug Administration (FDA) authority to regulate the manufacture, distribution, and marketing of tobacco products, including the authority to extend restrictions on flavored cigarettes to include menthol cigarettes (11). As a result of federal inaction, local jurisdictions (eg, Minneapolis, San Francisco) have themselves limited or restricted sales of menthol cigarettes and other flavored tobacco products (19). In June 2017, San Francisco became the first city to pass an ordinance that restricts the sale of any flavored tobacco product, including menthol, within the city limits (20). With growing local momentum coupled with increasing scientific evidence documenting disparities in menthol cigarette marketing and use (eg, the Tobacco Products Scientific Advisory Committee's report on menthol ([21]), FDA in November 2018 announced its intent to remove menthol cigarettes from the market (22). However, the agency has yet to act.

In a unanimous vote on September 24, 2019, the Los Angeles County Board of Supervisors approved an ordinance establishing restrictions on retail sales of menthol cigarettes and other flavored tobacco products in unincorporated areas of the county (23). The ordinance became enforceable on May 1, 2020 (23). In August 2020, California's Governor Gavin Newsom signed Senate Bill 793 to end the sale in the state of flavored tobacco products, including menthol cigarettes but excluding premium cigars, hookah, and some pipe tobacco (24). The law was set to go into effect on January 1, 2021 (25). However, state officials agreed to delay the effective date after opponents led by tobacco companies petitioned to bring the pending law to a statewide vote in 2022 (25).

Given the evolving landscape of menthol cigarette regulations, recent evidence on retail marketing of menthol cigarettes can help inform local ordinances in addition to the pending state laws to restrict the sale of menthol cigarettes. Therefore, we examined retail marketing strategies for menthol cigarettes and their association with neighborhood racial/ethnic composition in Los Angeles County, one of the largest and most diverse US counties. Our data were collected before the Los Angeles County ordinance was passed and before Governor Newsom signed Senate Bill 793.

Methods

Sample and procedures

We classified licensed tobacco retail stores in Los Angeles County into 6 categories: 1) small, independent convenience stores with or without a gas station; 2) beer, wine, and liquor stores; 3) small, independent grocery stores that primarily sold food; 4) tobacco-focused stores; 5) discount stores; and 6) other stores, such as donut shops and gas kiosks. We excluded pharmacies, big chain markets and supermarkets, and vape shops. Research has shown that independent and small licensed tobacco retailers use more tobacco advertising (26).

We selected stores in 2 steps. In step 1, zip codes with an annual median household income of \$55,909 or below the median household income for Los Angeles County were ranked by percentage of races and ethnicities (27). The number of zip codes with residents predominantly non-Hispanic White, Hispanic, African American, or Korean American differed (non-Hispanic White, 32 zip codes; Hispanic, 14 zip codes; African American, 14 zip codes; Korean American, 7 zip codes). To be consistent across all racial/ethnic groups studied, we selected up to 15 zip codes available from each identified group. This criterion mostly affected the non-Hispanic White resident sample, which had 32 eligible zip codes available. All other racial/ethnic groups of focus had fewer than 15 zip codes that met the criterion. Therefore, we kept all zip codes in those groups. We collected data from the first 15 zip codes in the non-Hispanic White group and repeated that process until we reached our desired sample of 21 zip codes out of the possible 32 zip codes. From the 296 zip codes in Los Angeles County that had licensed tobacco retailers, we collected data for this study from 56 zip codes (19%).

In step 2, we randomly selected stores from ranked zip codes by using a comprehensive list of approximately 11,600 licensed tobacco retailers in Los Angeles County that is maintained by the California Department of Tax and Fee Administration (28). The number of stores selected was in proportion to the ranking by percentage of residents by race/ethnicity in each zip code. Store type was categorized by using standard definitions (29,30). Approximately 10,200 of the 11,600 licensed tobacco retailers were eligible under our store criteria, and 2,556 of the eligible stores were in the selected zip codes for our study (22% of licensed tobacco retail stores in Los Angeles County). We randomly selected a total of 1,480 licensed tobacco retailers; 310 were deemed ineligible on the basis of the above inclusion criteria. We visited 1,170 eligible stores with the goal of conducting 700 in-person store observations. Of the 1,170 stores visited, 831 (71%) agreed to participate. We selected 700 of the 831 for our sample. Of the 700 selected,

679 were licensed tobacco retailers who allowed an observation; however, because of missing data, only 673 of these were included in our study. We estimated that our sample represented 21% of the licensed tobacco retailers that sold tobacco for all communities in the zip codes selected and 6% of all licensed tobacco retailers in Los Angeles County (28). Our sampling design process is described in detail elsewhere (27). The Institutional Review Board of the University of Southern California approved the study (HS#13-00647).

Data collection

We collected data from participating stores from January 2016 through April 2017. We used a store audit checklist adapted from the Standardized Tobacco Assessment for Retail Settings observation tool (31). Nineteen community health workers, including *promotores de salud*, participated in training to conduct the store observations and take digital photographs of each store's exterior and interior. This in-person training consisted of a detailed protocol for recording exterior and interior store observations of tobacco products and marketing materials and supervised practice field work. Store observations were completed by community health workers in zip codes with a high percentage of residents of the following races/ethnicities: African American (194 stores), non-Hispanic White (193 stores), Hispanic (187 stores), and Korean American (99 stores). Respondents representing their retail shop consented to permit the store observation, and those who agreed received a \$50 gift card and a printed information packet (available in English, Spanish, and Korean) containing fact sheets about the FDA's tobacco regulatory authority.

Measures

Community health workers coded the marketing and advertising of menthol cigarettes in 4 domains: 1) availability, 2) exterior advertisements, 3) price promotions, and 4) price. Availability was assessed by a yes or no answer to the following questions: Any cigarettes sold here? Are menthol cigarettes sold here? Are Newport cigarettes sold here? Availability of blu menthol disposable e-cigarettes was also assessed by a yes or no answer to the following question: Are blu menthol disposable e-cigarettes sold here? Storefront exterior advertising was assessed with yes or no to the following inquiries: Are menthol cigarettes advertised outside the store? Are nonmenthol cigarettes advertised outside the store? Price promotions were coded by location (interior/exterior), defined to include any multipack special (eg, buy one get one free) or special price (eg, \$1.00 off) and assessed by the presence or absence (yes or no) of any cigarette price promotions or any menthol cigarette price promotions. To assess price, community health workers recorded the lowest advertised single-pack price for cigarettes, for Newport menthol cigarettes, and for blu menthol dispos-

able e-cigarettes. Interrater reliability was assessed at 210 stores. Cohen κ statistics for binary measures ranged from 0.59 for menthol cigarette price promotions to 0.94 for availability of cigarettes. Good reliability was obtained for cigarette prices (minimum intraclass correlation coefficient [ICC] = 0.71 for a pack of Newport menthol cigarettes, maximum ICC = 0.90 for the cheapest cigarette pack, and ICC = 0.67 for blu menthol disposable e-cigarettes).

Data analysis

We used frequency distributions and cross tabulations for descriptive statistics of store type and product availability, exterior advertisements, price promotions, and price by racial/ethnic zip code cluster. Descriptive statistics were also computed to characterize product availability, exterior advertisements, price promotions, and price by store type. We then examined associations of racial/ethnic zip code cluster and store type with outcomes of marketing menthol cigarettes and related tobacco products. To identify independent and relative effects of neighborhood-level and store-level factors, we conducted regression tests in both unadjusted and adjusted models: univariable models included each individual regressor and multivariable models included both neighborhood and store regressors. Hypotheses were tested by using multilevel regression modeling implemented in Mplus version 7 (Mplus). Because the stores were nested in zip codes, 2-level models were used to adjust parameter standard errors for interdependence in the data. Level 1 was defined as the store-level factor of store type, and level 2 was defined as the neighborhood-level factor of racial/ethnic zip code cluster. Multilevel regression modeling of binary outcomes yielded odds ratios (ORs) and 95% CIs with significance set at $P < .05$ (2-tailed) for binary logistic regression coefficients. Multilevel regression modeling for continuous outcomes (ie, price) were unstandardized regression coefficients. Missing data were managed with maximum likelihood estimation.

Results

Convenience stores with or without gasoline sales (36% of our sample) were the most common store type, followed by small, independent grocery stores (28.2%), liquor stores (15.9%), tobacco-focused stores (9.5%), discount stores (6.5%), and other store types (4.2%). Nearly 95% of these stores sold menthol cigarettes, 87.7% offered Newport packs, and 20.8% offered blu menthol disposable e-cigarettes. Of the 673 stores, 35.2% had exterior advertisements for nonmenthol cigarettes, and 30.2% had exterior advertisements for menthol cigarettes. Approximately 30% of stores offered price promotions on packs of menthol cigarettes. The average price for the cheapest pack of menthol cigarettes was \$5.00

(standard deviation [SD], 1.14). The average pack price for Newport cigarettes was \$6.45 (SD = 0.78, $n = 590$ stores), and the average pack price for blu menthol disposable e-cigarettes was \$10.10 (SD = 1.73, $n = 139$ stores).

The availability of Newport cigarettes was significantly ($P < .001$) more common in African American (95.9%) and Korean American (92.9%) neighborhoods (Table 1). Blu menthol disposable e-cigarettes were significantly ($P < .001$) more common in non-Hispanic White (32.6%) neighborhoods than in African American (19.1%), Korean American (18.2%), or Hispanic (11.8%) neighborhoods. Newport cigarettes cost significantly ($P < .001$) less per pack in African American neighborhoods (\$6.19) than in non-Hispanic White (\$6.53), Hispanic (\$6.55), and Korean American (\$6.66) neighborhoods.

We assessed the results for 8 outcomes: 1) any cigarettes sold, 2) any menthol cigarettes sold, 3) any Newport cigarettes sold, 4) any blu menthol disposable e-cigarettes sold (Table 2), 5) any cigarette price promotions, 6) any menthol cigarette price promotions, 7) any nonmenthol cigarette exterior advertisements, and 8) any menthol cigarette exterior advertisements (Table 3). Stores located in neighborhood clusters with predominantly African American residents had significantly higher odds of selling Newport cigarettes than stores located in neighborhood clusters with predominantly Hispanic (OR = 0.21; 95% CI, 0.09–0.47; $P < .001$) or non-Hispanic White (OR = 0.19; 95% CI, 0.09–0.42; $P < .001$) residents (Table 2). After adjusting for racial/ethnic zip code cluster and store type simultaneously, the association persisted (non-Hispanic White, OR = 0.12; 95% CI, 0.05–0.31; $P = .01$; Hispanic, OR = 0.21, 95% CI, 0.09–0.53; $P < .001$). Stores located in neighborhood clusters with predominantly African American residents had significantly lower odds of selling blu menthol disposable e-cigarettes than stores located in neighborhood clusters with predominantly non-Hispanic White (OR = 2.06; 95% CI, 1.29–3.28; $P = .003$) or Hispanic residents (OR = 0.57; 95% CI, 0.32–1.01; $P = .05$). The association was nonsignificant after adjusting for racial/ethnic zip code cluster and store type (OR = 1.62; 95% CI, 0.96–2.72; $P = .07$ and OR = 0.67, 95% CI, 0.37–1.22; $P = .19$, respectively).

The odds of displaying a price promotion for menthol cigarettes were significantly higher in stores located in neighborhood clusters with predominantly African American residents than in stores located in neighborhood clusters with predominantly Hispanic (OR = 0.48; 95% CI, 0.30–0.77; $P = .002$) or Korean American residents (OR = 0.51; 95% CI, 0.29–0.90; $P = .02$) (Table 3). These associations were nonsignificant after adjusting for racial/ethnic zip code cluster and store type, except for stores located in neighborhood clusters with predominantly Hispanic residents (OR = 0.51; 95% CI, 0.30–0.88; $P = .02$). All stores had significantly

lower odds of displaying at least 1 price promotion for menthol cigarettes compared with gasoline/convenience stores. These associations persisted after adjusting for racial/ethnic zip code cluster and store type simultaneously. The odds of a store displaying at least 1 exterior advertisement for menthol cigarettes were significantly higher in stores located in neighborhood clusters with predominantly African American residents than in stores located in predominantly Hispanic (OR = 0.25; 95% CI, 0.15–0.40; $P < .001$), Korean American (OR = 0.50; 95% CI, 0.30–0.85; $P = .01$), or non-Hispanic White (OR = 0.66; 95% CI, 0.44–1.01; $P = .05$) neighborhood clusters. These associations persisted after adjusting for racial/ethnic zip code cluster and store type, except for stores located in neighborhood clusters with a higher proportion of Korean American residents (OR = 0.58; 95% CI, 0.28–1.20; $P = .14$). After adjusting for racial/ethnic zip code cluster and store type, gasoline/convenience stores had significantly higher odds of displaying exterior advertisements for menthol cigarettes compared with liquor stores (OR = 0.19; 95% CI, 0.10–0.38; $P < .001$), grocery stores (OR = 0.14; 95% CI, 0.08–0.24; $P < .001$), and discount stores (OR = 0.43; 95% CI, 0.20–0.91; $P = .03$), but not tobacco-focused stores (OR = 0.87; 95% CI, 0.46–1.67; $P = .68$).

We assessed the cheapest single-pack price for the following products: any cigarettes, menthol cigarettes, Newport menthol cigarettes, and blu menthol disposable e-cigarettes (Table 4). Adjusting for racial/ethnic zip code cluster and store type, the price of the cheapest menthol cigarette single pack was significantly lower in stores located in African American neighborhoods compared with Hispanic ($b = 0.39$; 95% CI, 0.18–0.60; $P < .001$) and non-Hispanic White ($b = 0.64$; 95% CI, 0.33–0.96; $P < .001$) neighborhoods. The prices of both Newport menthol cigarette single-pack and cheapest cigarette single-pack were significantly lower in African American neighborhoods than in Korean American, Hispanic, and non-Hispanic White neighborhoods (P values, $\leq .008$). For example, after adjusting for store type, the estimated price of a Newport single pack was \$0.38 higher in non-Hispanic White neighborhoods ($b = 0.38$; 95% CI, 0.16–0.60; $P = .001$) than in African American neighborhoods.

Discussion

Menthol cigarettes were widely available in Los Angeles County during our study period across racial/ethnic neighborhoods. Nearly all stores in our sample sold menthol cigarettes, and 87.7% sold Newport. This evidence supports tobacco control policies that restrict menthol cigarette sales in the retail environment. Notably, a disproportionate quantity of storefront advertisements, price promotions, and lowest advertised pack price for menthol cigarettes,

including Newport, was found in stores located in predominantly African American neighborhoods. These findings align with previous research (16) that found more price promotions for Newport near areas with predominantly African American residents.

Nearly all stores in Korean American and Hispanic neighborhoods sold menthol cigarettes, including Newport, and at least 20% displayed a price promotion for menthol cigarettes. In recent years, population-based survey research (2) found an increase in current (past 30-day) menthol cigarette use from 2012–2014 among Hispanic (47%), Asian (38%), and non-Hispanic White (29%) smokers (aged ≥ 12), compared with 2008–2010 (37.1%, 30.3%, 26%, respectively). Study findings suggest that restrictions on menthol cigarettes and price promotions can lead to reductions in the prevalence of menthol cigarette use across subpopulations.

In contrast to Newport, blu menthol disposable e-cigarettes were more likely to be sold in tobacco-focused stores and gasoline/convenience stores located in neighborhoods with predominantly non-Hispanic White residents. Our study findings support recent evidence (32) on e-cigarette availability and advertising and variations by racial/ethnic neighborhood. For example, in New York City, Giovenco et al (32) found that e-cigarettes and smokeless tobacco were more accessible in predominantly non-Hispanic White and higher-income neighborhoods than in predominantly Black, Hispanic, and low-income neighborhoods. This combination of findings suggests a consistent retail marketing strategy for e-cigarettes in the United States. Additionally, this combination of findings could mean widening tobacco-related health disparities if combustible cigarette use persists in racial/ethnic minority neighborhoods while majority non-Hispanic White neighborhoods have increased access to e-cigarettes.

Our study has limitations. First, zip codes represent reasonably accurate racial/ethnic boundaries because of the relatively high level of residential segregation in Los Angeles; however, they do not always represent exact neighborhood boundaries and provide less granularity than census tracts. Second, findings are limited to low-income zip codes in Los Angeles County and may not be generalizable to the county as a whole, to other large urban areas in the United States, or to areas with less racial/ethnic diversity. Third, a limitation of studying prices for the leading brands of menthol cigarettes and e-cigarettes is that these prices reflect promotional strategies that are determined by different manufacturers (33). Nevertheless, study findings are consistent with national, state, and regional findings from retail surveys that showed that menthol cigarettes are more prevalent in areas with a high proportion of African American residents. Also, few studies have specifically examined retail marketing of menthol cigarettes in Korean American and Hispanic neighborhoods. Study findings add to a grow-

ing body of evidence that e-cigarettes are more accessible in predominantly non-Hispanic White neighborhoods. Other strengths of this study are a large representative sample of licensed tobacco retailers and a standardized data collection protocol (31).

As the sale of menthol cigarettes continues to increase each year (1), it is vital for governments—local, state, and federal—to pursue policies that eliminate menthol cigarette sales and regulate the retail environment. Our study provides new information regarding racial/ethnic neighborhood disparities in retail marketing of menthol cigarettes, which can inform the pending law (SB793) in California (24,25) and provides an argument for the enforcement of existing regulations in the unincorporated areas of Los Angeles County (23). Future research is needed to include resident and retailer perceptions of retail marketing of menthol cigarettes and policies to restrict menthol cigarette sales. Our data also add novel information regarding marketing of menthol cigarettes and e-cigarettes to Korean American and Hispanic communities and contribute to existing evidence (9,12–14) that retail marketing of menthol cigarettes is a contributing factor to disproportionate use among African American smokers. The retail environment is the dominant channel for marketing tobacco products (1), and documenting marketing strategies for menthol cigarettes can inform regulation that reduces racial/ethnic disparities in access to menthol cigarettes and resultant tobacco-related morbidity and mortality.

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Tables

Table 1. Product Availability, Exterior Advertisement, Price Promotions, and Price, by Race/Ethnicity Zip Code Cluster (N = 673), Los Angeles, California, 2016–2017

| Variables, Menthol Cigarette Retail Marketing | Race/Ethnicity Zip Code Cluster | | | | P Value, Group Differences |
|---|---------------------------------|------------------------------|---------------------------|--------------------------|----------------------------|
| | African American (n = 194) | Non-Hispanic White (n = 193) | Hispanic/Latino (n = 187) | Korean American (n = 99) | |
| Availability, n (%) | | | | | |
| Cigarette, single pack | 188 (96.9) | 188 (97.4) | 187 (100.0) | 97 (98.0) | .14 ^a |
| Menthol cigarette, single pack | 184 (94.8) | 183 (94.8) | 175 (93.6) | 94 (94.9) | .94 ^a |
| Newport menthol cigarette, single pack | 186 (95.9) | 157 (81.3) | 155 (82.9) | 92 (92.9) | <.001 ^a |
| Blu menthol disposable e-cigarette, single pack | 37 (19.1) | 63 (32.6) | 22 (11.8) | 18 (18.2) | <.001 ^a |
| Advertisement, n (%) | | | | | |
| Exterior advertisement (nonmenthol cigarette) | 79 (40.7) | 85 (44.0) | 40 (21.4) | 33 (33.3) | <.001 ^a |
| Exterior advertisement (menthol cigarette) | 83 (42.8) | 64 (33.2) | 29 (15.5) | 27 (27.3) | <.001 ^a |
| Price promotion, n (%) | | | | | |
| Cigarette price promotion | 76 (39.2) | 92 (47.7) | 43 (23.0) | 24 (24.2) | <.001 ^a |
| Menthol cigarette price promotion | 67 (34.5) | 84 (43.5) | 38 (20.3) | 21 (21.2) | <.001 ^a |
| Price, \$, mean (standard deviation) | | | | | |
| Cheapest cigarette, single pack | 5.43 (0.73) | 5.82 (0.93) | 5.81 (0.91) | 5.77 (0.77) | <.001 ^b |
| Cheapest menthol cigarette, single pack | 4.68 (0.99) | 5.21 (1.16) | 5.16 (1.24) | 4.93 (1.03) | <.001 ^b |
| Newport menthol cigarette, single pack | 6.19 (0.77) | 6.53 (0.85) | 6.55 (0.72) | 6.66 (0.64) | <.001 ^b |
| Blu menthol disposable e-cigarette, single pack | 10.07 (2.01) | 10.47 (1.76) | 9.89 (0.84) | 9.09 (1.50) | .02 ^b |

^a Calculated by using χ^2 test.

^b Calculated by using 1-way analysis of variance (ANOVA).

Table 2. Associations Between Race/Ethnicity Zip Code Cluster (N = 673) and Store Type and Product Availability, Los Angeles County, California, 2016–2017

| Regressors | Menthol Cigarette Retail Marketing Outcomes, OR (95% CI) [P Value] ^a | | | |
|--|---|------------------------|--------------------------|-------------------------------------|
| | Any Cigarettes | Any Menthol Cigarettes | Newport Cigarettes | Blu Menthol Disposable E-Cigarettes |
| Univariable model^b | | | | |
| Race/ethnicity zip code cluster | | | | |
| Black/African American | | | | Reference |
| Korean American | 1.55 (0.31–7.81) [.60] | 1.02 (0.34–3.08) [.97] | 0.57 (0.20–1.61) [.29] | 0.94 (0.51–1.76) [.85] |
| Hispanic | – | 0.79 (0.33–1.88) [.60] | 0.21 (0.09–0.47) [<.001] | 0.57 (0.32–1.01) [.05] |
| Non-Hispanic White | 1.20 (0.36–4.00) [.77] | 0.99 (0.40–2.45) [.99] | 0.19 (0.09–0.42) [<.001] | 2.06 (1.29–3.28) [.003] |
| Store type | | | | |
| Gasoline/convenience store | | | | Reference |
| Liquor store | 1.82 (0.22–15.45) [.58] | 2.28 (0.54–9.71) [.26] | 0.53 (0.17–1.62) [.26] | 0.40 (0.22–0.75) [.004] |
| Grocery store | 1.60 (0.37–6.82) [.53] | 0.59 (0.27–1.28) [.18] | 0.15 (0.05–0.45) [.001] | 0.09 (0.04–0.21) [<.001] |
| Discount store | 0.70 (0.10–4.95) [.72] | 0.44 (0.13–1.43) [.17] | 0.20 (0.07–0.58) [.003] | 0.27 (0.09–0.77) [.01] |
| Tobacco-focused store | 0.20 (0.06–0.66) [.01] | 0.42 (0.16–1.12) [.08] | 0.21 (0.08–0.56) [.002] | 1.41 (0.79–2.54) [.25] |
| Other ^c | – | 0.67 (0.12–2.57) [.46] | 0.11 (0.04–0.33) [<.001] | 0.24 (0.07–0.87) [.03] |
| Multivariable model^d | | | | |
| Race/ethnicity zip code cluster | | | | |
| Black/African American | | | | Reference |
| Korean American | 1.45 (0.20–10.76) [.71] | 1.01 (0.32–3.16) [.98] | 0.61 (0.23–1.65) [.33] | 1.10 (0.47–2.61) [.82] |
| Hispanic | – | 0.78 (0.34–1.79) [.59] | 0.21 (0.09–0.53) [.001] | 0.67 (0.37–1.22) [.19] |
| Non-Hispanic White | 1.41 (0.52–3.86) [.50] | 0.93 (0.44–1.97) [.89] | 0.12 (0.05–0.31) [<.001] | 1.62 (0.96–2.72) [.07] |
| Store type | | | | |
| Gasoline/convenience store | | | | Reference |
| Liquor store | 1.84 (0.22–15.25) [.57] | 2.26 (0.53–9.64) [.27] | 0.57 (0.20–1.64) [.30] | 0.40 (0.22–0.73) [.003] |
| Grocery store | 1.34 (0.28–6.40) [.72] | 0.61 (0.27–1.35) [.22] | 0.13 (0.03–0.38) [<.001] | 0.10 (0.04–0.24) [<.001] |
| Discount store | 0.63 (0.08–5.07) [.66] | 0.44 (0.13–0.51) [.19] | 0.15 (0.05–0.43) [<.001] | 0.32 (0.11–0.91) [.03] |
| Tobacco-focused store | 0.24 (0.08–0.72) [.01] | 0.41 (0.16–1.04) [.06] | 0.25 (0.10–0.60) [.002] | 1.25 (0.70–2.25) [.45] |
| Other ^d | – | 0.56 (0.12–2.54) [.45] | 0.13 (0.05–0.35) [<.001] | 0.22 (0.06–0.82) [.02] |

Abbreviations: OR = odds ratio; –, not applicable.

^a Multilevel binary logistic regression models for each binary outcome. Values refer to single packs.

^b Univariable models including individual race/ethnicity zip code cluster and store type regressor, separately. Unadjusted associations between each regressor and outcomes of retail marketing of menthol cigarettes are shown.

^c Includes donut shop and gas kiosk.

^d Multivariable model including race/ethnicity zip code cluster and store type regressors simultaneously. Adjusted associations between each regressor and outcomes of menthol cigarette retail marketing are shown.

Table 3. Associations Between Racial/Ethnic Zip Code Cluster and Store Type With Price Promotion and Exterior Advertisement, Los Angeles, California, 2016–2017

| Regressors | Menthol Cigarette Retail Marketing Outcomes | | | |
|--|--|--|--|---|
| | Price Promotion, Any Cigarettes ^a | Price Promotion, Menthol Cigarettes ^a | Exterior Advertisement, Nonmenthol Cigarettes ^a | Exterior Advertisement, Menthol Cigarettes ^a |
| Univariable model^b | | | | |
| Race/ethnicity zip code cluster | | | | |
| Black/African American | | | | Reference |
| Korean American | 0.50 (0.29–0.86) [.01] | 0.51 (0.29–0.90) [.02] | 0.73 (0.44–1.21) [.22] | 0.50 (0.30–0.85) [.01] |
| Hispanic | 0.46 (0.30–0.72) [.001] | 0.48 (0.30–0.77) [.002] | 0.40 (0.25–0.62) [<.001] | 0.25 (0.15–0.40) [<.001] |
| Non-Hispanic White | 1.41 (0.95–2.12) [.09] | 1.46 (0.97–2.20) [.07] | 1.15 (0.77–1.72) [.51] | 0.66 (0.44–1.01) [.05] |
| Store type | | | | |
| Gasoline/convenience store | | | | Reference |
| Liquor store | 0.35 (0.21–0.58) [<.001] | 0.36 (0.20–0.63) [<.001] | 0.24 (0.12–0.47) [<.001] | 0.19 (0.10–0.37) [<.001] |
| Grocery store | 0.13 (0.07–0.23) [<.001] | 0.11 (0.05–0.22) [<.001] | 0.15 (0.10–0.25) [<.001] | 0.13 (0.07–0.24) [<.001] |
| Discount store | 0.27 (0.14–0.53) [<.001] | 0.17 (0.07–0.44) [<.001] | 0.36 (0.18–0.72) [.004] | 0.43 (0.20–0.93) [.03] |
| Tobacco-focused store | 0.43 (0.24–0.80) [.007] | 0.44 (0.26–0.77) [.004] | 1.53 (0.84–2.79) [.17] | 0.99 (0.51–1.92) [.97] |
| Other ^c | 0.15 (0.06–0.43) [<.001] | 0.14 (0.04–0.45) [.001] | 0.64 (0.26–1.58) [.34] | 0.18 (0.05–0.63) [.007] |
| Multivariable model^d | | | | |
| Race/ethnicity zip code cluster | | | | |
| Black/African American | | | | Reference |
| Korean American | 0.54 (0.21–1.36) [.19] | 0.56 (0.25–1.25) [.16] | 0.83 (0.38–1.83) [.64] | 0.58 (0.28–1.20) [.14] |
| Hispanic | 0.49 (0.28–0.86) [.01] | 0.51 (0.30–0.88) [.02] | 0.43 (0.21–0.88) [.02] | 0.25 (0.13–0.48) [<.001] |
| Non-Hispanic White | 1.33 (0.78–2.28) [.30] | 1.28 (0.77–2.12) [.35] | 0.90 (0.48–1.68) [.73] | 0.54 (0.31–0.92) [.03] |
| Store type | | | | |
| Gasoline/convenience store | | | | Reference |
| Liquor store | 0.35 (0.21–0.58) [<.001] | 0.36 (0.20–0.63) [<.001] | 0.24 (0.12–0.46) [<.001] | 0.19 (0.10–0.38) [<.001] |
| Grocery store | 0.14 (0.08–0.25) [<.001] | 0.12 (0.06–0.24) [<.001] | 0.16 (0.10–0.26) [<.001] | 0.14 (0.08–0.24) [<.001] |
| Discount store | 0.31 (0.16–0.59) [<.001] | 0.20 (0.08–0.50) [.001] | 0.38 (0.19–0.74) [.004] | 0.43 (0.20–0.91) [.03] |
| Tobacco-focused store | 0.38 (0.20–0.71) [.002] | 0.39 (0.23–0.68) [.001] | 1.39 (0.76–2.54) [.29] | 0.87 (0.46–1.67) [.68] |
| Other ^c | 0.15 (0.05–0.43) [<.001] | 0.14 (0.04–0.46) [.001] | 0.62 (0.25–1.53) [.30] | 0.17 (0.05–0.60) [.006] |

^a Multilevel binary logistic regression models for each binary outcome. Values are odds ratio (95% CI) [P value].

^b Univariable models including individual racial/ethnic zip code cluster and store type regressor, separately. Unadjusted associations between each regressor and menthol cigarette retail marketing outcomes are shown.

^c Includes donut shops and gas kiosks.

^d Multivariable model including racial/ethnic zip code cluster and store type regressors simultaneously. Adjusted associations between each regressor and outcomes of menthol cigarette retail marketing are shown.

Table 4. Associations Between Racial/Ethnic Zip Code Cluster (N = 673) and Store Type and Product Price, Los Angeles, California, 2016–2017

| Regressors | Menthol Cigarette Retail Marketing Outcomes ^a | | | |
|--|--|-------------------------------|------------------------------|-------------------------------|
| | Blu Menthol Disposable E-Cigarettes | Newport Menthol Cigarettes | Cheapest Menthol Cigarettes | Cheapest Any Cigarettes |
| Univariable model^b | | | | |
| Race/ethnicity zip code cluster | | | | |
| Black/African American | | | | Reference |
| Korean American | -0.98 (-1.92 to 0.04) [.04] | 0.47 (0.28 to 0.66) [<.001] | 0.25 (-0.03 to 0.52) [.08] | 0.34 (0.13 to 0.54) [.002] |
| Hispanic | -0.18 (-1.07 to 0.70) [.68] | 0.36 (0.19 to 0.52) [<.001] | 0.48 (0.26 to 0.71) [<.001] | 0.38 (0.21 to 0.55) [<.001] |
| Non-Hispanic White | 0.40 (-0.28 to 1.09) [.25] | 0.33 (0.17 to 0.50) [<.001] | 0.53 (0.31 to 0.76) [<.001] | 0.39 (0.22 to 0.56) [<.001] |
| Store type | | | | |
| Gasoline/convenience store | | | | Reference |
| Liquor store | 0.39 (-0.36 to 1.14) [.31] | 0.11 (-0.08 to 0.30) [.26] | -0.08 (-0.36 to 0.19) [.55] | -0.03 (-0.24 to 0.19) [.81] |
| Grocery store | -1.07 (-2.25 to 0.12) [.08] | 0.31 (0.15 to 0.47) [<.001] | 0.50 (0.27 to 0.73) [<.001] | 0.35 (0.18 to 0.53) [<.001] |
| Discount store | -0.25 (-0.91 to 0.42) [.47] | -0.09 (-0.28 to 0.10) [.35] | 0.19 (-0.10 to 0.48) [.21] | 0.01 (-0.20 to 0.20) [.98] |
| Tobacco-focused store | 0.43 (-0.55 to 1.42) [.39] | -0.43 (-0.58 to 0.27) [<.001] | -0.49 (-0.78 to 0.20) [.001] | -0.50 (-0.71 to 0.29) [<.001] |
| Other ^c | 0.62 (0.01 to 1.24) [.04] | 0.42 (0.13 to 0.70) [.005] | 1.21 (0.81 to 1.61) [<.001] | 0.73 (0.39 to 1.07) [<.001] |
| Multivariable model^d | | | | |
| Race/ethnicity zip code cluster | | | | |
| Black/African American | | | | Reference |
| Korean American | -1.14 (-2.02 to 0.26) [.01] | 0.42 (0.24 to 0.60) [<.001] | 0.20 (-0.03 to 0.42) [.08] | 0.29 (0.12 to 0.46) [.001] |
| Hispanic | -0.17 (-1.01 to 0.66) [.69] | 0.27 (0.07 to 0.47) [.008] | 0.39 (0.18 to 0.60) [<.001] | 0.28 (0.12 to 0.45) [.001] |
| Non-Hispanic White | 0.22 (-0.72 to 1.15) [.65] | 0.38 (0.16 to 0.60) [.001] | 0.64 (0.33 to 0.96) [<.001] | 0.46 (0.21 to 0.71) [<.001] |
| Store type | | | | |
| Gasoline/convenience store | | | | Reference |
| Liquor store | 0.33 (-0.35 to 1.00) [.34] | 0.11 (-0.08 to 0.29) [.27] | -0.07 (-0.35 to 0.20) [.60] | -0.03 (-0.24 to 0.19) [.82] |
| Grocery store | -0.76 (-2.23 to 0.71) [.31] | 0.33 (0.17 to 0.49) [<.001] | 0.54 (0.31 to 0.77) [<.001] | 0.38 (0.20 to 0.56) [<.001] |
| Discount store | -0.26 (-2.21 to 1.68) [.79] | -0.06 (-0.24 to 0.13) [.54] | 0.27 (-0.04 to 0.57) [.09] | 0.05 (-0.17 to 0.26) [.66] |
| Tobacco-focused store | 0.36 (-0.61 to 1.33) [.47] | -0.42 (-0.57 to 0.27) [<.001] | -0.50 (-0.78 to 0.21) [.001] | -0.50 (-0.71 to 0.29) [<.001] |
| Other ^c | 1.25 (-0.23 to 2.73) [.10] | 0.42 (0.12 to 0.71) [.006] | 1.19 (0.80 to 1.60) [<.001] | 0.72 (0.37 to 1.06) [<.001] |

^a Multilevel regression models for each continuous outcome. Values are b (95% CI) [P value] and refer to single packs.

^b Univariable models including individual racial/ethnic zip code cluster and store type regressor, separately. Unadjusted associations between each regressor and menthol cigarette retail marketing outcomes are shown.

^c Includes donut shops and gas kiosks.

^d Multivariable model including racial/ethnic zip code cluster and store type regressors simultaneously. Adjusted associations between each regressor and outcomes of menthol cigarette retail marketing are shown.

ORIGINAL RESEARCH

Employment Loss and Food Insecurity — Race and Sex Disparities in the Context of COVID-19

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PEER REVIEWED

Summary**What is already known on this topic?**

COVID-19 has widened existing sex and racial disparities that affect the health of adults in the US. Studies have shown food insecurity and employment loss are not evenly distributed across sociodemographic groups.

What is added by this report?

Few studies have examined how race, ethnicity, and sex intersect to affect employment loss and food insecurity in a metropolitan location of the US.

What are the implications for public health practice?

Results can be used to guide programs, interventions, and policy to mitigate the disproportionate effects of COVID-19 and related social harms on Black women.

Abstract

Introduction

Applying an intersectional framework, we examined sex and racial inequality in COVID-19–related employment loss (ie, job furlough, layoff, and reduced pay) and food insecurity (ie, quality and quantity of food eaten, food worry, and receipt of free meals or groceries) among residents in Saint Louis County, Missouri.

Methods

We used cross-sectional data from adults aged 18 or older (N = 2,146), surveyed by using landlines or cellular phones between August 12, 2020, and October 27, 2020. We calculated survey-weighted prevalence of employment loss and food insecurity for

each group (Black female, Black male, White female, White male). Odds ratios for each group were estimated by using survey-weighted binary and multinomial logistic regression models.

Results

Black female residents had higher odds of being laid off, as compared with White male residents (OR = 2.61, 95% CI, 1.24–5.46). Both Black female residents (OR = 4.13, 95% CI, 2.29–7.45) and Black male residents (OR = 2.41, 95% CI, 1.15–5.07) were more likely to receive free groceries, compared with White male residents. Black female (OR = 4.25, 95% CI, 2.28–7.94) and White female residents (OR = 1.93, 95% CI, 1.04–3.60) had higher odds of sometimes worrying about food compared with White male residents. Black women also had higher odds of always or nearly always worrying about food, compared with White men (OR = 2.99, 95% CI, 1.52–5.87).

Conclusion

Black women faced the highest odds of employment loss and food insecurity, highlighting the disproportionate impact of COVID-19 among people with intersectional disadvantages of being both Black and female. Interventions to reduce employment loss and food insecurity can help reduce the disproportionately negative social effects among Black women.

Introduction

Employment and food insecurity have been identified as 2 critical social determinants of health and health equity (1). Women and people of color have historically been at greater risk for both (2,3). Since the beginning of the COVID-19 pandemic, these longstanding social, economic, and health inequities that disproportionately affect women and people of color have intensified (4,5). However, the depth and breadth of the pandemic's effects on already socioeconomically marginalized groups need assessment.

A well-established body of literature documents the link between employment loss and adverse health outcomes, including increased risk of death, substance abuse, psychological distress, sui-



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cide, and unmet health care needs (6–8). People facing employment loss may simultaneously be at greater risk for food insecurity because of economic hardship. Additionally, food insecurity has been associated with poor diet quality and decreased access to healthy food options, such as fruits and vegetables (9); unfavorable mental health outcomes, including elevated stress, depression, and anxiety (10–11); substandard physical health status (11); and chronic disease (12).

Early evidence also indicates adverse mental and physical health consequences resulting from employment loss and food insecurity since the COVID-19 pandemic began (6). Although evidence on the effects of COVID-19 on food insecurity and employment is mounting, few studies have examined the potential harms of the pandemic by using an intersectional approach. Analyzing the effects of COVID-19 using an intersectionality framework can highlight how multiple social identities (eg, race, gender, class) might interact to influence health outcomes among segments of the population that would otherwise remain hidden (13,14). We aimed to fill this gap and by investigating the effects of COVID-19 on sex and racial inequality in employment and food security outcomes. We used data to analyze the social needs and harms associated with COVID-19 on employment and food insecurity for adults by race and sex in Saint Louis County, Missouri. This study is part of larger research that estimated the prevalence of COVID-19 infections in the region with a secondary aim to assess how the pandemic affected their lives across a variety of domains. Additional details on the parent research have been published elsewhere (15).

St. Louis County has almost 1 million residents, with 52.6% of residents identifying as female, 60.3% as female, 60.3% aged 18 to 64 years, and 17.6% aged 65 years or older, respectively (16). Non-Hispanic White residents make up 66.0% of the county's total population while non-Hispanic Black residents account for 24.1% (16). Most adult residents have a high school diploma (49.9%) or a higher level of education (43.7%) (16). The median household income is \$67,420, with incomes for White households above the median at \$77,989 and incomes for Black households below the median at \$43,801 (16). During our study period, it was estimated that approximately 7.5% of all county residents had been infected with the COVID-19 virus, with infection rates among Black residents nearly 3 times higher than White residents (15). This disparity is comparable with nationwide trends that report higher COVID-19 cases and deaths among Black people.

Methods

Eligibility and recruitment

We used a combination of random digit dialing (RDD) and targeted-telephone sampling from Marketing Systems Group

(<https://www.m-s-g.com/Pages/>), a commercial vendor to recruit 2,314 participants from August 12, 2020, and October 27, 2020. Eligible participants included residents of St. Louis County, Missouri, aged 18 years or older who were available by landline or cellular telephone. We oversampled telephone numbers tied to county locations with a majority of Black residents in an attempt to obtain equal Black and White resident participation. Participation in the study involved testing for COVID-19 infection or participation in an approximate 15-minute telephone survey. This study was approved by the institutional review board of Washington University in St. Louis.

We conducted a sensitivity analysis to evaluate the impact of readjusting weights to reflect the reduced sample size compared with the sample from which the weights were originally derived. This analyses revealed that reweighting the data did not significantly change our statistical inferences or conclusions; therefore, we retained the original weights in our analysis.

Measures

The telephone-administered survey assessed 11 topics including, demographics, testing willingness, health status and access, current chronic health conditions, tobacco use, and COVID-19-specific items. When appropriate, the survey included previously validated and tested items from the Behavioral Risk Factor Surveillance System (17).

Sociodemographics

We collected self-reported sociodemographic information. Sex was categorized as female or male. Age was measured continuously in years. Race was categorized as Black, White, or other. Other racial and ethnic groups included American Indian/Alaska Native residents, Asian American/Native Hawaiian/Other Pacific Islander, and Hispanic residents. Because of their small sample size ($n = 68$), other racial groups were excluded from this analysis. Education status was categorized as high school diploma equivalent or less, some college (1–3 years), and college graduate (≥ 4 years). The number of children 18 years or younger living in participant households was dichotomized as no children and 1 or more children. Participants reported their annual household income from all sources ($< \$10,000$, $\$10,000$ – $\$14,999$, $15,000$ – $19,999$, $\$20,000$ – $\$24,999$, $\$25,000$ – $\$34,999$, $\$35,000$ – $\$49,000$, $\$50,000$ – $\$74,999$, $\geq \$75,000$). Marital status was married, divorced, widowed, separated, never married, or member of an unmarried couple, and current employment status was employed for wages, self-employed, retired, or unemployed (including those out of work for less than 1 year, out of work for 1 year or more, homemaker, student, or unable to work). Health care coverage was de-

terminated by the participant as having any kind of health care coverage (including health insurance, prepaid plans, or government-sponsored plans) or none.

COVID-19-related employment loss

Participants were asked a series of 3 yes or no questions on how their employment status was affected by the COVID-19 pandemic. We asked if they had been furloughed, laid off, or had their pay or hours reduced because of COVID-19.

COVID-19-related food insecurity

The survey included 3 questions related to food insecurity since the beginning of the COVID-19 pandemic. We inquired about the quantity and quality of food eaten since the pandemic's start by asking, "Which of these statements best describes the food eaten in your household since the COVID-19 pandemic started?" Response options were enough food, enough food but not type wanted, sometimes not enough food, or often not enough food. To assess the magnitude of worry about food, respondents were asked, "Since the beginning of the pandemic, have you worried that your food would run out before you buy more?" Response options included always, nearly always, sometimes, seldom, and never. Seldom or never worried were collapsed into one response. Finally, participants provided a yes or no response to the question, "Since the pandemic, did you or anyone in your household get free groceries or a free meal?"

Statistical analysis

Survey respondents were assigned weights to be representative of the underlying population of St. Louis County with respect to sex, location, and sample type (RDD or targeted telephone sample). Before the weighting process, missing data for key variables were imputed by using hot-deck imputation. This technique handles missing data by replacing each missing value with an observed response from a comparable respondent. We first weighted the sample obtained through RDD by using a standard process and then combined the data with the targeted sample to be weighted to select variables in the survey. At each step, results were examined for extreme values and trimmed.

We calculated the survey's weighted prevalence for each of the employment and food security outcomes for each race by sex population segment (Black female, Black male, White female, White male). Differences ($P < .05$) between groups were determined using the Rao-Scott χ^2 test. We then conducted survey-weighted logistic regression models to calculate odds ratios and 95% CIs associated with the race-by-sex subgroups and each of our employment and food insecurity outcomes. Key sociodemographic variables associated with respondents included the presence of chil-

dren in the home, age, education, and employment. Weighted multinomial logistic regression was used to calculate the odds ratios for associations with the quality of food and food worry outcomes. All analyses were performed by using SAS software version 9.4 (SAS Institute). R software version 4.1.2 (R Foundation for Statistical Computing) was used to create visuals.

Results

Descriptive statistics

A total of 2,246 respondents participated in the survey (Table 1). Among the sample, 1,421 respondents (63.3%) were female, 861 (38.3%) were Black, and 1,017 (45.3%) were aged 65 years or older. Black residents were less likely, compared with their White counterparts, to be college graduates (31.9% vs 61.2%) or be currently married (33.9% vs 58.7%). Approximately 28.6% of the overall sample had an income of $< \$35,000$, with a higher proportion of Black respondents (44.5%) living below this threshold compared with White respondents (18.6%).

Prevalence of employment loss and food insecurity by race and sex

Although 9.7% (95% CI, 7.2%–12.2%) of respondents were estimated as laid off because of COVID-19, the estimate was higher for Black female respondents at 16% (95% CI, 8.9%–23.0%). Across other groups, 8.6% of White female respondents (95% CI, 5.0%–12.1%), 6.1% of White male respondents (95% CI, 3.0%–9.2%), and 7.1% of Black male respondents were estimated as laid off (95% CI, 2.6%–11.6%, $P = .02$). Both being furloughed and having reduced hours or pay did not differ across the 4 groups, with 12.5% (95% CI, 9.5%–15.5%, $P = .25$) and 24.0% (95% CI, 20.4%–27.7%, $P = .56$) of respondents estimated to have these employment changes, respectively. Weighted prevalence of employment loss among participants by race and sex is illustrated (Figure 1).

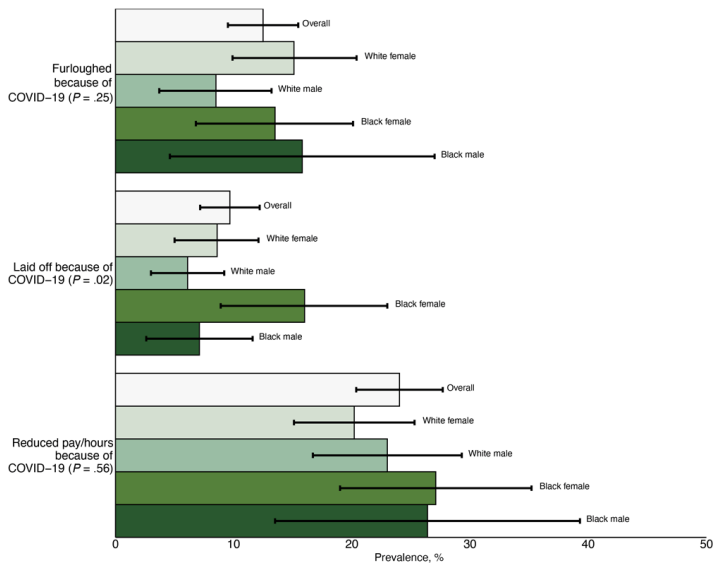


Figure 1. Estimated prevalence of 3 employment insecurity outcomes for St. Louis County residents and each sex and race subgroup. Prevalence is reported overall and for each race and sex subgroup. Group differences were assessed with a Rao-Scott χ^2 *P* value.

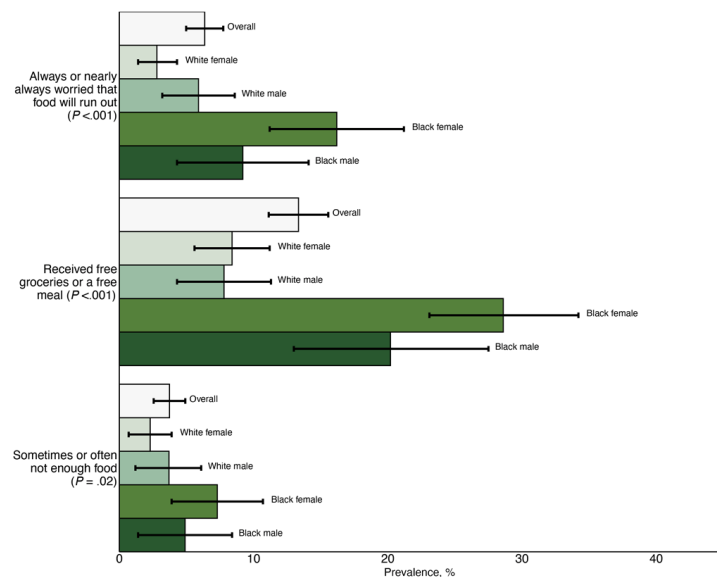


Figure 2. Estimated weighted prevalence for 3 food insecurity outcomes for St. Louis County residents and each sex and race subgroup. Prevalence is reported overall and for each race and sex subgroup. Group differences were assessed by using a Rao-Scott χ^2 *P* value.

Relative to White males (80.7%; 95% CI, 75.6%–85.9%) and White females (85.3%; 95% CI, 81.8%–88.7%), and to Black males (85.3%; 95% CI, 79.6%–91.0%), Black females were estimated to have a lower prevalence ($P = .02$) of having enough food (73.8%; 95% CI, 68.3%–79.4%) (Figure 2). This pattern of differences for Black female residents was consistent on all food insecurity items. Black females were estimated to have had a higher estimated prevalence of having enough food but not type wanted (18.9%; 95% CI, 13.9%–23.8%), followed by White male residents (15.6%; 95% CI, 10.8%–20.4%) and White female residents (12.4%; 95% CI, 9.3%–15.6%). Black males were estimated to have the lowest prevalence of having enough food but not type wanted (9.8%; 95% CI, 5.2%–14.4%). Both Black females (28.6%; 95% CI, 23.1%–34.2%) and Black males (20.2%; 95% CI, 13.0%–27.5%) were estimated to have higher prevalences of receiving free meals or groceries compared with their counterparts (8.4% White females; 95% CI, 5.6%–11.2%) and (7.8% White males; 95% CI, 4.3%–11.3%, $P < .001$) (Figure 2).

The 4 groups also differed by frequency of worry that food will run out ($P < .001$). An estimated 74.4% (95% CI, 71.6%–77.2%) of St. Louis County residents never worried that food will run out. Frequencies were slightly above the average for White female residents (75.8%; 95% CI, 71.1%–80.5%) and male residents (79.6%; 95% CI, 74.6%–84.7%), and slightly below the average for Black male residents (72.6%; 95% CI, 64.9%–80.3%). Black female residents were estimated to have the lowest prevalence of never worrying that food will run out at 57.8% (95% CI, 51.6%–63.9%). Moreover, 4.3% (95% CI, 3.2%–5.4%) of St. Louis County residents were estimated to always worry that food will run out. Across each group, this rate was highest among Black female residents with 13.2% (95% CI, 8.4%–18.0%) always worrying.

Sociodemographics as correlates of employment insecurity

For furlough, layoff, and reduced pay outcomes, there were no significant sociodemographic correlates. Regarding layoffs, although the overall model was not significant, Black female residents had higher odds of being laid off than White male residents. Specifically, Black female residents (OR = 2.61; 95% CI, 1.24–5.46, $P = .05$) had more than 2 times higher odds of being laid off, compared with White male residents (Table 2).

Sociodemographics as correlates of food insecurity

Race and sex were significant predictors of receiving free meals or groceries. Compared with White male residents ($P < .001$), White female residents had similar odds of receiving free meals (OR = 1.00; 95% CI, 0.54–1.83), Black male residents had more than 2 times the odds (OR = 2.41; 95% CI, 1.15–5.07), and Black female residents had more than 4 times higher odds (OR = 4.13; 95% CI = 2.29–7.45). Additionally, the presence of children in the household was a significant predictor: residents with children present had 65% higher odds of receiving free meals or groceries (OR = 1.65; 95% CI, 1.05–2.58, $P = .03$) than those with no children in the household. Neither age ($P = .52$) nor education ($P = .39$) were found to be related to receipt of free meals or groceries. Employment was a predictor ($P = .04$), with those who were unemployed having a 77% higher odds of receiving free meals, compared with those who were employed (OR = 1.77; 95% CI, 1.05–2.98) (Table 3).

Relative to White male residents ($P = .04$), White females had 27% lower odds (OR = 0.73; 95% CI, 0.46–1.15) and Black males had 47% (OR = 0.53; 95% CI, 0.25–1.10) lower odds of having enough food, but not type wanted. Black females had 22% times higher odds (OR = 1.22; 95% CI, 0.73–2.06). Similarly, White females (OR = 0.47; 95% CI, 0.15–1.54) and Black males (OR = 0.75; 95% CI, 0.24–2.39) had lower odds of sometimes or often not having enough food compared with White males; Black female residents had 26% higher odds of sometimes or often not having enough food compared with White males (OR = 1.26; 95% CI, 0.45–3.48). Furthermore, compared with those with a 4-year college degree ($P = .01$), residents with a high school education or less had 26% higher odds of having enough food but not type wanted (OR = 1.26; 95% CI, 0.72–2.21) and more than 3 times higher odds of not having enough food sometimes or often (OR = 3.46; 95% CI, 1.45–8.23). Residents with some college had 36% (OR = 1.36; 95% CI, 0.85–2.15) higher odds of having enough food but not type wanted, and more than 3 times higher odds of not having enough food sometimes or often (OR = 3.78; 95% CI, 1.63–8.78). Additionally, compared with employed residents ($P = .002$), those who were unemployed had 4 times higher odds of not having enough food sometimes or often (OR = 4.02; 95% CI, 1.55–10.39).

Compared with White male residents ($P < .001$), White females had nearly 2 times higher odds of sometimes worrying about food (OR = 1.93; 95% CI, 1.04–3.60), although Black males had 44% higher odds (OR = 1.44; 95% CI, 0.69–3.00) and Black females had more than 4 times the odds (OR = 4.25; 95% CI, 2.28–7.94). Regarding always or nearly always worrying about food, White females had 57% lower odds of worry, compared with White males (OR = 0.43; 95% CI, 0.20–0.93). Black males had 19%

higher odds (OR = 1.19; 95% CI, 0.52–2.75), and Black females had nearly 3 times higher odds of always or nearly always worrying about food compared with White males (OR = 2.99; 95% CI, 1.52–5.87). Compared with households without children ($P = .04$), those with children had 72% higher odds of sometimes worrying about food (OR = 1.72; 95% CI, 1.06–2.80). Although neither age nor education were found to be predictors of food worry ($P = .67$ and $P = .22$, respectively), employment status was significant ($P = .01$), such that those unemployed had 2 times higher odds of always worrying about food than those employed (OR = 2.37; 95% CI, 1.27–4.41) (Table 3).

Discussion

The aim of this study was to investigate the relationship between sociodemographic characteristics and 2 important social determinants of health, employment loss and food insecurity, during the COVID-19 pandemic among Black and White adults living in Saint Louis County, Missouri. We separately analyzed both employment loss and food insecurity and found that Black adult residents were disproportionately affected, compared with White adults. Additionally, we observed that Black females experienced the greatest burden of economic hardships.

These results corroborate findings from an emerging body of literature demonstrating the excessive burden of COVID-19 among Black Americans generally (18), and among Black women more specifically (19–21). We emphasize, however, that these are not new challenges for Black women, but long-standing systemic social and economic injustices against this group on the basis of their interlocking identities of being both Black and female (14,22). Because of their intersectional oppressions, Black women experience racism and sexism that make them more likely to be segregated into low-wage occupations that offer inadequate benefits, workplace inflexibility, and job insecurity (23,24). In the context of COVID-19, these sex and race inequities have placed a disproportionate number of Black women on the frontlines, working in jobs that cannot be done from home, which places them at higher risk of potential COVID-19 infections, hospitalizations, and deaths (21).

In our study, Black women were more likely to be laid off compared with White men and most likely to always worry about food more than the other groups. These findings suggest that COVID-19 created more social risks and distress for Black females and highlights a need for additional support for this population. Further, Black females typically have multiple primary caregiving responsibilities, and they provide support for both their nuclear and extended family systems, as well as friends and fictive kin (people

not biologically or legally related yet who are considered to be “family”) (25).

Compared with White women, Black women are more likely to provide this care in isolation without the help of others and to experience more financial hardships as a result of their caregiving (23). Without adequate systems and policies to support Black women, it is conceivable that entire family and friend networks supported by Black women are placed at increased risks of food insecurity and other adverse social conditions.

We observed that the estimated overall prevalence of food insecurity in St. Louis County residents increased since the beginning of the pandemic until the end of our study. Moreover, in 2019 (pre-pandemic), 10.1% of all St. Louis County residents were food insecure, and our findings show slightly higher rates, for example, 13.3% of residents receiving free groceries or meals (26). Among those who were food insecure, Black respondents living with children and those who were unemployed were more likely to receive assistance in the form of free groceries or meals, supporting prior study findings (27). Given the higher prevalence of pre-existing food insecurity among these groups, it is possible that they were already familiar with accessing and using community resources from needs before the pandemic. Formerly established social networks and community ties might have provided them with the advantage to know more readily where and how to access needed resources during the pandemic (28,29).

Our findings are consistent with other evidence documenting the protective benefits of a college-level education to buffer against the social and health harms of COVID-19 (27). Respondents in our sample with a high school education or less were more vulnerable to being laid off from their jobs and being food insecure since COVID-19.

Our study has limitations. The cross-sectional design limits causal conclusions. The study also does not account for whether people had pre-existing food insecurity or employment hardships compared with new hardships since the pandemic. Groups having new hardships since the pandemic or existing hardships before the pandemic may be different in important ways that were not explored in this study. Another limitation of this study is low response rates. Although weighting techniques were applied to reduce bias and obtain a more representative sample, estimated proportions of residents in St. Louis County affected by food insecurity or employment loss may still be underestimated or overestimated. Additionally, racial and ethnic groups other than Black or White, and people who did not identify as male or female, were not included in our sample, limiting our understanding of how COVID-19 affected employment loss and food insecurity for these groups. Despite these limitations, our analysis had strengths. Our study de-

creased digital divide challenges in reaching participants by requiring only a cellular telephone or landline to be eligible. Given the large sample size and the complex sampling design, our findings are likely to be generalizable to adults living in similar types of counties in the US. Furthermore, the study is timely, and was administered during the pandemic to assess COVID-19–related concerns occurring in “real-time.” The findings suggest additional research is needed to identify factors that contribute to elevated social harms in the context of a pandemic. For instance, given the disproportionate rates of chronic conditions like heart disease and diabetes among Black women compared with White women (21), it is possible that if unable to work from home, these women may have had to decide between their financial wellness or physical wellness, and chose, or were forced to choose, to exit their employment.

Moreover, this study sheds light on group differences by race and sex, providing further insight beyond studies examining only gender or only racial disparities in employment loss and food insecurity. Identifying which segments of the population are more likely to experience increased social harms is critical to prevent a subsequent increase in chronic disease incidence, morbidity, and mortality (30). In summary, this study provides important and relevant contributions and insights into the uneven social harms associated with the COVID-19 pandemic on different population segments. Results can be used to guide programs, interventions, and policies to mitigate the disproportionate impact of COVID-19 and its related social harms on Black women.

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Tables

Table 1. Sample Demographics, by Race, in Surveyed Adults (N = 2,246) Living in St. Louis County, Missouri, August 12, 2020–October 27, 2020

| Demographics | Overall, n (%) | White, n (%) | Black, n (%) |
|--|----------------|--------------|--------------|
| Total | 2,246 | 1,385 (61.7) | 861 (38.3) |
| Sex | | | |
| Female | 1,421 (63.3) | 822 (59.4) | 599 (69.6) |
| Male | 825 (36.7) | 563 (40.6) | 262 (30.4) |
| Age (mean, SD) | 59.63 (16.6) | 60.6 (16.6) | 58.14 (16.5) |
| Marital status | | | |
| Married | 1,105 (49.2) | 813 (58.7) | 292 (33.9) |
| Divorced | 328 (14.6) | 167 (12.1) | 161 (18.7) |
| Widowed or separated | 335 (14.9) | 180 (13.0) | 155 (18.0) |
| Never married or Other | 478 (21.3) | 225 (16.2) | 253 (29.4) |
| Education | | | |
| High school diploma or less | 500 (22.3) | 216 (15.6) | 284 (33.0) |
| College, no degree | 624 (27.8) | 322 (23.2) | 302 (35.1) |
| College, undergraduate or advanced degree | 1,122 (50.0) | 847 (61.2) | 275 (31.9) |
| Employment status | | | |
| Employed for wages | 853 (38.0) | 532 (38.4) | 321 (37.3) |
| Self-employed | 133 (5.9) | 99 (7.2) | 34 (4.0) |
| Out of work ≥1 years | 48 (2.1) | 22 (1.6) | 26 (3.0) |
| Out of work <1 year | 86 (3.8) | 49 (3.5) | 37 (4.3) |
| Persons working in household | 47 (2.1) | 35 (2.5) | 12 (1.4) |
| Student | 37 (1.7) | 24 (1.7) | 13 (1.5) |
| Retired | 925 (41.2) | 575 (41.5) | 350 (40.7) |
| Unable to work | 117 (5.2) | 49 (3.5) | 68 (7.9) |
| Health care coverage | | | |
| No | 143 (6.4) | 54 (3.9) | 89 (10.3) |
| Yes | 2,103 (93.6) | 1,331 (96.1) | 772 (89.7) |
| Presence of children in the household | | | |
| No | 1,731 (77.1) | 1,083 (78.2) | 648 (75.3) |
| Yes | 515 (22.9) | 302 (21.8) | 213 (24.7) |
| Income, \$ | | | |
| <10,000 | 73 (3.3) | 21 (1.5) | 52 (6.0) |
| 10,000–\$14,999 | 60 (2.7) | 22 (1.6) | 38 (4.4) |
| 15,000–\$19,999 | 117 (5.2) | 35 (2.5) | 82 (9.5) |
| 20,000–\$24,999 | 194 (8.6) | 82 (5.9) | 112 (13.0) |
| 25,000–\$34,999 | 198 (8.8) | 98 (7.1) | 100 (11.6) |
| 35,000–\$49,999 | 376 (16.7) | 204 (14.7) | 172 (20.0) |
| 50,000–\$74,999 | 405 (18.0) | 254 (18.3) | 151 (17.5) |
| >75,000 | 823 (36.6) | 669 (48.3) | 154 (17.9) |

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Table 2. Weighted Logistic Regression Models^a of COVID-19 Related Employment Loss Outcomes, St. Louis County, Missouri, August 12, 2020–October 27, 2020

| Characteristics | COVID-19 furlough | | COVID-19 lay-off | | COVID-19 reduced pay or hours | |
|--|-------------------|----------------|------------------|----------------|-------------------------------|----------------|
| | OR (95% CI) | P ^b | OR (95% CI) | P ^b | OR (95% CI) | P ^b |
| Sex and race subgroup | | | | | | |
| Black female | 1.60 (0.72–3.53) | .35 | 2.61 (1.24–5.46) | .05 | 1.26 (0.73–2.16) | .51 |
| Black male | 1.79 (0.66–4.90) | | 0.97 (0.39–2.44) | | | |
| White female | 1.98 (0.93–4.24) | | 1.46 (0.72–3.00) | | | |
| White male | 1 [Reference] | | 1 [Reference] | | | |
| Presence of children in household | | | | | | |
| Children in household | 0.85 (0.44–1.64) | .63 | 1.05 (0.56–1.98) | .87 | 1.03 (0.66–1.60) | .90 |
| No children in household | 1 [Reference] | | 1 [Reference] | | | |
| Age | 1.00 (0.98–1.03) | .89 | 1.00 (0.99–1.02) | .63 | 0.99 (0.98–1.01) | .24 |
| Education | | | | | | |
| ≤High school diploma | 1.51 (0.72–3.15) | .55 | 1.97 (0.95–4.08) | .18 | 0.78 (0.44–1.37) | .24 |
| College 1–3 years | 1.13 (0.55–2.33) | | 1.16 (0.61–2.18) | | | |
| College graduate | 1 [Reference] | | 1 [Reference] | | | |

^a Values obtained through logistic regression with adjustment for all variables shown.

^b Type 3 analysis of effects, *F* test, $\alpha = .05$.

Table 3. Weighted Logistic Regression Models^a of COVID-19-Related Food Insecurity Outcomes, St. Louis County, Missouri, August 12, 2020–October 27, 2020

| Characteristics | Received free groceries or a free meal during COVID-19 | | Quantity and quality of food eaten during COVID-19 ^b | | | Worries about food running out before able to purchase more ^c | | |
|--|--|----------------|---|--|----------------|--|--------------------------------------|----------------|
| | OR (95% CI) | P ^d | Enough food, but not type wanted, OR (95% CI) | Not enough food ^e , OR (95% CI) | P ^d | Sometimes, OR (95% CI) | Always or nearly always, OR (95% CI) | P ^d |
| Race and sex subgroup | | | | | | | | |
| Black female | 4.13 (2.29–7.45) | <.001 | 1.22 (0.73–2.06) | 1.26 (0.45–3.48) | 0.04 | 4.25 (2.28–7.94) | 2.99 (1.52–5.87) | <.001 |
| Black male | 2.41 (1.15–5.07) | | 0.53 (0.25–1.10) | 0.75 (0.24–2.39) | | 1.44 (0.69–3.00) | 1.19 (0.52–2.75) | |
| White female | 1.00 (0.54–1.83) | | 0.73 (0.46–1.15) | 0.47 (0.15–1.54) | | 1.93 (1.04–3.60) | 0.43 (0.20–0.93) | |
| White male | 1 [Reference] | | 1 [Reference] | 1 [Reference] | | 1 [Reference] | 1 [Reference] | |
| Presence of children in household | | | | | | | | |
| Children in household | 1.65 (1.05–2.58) | 0.03 | 1.14 (0.74–1.76) | 1.82 (0.71–4.72) | 0.42 | 1.72 (1.06–2.80) | 1.68 (0.91–3.09) | 0.04 |
| No children in household | 1 [Reference] | | 1 [Reference] | 1 [Reference] | | 1 [Reference] | 1 [Reference] | |
| Age | 1.00 (0.98–1.01) | 0.52 | 1.00 (0.99–1.01) | 1.01 (0.98–1.04) | 0.93 | 1.00 (0.99–1.02) | 0.99 (0.98–1.01) | 0.67 |
| Education | | | | | | | | |
| High school diploma or less | 1.46 (0.84–2.55) | 0.39 | 1.26 (0.72–2.21) | 3.46 (1.45–8.23) | 0.01 | 1.59 (0.89–2.86) | 2.03 (0.99–4.15) | 0.22 |
| College 1–3 years | 1.10 (0.69–1.76) | | 1.36 (0.85–2.15) | 3.78 (1.63–8.78) | | 1.16 (0.67–2.01) | 1.67 (0.87–3.20) | |
| College graduate | 1 [Reference] | | 1 [Reference] | 1 [Reference] | | 1 [Reference] | 1 [Reference] | |
| Employment | | | | | | | | |
| Retired | 0.86 (0.53–1.40) | 0.04 | 0.65 (0.40–1.07) | 0.85 (0.32–2.25) | 0.02 | 0.52 (0.26–1.04) | 1.05 (0.52–2.12) | 0.01 |
| Unemployed | 1.77 (1.05–2.98) | | 1.07 (0.64–1.82) | 4.02 (1.55–10.39) | | 1.48 (0.84–2.62) | 2.37 (1.27–4.41) | |
| Employed for wages | 1 [Reference] | | 1 [Reference] | 1 [Reference] | | 1 [Reference] | 1 [Reference] | |

^a Values obtained through simple (received free groceries or a free meal during COVID-19) or multinomial (quantity and quality of food eaten during COVID-19, worry about food running out before ability to purchase more) logistic regression with adjustment for all variables shown.

^b Outcome reference response: Enough food.

^c Outcome reference response: Seldom or never.

^d Type 3 analysis of effects, *F* test, $\alpha = .05$.

^e Sometimes or often not enough food.

ORIGINAL RESEARCH

“We’re, Like, the Most Unhealthy People in the Country”: Using an Equity Lens to Reduce Barriers to Healthy Food Access in Rural Appalachia

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PEER REVIEWED

Summary**What is already known on this topic?**

The prevalence of obesity is disproportionately high among people living in rural areas, yet many policy, systems, and environmental interventions designed to improve healthy food access in these environments have not been successful.

What is added by this report?

An equity-oriented obesity prevention framework can guide investigators in identifying or tailoring acceptable interventions unique to a community's needs.

What are the implications for public health practice?

Community input to intervention development is crucial to the success of environmental changes to expand healthy food access in rural areas.

Abstract**Introduction**

Obesity disproportionately affects rural communities, and Appalachia has some of the highest obesity rates in the nation. Successful policy, systems, and environmental (PSE) interventions to reduce obesity must reflect the circumstances of the population. We used a health equity lens to identify barriers and facilitators for healthy food access in Martin County, Kentucky, to design interventions responsive to social, cultural, and historical contexts.

Methods

We conducted 5 focus groups in Martin County, Kentucky, in fall 2019 to obtain perspectives on the local food system and gauge acceptability of PSE interventions. We used grounded theory to identify perceived barriers and facilitators for healthy eating.

Results

Thirty-four adults (27 women; median age, 46 years) participated in 5 groups. One prominent theme was declining interest in farming; many participants believed this decline was generational. One participant noted, “Most of my adult male relatives worked in the coal mines, and they worked 6 days a week. . . . My grandpa had the garden, but then my dad’s generation is the one quit gardening.” Another shared, “You would probably have to have someone to teach [gardening].” Instead of enhancing farmers markets, participants suggested building community capacity for home gardens to increase vegetable consumption.

Conclusion

Our findings demonstrate the importance of obtaining community input on the development of PSE interventions to mitigate inequities in obesity. Although farmers market interventions were deemed not feasible, other solutions to enhance access to produce were identified. Developers of community-responsive PSE interventions to improve healthy eating in rural, food-insecure locations should consider using an equity-oriented prevention framework to ensure acceptable interventions.

Introduction

Rural communities in the United States have disproportionately higher rates of preventable obesity-related illness and death compared with their urban counterparts (1). Characteristics of some rural regions, such as Appalachia, present challenges that exacerbate the high rates of obesity and related health conditions in certain populations (2,3). The lack of reliable food retailers in Ap-



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palachia reflects a malfunctioning food system unable to support healthy eating patterns (4). In addition, persistent poverty and unemployment are linked to a high prevalence of preventable mortality in Appalachia (2,5).

Social, political, and historical contexts influence the effectiveness of programs and interventions aimed at promoting healthy food choices (6). These contexts are unique to each community, with distinctive regional characteristics among Appalachian communities (7). Policy, systems, and environmental (PSE) interventions and strategies designed for communities with a disproportionately high prevalence of obesity, such as communities in Appalachia, are needed. However, established approaches have been largely ineffective in adult populations that have inequities (8); therefore, new and novel frameworks for designing and implementing successful, equitable interventions are necessary.

The Getting to Equity (GTE) framework provides a guide for implementing obesity prevention activities that gives priority to health equity principles (9,10), an approach that is potentially important in Appalachia (Figure). Each quadrant in the framework represents a type of intervention approach. The upper 2 quadrants, which include increasing healthy options and reducing deterrents, focus on potential policy-change and systems-change interventions. The lower 2 quadrants, which include building on community capacity and improving social and economic resources, reflect individual and community resources and capacity. Each identified strategy in each quadrant has shown promise or relevance in the mitigation of health disparities. Kumayika argues that balance and synergy are needed among the strategies (4 quadrants) to be effective at producing sustainable, positive change (10).

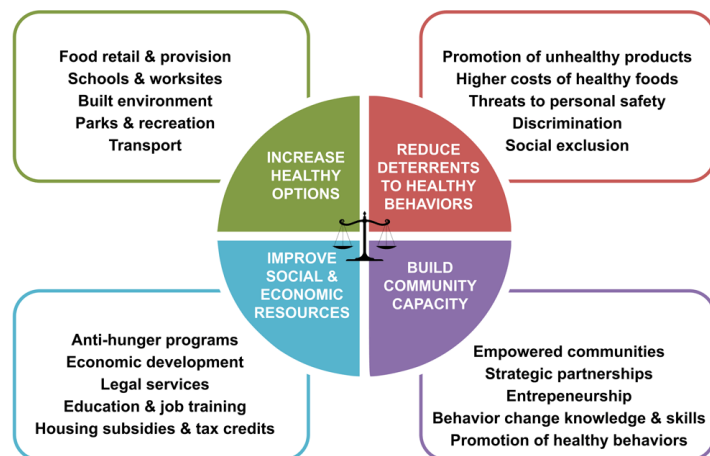


Figure. Getting to Equity framework for obesity prevention. Source: Kumayika (9). Reprinted with permission from the National Academy of Sciences, Courtesy of the National Academies Press, Washington, DC.

Our study, in Martin County, Kentucky, was part of the larger, multiyear High Obesity Program, which has the overall aim of reducing rural obesity and decreasing the risk of preventable mortality (11). Although the High Obesity Program is multifaceted, it emphasizes increasing geographic or financial access to healthy foods. In addition, the High Obesity Program requires use of existing infrastructure in rural communities, such as the Cooperative Extension Service and community coalitions. The aim of this study was to use the GTE framework to identify barriers to and solutions for increasing access to healthy foods in a rural, resource-poor environment.

Methods

We conducted our focus group study in September and October 2019 in Martin County, in eastern Kentucky, which is adjacent to West Virginia. Approximately 39% of residents live in poverty, and the county struggles with high unemployment (12.4%) and outmigration (a 13.4% reduction in population from April 2010 to July 2019) (12). According to the Food Access Research Atlas, more than 33% of county residents live 20 miles or more from the nearest supermarket, which would classify the entire community as a food desert (13). Approximately 1 in 5 Martin County households are considered food insecure (14). One of the few community assets to promote healthy eating in the county is the non-profit organization Grow Appalachia. Established at Berea College in 2009, the mission of Grow Appalachia is to increase access to fresh fruits and vegetables by building capacity to successfully grow home gardens. Grow Appalachia is active in Martin County, supplying participants with assistance to grow food (15).

In summer 2019, we purposively recruited adults from Martin County for participation in focus groups. The Martin County Extension agent recruited participants, as did community coalition members. We placed informational flyers in the Martin County Extension Office and posted information on its Facebook page. Eligibility criteria for participation were being 18 or older, speaking English, and residing in Martin County. Participants completed written informed consent and completed a brief sociodemographic survey. Participant assignment to focus groups was random with 1 exception: staff members of a local middle school were recruited to participate in a focus group held at that location. A trained moderator facilitated the focus groups (K.M.C.) using a written moderator guide (Box), and 2 research team members took notes (E.D., R.G.). All focus groups took place in September and October either in the Martin County Extension Office or in the local middle school and lasted approximately 1 hour. Participants received a \$25 voucher for a local grocery store as an incentive to participate. The University of Kentucky Institutional Review Board approved this study.

Box. Questions for Focus Groups on Healthy Eating in Appalachia

Where are the places you can purchase food in your community?

- How easy it is to get fruits and vegetables at these locations?
- Do many people in your community purchase food at farmers markets?
- Where can people go in your community to get food if they are unable to purchase it? (eg, food pantries, churches)

Do you think your community is designed to promote healthy eating choices? Why or why not?

- What factors in your community make it easier to eat healthy?
- What factors in your community make it harder to eat healthy?
- Would you consider transportation a barrier?

What other resources do you think would be helpful to have in your community to allow people to purchase fruits and vegetables?

What would be some ways to motivate or encourage people in your community to eat fruits and vegetables?

(Bullet points refer to probes the moderator could use for further discussion, if needed.)

We summarized the data from the brief sociodemographic survey, and we compared the sociodemographic composition of focus group participants with the composition of the Martin County population as reflected by data from the US Census Bureau (12). Focus groups discussions were audio recorded and transcribed verbatim. Multiple investigators reviewed focus group transcripts using a grounded theory approach (16). Investigators used an iterative inductive–deductive approach to identify themes on assets and barriers to healthy eating in the community. These themes formed the basis of codes that were analyzed in NVivo software version 12 (QSR International). Investigators then used the GTE framework to categorize themes according to the 4 quadrants of intervention approaches and selected illustrative quotes for each theme. We conducted this analysis during January–March 2020.

Results

Thirty-four adults participated in 5 focus groups. The median age of participants was 46 years, and 27 were women (Table 1). All participants were non-Hispanic White, and most participants had some college education or were college graduates. Compared with the Martin County general population, study participants were less racially/ethnically diverse, slightly older, and had higher levels of education.

Investigators established several independent but interconnected themes related to healthy eating. Participants identified myriad barriers to healthy eating (Table 2) and a smaller number of assets in the community that promote healthy eating. These assets included Grow Appalachia and Cooperative Extension Service pro-

gramming, both of which address barriers identified by participants to growing food, including knowledge of how to grow a garden and the ability to grow and sell food for a profit. Deep-rooted community pride was also made evident as an asset. These assets collectively lie within the GTE quadrant of building community capacity. Several participants drew connections between Grow Appalachia and their capacity to grow and consume produce year-round.

Where I was in the Grow Appalachia project, they paid for all my seeds and everything. . . . I bet there was between tools and everything, well over a \$1,000 put into my garden.

I was a participant in [Grow Appalachia], and I enjoyed it. . . . I already knew a lot, but I have learned a lot more about canning and different things . . . we grew tomatoes, cucumbers, green beans, corn, zucchini, squash . . . peppers.

[Referring to Grow Appalachia] What helped me most from that program was, um, my husband passed away 3 years ago, and since then it's been really hard to get it plowed. I have a plow, but it's big and I can't operate it. . . . That was so helpful to me, to get it plowed that first time.

Because of community support from programs like Grow Appalachia, participants expressed the idea that residents could grow their own produce for consumption. Participants also described a distribution network that existed across the community in which residents shared produce with neighbors and family members, rather than selling it.

I do share. I've not sold anything this year; it was the first year I had that big a garden. But yeah, my grandma, my parents, whoever, they want to drive out and help. I told them if they want to come help pick it, they can have some.

Yeah, I can answer that for myself there. When I raise things, I mean, I don't sell it. I don't believe in selling it. If I have got, usually I got a whole bunch, I give it away.

I know when I had a garden, and I had extra produce, I would tell people you can have anything you want they just have to come get it.

Participants revealed a keen awareness of the decline in the local farmers market. They connected the decline to generational shifts in career opportunities. As coal mining gained popularity in the region, people prioritized mining over farming.

Most of my adult male relatives worked in the coal mines, and they worked 6 days a week. My dad left before sunrise and home after

dark. . . . My grandpa had the garden, but then my dad's generation is the one that quit gardening.

Moreover, although a clear desire for homegrown produce was apparent among community members, the lack of interest in farming may result from the local view that cultivating homegrown produce is labor-intensive. Participants indicated that farming is not a lucrative endeavor in this region, further deterring interest among this population. Thus, the farmers market continues to dwindle in this county because of a lack of participating growers.

Dad sells at the farmers market, and he has noticed it seems to be declining a little bit, especially as the year goes on. It starts out pretty strong, he says, but as the year goes on. . . . I don't know if they get burned out on produce, everyone gets used to eating fast food and stuff.

There's no money in it. For the work and time and effort you put into it, if you don't just enjoy doing it, there is no money in it. You can't do it and make your car payment every month. You couldn't use it as a second income. There is no way to be profitable with it. Unless you are doing it on a mass scale.

Participants described opportunities for encouraging homegrown produce, including enhanced knowledge of food preservation and opportunities to learn from those who have become experts through practice; however, most participants perceived opportunities as limited in their community.

But it was, like, a couple in my church that does that stuff, and they kind of walked me through it and showed me. And I just wish we had more resources to show us how to do those things.

Like our garden, I think I would plant a lot more, if I knew more about how to do the canning.

Yeah, you know, he'll have, you know, lots of, you know, a lot of people have corn. Corn, you know, I'm pretty sure everybody has corn normally certain times of year, but green beans too quick. And you know, he always has lots of squash, and cucumber, tomatoes and stuff like that, and packs it up and takes it all home.

We like a certain thing, we want cucumbers, and we want green beans, and we want tomatoes, and my kids don't really look at nothing else when we come. So, like you said, more green beans please.

Although preferences were established, participants described being motivated to make healthy choices to set an example for younger generations.

Discussion

Using the GTE framework for obesity prevention, our study identified many barriers to, and a smaller number of solutions for, increasing access to healthy foods in the Appalachian region of Kentucky. Applying an equity-oriented lens to understanding rural food access requires recognition of fundamental conditions that shape individual experiences and the rejection of biases that blame individuals for circumstances beyond their control (10). Our findings reflect the decline of farming as an occupation in rural Appalachian communities, yet many participants spoke of home gardening as a self-sustaining food source for themselves or a network of people, such as family members or neighbors. Garden produce unused by the grower, we learned, is distributed to the community through an informal economy of food bartering and sharing. Food, in this fashion, acts as its fundamental purpose, a commodity valued at a worth woven into the fabric of Appalachian culture. This concept is important to consider when designing PSE interventions focused on food access in Appalachia.

The declining fiscal contribution of farming, as well as the practice itself, has been gradual yet consistent in Appalachia (17). As our findings suggest, the decline in farming could be attributed to generational shifts in industry opportunities. In Appalachia, farming practices began to deteriorate in the late 19th century, when a new economic stimulus appeared in the form of timbering and coal mining (18). Since then, the region has continued to experience agrarian decline. The 2017 Census of Agriculture for Martin County showed 30 farms and 43 total producers (60% male, 40% female); the average age of producers was 47. Ten farmers reported being younger than 35; 17 reported farming as their primary occupation, and only 3 farmers sold directly to consumers (19). Furthermore, the Kentucky Appalachian region lost a disproportionate amount of farmland from 2007 through 2012: 9.2% compared with 0.8% across the United States (17). The effect of these declines in Appalachia has yet to be fully explored. However, it begs further investigation when considering factors that have led to the persistent poverty levels, poor health status, and dissolved food access points in this community.

Health disparities in Appalachia, including those related to continued outmigration, have led to economic decline and increased poverty (20). From 2010 to 2019 alone, the population in Martin County decreased by an estimated 13.4% (12). The GTE framework further guides synergetic interventions and explores the intertwining realms that influence equity in the context of outmigration, economic decline, and increased poverty. Therefore, it is worth continuing to investigate the chasm between a community practice of food sharing and a farming decline as a mode to incor-

porate GTE principles to improve healthy food access in rural Appalachian communities such as Martin County.

The shift from traditional farmers markets is increasingly evident, leaving communities and food systems to envision alternative modes in which to implement healthier lifestyle behaviors, including fruit and vegetable consumption (21). Small farms and home gardens are important assets in Appalachian heritage; they have numerous social and historical implications and reflect strong local values, such as self-sufficiency and esteemed locavore practices (sourcing and consumption of locally grown or produced foods), bolstering their feasibility as effective interventions (22). The findings from our focus groups echo the role of small-scale home gardens in this Appalachian community as a mode of increasing access to fresh fruits and vegetables. Appalachian communities value these cultural customs, as evidenced by the rich history of heirloom vegetable seeds in the region (22). Future work should use culturally relevant tools and examine the existing food system infrastructure when developing novel strategies to increase access to fruits and vegetables outside traditional approaches. Although farmers markets have been viable interventions in some communities (23), they may not be suitable solutions for all, given the unique characteristics of Appalachian communities. For example, a qualitative study of 15 low-income Appalachian residents found that only 1 person regularly visited a farmers market, citing pricing and inconvenience as barriers (24). Although respondents reported generally positive attitudes toward farmers markets, the economic and cultural environmental landscapes and other barriers do not make them a plausible intervention for all Appalachian communities (25,26).

The findings from our focus groups add to the growing body of research illuminating the health inequities Appalachian communities face. It is important to note the rapid decline of the socioeconomic landscape in rural communities compared with their urban counterparts (27). Although common barriers, such as affordability and access to healthy food, exist among low-income residents of both rural and urban communities, Appalachia has unique challenges, including low population density, geographic isolation, and persistent poverty, that amplify these barriers (7,25). An increase in poverty leads to less food affordability, particularly among rural low-income populations in the Appalachian region (27). Additionally, since the completion of our focus groups, 1 of only 3 grocery stores in this community closed. This further reinforced the food access barriers in this community.

Inadequate access to healthy foods contributes to the declining health status of rural communities, including increased rates of obesity and chronic diseases (1,3). Inadequate access to healthy foods is challenging when coupled with aforementioned barriers and transportation access. Collectively, these factors make rural

Appalachian communities distinctly different from impoverished urban communities when addressing improvements to food accessibility and, more broadly, the health status of populations. Despite probing feasible solutions for the multitude of barriers their food system presented, participants were not forthcoming with many solutions aside from suggested enhancement to current practices such as home gardening.

For interventions to be successful, they must be tailored to unique community needs. For example, participants in our study deemed farmers markets impractical, although they are a common intervention to mitigate problems with food systems in rural communities. However, participants identified some community assets, particularly Grow Appalachia, an initiative established to address food insecurity by working with families to grow produce at home. Through training and technical assistance, Grow Appalachia enables communities to prepare, plant, and cultivate home gardens, improving access to nutritious foods and enhancing social enterprise to sustain an equitable food system (14). In 2019, the Martin County Cooperative Extension Office partnered with Grow Appalachia to enhance food security. The partnership enables Grow Appalachia to provide home gardeners with resources and services, such as equipment and seeds, while the Cooperative Extension Service provides ongoing support and training throughout the growing season. By supporting individual gardeners, the Grow Appalachia framework may be more effective in improving access to fruits and vegetables than sustaining the farmers market in this rural community. Furthermore, because of coronavirus disease 2019 (COVID-19), interest in the victory garden toolkit on how to grow gardens — distributed by Cooperative Extension offices — has increased. The increased interest lends support for continued interventions that focus on home gardening. Food preservation and cooking classes are additional services that support home gardeners and promote healthy eating (28) and are services identified as desirable to this community.

Future initiatives must consider the deeper roots of systemic issues to implement effective and equitable solutions. One issue influencing food choice in this community is basic food security. Martin County has historically faced high rates of food insecurity. Yet, because of the COVID-19 crisis, food insecurity is projected to increase by more than 5% to 26%; 1 in 4 households will experience food insecurity in the years to come (29). The repercussions of food insecurity will be numerous for an already vulnerable population. Moreover, Appalachia experiences persistent poverty (16.3% vs. 14.6% for United States), with Appalachian Kentucky having the highest poverty rate among all states in the Appalachian region (25.6%) (26). To address food access inequities, poverty and food security status must first be addressed. Addressing only 1 quadrant of the GTE framework is likely insufficient to imple-

ment sustainable change in food access. The incorporation of additional strategies that support the 3 remaining quadrants of the GTE framework are needed to balance and enhance effectiveness and sustainability of future interventions. Furthermore, finding culturally relevant facilitators to promote healthy choices will be key to behavior change.

Our study has several limitations. We did not randomly select our sample; we used a purposive, community-engaged approach to recruiting. Participants reported higher levels of education than the general county population. Additionally, our sample included more women than men and older participants (13), limiting the external validity of our findings to other rural or Appalachian populations. In an equity perspective, this is an important limitation and suggests that the barriers identified in our study are likely not the only barriers that impede access to healthy food in the community. Finally, social desirability bias may have influenced respondents' comments. Despite these limitations, our study demonstrates the value of framing barriers to food access in a rural Appalachian population with an equity lens. Future PSE interventions to address food access in this and similar populations should consider using the GTE framework to envision new approaches that explicitly acknowledge social inequities that challenge healthy eating.

Few macro-scale approaches, such as enhancing farmers markets, have shown broad success in rural Appalachia, which speaks to the heterogeneity of these communities (24,30). Designing food access interventions in rural Appalachia that explicitly acknowledge the social inequities in the region and actively engage community members are likely to be more successful than those that do not. This study revealed a novel overarching theme: enhancing community capacity through various channels that depend on the existing resources reported by community residents. Our findings validated the importance of having community buy-in to support the small grower through multiple avenues, including Grow Appalachia and Cooperative Extension Service programming. The COVID-19 pandemic has further affected the food system in Appalachian communities. Instead of enhancing farmers markets, future investigators focused on obesity prevention work in rural Appalachia must learn about the local food system and culture. This focus will enhance community capacity for growing personal gardens, increase food access availability, and improve equity.

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Tables

Table 1. Sociodemographic Characteristics of Focus Group Participants (N = 34) and the General Population of Martin County, Kentucky, 2019

| Characteristic | No. (%) | Martin County, % ^a |
|-----------------------------|----------|-------------------------------|
| Age, median, y | 46 | 39 |
| Sex | | |
| Female | 27 (79) | 45 |
| Male | 7 (21) | 55 |
| Race | | |
| Non-Hispanic White | 34 (100) | 92 |
| Non-Hispanic Black | 0 | 7 |
| Other races combined | 0 | 1 |
| Hispanic ethnicity | 0 | 3 |
| Education | | |
| <High school graduate | 1 (3) | 26 |
| High school graduate | 4 (12) | 39 |
| Some college | 12 (35) | 25 |
| College graduate | 17 (50) | 9 |
| Household income, \$ | | |
| <20,000 | 8 (24) | _ ^b |
| 21,000–59,999 | 13 (38) | _ ^b |
| ≥60,000 | 13 (38) | _ ^b |

^a Data source: US Census Bureau (12).

^b No analogous data categories available from the US Census Bureau.

Table 2. Barriers to Healthy Eating in Martin County, Kentucky, as Identified by Focus Group Participants and Organized Within the Getting to Equity Framework^a

| GTE Quadrant and Participant Narratives | Illustrative Quote ^b |
|---|--|
| GTE quadrant: Increase healthy options | |
| Limited food retail options | [O]ne of the main problems with [local grocery store] is not enough people in our community buy the fruits and vegetables, and so they don't keep as much on hand because it doesn't sell as quickly here. |
| Lack of access to produce | I know for the senior citizens, like, we will order bananas but we can't get them around here 'cause they don't have enough for us to go purchase. So we have to order them and they come frozen. And when you open it up, it's black. |
| | We do have a local produce, private owned produce store, but they don't keep a lot of stuff. |
| GTE quadrant: Reduce deterrents to healthy behaviors | |
| Cost of healthy food | Fresh fruits and vegetables are not cheap. |
| | A lot of people are on fixed income . . . and it's hard to eat healthy . . . it's the bottom line. It is way expensive to eat healthy. |
| Availability of fast food | It's like, say you go to McDonald's or Wendy's or somewhere, you know a salad is \$4 or \$5 compared to you know, chicken nuggets a dollar. |
| | You can go out and get a dollar hamburger versus \$5 for fruit. |
| | You can buy a box of Little Debbie's for \$1.99 and you can't buy hardly anything out of the produce case for \$1.99. |
| | I am sure there are a lot of kids out there right now that's in high school that have very little fresh vegetables their whole life. Their parents have always went to McDonalds or a pizza place. |
| Transportation barriers | I think it's just tradition, people are used to eating their fatty . . . fried foods. . . . I would agree with that. I think it's just part of the culture. That's just what we're used to. |
| | Transportation is a very big issue . . . it's getting out there and getting them to a grocery store that's a barrier for them. |
| | Transportation is the biggest issue for this community. . . . It is a big obstacle. . . . It is getting them to church, it is for getting them to school, it is for getting them to the grocery store, to the doctor, it is just a major issue. |
| GTE quadrant: improve social and economic resources | I have people that pay people to drive them out of the hollow basically. |
| | Persistent poverty |
| | I mean, we never knew we were poor until Johnson and Kennedy came and told us we were poor. |
| | Because they are not going to ask. I think it is just a pride thing for some people. |
| Lack of cooking skills | Honestly, my biggest thing is that I can take an elderly woman who lives alone and is a widow and she gets \$15 a month in food stamps. And I think that is insanity. She gets no food vouchers – she living off \$771 a month. |
| | I mean, we're, like, the most unhealthy people in the country. This part, I mean that's just honest, central Appalachia it is. |
| GTE quadrant: build community capacity^c | |
| Lack of interest in farming | There is a whole generation just like me . . . that is something that we didn't do, so we don't even know how to teach our kids to do that. There is a whole gap there of you know. |
| | They are some of the younger generation that asks, "Dad, well, how do you fix corn, how do you fix green beans?" They don't know how. They don't know to put it in a pot, put some water in it and put it on boil . . . they have no clue how to fix fresh vegetables. |
| | When RAMP [local food pantry] gives out produce, we have suppliers that send us stuff like eggplant and squash. Stuff that I have never heard of and can't pronounce and stuff like that. And people don't want it. |
| Lack of interest in farming | There's no money in it . . . for the work and time and effort you put into it, if you don't just enjoy doing it, there is no money in it. . . . You can't do it and make your car payment every month. You couldn't use it as a second income. There is no way to be profitable with it. |
| | It is a good thing if kids get to see it made . . . or get to see it grown, or whatever. And they know where, my grandkids don't know where stuff comes from. They don't work in a garden. |
| | You would probably have to have someone to teach people because while there aren't any farmers in the county, they're getting old or they have already died off and heaven forbid the kids would ever have to work in a garden. |

^a The Getting to Equity framework provides a guide for implementing obesity prevention activities that gives priority to health equity principles (9,10).

^b Selected qualifying quotes included; not all quotes included per GTE framework and qualitative methodology.

^c Assets (Grow Appalachia, community pride, and Cooperative Extension Programming) identified by participants would be categorized into this quadrant, but they are not included here.

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(continued)

Table 2. Barriers to Healthy Eating in Martin County, Kentucky, as Identified by Focus Group Participants and Organized Within the Getting to Equity Framework^a

| GTE Quadrant and Participant Narratives | Illustrative Quote ^b |
|---|--|
| | Most of my adult male relatives worked in the coal mines and they worked 6 days a week. . . . My dad left before sunrise and home after dark. Between coaching my little league and fishing. |
| | That whole generation of working people were worked their fingers to the bone. |
| | My grandpa had the garden, but then my dad's generation is the one quit gardening. |

^a The Getting to Equity framework provides a guide for implementing obesity prevention activities that gives priority to health equity principles (9,10).

^b Selected qualifying quotes included; not all quotes included per GTE framework and qualitative methodology.

^c Assets (Grow Appalachia, community pride, and Cooperative Extension Programming) identified by participants would be categorized into this quadrant, but they are not included here.

COMMENTARY

Oral Health and COVID-19: Increasing the Need for Prevention and Access

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PEER REVIEWED

Summary

What is already known on this topic?

Oral health is an important component of health and overall well-being.

What is added by this report?

Nonemergency dental care has been curtailed during the coronavirus disease 2019 (COVID-19) pandemic. Reopening dental practices involves unique challenges and provides opportunities to increase focus on prevention and nonaerosol-generating procedures.

What are the implications for public health practice?

Vulnerable populations are at high risk for COVID-19 and oral and other chronic diseases, and they also have less access to health care services. Removing policy, regulatory, workforce, and reimbursement barriers and incentivizing prevention would increase access to oral health care and improve population health.

Abstract

Populations disproportionately affected by coronavirus disease 2019 (COVID-19) are also at higher risk for oral diseases and experience oral health and oral health care disparities at higher rates. COVID-19 has led to closure and reduced hours of dental practices except for emergency and urgent services, limiting routine care and prevention. Dental care includes aerosol-generating procedures that can increase viral transmission. The pandemic offers an opportunity for the dental profession to shift more toward non-aerosolizing, prevention-centric approaches to care and away from surgical interventions. Regulatory barrier changes to oral health care access during the pandemic could have a favorable impact if sustained into the future.

Introduction

On March 11, 2020, the World Health Organization declared the global spread of coronavirus disease 2019 (COVID-19) a pandemic (1). Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a new virus with no vaccine or treatment, and the population currently has no immunity. The virus is primarily transmitted by direct or indirect personal contact through airborne respiratory droplets from an infected person (2).

On March 16, 2020, the American Dental Association (ADA), the nation's largest dental association, recommended that dental practices postpone elective dental procedures until April 6, 2020, and provide emergency-only dental services to help keep patients from burdening hospital emergency departments (3). Because of the rise of infections, this recommendation was updated on April 1, 2020, when the ADA advised offices to remain closed to all but urgent and emergency procedures until April 30 at the earliest. As a result, access to dental care substantially decreased. During the week of March 23, 2020, an ADA Health Policy Institute survey indicated that 76% of dental offices surveyed were closed but seeing emergency patients only, 19% were completely closed, and 5% were open but seeing a lower volume of patients (4).

In addition to the lack of widespread COVID-19 testing, point-of-care testing in dental offices also was not available. Because of the inability to test all patients and the fact that asymptomatic or presymptomatic patients could be infectious, ADA guidance shifted in mid-April 2020 as state and local government policies varied regarding criteria for reopening different types of services, including dental services (5). Questions remain about how soon patients will prioritize and resume nonemergency dental care amid other delayed health care services. The full extent of pandemic-related financial strain and loss of dental insurance is not yet clear and will dramatically affect dental care utilization.

In this commentary, we explain why oral health care should be a public health priority in the response to the pandemic and discuss the aspects of dental care that make it challenging to accomplish this. We will also provide opportunities for improvement, such as focusing more on prevention and nonaerosolizing dental proced-



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ures and the means by which to increase access to affordable, more equitable care for vulnerable populations.

Importance of Oral Health

In 2000, the first and only Surgeon General’s Report on Oral Health (the second is in progress) made clear that oral health is part of overall health and well-being (6). The mouth is indispensable to eating, speaking, smiling, and quality of life. The most prevalent oral conditions are dental caries and periodontal diseases, and they are largely preventable (7). Dental caries is the most common chronic childhood disease and continues into adulthood. Among US adults, 2011–2014 national data indicate that 32.7% had untreated dental caries (8). Furthermore, according to weighted averages from 2009 through 2014, 42% of adults aged 30 or older had periodontitis (9). Oral disease is unevenly distributed in the population by race and ethnicity (Table 1). The progression of oral disease can cause pain, infection, and sepsis, and treatment is expensive. In addition to primary prevention, in early stages the progression can be reversed or arrested with appropriate oral hygiene, fluoride exposure, dental sealants, changes in diet, and other measures.

Populations With Oral Health and Chronic Disease Disparities: COVID-19 Puts Both at Increased Risk

Populations at higher risk for many chronic diseases are similar to those at higher risk for developing oral diseases. Common risk factors include stress, poor diet, alcohol and tobacco use, substance misuse, behavioral health issues, domestic violence, and poverty. Many of these factors have been heightened during the pandemic. These and other social determinants of health lead to both exacerbation of chronic disease and poor oral health outcomes (13).

Populations vulnerable to COVID-19, including those in low socioeconomic groups, minority groups, older adults, low-literacy individuals, those in rural areas, and the uninsured are also at increased risk for oral disease and associated systemic health problems (14). Minority populations are especially at risk during the COVID-19 pandemic. The Centers for Disease Control and Prevention (CDC) notes that “non-Hispanic blacks, Hispanics, and American Indians and Alaska Natives generally have the poorest oral health of any racial and ethnic groups in the United States,” (15) and these same populations have disproportionately higher incidence of COVID-19–related infection and death (16).

Among those hospitalized with COVID-19, diabetes and cardiovascular disease are 2 of the most prevalent underlying comor-

bidities, according to the CDC (17). Periodontal disease is associated with diabetes and cardiovascular disease, although causality is difficult to ascertain because of confounding evidence, and few randomized trials or longitudinal studies have been conducted on the effects of treatment (18,19).

Researchers note, “The COVID-19 pandemic has alarming implications for individual and collective health and emotional and social functioning” and that “health care providers have an important role in monitoring psychosocial needs and delivering psychosocial support to their patients” (20). Research suggests a strong association between oral health conditions like erosion, caries, and periodontal disease and mood conditions like stress, anxiety, depression, and loneliness (21). There are other potential connections downstream between COVID-19 and oral health. With the COVID-19 pandemic’s impact on mental health, pandemic-related increases in oral health risk factors, and anticipated declines in per capita dental visits, increasing integrated practice and referrals between dental providers and behavioral health providers will be prudent. Similarly, increased efforts to more effectively integrate dental programs focused on prevention, screening, and risk assessment within primary care, obstetrics and gynecology, and pediatric offices should be pursued to expand access to oral health services for vulnerable populations (22).

COVID-19 and Oral Health Disparities in Access to Care

Access to oral health care is especially limited for populations at high risk for COVID-19. Patients with symptoms of COVID-19 are advised “to avoid nonemergent dental care” (23). Providers are advised, “if possible, [to] delay dental care until the patient has recovered” (23).

More than 49 million US residents live in areas designated by the Health Resources and Services Administration as Dental Health Professional Shortage Areas (24). This shortage has been compounded by the COVID-19 pandemic, which has resulted in limited preventive dental services in the interest of public health safety. Emergency departments, a less-than-ideal but common treatment destination for those facing oral health care access disparities, have also seen a significant drop in visits for health problems unrelated to COVID-19 (25). School-based oral health programs, such as effective dental sealant programs to prevent dental caries — the only source of preventive oral health care for many children in vulnerable populations — have similarly been suspended because of government-mandated school closures (26). Nationally, children in low-income families and at higher risk of caries are less likely to receive sealants than children in higher-income families, at 39% and 46%, respectively (27).

Access disparities are particularly acute for poor and minority populations. Researchers note that “poor and minority children are substantially less likely to have access to oral health care than their nonpoor and nonminority peers” (14). These populations are also more likely to lack dental insurance. A 2020 report notes, “The oral health care safety net is expected to cover . . . one-third of the US population, notably those who are low-income, uninsured, and/or members of racial/ethnic minority, immigrant, rural, and other underserved groups” (28). Many of these populations, which often rely on Medicaid dental benefits, have seen their access restricted or eliminated by reductions in this vital coverage. In 2020 it was reported that “in response to fiscal challenges, many states have reduced or eliminated Medicaid dental coverage over the past decade, with a concurrent 10% decline in oral health care utilization among low-income adults” (28). Among those in at-risk populations who do have dental benefits under Medicaid, the same report notes there is often “difficulty finding Medicaid-contracted dental providers, because only 20% of dentists nationwide accept Medicaid” (28). We can reasonably anticipate a worsening of these trends as the COVID-19 pandemic takes a large proportion of state budgets.

COVID-19 and Dental Care: Aerosol-Generating Procedures Create Risk

Dental professionals have been practicing increased infection control and taking universal precautions since the 1980s HIV epidemic (29). Nevertheless, oral health professionals are among those occupations at the highest risk for COVID-19, as reported by *The New York Times* (30). Dental care personnel face challenges because of their proximity to infected patients. These patients’ mouths are open and unmasked during treatment, significantly increasing the potential for direct and indirect exposure to infectious materials. The Occupational Safety and Health Administration designates the performance of aerosol-generating procedures on known or suspected COVID-19 patients as “very high risk” (31). Shortages of personal protective equipment (PPE) and the use of instruments and equipment that generate aerosols containing oral and respiratory fluids only compound the risk (23). Two of the highest aerosol-creating procedures involve inventions that have been considered major advances in dental practice, because they are faster and less painful for the patient: the high-speed handpiece with its water spray coolant and the ultrasonic scaler used by hygienists to remove hard deposits on teeth (32). These dental procedures have become problematic during the pandemic, providing an opportunity to shift to nonaerosolizing procedures and a greater focus on prevention (23,33).

Going Forward: Opportunities

Focus on prevention and promote nonaerosol-generating dental procedures

Prevention is a cornerstone of public health. The COVID-19 pandemic presents an opportunity for the dental profession to shift from an approach focused on surgical intervention to one emphasizing prevention. Embracing nonsurgical, nonaerosolizing caries prevention and management will be critical in this endeavor. The profession has always supported community water fluoridation, and dental hygienists are considered prevention experts (34,35). However, the dental compensation model is based on providing expensive, restorative procedures that are financially out of reach for many people.

Guidelines have been developed to shift the dental care paradigm to a more preventive focus (36–40). Strategies include reduction in common risk factors such as tobacco and alcohol use, promotion of a healthy diet low in sugars, community water fluoridation, topical fluorides, and promotion of oral health in community settings. These oral health messages and interventions should be integrated into medical sites such as primary care and pediatric offices. Prevention and nonsurgical caries management include many options. Evidence-based materials include dental resin sealants, glass ionomers as sealants or as part of atraumatic restorative treatment performed with hand instruments, silver diamine fluoride, sodium fluoride varnish, and other self-applied and professionally applied topical fluorides (40–42). These materials can be applied without generating aerosols, reducing the risk of viral transmission. These methods present a major opportunity to expand access to preventive and restorative care for vulnerable populations, particularly when combined with policy changes increasing hygienists’ scope of practice, sustainable payment reform, and changes in the education of oral health professionals.

Providers and payers together have a responsibility to shift toward preventive care, particularly as COVID-19 threatens to increase disparities in oral health care access for the United States’ most vulnerable populations. Before the pandemic, Birch et al noted that a review of provider and payer practices made clear that “further work was required on both the provider and payer side to ensure that evidence-based prevention was both implemented properly but also reimbursed sufficiently” (43). As health care compensation moves toward value-based care and a focus on health outcomes, prevention and maintaining oral health and sound tooth structure will shift reimbursement away from the current expensive model of reimbursement for restoration of tooth structure and

function (44). In particular, reimbursement policies, which traditionally have incentivized surgical, high-end restorative procedures like crowns and multisurface fillings, must be revisited to prioritize preventive and nonsurgical, nonaerosolizing treatments and make them more financially sustainable.

Improve communication

Communications concerning patient and provider safety are critical (45). Surveillance and monitoring are needed to confirm whether transmission of COVID-19 occurs in the dental office. According to CDC (27), “There are currently no data available to assess the risk of SARS-CoV-2 transmission during dental practice.” The availability of PPE for dental care should be monitored, and the effectiveness of various types of PPE should be determined. Many oral health care providers are anxious about returning to work, and many patients may be hesitant to enter a dental office. Communication and clarity are critical, especially with low-literacy populations. Messaging should include the importance of maintaining good oral health and its role in overall health.

Protect and enhance Medicaid reimbursement

Dental coverage under Medicaid is mandated for children, but state Medicaid programs’ approaches to oral health services for adults vary significantly, especially in terms of the comprehensive nature of such services (Figure). Only 19 states have “extensive” Medicaid dental benefits for adults (46). Among US adults aged 19 to 64, only 7.4% have Medicaid dental benefits and, alarmingly, 33.6% have no dental insurance benefits (47). The fiscal solvency of dental safety-net clinics will thus remain critical to serving at-risk populations during and after the pandemic. These sites will be needed more than ever, as delayed and postponed treatment increases need for more extensive and urgent care.

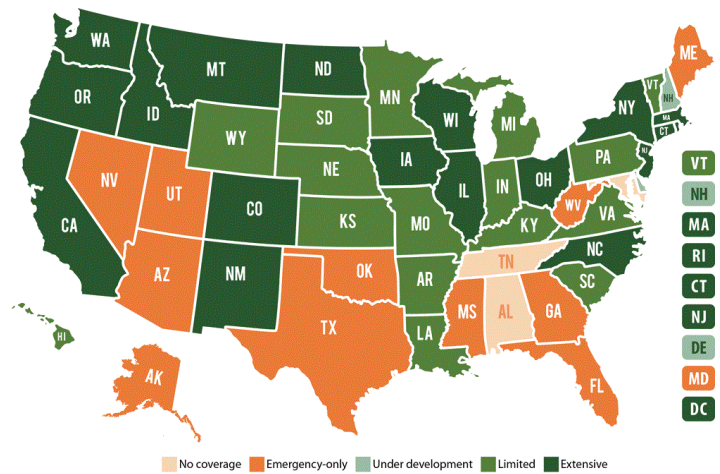


Figure. Extent of Medicaid adult dental benefits, by state. Source: Center for Health Care Strategies (46).

It is widely documented that during economic downturns, Medicaid enrollment increases (48). With unemployment increasing at an unprecedented rate, we can reasonably anticipate the same effect in this pandemic. During times of state budget cuts, dental Medicaid coverage is often at risk (49). In the immediate aftermath of the Great Recession during state fiscal years 2010 through 2012, 19 states reported restrictions in Medicaid adult dental benefits (50). Amidst the pandemic, many states have modified public payment policies to meet the demand of their most vulnerable residents, and it will be important that advocacy efforts secure continuity of these provisional changes. However, given current circumstances, it is imperative that policy makers consider expanding adult dental benefits under Medicaid rather than reducing them. Access disparities will likely increase without expansion of dental benefits under Medicaid.

Ease dental workforce restrictions

Guidance for dental practice during COVID-19 continues to evolve, and regulations vary by state (51). As dental care resumes, it is critical that workforce policies and licensure scope are evaluated to address workforce utilization bottlenecks to respond to communities’ needs more effectively and efficiently.

As of 2019, 11 states did not allow for some form of direct access to preventive oral health services by a dental team member outside of the dentist’s supervision (52). In these states, a dentist must perform an examination before delivery of preventive care by a hygienist. Easing scope of practice and workforce restrictions would increase access to care. Increasing opportunities for dental

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team members like dental therapists, community dental health coordinators, and expanded function dental assistants — all currently in limited supply and restricted by dental practice acts in many states — would help bring needed, more affordable services to underserved communities.

Advance teledentistry to address access gaps

The COVID-19 pandemic has thrust alternative modalities such as teledentistry to the forefront of policy considerations (53). Teledentistry supports the delivery of oral health services through electronic communication means, connecting providers and patients without usual time and space constraints. Teledentistry's unique ability to connect disadvantaged, primarily rural communities and the homebound with dental providers (54) makes this method particularly well-suited to address lack of access during and after the pandemic.

Teledentistry can be used for education, consultation, and triage, allowing providers to advise patients whether their dental concerns constitute a need for urgent or emergency care, whether a condition could be temporarily alleviated at home, or whether treatment could be postponed. When many dental offices are closed and people are largely staying at home, communication and information via teledentistry can help lessen the burden of people seeking dental care at overwhelmed emergency departments and urgent dental care settings. In more usual circumstances, teledentistry can also be used to facilitate access to preventive services and oral health education when members of the dental team can provide such services in community settings, such as schools, without onsite dentist supervision.

Before COVID-19, many states inhibited use of teledentistry through legislative barriers and limited public and private insurance reimbursement. Compared with dentistry, many medical and behavioral health providers have less restrictive regulations and insurance reimbursement policies concerning telehealth. A *Washington Post* report (55) was clear: "Telemedicine was largely ready for the influx." Teledentistry, on the other hand, was forced to play catch-up (56). Emergency reimbursement changes prompted by COVID-19 have brought relief, but post-pandemic, we recommend that legislators, regulatory authorities, and third-party payers consider making permanent the temporary modifications to teledentistry policies to support increased access.

Implications for Public Health Practice: Dental Public Health's Roles

Health inequities are avoidable and unjust. Although SARS-Cov-2 has infected people worldwide, it has disproportionately affected those who are most disadvantaged. In the United States, people

without good access to health care, healthy food, and a safe environment; with underlying health conditions; who live in crowded conditions; or who have become unemployed and homeless are especially vulnerable and at increased exposure to the virus. It is time to recognize the social determinants of health and rectify unjust conditions, systemic inequality, and racism.

Oral health disparities and inequities are part of the larger, cultural picture. There has been a tendency to blame the victim. Mary Otto, health journalist and author of the groundbreaking book *Teeth* (57), stated, "We see tooth decay through a moral lens, almost. We judge people who have oral disease as moral failures, rather than people who are suffering from a disease" (58).

It is perhaps not hyperbole to describe pandemic-related circumstances as creating a "perfect storm" in oral health care in the United States. Risk factors are elevated, access for the most vulnerable is limited, safety concerns are heightened, and the economy presents substantial challenges for patients and providers alike. The effects of COVID-19 are particularly acute for vulnerable populations, and the crisis has made evident the challenges and opportunities for oral health care in the United States. In such a time, oral health care providers and advocates must clearly communicate the importance of oral health to overall health, indicate the steps being taken to ensure patient and provider safety, and promote prevention and nonaerosolizing procedures (Table 2). Oral health should be included in policy considerations, continued research, monitoring, surveillance, and other aspects of health. Advocacy is crucial to make permanent the temporary regulatory changes being implemented to address the immediate crisis, ensure access to oral health care, address disparities and inequities, and improve population health.

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Tables

Table 1. Percentage of COVID-19 Hospitalized Cases in COVID-NET Catchment Areas and Prevalence of Dental and Other Chronic Conditions in the United States, by Race/Ethnicity, 2020

| Characteristic | % of COVID-19 Hospitalized Cases | COVID-NET Catchment Area for Comparison | % of Periodontitis (Gum Disease) | % of Untreated Dental Caries (Tooth Decay) | % With Diabetes (Physician-Diagnosed and Undiagnosed) | % of Self-Reported Heart Disease |
|--------------------|----------------------------------|---|----------------------------------|--|---|----------------------------------|
| Population | COVID-NET, 14 jurisdictions | COVID-NET, 14 jurisdictions | US dentate adults aged ≥30 y | US dentate adults aged 20–64 y | US adults aged ≥20 y | US adults aged ≥18 y |
| Period | As of June 20, 2020 | As of June 20, 2020 | 2009–2014 | 2011–2016 | 2015–2016 | 2017 |
| Source | CDC (10) | CDC (10) | NCHS, NHANES (9) | NCHS, NHANES (11) | NCHS, NHANES (12) | NCHS, NHIS (12) |
| Non-Hispanic White | 32.8 | 58.8 | 37.0 | 22.2 | 13.0 | 11.5 |
| Non-Hispanic Black | 32.6 | 17.7 | 56.6 | 40.2 | 19.6 | 9.5 |
| Hispanic | 22.0 | 14.0 | ^a | ^a | 21.5 | 7.4 |
| Mexican American | ^a | ^a | 59.7 | 37.1 | ^a | ^a |
| Other Hispanic | ^a | ^a | 48.5 | ^a | ^a | ^a |

Abbreviations: CDC, Centers for Disease Control and Prevention; COVID-19, coronavirus disease 2019; COVID-NET, COVID-19–Associated Hospitalization Surveillance Network; NCHS, National Center for Health Statistics; NHANES, National Health and Nutrition Examination Survey; NHIS, National Health Interview Survey.

^a Studies vary in definitions used for Hispanic ethnicity.

Table 2. Implications of COVID-19 for Oral Health in the United States, 2020

| Core Functions of Public Health | Public Health Concerns | Future Opportunities |
|---------------------------------|--|---|
| Assurance | Limited access to dental care compounded by COVID-19; aerosol-generating dental procedures increase risk of transmission | Promote prevention and use of nonaerosol-generating dental procedures; advance teledentistry training and reimbursement and other efforts to reach patients outside of the dental setting |
| | Regulations in some states limit dental hygienists' and other dental team members' ability to provide care in settings outside of the dental office | Modify state dental practice acts and other regulations for dental workforce reform and to increase access to prevention |
| | Lack of integration between oral health and the rest of the health care system | Increase integration between oral health care and primary care (ie, locations serving patients who are pregnant, have diabetes or cardiovascular disease) |
| Assessment | Lack of timely national oral health data and coordinated state and local information | Monitor oral health conditions as a result of delayed dental care during pandemic; include oral health metrics in health care quality measures |
| | Lack of information about health and safety of dental health care personnel during COVID-19; limited availability of PPE and COVID-19 testing for dental practices | Monitor dental workforce health and safety; increase availability of PPE and COVID-19 tests for dental care settings |
| | Evidence needed to determine most cost-effective PPE or PPE combinations and other measures to prevent SARS-CoV-2 in dental settings | Further testing of specific PPE and PPE combinations and other measures to protect patient and provider health in dental settings |
| Policy Development | Potential public and provider unease about seeking and providing dental care during pandemic | Provide clear communication about how to safely obtain and provide dental care during the pandemic |
| | Oral health not prioritized | Educate about importance of oral health and its relation to the health of the rest of the body; provide parity with health care policies (ie, Medicaid, Medicare) |
| | Varied state-level adult dental Medicaid benefits | Advocate for sustained dental Medicaid funding and expansion to close coverage gaps |
| | Reimbursement models incentivize surgical, high-end restorative dental procedures | Modify reimbursement to provide incentives for prevention, maintaining health, teledentistry |

Abbreviations: COVID-19, coronavirus disease 2019; PPE, personal protective equipment; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

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TOOLS FOR PUBLIC HEALTH PRACTICE

CDC's Guiding Principles to Promote an Equity-Centered Approach to Public Health Communication

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PEER REVIEWED

Summary

What is already known on this topic?

Public health services to protect and promote the health of all people involve equity-centered approaches and communication to inform people about factors that influence health and how to improve it.

What is added by this report?

This report describes the development of CDC's Health Equity Guiding Principles for Inclusive Communication and summarizes equity-centered best practices for public health communication.

What are the implications for public health practice?

Public health practitioners can apply these principles across their work with collaborative approaches by using respectful language and narrative that might contribute to reducing health inequities.

Abstract

A public health practitioner's mission is to protect and promote the health of all people in all communities. Components of being successful in that mission include understanding who is at risk of negative outcomes, identifying effective actions to promote and protect health, and communicating information accordingly. Information must be scientifically rigorous, provide appropriate contextualizing information, and refer to and visually represent people through words and images in respectful ways. Public health communication objectives include that the audience accepts, understands, and acts on the information to protect and promote health. This article describes the impetus for, development of, and public health applications and implications of principles to guide commu-

nication efforts. CDC's Health Equity Guiding Principles for Inclusive Communication is a web-based resource published in August 2021 that offers — but does not mandate — guidance and recommendations for public health practice. The resource can help public health practitioners and their partners consider social inequities and diversity, think more inclusively about the people they serve, and adapt to the cultural, linguistic, environmental, and historical situation of each population or audience of focus. Users are encouraged to have conversations about the Guiding Principles as they plan and develop communication products and strategies in collaboration with communities and partners and build a shared vocabulary consistent with how communities and groups of focus see and understand themselves, because words matter. As the public health field renews its focus on shifting the paradigm toward equity, a language and narrative shift is a vital intervention.

Background

Public health practitioners work to ensure that policies, systems, and public health practices enable optimal health and safety for all people in all communities. This work is conducted across federal, state, tribal, local, territorial, and freely associated state public health levels and in collaboration with partners. One of the 10 essential public health services (core public health practices) is to communicate effectively to inform and educate people about health, factors that influence it, and how to improve it (1). Effective communication informs the public, health care providers, public health practitioners, communities, and partners from other sectors to approach the health of all communities in ways that can reduce risks and improve health and safety. An equity-centered approach to inclusive communication — which is respectful communication that uses shared terminology and narrative consistent with how the intended audiences see and understand themselves — can reach more people and therefore be more effective (2). Such narratives are collections of messages and stories that represent values of fairness and justice and describe strengths as well as inequities, their causes, and solutions (3). All people should be able



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to access and understand health promotion and disease prevention information without stigmatization of themselves or others (4). Public health practitioners have an ethical obligation as well as sound practical reasons to share scientific data results and recommendations that appropriately frame social and health inequities (5). Additionally, practitioners need to make every effort to avoid the continuation of harmful stereotypes. Stigmatizing language can harm people by influencing people's judgments, including those that affect medical treatment (6). Conversely, inclusive language could contribute to reducing health inequities and increasing opportunities to become as healthy as possible.

The Centers for Disease Control and Prevention (CDC) is committed to advancing health equity. The agency has prioritized integrating equity into all science and intervention strategies and has declared racism a serious threat to the public's health (7,8). The agency defines health equity as the state in which everyone has a fair and just opportunity to attain their highest level of health (9). Efforts to advance health equity correspond with and are central to core practices needed to accomplish the public health mission successfully. Achieving equity requires

- sustaining focused and ongoing societal efforts to address historical and contemporary injustices among groups that have been marginalized, such as racialized minority groups, people who identify as LGBTQIA+ (lesbian, gay, bisexual, transgender, queer [or questioning], intersex, asexual [or allied]), people living with a disability, and people living in rural areas;
- overcoming economic, social, and other obstacles to health and health care; and
- working to eliminate preventable health disparities.

Long-standing inequities exist among populations that have been historically marginalized, and social, economic, and environmental inequities have substantial effects on health (10). CDC has long understood that social and health inequities challenge the agency's ability to reach its goals. The COVID-19 pandemic brought increased awareness of these inequities, resulting in a greater push for public health communication about inequities with appropriate, unbiased contextualization and language. The pandemic pushed CDC and many others to counteract social stigma systematically, with communication being an integral component. Improved communication is only one facet of addressing inequities, and it is only one of many steps that CDC is taking to renew its commitment to advancing health equity. CDC invites all public health practitioners to make a renewed commitment to inclusively consider the people it serves and apply an equity-centered public health approach, including communication.

Development and Dissemination of a Communication Resource

CDC's Health Equity Guiding Principles for Inclusive Communication (11) was developed in 2 phases. The first phase began in the early stages of CDC's COVID-19 pandemic response. CDC first established a Chief Health Equity Officer unit (CHEO) for this emergency response structure, in part because of the pandemic's devastating effects on communities that have historically been stigmatized or excluded. In 2020, CHEO led the development of CDC's COVID-19 Response Health Equity Strategy (12) and was tasked to review scientific and health promotion products before dissemination. Reviews focused on health equity science, scientific integrity, adherence to CDC policy, and equity-centered communication. These reviews applied both health equity science and health communication science principles to acknowledge the social, cultural, economic, and environmental contexts of health inequities. Given that CHEO was stood up (ie, initiated and established) by CDC's Office of Health Equity (OHE, formerly Office of Minority Health and Health Equity), the review process was substantially influenced by OHE's practices for contextualizing data results and addressing stigma and implicit bias in public health science communication. Though guidance had been shared informally with individuals and writing groups across CDC, these practices had not yet been collated and systematized for the agency.

The heightened national consciousness of the persistent, disproportionate risks experienced by certain communities identified an urgent need for a resource that would guide CDC staff participating in the COVID-19 emergency response when developing scientific and other communications (eg, health education, social media). CHEO staff worked with units across the response structure to gather input and resources, including the Community Mitigation Task Force's draft list of preferred terminology. The initial draft of the resulting COVID-19 Health Equity Style Guide included a review of equity-centered communication science and best practices from peer-reviewed and gray literature and contributions and reviews from numerous CDC subject matter experts. At that time, it was intended as a resource for CDC staff participating in the agency's COVID-19 response, and as such, it was disseminated internally through response communications, intranet sites, presentations, and meeting discussions. Uptake was strong, and the resource was informally shared with CDC staff who were not participating in the COVID-19 response. Demand clearly existed for this type of resource.

The second phase of development involved refinement and a broader perspective that was not focused on COVID-19. The goal was to create a public-facing resource available for all public

health practitioners and partners to apply an equity-centered approach to communication. A CDC work group conducted further review of the content with additional consultation of the literature, subject matter experts, and people with lived experience. After the work group refined and added content, numerous diverse CDC subject matter experts and external partners provided input through rounds of collaborative feedback and revisions before making the guide final. Launch of the Health Equity Guiding Principles for Inclusive Communication website (11) included a presentation for public health communicators at the 2021 National Conference on Health Communication, Marketing and Media (13). CDC and partners broadly disseminated information about the new resource through email, newsletters, websites, social media, and presentations.

Since the launch of the public-facing Guiding Principles website, more than 35 webinars and trainings on the content have been made to almost 5,000 staff members of CDC, National Institutes of Health/National Institute on Aging, the Guide to Community Preventive Services (the Community Guide), academic departments of public health, multiple state and local public health departments, the Impact Assessment Agency of Canada, the American Medical Association (AMA), Association of American Medical Colleges, Merck, and other organizations. Demand for such presentations continues. Subject matter experts and communication staff also provide consultations to groups across CDC who are interested in learning more about applying the Guiding Principles to their work. Additionally, the website provides an email address for questions and feedback about the content. Together with feedback from the presentations, trainings, and consultations, CDC staff review feedback and consider whether revisions should be made to the resource to either clarify, remove, or add content. An annual review of the content also helps to ensure that the content is aligned with the latest science and cultural and social norms, and that it is in accord with related agency resources such as CDC’s Global Public Health Equity Guiding Principles for Communication, which was launched in 2022 (14). AMA incorporated content from the Guiding Principles into its Advancing Health Equity: A Guide to Language, Narrative and Concepts (3), and other organizations have since created resources (15).

Description of the Resource

The Guiding Principles is a website that covers 2 wide-ranging considerations when developing a communication product: understand and frame the context of the information in terms of social and health inequities (Box 1) and apply best practices for language and images (Box 2). In other words, communicators should use both context and language to create health communication messages that can be heard, understood, and acted on. Again, ef-

fective communication is respectful, inclusive, and nonstigmatizing. Communication about inequities must use an approach that appropriately frames data and information in a way that considers the underlying societal factors influencing inequities and methods to prevent exacerbation and eliminate them most effectively.

Box 1. Applying Key Concepts for Equity-Centered, Inclusive Communication

| Health equity concept | How to incorporate the concept |
|---|--|
| Long-standing systemic social and health inequities have put some population groups at increased risk of getting sick, having overall poor health, and having worse outcomes when they do get sick. | <ul style="list-style-type: none"> Understand how policies, programs, practices, services, and environments that support health can reduce health inequity (16). Avoid implying that a person, community, or population is responsible for increased risk of adverse outcomes. Avoid perpetuating health inequities in communication by considering how racism (8) and other systems of power differentially advantage people. |
| Diversity exists within and across communities and can be defined by several factors. | <ul style="list-style-type: none"> Understand that there is diversity within communities and members of population groups are not all the same in their health and living circumstances. Limit use of the terms minority and minorities, in general. Refer to groups with an appropriate and relevant level of specificity. |
| Individuals and communities vary in history and lived experiences, cultural traditions, religious beliefs and practices, social norms, available resources, and many other factors. | <ul style="list-style-type: none"> Seek to understand the intended audience to avoid misinformation, errors, confusion, or the loss of credibility. Adjust recommendations that might not make sense for specific situations, places, communities, or cultures. Understand that not everyone has access to medical and mental health care or services — including barriers such as lack of insurance, transportation, childcare, and paid work leave — and trust in medical professionals may be limited. Understand that people may not have full control over their work environment or conditions, and that an employer’s responsibility to provide certain resources or allow certain conditions for workers may vary. |
| Interconnected structures and systems can create inequality among groups based on social categories (17). | <ul style="list-style-type: none"> Be cautious in generalizing about a community. Consider how people’s social identities overlap to better understand, interpret, and communicate about health. Consider multifaceted approaches to address overlapping connections of individuals and groups with structures and systems that create social and health inequities as well as to leverage strengths and assets. |
| Achieving health equity requires focused and ongoing societal efforts to address historical and contemporary | <ul style="list-style-type: none"> Consider that communicating effectively and equitably — to inform and educate about health, factors that influence it, and how to improve it — is |

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| Health equity concept | How to incorporate the concept |
|--|--|
| injustices; overcome economic, social, and other obstacles to the best health and health care; and eliminate preventable health disparities (9). | an essential public health service (1). <ul style="list-style-type: none"> • Intentionally consider the potential positive and negative impacts of proposed messages, including how messages could help reduce or contribute to inequities. • Address and refer to people and groups inclusively, respectfully, and accurately. Avoid dehumanizing language. |

| Strategy | Implementation considerations |
|---|---|
| Use clear communication and plain language while recognizing that the audience of focus may not all have the same level of literacy and, specifically, health literacy (20–23). | <ul style="list-style-type: none"> • Consider both reading level and ability to understand the content in the language presented. • Use active verbs, plain language, and accessible channels and formats so that all members of your audience can access and understand the information. • Avoid jargon and use straightforward, easy to understand language. |
| Ensure that any images support and do not detract from your message. | <ul style="list-style-type: none"> • Consider the intended audience, the intended use, and the full set of images planned. • Include members or representatives of your intended population of focus in the decision-making process. • Decide whether an image is culturally appropriate, clear, and inclusive for diverse audiences. • Depict positive and health-promoting behaviors, and don't unintentionally reinforce stereotypes or perpetuate health inequities. • Include accurate depictions of people within the given context. For example, use accurate depictions of people with a disability and their assistive technology and avoid inappropriate depiction of cultural dress or activity in a daily life setting. • Include alternate text that can be easily understood and images with enough color contrast for people with low visual acuity. |

Box 2. Strategies for an Equity-Centered Approach to Developing Public Health Communication

| Strategy | Implementation considerations |
|--|---|
| Build and support a diverse and skilled public health workforce. | <ul style="list-style-type: none"> • Build a diverse and inclusive workforce throughout all levels, including leadership positions. • Consider hiring people from the communities served, including disproportionately affected communities, and who look and sound like the communities served. • Ensure capacity to work with community partners to identify priorities and strategies and build community awareness and acceptance before communication products are developed and released. • Promote open discussion of health equity concepts and use of equity-centered communication strategies. |
| Incorporate meaningful community engagement (18) as a foundational component throughout the process to develop culturally relevant, unbiased communication for health promotion, research, or policy making. | <ul style="list-style-type: none"> • Remember that successful community engagement is a continuous process that builds trust and relationships through multidirectional communication processes. • Start with mindfulness and listening and continue with joint decision making and shared responsibility for outcomes. |
| Ensure that public health programs, policies, and practices recognize and reflect the diversity of the community they are trying to reach. | <ul style="list-style-type: none"> • Ensure that information is culturally responsive (19), represents people in the communities for whom it is intended, and is accessible and available. • Tailor interventions based on the unique circumstances of different populations. Recognize that some members of your audience of focus may not be able to follow public health recommendations because of their cultural norms, beliefs, practices, available resources, or other reasons. • Translate materials into the preferred languages of the intended audience, and make sure a native speaker reviews translated materials. • Work with community members, leaders, and population-specific representatives or experts to develop culturally responsive content. • Emphasize positive actions and highlight community strengths and solutions. |

The Guiding Principles is a starting point and an approach, not a mandate, for public health practitioners and partners to intentionally consider in all types of communication. Using an inclusive process with community and partner engagement, practitioners can use this equity-centered approach to tailor and enhance reach and understanding of health information with the ultimate goal of improving health for all people. The 6 sections of the website are described below.

- **Using a health equity lens:** This section emphasizes that public health programs, policies, and practices are more likely to succeed when they recognize and reflect the diversity of audiences they are trying to reach. It describes actions to intentionally assess potential positive and negative impacts of proposed messages and to consult and collaborate with groups from intended audiences to reach those audiences most effectively. It recognizes intersectionality (17) and the need to understand the overlapping individual and systems-level contexts that create inequality based on social categories (eg, race, class, gender), as well as communities' unique assets and influences.
- **Key principles:** This section lists several key principles, including avoiding terms that are inadequately specific or imply a condition is the fault of a specific group, using person-first language to intentionally recognize humanity, limiting use of the term minority or minorities, avoiding language with violent connotations, and avoiding blaming and stigmatization in how people's actions, inactions, or conditions are described.
- **Preferred terms:** This section provides suggestions for terms that could be

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used to increase inclusiveness and decrease blaming and stigmatization. It is meant to be used as a guide and inspiration to learn more and engage people from the population or community of focus to understand their preferences. The section is not comprehensive — the listed terms are not intended to be the only terms to avoid or use to improve messages.

- **Developing inclusive communications:** This section provides suggestions for developing public health communications related to specific topics, including images, cultural responsiveness, appropriateness of public health guidance for an intended audience, disability (24,25), mental and behavioral health (26), and older adults (27).
- **Inclusive images:** This section provides detailed suggestions for selecting culturally appropriate, inclusive photographs or images for health communication materials, including considering the intended audience, the intended use of the image, how it supports the communication, and in what format the images will be disseminated.
- **Resources and references:** This section provides selected resources and best practices for inclusive language and framing health inequities, many of which were used as resources in the development of the Guiding Principles.

For more information, see CDC’s Health Equity Guiding Principles for Inclusive Communication website, https://www.cdc.gov/healthcommunication/Health_Equity.html.

Applications in Public Health Practice

CDC encourages all public health practitioners to identify opportunities to apply these Guiding Principles across all their work, such as when engaging with communities, partners, and colleagues and when developing scientific publications and recommendations (Box 3). The resource is designed to be used throughout planning, development, writing, and dissemination of communication products. The Guiding Principles can be used in epidemiology and surveillance, program planning, evaluation, policy, and other essential public health functions.

Box 3. Examples of CDC’s Experiences in Applying and Discussing Health Equity Guiding Principles for Inclusive Communication

Scientific Practice Example

Recently, a national group of American Indian and Alaska Native experts from multiple fields were charged with writing a complex scientific primer, *American Indian and Alaska Native Knowledge and Public Health for the Primary Prevention of Missing or Murdered Indigenous Persons* (28), for a nonpublic health audience, with a 3-week turnaround. The authors had multiple goals for the paper, which included bringing prominence to tribal elders’ traditional knowledge to complement public health science, epidemiology, psychology, and the law. The writing group was challenged with shared intentionality, defining communication goals upfront, and in the end, respecting diverse views, while presenting a unified voice for the reader. There were no challenges with purpose, goals, or cooperation.

All authors were subject matter experts and had collectively authored thousands of books, papers, health education materials, policies, and laws. The authors needed a process to ensure their language was inclusive and contemporary for a primary audience of legal scholars, judges, and law enforcement. For speed, they broke into teams and wrote sections based on their scientific and practice experience, then met to review and negotiate challenges. During this review process, they used the Guiding Principles as a practical tool to eliminate jargon, evaluate habitual language, and improve the writing.

Public Health Communication Example

Since the launch of the Guiding Principles, more than 35 presentations to nearly 5,000 listeners have been provided to a diverse group of people both internal and external to CDC. The approach used introduces the core concepts of the Guiding Principles, using an invitational versus a mandated approach to join in the work of being more inclusive. The idea of “meeting people where they are” recognizes that although the audiences are primarily public health professionals, each listener brings a different world view. The presenters acknowledge this fundamental concept and address issues of racism, ageism, generational influences, cultural influences, and intersectionality to highlight the importance of understanding that change is a process and the ability to view the world inclusively through an equity-focused lens requires continuous learning.

The Guiding Principles have received both positive feedback and push-back, and the authors recognize that there is much work to be done. Using the invitational approach has encouraged people to speak freely about their responses to the concepts. Questions often include requests for justification for the suggested terminology as well as requests and suggestions for the addition of terms that have not yet been included in the work.

As a result of these presentations, people have revealed their personal challenges with this work. One person who self-identified as a middle-aged, White man noted that he felt like he was overly cautious because of the attention on the subject. He said that he was self-conscious about speaking out in meetings now for fear he might say the wrong thing. Others have questions about why terms such as “target population” and “stakeholder” are now considered offensive when they have been used for many years. The authors recognize and support that this process will take time, patience, and open minds to be successful. Continued discussions of the Guiding Principles are critical to our collective learning.

The Guiding Principles are founded on respect for diversity and inclusion. Products are more effective if authors incorporate diverse input by using inclusive engagement of the intended audience. The first step in developing any communication product is to identify and consider the intended audience. Engaging people from the population or community of focus for input and terminology preferences is a best practice. The bottom line is: it is important to know your audience. Authors (public health practitioners) do not get to decide what is stigmatizing to someone else or a community. And when key issues important to that audience are not addressed, this omission could negatively influence the goals of the public health program. What is left unsaid (eg, not providing context about underlying causes of health inequities) can put the burden on the audience to make those connections and could lead to inaccurate interpretations and takeaways from the communication.

The Guiding Principles provides a starting point to improve public health writing and communication. Language and culture are both dynamic and shift across the years and generations, regionally and within population groups. The Guiding Principles are not meant to mandate language in health communication, but rather are a tool for further thought, information collection, community and partner engagement, and data analysis and interpretation. In selecting terms to be used to refer to specific population groups or communities, the Guiding Principles are not prescriptive.

Public health practitioners can refer to the Guiding Principles when answering the following questions to take an equity-centered approach to their work:

1. How do social and health inequities influence the topic?
2. How should planning and implementation of the public health activity be responsive to the inequities?
3. Will (or does) the activity perpetuate existing inequities?
4. How can the Guiding Principles be applied to improve communication and meet the public health needs of the communities served?
5. Being mindful that language, culture, and norms are dynamic, how can we commit to enhancing and maintaining learning, awareness, and humility to improve communication?

Strengths and Limitations of the Resource

The Guiding Principles is designed to be a living resource that will be updated as culture, norms, and language evolve and the associated science and evidence base grow. The resource is updated periodically and at least annually (eg, content was recently added about images). Users of the resource are encouraged to bookmark the website and refer to it often, as updates are made periodically.

The routine updates to this resource and active dissemination through training and discussions are meant to promote continued learning and more effective communication. It intends to help people understand that words and images matter — they can either support inclusiveness through an equity-centered approach or reinforce harmful stereotypes and marginalization. The resource includes current best practices toward an equity-centered approach, including that being effective in that approach cannot be realized in isolation, though further evaluation of these practices is needed. Meaningful community engagement is key to growth and learning (29).

A potential limitation of the Guiding Principles is that they can be misinterpreted as a directive style guide, as opposed to an intentional approach with suggested terminology to consider. Prin-

ciples and preferred terms should be considered in each specific context (eg, type of product, audience, population-specific focus). In addition, some terms might not always be appropriate or inappropriate, depending on context and audience, and any potential unintended outcomes (eg, alienation of another group) should be assessed. It is also not comprehensive — every possible consideration, topic, or population of focus is not included. The reader should identify how to apply the principles to any additional areas by using equity-centered, inclusive approaches outlined in the resource.

Some common health equity science considerations (eg, choice of an analytic comparison group) are beyond the scope of what could be addressed in the communication product development process, and those are being incorporated in ongoing CDC efforts to elevate and systematize equity-focused scientific best practices. In addition, the Guiding Principles cannot fix foundational problems in public health science, program, or activity approaches. For example, a poorly designed study or a poorly implemented program or activity cannot be fixed with words.

The lack of an evaluation of the resource means that we cannot yet determine the effectiveness of applying the Guiding Principles. The authors are aware that numbers of people reached with presentations and the volume of hits to the website do not represent agreement with the concepts or use of the principles, again reflecting the importance of continuing to review, reflect, and update as language and culture evolves. Equally important is continuing to engage in discussions about the principles with colleagues and partners, evaluating the process and outcomes of efforts to disseminate and apply the principles, and contributing to the development and refinement of best practices.

Population Health and Health Equity

The Guiding Principles was developed and disseminated during a divisive time of social conflict, misinformation, and mistrust of public health, but this is not a new problem. Public health practitioners need to consider this continually challenging environment when communicating with a diverse public. Recognizing that perspectives and opinions differ, including among public health practitioners, will help in planning and implementing public health activities effectively. For example, understanding the values, beliefs, and experiences that lead intended audiences to trust or mistrust sources of information will help practitioners to craft communication products with messages that resonate and to disseminate those messages through appropriate channels. Humility and openness to new perspectives and changing language and norms may improve effectiveness, ensure responsiveness to communities, and help inform decisions that promote health for all.

When social and health inequities are addressed, this benefits all people and overall population health (30). Equity-centered public health approaches must be systematic and multifaceted. Communication is simply one set of tools in the toolbox, as it is only 1 of the 10 essential public health services. Communication efforts that use the right tools get better results. Public health practitioners must work across disciplines and with diverse colleagues and partners to achieve the vital goal of health equity. For example, ensuring collaboration among a diverse and representative team of communicators, scientists, statisticians, policy experts, and partners throughout the life cycle of a public health activity may ensure stronger and more effective communication and public health outcomes. Public health practitioners must recognize that they are all communicators and should continually reflect on the effects of their words (and actions). Building trust and being respectful is both an individual and collective effort that is essential in protecting and promoting health and well-being for all.

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IMPLEMENTATION EVALUATION

“Make Stories That Will Always Be There”: Eagle Books’ Appeal, Sustainability, and Contributions to Public Health, 2006–2022

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PEER REVIEWED

Summary

What is already known on this topic?

Public health interventions are most effective when culture and history are integrated into health education programs. Memorable stories for children can foster learning about preventing chronic diseases, including type 2 diabetes.

What is added by this report?

Sustainability factors include versatility of use, continued availability, culturally relevant messages, compelling illustrations, and cultural identity. Children who “look like today’s kids” with connections to their elders’ traditional knowledge have propelled the Eagle Books’ appeal and longevity for 16 years.

What are the implications for public health practice?

Well told, colorful stories based on Indigenous traditional wisdom and honoring the time-tested skill of storytelling can affect children’s healthy choices and, consequently, community health.

Abstract

Purpose and Objectives

We aimed to determine why the Eagle Books, an illustrated series for American Indian and Alaska Native (AIAN) children to address type 2 diabetes, remain viable long after their release. We

sought to answer 2 questions: Why did the books maintain popularity? What factors have sustained them?

Intervention Approach

Type 2 diabetes burgeoned in the US after World War II, compounding a long legacy of injustices for AIAN peoples. By the 1980s, their rates soared above those of White people. Concerned for future generations, Tribal Leaders suggested that the Centers for Disease Control and Prevention and Indian Health Service use traditional storytelling to teach children about staying healthy. Public health interventions are most effective when culture and history are integrated into health education, particularly stories to address a relatively new disease for AIAN peoples.

Evaluation Methods

From 2008 through 2013, we conducted a case study among 8 tribal communities to evaluate the uptake of the Eagle Books across Indian Country. To understand the Eagle Books’ sustained appeal, in 2022 we reanalyzed the original case study themes and analyzed for the first time themes that emerged from evaluation results in the Eagle Books’ program literature. These were programs that had independently evaluated their use of the Eagle Books and published their findings.

Results

Outcomes demonstrated continuous application of the Eagle Books in diverse community interventions, influencing children’s healthy choices. Community implementers described sustainability components, such as the books’ versatility, flexibility of use, and availability online and in print.

Implications for Public Health

Historical, social, economic, and environmental health determinants intersect with biological and behavioral factors to weave a complex web of causation for type 2 diabetes, beginning early in



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life. Compelling, colorful stories reflecting traditional wisdom and respect for Western and Indigenous science — through the eyes of a wise eagle, a clever rabbit, a tricky coyote, and kids in T-shirts and sneakers — can positively influence community health.

Introduction

Children and adolescents in the US today face a greater risk than previous generations for type 2 diabetes and shortened lifespans, an unprecedented reversal in health (1). Case reports of American Indian and Alaska Native (AIAN) adolescents in the US and Canada with type 2 diabetes surfaced in the 1970s and 1980s, startling medical practitioners who had long considered it an adult disease. By the mid-90s, the epidemic of type 2 diabetes, characterized by insulin resistance and propelled by obesity, had affected children and adolescents in all US populations (2). From 1996 to 2004, type 2 diabetes prevalence among AIAN adolescents aged 15 to 19 years increased by 68% (3). In 2019, AIAN and African American children and adolescents aged 19 or younger had the highest type 2 diabetes rates compared with peers in other US populations (4), placing them at risk for complications such as chronic kidney disease while they are still young (5).

Collective factors, termed social determinants of health (SDOH), can predict physical and mental health outcomes. Socioeconomic status, including economic, educational, and occupational status, is strongly associated with diabetes risks and outcomes (6). For example, obesity prevalence was 18.9% among children and adolescents in the US aged 2 to 19 years in the lowest income group, 19.9% in the middle-income group, and 10.9% among those in the highest income group (7). Connectedness with “place,” which for many AIAN and other peoples encompasses loss of homeland and community (8) also impacts health.

Trauma and chaotic conditions in childhood trigger physiologic stress, leading to neurologic regulatory responses that alter the brain’s pathways (9). Adverse childhood experiences (eg, witnessing violence, personally experiencing abuse or neglect) (10) correlate with obesity and type 2 diabetes across populations (11), including AIAN populations (12). Poverty contributes to conditions that can perpetuate adverse childhood experiences (eg, crowded housing, stress, and food insecurity). In 2020, two racial groups had poverty rates more than 10 percentage points higher than the national rate of 14.3%: AIAN (27.0%) and Black or African American (25.8%) (13). From 2000 to 2010, 25% of AIAN families were consistently food insecure, twice that of White families (14).

Stressors associated with colonization (eg, trauma, loss of lands, relocation to reservations, food insecurity, poverty), compounded across centuries, are linked to trends in obesity and type 2 dia-

betes in recent decades. As defined in 1998 by Brave Heart and DeBruyn, historical trauma is the collective, complex trauma inflicted on a group of people with a specific group identity or affiliation (eg, ethnicity, nationality, religious affiliation) (15). For generations of AIAN children, harsh conditions in boarding schools also contributed (16). “They taught us to be stingy,” said an elder removed from her home as a young child to attend boarding school. Competition for food to avoid hunger countered her cultural values of generosity and sharing (17).

Indigenous peoples’ survival and well-being has been supported by connectedness, the interrelated welfare of everyone and everything (18). Protective factors such as safe, stable, and nurturing relationships (10) can serve as buffers that mediate stressful and traumatic life events (19,20). Strengths-based health promotion efforts, including type 2 diabetes prevention programming, leverage protective factors to foster connectedness across environments and support the health and relational well-being of AIAN children and adolescents (20,21). Indigenous scholars note that historical and protective factors influence all levels of socioecological models, increasing a sense of belonging, self-esteem, self-efficacy, and health knowledge (1,18,21–24). For example, an Indigenous connectedness framework created by Ullrich (Figure 1) centers on child well-being in the context of intergenerational, environmental, family, and community connectedness, encompassed by spiritual and cultural connectedness (18). Stories, dance, music, and ceremony are common expressions of connectedness across Indigenous cultures.

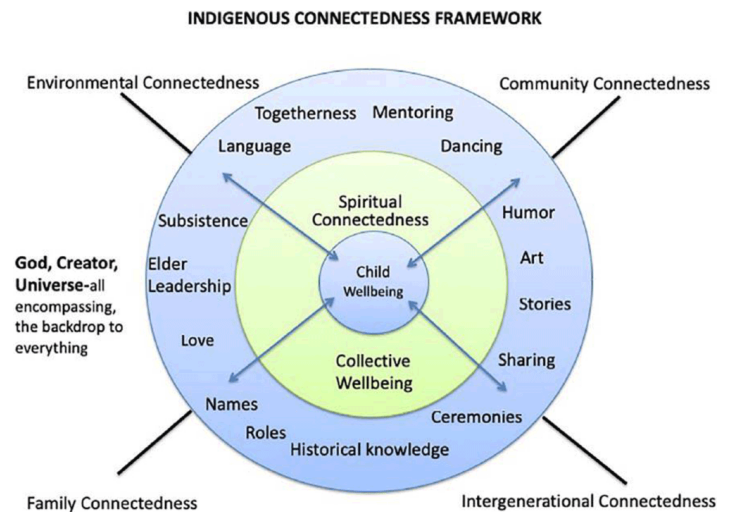


Figure 1. Indigenous connectedness framework for child well-being created by Ullrich (18). Reprinted with permission from the author.

Concerned for their people and future generations, tribal leaders and allies testified about the disproportionate prevalence of dia-

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betes before Congress, which passed the Balanced Budget Act of 1997 (25). Under this legislation, lawmakers established the Special Diabetes Program for Indians in 1998, administered by the Indian Health Service (IHS). The Tribal Leaders Diabetes Committee (TLDC) guided tribally driven, culturally grounded programs designed to advance diabetes care and prevention (26). The Special Diabetes Program for Indians, with more than 300 programs nationwide, continues to demonstrate substantial improvements in health outcomes for AIAN people (27,28). The incidence of type 2 diabetes among AIAN adults decreased 5.2% from 15.4% in 2013 to 14.6% in 2017 (29). Overweight and obesity rates among AIAN children and adolescents aged 2 to 18 years, although high compared with their peers in other racial and ethnic groups, appear to have stabilized in recent years (30).

The IHS provided funds to the Centers for Disease Control and Prevention (CDC) through an interagency agreement, leading to the formation of CDC's Division of Diabetes Translation Native Diabetes Wellness Program (NDWP) in 2004. The NDWP established principles of practice to inform the program's work in Indian Country (Box).

Box. Native Diabetes Wellness Program Principles of Practice

Mission

The mission of the Native Diabetes Wellness Program is to work with a growing circle of partners to address the health inequities so starkly revealed by the number of people with diabetes in Indian Country. With social justice and respect for Indigenous and Western science as grounding principles, we strive to support community efforts to promote health and prevent type 2 diabetes.

Vision

Indian Country free of the devastation of diabetes.

Goals

1. Support sustainable, evaluable ecological approaches to promote Indigenous knowledge about physical, mental, spiritual, and emotional health, including foods, physical activity, and social support.
2. Share stories that promote health in traditional ways, to be remembered, retold, and talked about in homes, schools, and communities.

Principles of Practice

1. Listen.
2. Recognize tribal sovereignty and respect the diversity of tribes.
3. Consult tribal leadership and tribal members.
4. Honor federal responsibility to tribal nations.
5. Respect and incorporate Indigenous science.
6. Share a vision of hope.

7. Honor storytelling and the power of stories.
8. Establish direct relationships with tribal nations.
9. Respect the power of words — keep our word.
10. Seek reciprocity and balance.
11. Be grateful for our work.
12. Reflect critically.
13. Practice cultural humility.

The Diabetes Prevention Program (DPP), a landmark clinical trial to determine if treatment with lifestyle changes or medication can help prevent type 2 diabetes, was published in 2002 (31). AIAN adults living in the Southwest joined other volunteers with prediabetes for the study, supported by the National Institutes of Health, CDC, and IHS, confirming that type 2 diabetes can often be prevented with intensive lifestyle interventions (31). The Special Diabetes Program for Indians successfully replicated the DPP in tribal-based reservation and urban communities (32).

In 2000 and 2001, IHS, CDC, and TLDC held 8 listening sessions. More than 421 representatives from 171 tribes offered guidance on community-based approaches for diabetes prevention and care. A recurring theme was respect for traditional knowledge about protecting people's health and appreciating the diversity of tribes. "Look to the culture. Our cultures are the source of health," one representative said. Related to this was a deep concern for the health of children, who are considered sacred (33) in many AIAN cultures. "We need stories . . . it's just the last decades where [diabetes] has run rampant. The stories aren't there," one representative explained. Another added, "Make it [a story] something that is there all the time" (CDC, unpublished report, *Formative Research to Obtain Tribal Input on the National Diabetes Prevention Center*. Westat, Inc, for CDC Division of Diabetes Translation, through CDC Health Communication Evaluation Services; 2000). Several representatives suggested a story about an eagle, told by Georgia Perez, a community health representative for Nambe Pueblo, incorporated into the Strong in Body and Spirit program. Told at the beginning of each session, the story facilitated open discussions. "It was as though walls of guilt, fear, anger, and denial came down, and people had new hope" (34). From 2002 through 2006, *Through the Eyes of the Eagle*, *Knees Lifted High*, *Plate Full of Color*, and *Tricky Treats* were written by Georgia Perez and illustrated by Patrick Rolo and Lisa A. Fifield. CDC supported the development of the series through a contract with Westat, Inc. The books feature children in sneakers and T-shirts, a wise eagle, a clever rabbit, and a wily coyote. The books were launched in 2006 at the Indian Pueblo Cultural Center in Albuquerque, New Mex-

ico, and news media outlets covered the event (eg, *Indian Country Today*, *Green Bay Gazette*, *USA Today*). The development and implementation of Eagle Books programs and applications has spanned 2006 through 2022 (Figure 2).

Purpose and Objectives

Our study aimed to determine why the Eagle Books, an illustrated series created for AIAN children to address type 2 diabetes, remain viable 16 years after their launch. We sought to answer 2 questions: Why have Eagle Books maintained popularity? What factors sustained them?

The objectives of the Eagle Books were to 1) address the need for diabetes education for AIAN children, 2) create compelling, relevant stories about staying healthy and preventing type 2 diabetes, 3) promote traditional ways of knowing about healthy foods and physical activity through storytelling, and 4) portray vivid images and memorable characters to inspire healthy choices.

Intervention Approach

We used 2 evaluation approaches. First, we reviewed the qualitative case study of the adoption of the Eagle Books for children in 8 diverse AIAN communities. Second, we performed an implementation evaluation to determine why and how the Eagle Books have remained popular in Indian Country and elsewhere.

Initial case study in 8 American Indian and Alaska Native communities

From 2008 through 2013, NDWP contracted with Westat to conduct a qualitative case study among AIAN communities to determine their uptake of the Eagle Books since 2006 (Teresa Lofton, PhD, et al, unpublished report, 2013. *Uptake of the Eagle Books in Selected American Indian and Alaska Native Communities: Internal Report*. Supported by the Native Diabetes Wellness Program, Division of Diabetes Translation, CDC. Task order contract no. 200-2007-20015). We chose sites to learn common patterns of use and unique local applications. Selection criteria included variation by culture, geographic region, population size, and whether communities had been exposed to federally funded promotion of the Eagle Books (DETS curriculum, Eagle Book campaign fairs and exhibits, diabetes talking circles) or had independently ordered at least 1,000 books. We wanted to understand how federal promotion influenced uptake and to identify contextual factors that affected the books' use with or without support. Ultimately, we selected 8 locations — 4 locations had federal support and 4 locations were independent.

Westat assembled a team (T.L., lead evaluator) to conduct evaluation activities on site (C.D.F., L.D.C., and D.S., L.D.B., observers). Community-based and tribally driven participatory research (37) framed our approach, as these tribal partners had determined the most culturally appropriate uptake of the books in their communities.

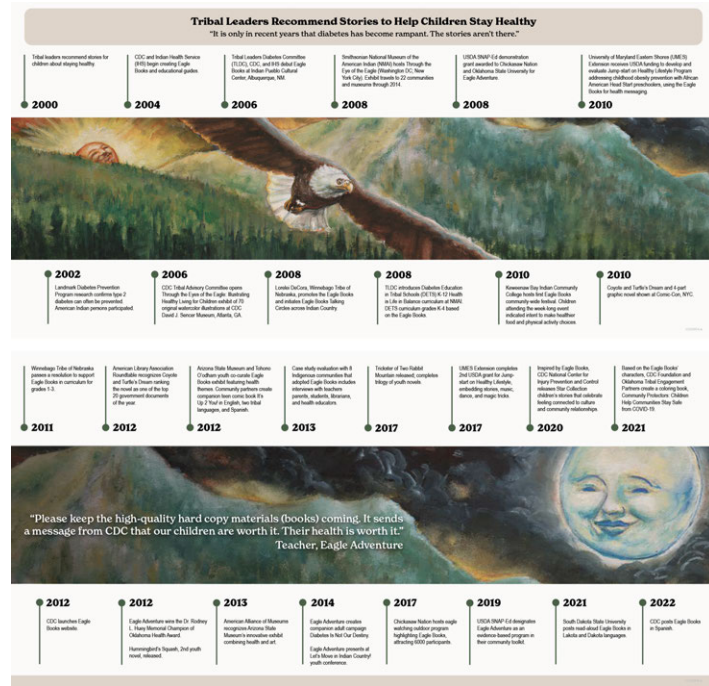


Figure 2. A timeline of the development and implementation of Eagle Books, 2006–2022. Abbreviation: USDA SNAP-Ed, US Department of Agriculture Supplemental Nutrition Assistance Program–Education.

Responding to TLDC guidance, NIH concurrently established cooperative agreements with 8 tribal colleges and universities, and interagency agreements with CDC and IHS to create the K–12 Diabetes Education in Tribal Schools (DETS) curriculum (35,36). The K–4 curriculum included the Eagle Books. NDWP (D.S., L.D.B.) provided scientific review throughout the curriculum development.

In 2010, NDWP created novels for adolescents based on the original series (Figure 2). The children now aged 12 years and the animal characters returned with an expanded cast, including an elderly box turtle and a multicultural trickster rabbit. Written by Terry Lofton and illustrated by Patrick Rolo, these novels broadened the dialogue about type 2 diabetes prevention. Although not included in our evaluation, these books are part of Eagle Books' continuity.

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Implementation evaluation framework

An implementation evaluation provided the best approach for the present study. We wanted to determine if the intervention, uptake of the Eagle Books, had been implemented in diverse settings and programs to address type 2 diabetes and had influenced children's healthy food choices. We wanted to learn whether use of the Eagle Books had accomplished the original goals for their use, and if additional findings related to those goals. We were particularly interested in what happened after the Eagle Books case study was completed and what led to the books' continued viability. Implementation evaluation covered these areas of inquiry to help us understand how sustainability occurred over 16 years.

Funding support for communications about Eagle Books (eg, newsletters and conferences) concluded in 2016. Programs continued to use the books in schools, communities, and culture camps (38). A small number of those programs conducted formal evaluations with similar (qualitative) or other (quantitative or both quantitative and qualitative) methods. Implementation evaluation can use both quantitative and qualitative measures to answer descriptive (who, what, where, when) questions and qualitative measures to explain how and why. Implementation evaluation helped frame the examination of what factors led to continued use of the Eagle Books and if themes from the first assessment still held.

Evaluation Methods

Methods for the present study are based on the findings of the case study, which we reviewed and reanalyzed to answer our 2 research questions (Table 1). The review was sufficient to address the first question about popularity. To answer the second question about sustainability, 4 raters (T.L., D.S., C.W., L.D.B.) independently reanalyzed these data to identify the most important themes.

We knew of 3 Eagle Books evaluation studies. These included 1 of the 8 communities in the case study (41,42) and 2 programs that conducted independent evaluations, the DETS curriculum and the Jump-start on a Healthy Lifestyle program in Maryland (35,43). We reviewed the literature that described the 3 programs, comparing approaches, methods, and findings with the major themes. We listed the quantitative results that demonstrated significance in relation to Eagle Books' use and impact. We described qualitative findings and extracted illustrative verbal descriptions from participants in the case study and other programs that supported, enhanced, and broadened our understanding of identified themes.

We conducted literature searches with Google using the terms "CDC Eagle Books program evaluation" and "CDC Eagle Books." Our criteria included programs that had participant sample sizes

large enough to determine significance and employed quantitative measures or, if qualitative, had used methods with a variety of participants, similar to the case study. We found no additional Eagle Books evaluations in the literature that met these criteria.

Results

We identified 11 major themes that addressed Eagle Books' popularity and why they are still in demand 16 years after launch. These themes include versatility and flexibility, cultural relevance, a relatable explanation of type 2 diabetes, colorful artwork, characters with whom children identify, relevance to diverse populations, and children as change agents (Table 2). Theme 1, versatility, includes subthemes that address sustainability: easy "as is" use; integration of books into existing programs; adaptation of the books for different genres, age groups, and diverse AIAN and other cultural groups; adjustment of books for very young readers; development of new programs for classroom, home, and Head Start; and stable, embedded use of Eagle Books across tribal and nontribal organizations and programs.

To illustrate application of these themes, we describe 5 programs that exemplify and promote Eagle Books sustainability and operationalize their popularity.

Whirling Thunder Eagle Books Program, Winnebago Tribe of Nebraska

In 2009, the Whirling Thunder Wellness Program collaborated with an Eagle Books champion and NDWP consultant (L.D.C.) to promote health and early literacy through the books. Whirling Thunder introduced the series to Head Start. Each family received the books and an animated video as the children were welcomed to the program (themes 7,8 [Table 2]).

Whirling Thunder developed an Eagle Books program, 4 in-class sessions for grades 1 through 6 with new outdoor games based on the characters, classroom discussion that engaged shy students at risk for type 2 diabetes, and reinforcement of messages (eg, "sometimes" and "everyday" foods) (themes 1, 4, 5, 9 [Table 2]). In 2011, the Winnebago Tribal Council passed a resolution to continue Eagle Books in their curriculum for prekindergarten through third grade (Figure 2).

A TLDC member in 2004 and Winnebago Tribal Council member (L.D.C.) developed Eagle Books Talking Circles, an adaptation of the books for educating adults about children's health needs. This activity became part of the many she developed and presented as part of NDWP's 2008 partnership with the Seva Foundation to fund diabetes talking circles in AIAN communities. She conducted 148 talking circles and promotional events that in-

cluded booths at health fairs and pow-wows, presentations at regional and national conferences, and book distribution to families, schools, libraries, and health departments. She understands children's power: "One aspect of Native communities is all-powerful — that's our children. No one can get Indian communities to change faster than their children" (theme 11 [Table 2]).

Over the years, local newspapers have reported on Eagle Books events. In spring 2022, The Winnebago Times newsletter praised a skit performed by third graders based on *Plate Full of Color* and the US Department of Agriculture's (USDA's) My Native Plate (44).

Through the Eyes of the Eagle: Illustrating Healthy Living for Children Exhibit, Arizona State Museum and Tohono O'odham Community Action

In 2008, Lisa Falk, associate director of education at the Arizona State Museum (ASM), visited the exhibit *Through the Eyes of the Eagle: Illustrating Healthy Living*, at the National Museum of the American Indian. Falk was impressed by the extraordinary artwork that addressed a serious health issue in her community (theme 4 [Table 2]). To bring the exhibit to Tucson, she built a partnership of 9 community organizations and university departments to support an expanded version of the tour (theme 1 [Table 2]). Her goal was to promote understanding of type 2 diabetes that spoke to art, history, culture, and community health (theme 10 [Table 2]). Tohono O'odham Community Action joined the partnership to represent the Tribe's struggle with type 2 diabetes and efforts to revitalize their agricultural and athletic traditions.

Falk (ASM) and Terrol Dew Johnson (Tohono O'odham Community Action) co-curated the exhibit, which featured O'odham historical and contemporary items relating to sport and foodways spanning 13,000 years. Concurrently, ASM partnered with the Ha:San Preparatory School and faculty to develop a comic book adaptation of the Eagle Books for middle and high school students. Falk and Ryan Huna Smith (Chemehuevi/Navajo) co-wrote the comic, *It's Up 2 You!*, set in the Southwest. The comic includes a wise tribal elder and a skateboarder who encourages her friends to eat healthy and be physically active. Students narrated a video of *It's Up to You!* in English, O'odham, and Spanish (theme 1 [Table 2]).

Healthy Celebration Day opened the exhibit with more than 60 activities, including a 5K run, cultural dances, storytelling, food tasting, and local tribal games. Four years in development, the exhibit was on display from October 2011 to January 2012; more than 6,000 visitors attended.

When the exhibit closed, ASM added exhibit objects to its permanent collection. The 2013 edition of Sites of Conscience de-

voted 10 pages to the exhibit as a collaboration that addressed the critical issue of diabetes through community planning and participation. Currently, Falk delivers a lecture on the Eagle Books' exhibit to each new class of museology students at ASM, and the museum's website posts the comic and a diabetes quiz for download.

Eagle Adventure Program

Eagle Adventure was the outcome of formative research conducted by staff from the Chickasaw Nation Nutrition Services Get Fresh! Program and the Department of Nutritional Sciences at Oklahoma State University to assess the health needs of local tribal families and elders from 2006 through 2008. Their findings identified type 2 diabetes as a primary concern, with elders emphasizing the need for child education that includes storytelling and intergenerational interaction (theme 2 [Table 2]).

The research team explored program products and models that would address these needs. The Eagle Books were free, available, and culturally appropriate; there were no restrictions on use; the art was spectacular; appeal would probably extend to mixed ethnicity classrooms; and the messages aligned with USDA standards (themes 2, 4, 10 [Table 2]).

The team was awarded a USDA Supplemental Nutrition Assistance Program–Education (SNAP-Ed) Wave 1 demonstration project in 2008 to develop, pilot, and evaluate an Eagle Books school-based program in grades 1 through 3. The pilot design included developing a live play, 4 classroom sessions based on each book, and take-home materials (Network) that brought families and elders into the program (theme 1 [Table 2]). The classroom sessions featured nutritional messages and physical activities that included dancing, nutrition games, and a healthy harvest activity (themes 4, 5 [Table 2]).

To develop the pilot components, the team had to reach out across many departments in tribal government and locate schools willing to participate (theme 1 [Table 2]). The pilot program, named Eagle Adventure, was implemented in spring 2010, and the program was deployed in the fall.

Since its launch, the program has spread beyond Chickasaw Nation's tribal jurisdiction, reaching more than 6,000 students throughout Oklahoma. Eagle Adventure components remain unchanged, although staff continue to create additional activities and materials. Evaluation results demonstrated significant intentions for healthy eating and physical activity choices (Table 3). In 2019, Eagle Adventure was accepted into the USDA's SNAP-Ed toolkit, a collection of evidence-based programs.

In 2017, the Eagle Adventure team reorganized as Oklahoma Tribal Engagement Partners (OKTEP) (theme 1 [Table 2]). They added team members, and new tribal partners adopted the program. CDC remains a partner for program sustainability, providing books to support ongoing needs. Currently, 9 tribes offer Eagle Adventure.

“Health Is Life in Balance”: DETS

Responding to TLDC guidance to develop a culturally relevant type 2 diabetes health education curriculum for AIAN children, the National Institute of Diabetes and Digestive and Kidney Diseases established cooperative agreements with 8 tribal colleges and universities and interagency agreements with IHS and CDC. DETS is a supplement for science, social science, and health education lessons in kindergarten through 12th grade designed to meet national science education standards and include AIAN traditions (theme 2 [Table 2]) (35,36).

DETS K–4 explores health and foods, healthy life in balance, diabetes as imbalance, and harvesting Mother Earth. Tribal college and university education specialists tasked with developing these lessons described the Eagle Books as having a “wow” factor. They believed that, integrated into the curriculum, the books’ beautiful imagery, character emotion, and easy-to-understand explanation of diabetes would create excitement and effective messaging in the classroom (themes 1, 3, 4, 5 [Table 2]). As expected, most children reported liking the books, drawn to the colorful illustrations, and the fun-to-read messages (Table 3) (35,36).

When DETS rolled out across Indian Country in 2008, Eagle Books had their first widespread distribution (Figure 2). The K–4 program was well-liked in schools. However, state school policies and budget cuts made it challenging to use the curriculum in some communities. Nevertheless, DETS began spreading as educators adjusted and adapted the lesson plans for informal use in schools and integration into Head Start programs (Theme 1 [Table 2]). Six of the case study communities were using DETS. In Alaska, community educators delivered DETS directly to schools as well as to families in which children were home schooled. Amazed at the popularity of DETS and Eagle Books, these educators observed a principal, dressed in a Mr. Eagle costume, reading a book to a class. Later, children participated in a DETS balance activity. The curriculum is available online from the IHS diabetes catalog.

Jump-start on a Healthy Lifestyle, a Head Start Program

Jump-start on a Healthy Lifestyle, Head Start Program, is a University of Maryland Eastern Shore Extension program that partners with Head Start Centers and summer camps in the tri-county area of the Lower Eastern Shore of Maryland. The program pro-

motes health, including preventing obesity, in children from low-income families. Virginie Zoumenou, University of Maryland Eastern Shore Extension, received 2 USDA grants to develop an Eagle Books–based Jump-start program (2010–2017) that served African American families (theme 10 [Table 2]). Zoumenou et al published an article describing the development and testing of components in 4 phases (43). The evaluation included students in prekindergarten through third grade in the tri-county area of the Lower Eastern Shore. Program adaptations included teachers reading Eagle Books in short excerpts for prekindergarten, shortening book length, and introducing gardening to reinforce nutritional messages (grades 1–3) (themes 1,4 [Table 2]). Zoumenou also developed songs, music, dance, and magic tricks to create classroom enthusiasm. Qualitative results showed that children remembered character names, the stories, and shared stories with their families (theme 11 [Table 2]). Quantitative results demonstrated that book messages and gardening significantly increased children’s healthy food choices, physical activity, and knowledge of diabetes (Table 3).

NDWP did not know if the popularity of the Eagle Books, designed for AIAN communities, would cross cultural groups. Zoumenou et al suggested the stories are relevant for African Americans, whose story traditions also preserve history, mores, and cultural information, consistent with *griot* practices of West African storytellers (43).

Zoumenou et al noted other commonalities (43). African Americans and AIAN people share high rates of diabetes and a long history of oppression. The consequent histories of disenfranchisement continue to result in devastating health inequities for both populations. When Mr. Eagle gives hope that diabetes can be prevented, children may also understand that history does not determine their destiny.

Implications for Public Health

We sought to answer 2 questions: Why have the Eagle Books maintained their appeal, and what factors sustain them? Our findings suggest that Eagle Books’ appeal is due to culturally relevant storylines, relatable characters, the emotional power and beauty of the artwork, and respectful messaging of traditional health knowledge set in current times. The stories have meaning for a wider audience than in Indian Country alone, demonstrating respect, wisdom, humor, peer support, and hope. (theme 10 [Table 2]).

An important element of remembered stories is identification with story characters (45). Many children identified with the Eagle Books’ child characters because they looked like them. These and other children were equally drawn to the colorful artwork and imagery, regardless of age, race, or ethnicity.

We had hoped to create stories that would “always be there,” guided by tribal leaders and representatives. We did not project the application of the Eagle Books’ stories for 16 years. In public health, we tend to create shorter-lived, conventional communications. Although the sustainability of public health interventions is inherently valued, sustained applications of effective messaging with measurable outcomes are not common (40,46).

The Eagle Books’ availability, including access to online versions (47), was a sustaining factor. Many children, parents, and teachers still prefer the feel of a book in hand, especially books for young children (Figure 3). The books were widely distributed — shared at events, or on request mailed to all 50 states, more than 200 tribal communities, the 6 US Affiliated Pacific Islands, Puerto Rico, and the US Virgin Islands, CDC distributed almost 6,000 sets of books annually from 2016 through 2021. The Canadian Diabetes Association tailored and printed the series. South Dakota State University Extension, through a cooperative agreement with CDC’s Racial and Ethnic Approaches in Community Health program, led talking circles and worked with native speakers to translate the series into Lakota and Dakota languages (48).

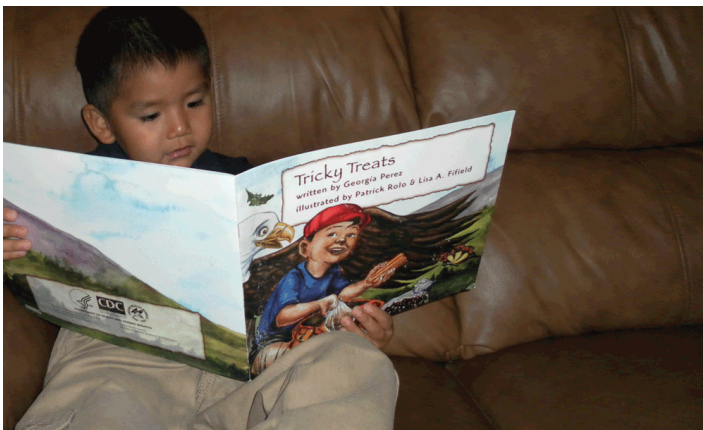


Figure 3. Child reading *Tricky Treats*.

The Eagle Books inspired CDC’s National Center for Injury Prevention and Control to develop the Star Collection stories, published in 2020. *The Friendship Makers* and *Stars that Connect Us*, written and illustrated by Marisa Erven, highlight protective factors of safe, stable, and nurturing relationships (49). In 2021, OKTEP, in collaboration with CDC and the CDC Foundation, created a coloring book, *Community Protectors: Children Help Communities Stay Safe from COVID-19*, featuring original Eagle Books’ characters, illustrated by Patrick Rolo and written by James Wallace (Figure 2).

Partnerships and political infrastructures with tribal leaders and allies advocating for diabetes prevention and care are 2 of 9 domains identified as critical for program sustainability (40,46). Program evaluation, another sustainability domain, began informally when Eagle Books launched in 2006 and continues, including the recent studies (34,41–43) that confirm changes in children’s intent for healthy choices (Table 3).

In entrusting local and national partners to create paths for better health outcomes through storytelling, tribal leaders lent powerful support, grounded by traditional ecologic knowledge, to “what works,” as advised during early listening sessions. In cultures where words carry the power to shape reality, stories have the power to empower a vision of hope and strength for the future in an indirect, nonthreatening way (34).

“Stories are universal,” Zoumenou et al reminds us (43). Relatable characters enlivened by story and images can transcend cultures and bring people together. In public health, well-told stories — culturally relevant, respectfully integrating traditional knowledge with sound Western science — are a powerful tool to relay indelible messages connecting people, history, culture, hope, and health. Storyteller N. Scott Momaday deepens our understanding of stories, language, and the power of words: “Language is considered sacred and to be used in ways that count for good. Words are to be taken seriously and remembered . . . the risk of loss is constant, and language is never to be taken for granted” (50).

AIAN communities exemplify “communities of memory,” in which members share a sense of belonging, kinship, cultural identity, connectedness, and history, with understanding of the intrinsic meaning of these values for their people (51). The power of stories to create hope for the future, told and retold over generations, is time-tested.

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The generosity of diverse and dedicated partners across tribes, agencies, programs, and academic institutions has made this work not only rewarding but possible. We could never name all who have and continue to contribute to this work in support of the well-being of future generations. We especially thank the IHS Tribal Leaders Diabetes Committee for their guidance and encouragement throughout the development and sharing of the Eagle Books. They were the books’ first champions. We also want to acknowledge those who have journeyed to the Spirit World. Your shoulders were strong. You held us up.

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C.D.F. is an enrolled member of the Oneida Nation; L.D.C. is an enrolled member of the Winnebago Tribe of Nebraska, and C.W. is an enrolled member of the Choctaw Nation of Oklahoma.

The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of CDC or the Agency for Toxic Substances and Disease Registry. No copyrighted tools or instruments were used in this research without permission.

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Tables

Table 1. Case Study Methods for Evaluation of Eagle Books, 2008–2013

| Phase | Task |
|--|--|
| Preparation | |
| Developing study protocols and instruments | We developed semistructured interview and focus group schedules, informed consent forms, and site visit recruitment and scheduling sheets for each type of participant. |
| | We designed structured and open-ended questions in semistructured interview guides to interview health workers (nurses, public health and Indian Health Service staff, diabetes educators, and fitness specialists), school administrators and counselors, and teachers (grades kindergarten through 4). |
| Purpose | These instruments would assess awareness of Eagle Books in the community, Eagle Books activities in health programs and schools, ease of use and comprehension by children, and how Eagle Books compared with other diabetes prevention materials in appeal and messages. Instruments included questions about barriers for use and ways the Centers for Disease Control and Prevention could improve support of Eagle Books. |
| Focus groups | Focus group guides were designed for parents. Children (grades kindergarten–4) accompanying their parents would be interviewed with a short discussion about the Eagle Books (what Mr. Eagle wants you to do and why), followed by hands-on activities. |
| | Focus group questions centered on use and influence of Eagle Books in the home: reading books with children, using messages to encourage children’s healthy behaviors, adoption of healthier food choices and increased physical activity, what they have learned about diabetes prevention, challenges encountered, and general questions about appeal of Eagle Books. |
| Approvals | Office of Management and Budget (OMB) approved all data collection instruments (OMB no. 0920–0798). All instruments and protocols were approved by the institutional review boards of the Centers for Disease Control and Prevention, Westat, and tribes with institutional review board committees. |
| Preparing to work with tribal communities | Because some staff did not have experience in Indian Country, Westat held meetings to discuss working with tribal communities. We asked tribal communities to collaborate with us in conducting the site visits. To ensure our interactions were aligned with the principles of participatory research and NDWP’s principles of practice, we introduced inexperienced team members to Native communities’ history, cultures, economics, and proper etiquette. With appreciation for the values of respect, reciprocity, and cultural humility, we adopted qualities of “talking circles” to conduct focus groups and enhance the semistructured interviews: <ul style="list-style-type: none"> • The moderator and participants listened attentively and respectfully to everyone, and speakers were not hurried. • Focus groups and interviews were to be held in comfortable, culturally familiar settings, for people to feel safe to talk about family struggles with diabetes and how they want a better life for their children. |
| Site selection | We selected sites by cultural and geographic diversity. Four sites had federal support from NDWP to promote Eagle Books, and 4 sites had no federal support and had ordered Eagle Books independently. |
| Recruitment and scheduling | NDWP and project consultants identified local health department staff and diabetes educators to recruit participants. Westat made introductory telephone calls and sent emails to each contact, with follow-up to identify numbers and kinds of participants, and scheduling or confirming visit dates and times. When asked, Westat directly recruited participants. |
| Data collection | |
| Methods used (39) | We used qualitative data collection methods: in-depth, semistructured interviews, focus groups, collection of locally developed Eagle Books–related materials, and observational tours. |
| Participants | Representatives from health departments, schools, colleges, museums, libraries, Native organizations, and cultural programs, in addition to parents/caregivers and children and adolescents, participated in data collection. |
| Participatory approach | Participants and researchers engaged in conversational interaction with each other. Participants steered the agenda content by asking questions, making recommendations, and expressing opinions. |
| | This participatory approach embraced the traditions of oral Native communication that encourages respect and equitable co-creation of knowledge. |
| Value of multiple methods | Multiple cases, data collection methods, and sources provided in-depth data necessary to understand appeal of Eagle Books, initial uptake and continued use, kinds of uptake and their effects, and factors that influenced site-specific use. Interviews and observational tours took place in the natural environment of participants’ own community. |

Abbreviations: AIAN, American Indian or Alaska Native; NDWP, Native Diabetes Wellness Program.

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Table 1. Case Study Methods for Evaluation of Eagle Books, 2008–2013

| Phase | Task |
|-------------------------------------|---|
| Site visits | Site visits were conducted from October 2011 through June 2012. |
| | The evaluation team consisted of 3 or 4 researchers: at least 2 Westat staff members (evaluation lead [T.L.], 1 other) and 1 project consultant (C.D.F. or L.D.C.). These researchers conducted focus groups and semistructured interviews. |
| | NDWP codirectors (D.S. or L.D.B.) attended as observers only. |
| | The evaluation team interviewed 186 participants; 3 participants in Alaska were interviewed by telephone. |
| Process | At the beginning of individual, small group, and focus group interviews, participants received a \$70 gift card. |
| | Focus groups began with a blessing by an elder followed by a box lunch. Parents signed consent forms and child permission forms before children went to a separate room for their interview. |
| | Three members of the team conducted focus groups: a moderator, a note taker to augment audio recording, and a team member to entertain the children. |
| | Children received gift packs of colored pencils and Eagle Books stickers and played with Eagle Books puppets and art activity sheets. They participated in 2 activities to assess their knowledge of Eagle Books nutrition and physical activity messages. Children drew lines on a worksheet between Mr. Eagle and activities that he would approve (playing ball) or not approve (playing video games). They sorted pictures of foods onto a Miss Rabbit plate (healthy choices) and a Mr. Coyote plate (less healthy choices). |
| Observational tours | The site visit team made observational tours arranged by the tribes, including local schools, Head Start programs, community colleges, tribal museums, cultural centers, casinos, tribally owned restaurants, hospitals, health departments (including an office dedicated to an Eagle Books program), tribal markets, grocery stores, economic development offices, and an Eagle Books play performance. |
| | We observed local use and dissemination of Eagle books, community infrastructure, and economic development. We shared dinners with tribal members, danced with elders at a weekly exercise class, listened to children reading letters to Mr. Eagle, and participated in a blessing of the tribe's bison herd. |
| Team adaptability | The research team adapted to community situations. Inclement weather led to telephone interviews with participants in Alaska. We were respectful and supportive when unexpected events affected the community. |
| Data analysis | |
| Who conducted analysis (39) | Westat team members were assigned a set of communities for reporting and analysis based on the sites they had visited. |
| How analysis was conducted | The team developed verbatim transcripts for each community from audiotaped interviews and focus groups. |
| | These transcripts served as the primary data source for description and analysis of participant responses, observation notes, and relevant documents. |
| | Initially, descriptive summary reports were developed for each community. These reports included 3 sections: <ul style="list-style-type: none"> • A brief tribal history and a description of community population, government, economy, and public services. • A description of tribal health programs, schools, museums, and community organizations that had adopted the books for development of new Eagle Books–based programming or use in existing health promotion and diabetes prevention programs. • A summary of community responses that included health department personnel, teachers and librarians, local college partners, school administrators, and parents and children. |
| Cross-site theme analysis | The community reports and original transcripts were the sources for a cross-site thematic analysis. |
| | Already familiar with these data and understanding that we observed in similar responses across communities, we used hand coding to develop word codes, code data, and categorize codes to discover trends and patterns. |
| | By combining codes and patterns, we identified broader themes, recognizing commonalities and relationships across community data. |
| Ensuring reliability | Because interpretation was often required, other Westat team members who had visited the same community regularly reviewed the emerging analyses, which strengthened reliability. |
| Triangulation and internal validity | Patterns and themes identified from multiple cases and multiple data collection methods and sources provided the opportunity to compare data and reduce errors in interpretation through triangulation. |
| | Alignment of these data provided evidence of internal validity and greater confidence in findings related to the appeal of Eagle Books, initial uptake and continued use, kinds of uptake and their effects, and contextual factors that influenced community- |

Abbreviations: AIAN, American Indian or Alaska Native; NDWP, Native Diabetes Wellness Program.

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Table 1. Case Study Methods for Evaluation of Eagle Books, 2008–2013

| Phase | Task |
|---|---|
| | specific use of books. |
| | The multiple cases coupled with multiple methods of qualitative data collection (in-depth and group interviews, community observation data, and examination of program materials) enabled us to triangulate these data. |
| | Triangulation strengthened the findings in relation to the research questions and increased internal validity by deriving findings from multiple sources reflecting real-world community settings and populations. |
| Definitions and resources | |
| Participatory research and evaluation | Participatory research frameworks encompass research and program evaluation designs and methods that use systematic inquiry in direct collaboration with persons, groups, and communities that are the focus of study. |
| | Researchers and evaluators use methods and tools that bring participants directly into the research and evaluation process. |
| | Researchers, evaluators, and participants collaborate as partners to determine questions for inquiry and the means to answer them. |
| | Balanced, interactional relationships produce value for researchers, evaluators, and participants in knowledge gained and application in the real world. |
| | Tribally driven participatory research takes an active, rather than passive, stance in the research process and emphasizes the critical governmental authority of AIAN tribes. |
| Participatory approach formed the foundation throughout Eagle Books development and promotion | NDWP adopted participatory approaches for the production and promotion of all Eagle Books products. The program recruited Native artists to illustrate the stories and funded the art direction and production services of Westat Graphics. |
| | This collaboration produced the Eagle Books series, novels for adolescent readers, graphic novels, and all ancillary materials. |
| | As books and materials were developed, they were reviewed by members of tribal communities, including children, adolescent leaders, health educators, and tribal leaders. |
| | We employed a Native-owned firm to promote the books nationwide at conferences, health fairs, pow-wows, and other community gatherings. |
| Sustainability | Sustainability is defined as the capacity to maintain program services at a level that will provide ongoing prevention and treatment of a health problem after termination of major financial, managerial, and technical assistance from an external donor. |
| | Sustainability includes use of program components and activities for the achievement of desirable program and population outcomes over time. |
| | A main component of sustainability is the ability to maintain programming and its benefits over time (40). |
| Resources | NDWP's principles of practice (Box). |
| | L.D.C. provided guidance on AIAN talking circles and behavioral protocols in AIAN communities. |
| | For Eagle Books' promotion, L.D.C. conducted talking circles, including Eagle Books talking circles, and Eagle Books promotions in 148 reservation communities. |
| | C.D.F. provided guidance on diabetes education in tribal schools and curriculum uptake in communities, promoting Eagle Books during and after curriculum development of the K–12 Diabetes Education in Tribal Schools program. |
| | C.D.F. brought scores of Eagle Books on small planes that took her to outlying villages in Alaska. There she provided teacher training on the K–12 Diabetes Education in Tribal Schools program and supplied the village with books. |
| | C.W. provided guidance on use of Eagle Books in tribal nations with traditional foods programs and food sovereignty practices. |
| | V.Z. provided guidance on cross-cultural application of Eagle Books with African American children in Head Start programs and insights on AIAN African wisdom. |
| | NDWP website includes all materials developed for Eagle Books promotion and use: www.cdc.gov/diabetes/ndwp/about-us/index.html . |

Abbreviations: AIAN, American Indian or Alaska Native; NDWP, Native Diabetes Wellness Program.

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Table 2. Major Themes, Subthemes, and Illustrative Quotes About the Eagle Books, 2006–2022

| Themes and subthemes | Quotes from the Eagle Books case study, evaluation studies, and the media |
|---|--|
| Major theme 1: The Eagle Books' appeal is versatility and flexibility. | |
| The Eagle Books are ready to use for many purposes. | Eagle Books have not required customizing. We usually need to alter materials to make them more kid-friendly or culturally appropriate . . . but the Eagle Books are ready to use so staff can easily incorporate them into current diabetes prevention efforts. [Health Department, Southeastern Tribe] |
| | We count images and health activities in the books for addition and subtraction. [Elementary school teacher, Great Plains Tribe] |
| | The health department gives away Eagle Books to participants in our Pathways and walking program. Elders at the adult tricycle race like them to give to grandkids. This year we have worked with the tribe's museum to put on the Eagle Books exhibit. They will be distributing the books and have asked us to integrate Eagle Books health messages into the exhibit activities. All the schools are going. [Health Department, Southeastern Tribe] |
| | We use <i>Tricky Treats</i> when we visit a grocery store to learn about nutrition labels and then set up our own store for shopping. And we use the books to play Fear Factor, where the kids dare each other to eat healthy foods they don't usually eat. [Boys and Girls Club staff, Southeastern Tribe] |
| The Eagle Books are adjustable for early childhood education. | The children I use them with are too young. . . . There are too many words on a page. So, we look at the pictures. The 3- to 4-year-olds have an attention span of a half-inch! [Community librarian, Midwest Woodlands Tribe] |
| | The actual wording was a little higher level for our age group. But the pictures are so vivid and there is so much going on. Teachers can be familiar with it and then just tell the story. [Early Childhood Center's Head Start, Alaska village] |
| The Eagle Books can be integrated into existing programs. | This was going to be enjoyable. Something the kids could really get into. It rippled through the community and our schools. They were excited about having copies of the Eagle Books in their classrooms. [Project DESTINY, Midwest Woodlands Tribe] |
| | I led training sessions across Alaska promoting the Eagle Books and DETS [Diabetes Education in Tribal Schools] program. I distributed [them] to many students who are home-schooled. I encouraged schools and after-school programs to use the books so older children are reading them to younger children. [Alaska village community educator] |
| | Teachers have been using <i>Knees Lifted High</i> in with "I am Moving, I am Learning." That's a Head Start program. And linking to the culture program about traditional living – we took children on trips to see the bison herd, then talked about traditional food and coyote food. [Head Start, Great Plains Tribe] |
| The Eagle Books are used to create new programs. | We introduced healthy foods, created active games, promoted social interaction, and making friends, and encouraged participation of shy students, especially those with weight problems. A key message in the books is that you are not alone. Friends help each other to stay healthy. [Fitness specialist, Great Plains Tribe] |
| | [This program] introduces nutritional education and physical activities in classrooms with follow-up homework for students and their families. [We created] a play based on <i>Through the Eyes of the Eagle</i> , dances, songs, and music. The evaluated program has expanded to tribes throughout [our state] and to other states. Essentially, we took the stories and layered them with activities and education. [Southern Plains Tribe Eagle Books program] |
| | The <i>Through the Eyes of the Eagle: Illustrating Healthy Living</i> exhibit was in collaboration with Tohono O'odham Community Action as co-curators to promote understanding of [Southwest Tribe's] history, culture, and how they are working to prevent type 2 diabetes. [Associate Director of Education, Arizona State Museum] |
| Eagle Books were adapted to different genres, age groups, languages, and cultural groups. | We developed a play, <i>Through the Eyes of the Eagle</i> , that would get the kids excited and create readiness for classroom activities. We created songs and lyrics, too. [Southern Plains Tribe Eagle Books program] |
| | We wanted to make something like the Eagle Books that would be from the Southwest and reflect local Native cultures – more of our racial and ethnic group mix. So, we wrote a comic that included Native and Hispanic teens that were skateboarders. [Associate Director of Education, Arizona State Museum] |
| | There were some new outdoor games we created for older kids – 6th graders. Some we based on traditional games, but we used the Eagle Book characters in them. We called one game <i>Coyote with the Stinky Feet</i> . We were thrilled when we were riding by the school, and some kids were outside playing our games! [Fitness specialist, Great Plains Tribe] |
| | We created songs to help African American children understand the importance of healthy eating and physical activities: "A plate full of color, fresh from the garden. Is too much sugar good for you? Oh, no! You wanna eat fruit and vegetables? You wanna drink water, not soda? You wanna play ball? Keep it away, keep it away, diabetes, keep it away!" [Lyrics by Dionne Ray and team, Jump-start on a Healthy Lifestyle, University of Maryland Eastern Shore] |
| Adopters reached across multiple organizations – strengthening and creating infrastructure that support | Everybody was working like crazy for the pilot! Performing arts did the play script. The culture program helped with the dance. University partners made shakers and built the garden boxes. Kids from the after-school program, 4-H, and Boys and Girls Club played the parts. Multimedia provided background music. And later, Communications took photos for our |

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Table 2. Major Themes, Subthemes, and Illustrative Quotes About the Eagle Books, 2006–2022

| Themes and subthemes | Quotes from the Eagle Books case study, evaluation studies, and the media |
|---|---|
| Eagle Books' uptake. | at-home activities. [Southern Plains Tribe Eagle Books program] I make sure copies of Eagle Books are in the library and family resource center. The center is cozy with couches and a TV. And every year I give copies to new kindergartners, too. [School librarian, Midwest Woodlands Tribe] I'm a member of the wellness committee, so I worked with the clinic to develop their walking literacy trail for the primary school. And I work with Head Start and the school's smart snack program. I'm always looking for materials relevant to Native culture and ways to introduce words from our language into the lessons. [Director, Midwest Woodlands Tribe Language and Culture Commission] I invited anybody interested in health, American Indians, students, food banks, public health, Native health centers, the College of Education, the Cultural Center, the College of Agriculture, and people interested in art, literacy, and nutrition. I wanted to build a partnership — an internal team — that would last. With TOCA [Tohono O'odham Community Action], we did that. [Associate Director of Education, Arizona State Museum] |
| Major theme 2: The Eagle Book stories are culturally meaningful. | |
| The Eagle Books fit cultural traditions of storytelling. | Storytelling is a big part of our culture. And our matriarchal structure is reflected in the books' references to Mother Earth. These [teachings] are heavily emphasized in our cultural program. [School teacher, Southeastern Tribe] Our tribal members believed there was a need for diabetes prevention education for children — education that included interaction between generations and traditional storytelling. [Health educator, Southeastern Tribe] The books fit with the tribal cultural practice of storytelling, and they are intergenerational . . . having elders reach out to the younger members of the community. [Project DESTINY, Midwest Woodlands Tribe] Storytelling is an effective means for educating children because storytelling crosses individual, cultural, and educational differences more powerfully than other types of teaching methods. [V.Z., Jump-start on a Healthy Lifestyle, University of Maryland, Eastern Shore] |
| The Eagle Books are culturally sensitive and relevant. | So, thank you, God. Finally, something that has relevance and meaning for our children to relate to. [Director, Language and Culture Commission, Midwest Woodlands Tribe] We are thankful for the books' culturally sensitive presentation of type 2 diabetes that reduces children's anxiety about getting diabetes. [Health Department, Great Plains Tribe] Head Start's lessons about ancestral traditions include health and nutrition messages that we connect with the Eagle Books. They fit with the tribe's cultural program that takes students to our fishing site to teach about traditional fishing and health benefits of traditional foods. [Head Start Education and Disabilities Coordinator, Alaska village] |
| The Eagle Books support parents' traditional teachings for their children. | This series of books — it says that the eagle has come to visit. The power of our prayers, every time we use an eagle bone whistle, every time we pray with that feather, you know it goes somewhere. When people need healing, the eagle comes back. This is powerful. [Great Plains Tribe parent] I can see how the books interact with our own teachings. When it talks about telling stories in winter. We identify that with ourselves. Things that have meaning to us, somebody that looks like us. [Great Plains Tribe parent] The eagle talked about Mother Earth. Mother Earth has meaning for our family. My daughter's friend came over and said, "Who is Mother Earth?" But in our family, it means a lot. [Southern Plains Tribe parent] |
| The Eagle Books are relevant in communities with different cultural elements and settings. | The one criticism I heard was that [the books] did not speak directly to Alaska Natives. No bison in Alaska — it's caribou and moose. But most kids can make the transition. Eagles are here and fish are here, and it is relevant . . . because of the skin coloring and speech pattern. [Community educator, Alaska village] Even though some of the tribal elements are different from our tribe, we can relate to it. Some of the characters may be different as far as our traditional stories are concerned, but I really appreciate them. They speak to the values that are important to us. [Health Clinic Wellness Manager, Alaska village] In the books, the rabbit is a positive, supportive character. In our tradition, rabbits, seen as tricksters, are different. In our culture, the panther is sacred, and the eagle is negative. Despite these differences, teachers are overwhelmingly supportive of the books. [Culture Program teacher, Southeastern Tribe] |
| Major theme 3: The Eagle Books explain type 2 diabetes in relatable ways. | |
| The Eagle Books explain type 2 diabetes and how to prevent it in a way children can understand. | Most children have heard of diabetes because someone in the family has it. Until the Eagle Books, they didn't really understand. It was something that just happens to them. Now they know how they can keep from getting it. [Diabetes educator, Great Plains Tribe] <i>Through Eyes of the Eagle</i> talks about diabetes in a way that was powerful and easy for kids to understand. It would have been hard to explain diabetes to kids without these books. [Boys and Girls Club, Southeastern Tribe] The books provide a friendly way to introduce the word "diabetes." [Early Childhood Center's Head Start, Alaska village] |

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Table 2. Major Themes, Subthemes, and Illustrative Quotes About the Eagle Books, 2006–2022

| Themes and subthemes | Quotes from the Eagle Books case study, evaluation studies, and the media |
|---|--|
| | <p>Everybody would like these books because we need to stay healthy – nothing good would happen if we aren't healthy. All the good food comes from nature . . . but the bad food is made by some person. [3rd grade child, Southern Plains Tribe]</p> <p>Educators as well as health professionals were floored – how do you explain type 2 diabetes in a way that is not complex that children in elementary grades can understand? Eagle Books provided a way to do that. [Project DESTINY, Midwest Woodlands Tribe]</p> |
| <p>“Sometimes” and “everyday” food concepts are easy for children to remember.</p> | <p>My mom tried to give me a brownie, but I wanted something healthy. I knew it was a “sometimes” treat and I told her. [Great Plains Tribe child]</p> <p>My dad got this type of apple and then he got some caramel and sliced the apples, and he dipped the apples in there. Is that caramel good for us? I thought about it, and I think it is a “sometimes.” [Southern Plains Tribe child]</p> <p>A tribal employee said her son still talks about our program after two years. She made brownies and he was telling how they were a “sometimes” food and he wasn't going to eat them! [Health educator, Southern Plains Tribe]</p> |
| <p>Major theme 4: The Eagle Books' colorful pictures impact messaging.</p> | |
| <p>The Eagle Books pictures are an integral part of the health messages.</p> | <p>It means so much to have a beautiful book to physically hold, and you can curl up in your mother's or father's lap. [Southern Plains Tribe parent]</p> <p>The books made me want to eat carrots and healthy food because of the pictures. [Southwestern Tribe child]</p> <p>The children were just taken in by the pictures. [3rd grade teacher, Great Plains Tribe]</p> |
| <p>The vivid colors in the Eagle Books make health messages more memorable.</p> | <p>The colors made a big impression. Someone told me their daughter came home and was talking about the colors of the vegetables and she wanted to make sure they had different colors [to eat]. [Health educator, Southern Plains Tribe]</p> <p>Miss Rabbit said that type 2 diabetes can get you sick. She said you need to eat fruit and try different colors. [Southern Plains Tribe child]</p> <p>When <i>Plate Full of Color</i> came out . . . when we went to lunch, they would brag, “Look at my plate, it's colorful.” [Middle school teacher, Midwest Woodlands Tribe]</p> <p>The thing that stuck with my kids is the colors, all the colors of the fruits and vegetables. They just liked to look at the different colors of all the healthy fruits. [Great Plains Tribe parent]</p> |
| <p>Major theme 5: The Eagle Books' action imagery promotes children's interpretation and activity.</p> | |
| <p>Children interpret and act on the Eagle Books' messages.</p> | <p>The eagle was sad because he didn't see the children playing outside, and they didn't go play like they are supposed to . . . like they used to. [Great Plains Tribe child]</p> <p>Mr. Eagle wants me to go outside and play with dinosaurs! [Great Plains Tribe child]</p> <p>You got to play games with other children like basketball that will keep you healthy. [Great Plains Tribe child]</p> <p>My kids came home from school and said we have to move! [Southern Plains Tribe parent]</p> <p>There was one part of the story where the eagle told Rain that Dances about how our people lived a long time ago. Although it was a hard life with all the hard work, they were healthy. Now our lifestyle has changed so much, our elders are ill with diabetes. [4th grader, <i>USA Today</i>, 2006]</p> |
| <p>The Eagle Books' action imagery promotes physical activity.</p> | <p>There were dancers in the books, and my kids dance, so they connected with it right off. [Great Plains Tribe parent]</p> <p><i>Knees Lifted High</i> was good for [my daughter] because she realized she should be running around and being outside. After reading that book, she would talk about exercising and what we need to do to keep healthy. If we had music on or something, she would dance. She'd be like, “This is good for you!” [Midwest Woodlands Tribe parent]</p> <p>My kids like it. That is all they are interested in is the exercise. I've got a stationary bike at home and they're like, “Dad, look at me!” And upstairs, on the mattress, they're doing sit-ups. [Midwest Woodlands Tribe parent]</p> <p>They don't play video games as much anymore and they [the video players] get dusty. They would rather be outside running around. [Midwest Woodlands Tribe parent]</p> |
| <p>Major theme 6: The Eagle Books promote cultural identity.</p> | |
| <p>Native children recognize themselves in the Eagle Books.</p> | <p>A father came up to me and said, “My son loves these books because the little boy has long hair and his son had long hair, which was not the norm at his school. The children physically identify with the characters.” [Health educator, Southern Plains Tribe]</p> <p>They are at an age where they notice differences between them and other kids. It helps them to identify more. Little brown kids that look like them. [Midwest Woodlands Tribe parent]</p> <p>Rain is like me. He figures things out like me and is nice to friends, like me. [5th grader, Southern Plains Tribe]</p> |

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Table 2. Major Themes, Subthemes, and Illustrative Quotes About the Eagle Books, 2006–2022

| Themes and subthemes | Quotes from the Eagle Books case study, evaluation studies, and the media |
|--|---|
| The Eagle Books portray contemporary life and traditional values. | Our teachers liked that the books show present day, modern Native children. It does not give the impression that all this happened forever ago. [Project DESTINY, Midwest Woodlands Tribe] |
| | Just look at the pictures. The kids are in ball caps turned backwards. It would be unrealistic for these kids to be in traditional moccasins. Our families have those and wear them, but they have their little sneakers with bright stripes, too. That is what's real to them. [Head Start coordinator, Alaska village] |
| | The activities look like our kids and the kids look like us – the families relate to these stories. [Head Start coordinator, Alaska village] |
| | Rain that Dances is a normal kid who does what modern kids do. [Southeastern Tribe child] |
| The Eagle Books inspire cultural pride. | The kids feel proud when they read the books. They show pictures of kids that look like them, dress like them, play like them. [Elementary school teacher, Great Plains Tribe] |
| | The books are excellent. We now have books we can use in the classroom that have positive images of Native Americans – books for children! [3rd grade teacher, Great Plains Tribe] |
| | I thought it was really cool because there were Indian kids in the books. The kids really liked it because it was Indian kids and they said, "We're Indian!" [Great Plains Tribe parent] |
| | Parents said that they felt proud to share books with their kids, that their children could relate to the characters. The eagle and coyote are favorites because animals figure prominently in our tribal stories and culture. [Great Plains Tribe parent] |
| Major theme 7: The Eagle Books support health literacy. | |
| The Eagle Books are used to promote literacy. | We used the Eagle Books in our family program to promote literacy and nutrition. Students and families attended a read-aloud program where the principal dressed as an eagle and read the books. They shared a healthy meal, and we gave them books to take home. [Health educator, Alaska Tribe] |
| | We have been using Eagle Books as part of Head Start's family literacy initiative. We have been able to engage the parents. The parents get instructions and 4 copies of the Eagle Books every year. They are asked to read the books to their children. [Head Start teacher, Great Plains Tribe] |
| Parents are engaged in their family's health literacy. | We would stop reading and I would point out things like the video games, the pop, and the "sometimes" foods. I stopped at the part about the boy who didn't like vegetables and said, "Do you see yourself? Well, just try a little bit [to taste foods] like he did." [Great Plains Tribe parent] |
| | He likes us to tell stories before he goes to bed. So, we make up stories about a wolf or a dinosaur. Sometimes we bring in the eagle or the coyote and put in something about healthy eating. Just to remind him. [Great Plains Tribe parent] |
| | The school has family fun night which we go to once a month. You get to eat dinner. They have raffles so kids and parents can win a raffle. They took the Big Eagle Books and put them up in the hallway, gym, and cafeteria. You got to walk through the school and read the books with the kids. We got our first set of Eagle Books in Head Start [Midwest Woodlands Tribe parent] |
| Major theme 8: The Eagle Books support pre-K reading readiness. | |
| Pre-K children play with the books, look at the pictures, and make up their own stories. | Kids love the pictures and know the characters. They make up their own stories about the books . . . which really helps their interest in reading. [Head Start teacher, Great Plains Tribe] |
| | The children play with the books so much that they tear. I've taped and stapled them back together many times. Then I re-order copies. [Head Start coordinator, Great Plains Tribe] |
| Pre-K children like the bright colors and know the roles of the characters. | The 3- to 4-year-olds are drawn to the bright colors, and they understand the role of the characters in teaching them what is healthy and unhealthy. They know the coyote cannot be trusted. He tries to get them to eat unhealthy foods. [Head Start teacher, Great Plains Tribe] |
| Major theme 9: The Eagle Books support children's sense of comfort and safety. | |
| The Eagle Book help children feel better about themselves. The Eagle Books help to discuss diabetes in hopeful, not scary, ways. | The program uses Eagle Books to build resilience through activities related to traditional hunting and healthy food gathering. [Community college educator, program for troubled middle schoolers, Great Plains Tribe] |
| | I have a 5th-grade volleyball team. A lot of girls are overweight, and some are Native girls. They were quiet and kept to themselves. I was able to pull them out of their shells during Eagle Books lessons. [Fitness specialist, Great Plains Tribe] |
| | The Eagle Books are used in acanthosis nigricans screening. Health department staff noted the books' sensitive presentation of type 2 diabetes helped reduce children's anxiety about being screened. [Health Department, Great Plains Tribe] |
| | Rain and his friends support each other. I would like to have friends like that. [Great Plains Tribe child] |

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Table 2. Major Themes, Subthemes, and Illustrative Quotes About the Eagle Books, 2006–2022

| Themes and subthemes | Quotes from the Eagle Books case study, evaluation studies, and the media |
|---|---|
| | The Eagle Books gave us permission to talk about diabetes in a storytelling way – simple, but accurate and hopeful – rather than talking about a terrible, scary disease. [Project DESTINY, Midwest Woodlands Tribe] |
| Major theme 10: The Eagle Books appeal to diverse populations. | |
| Non-Native children relate to the Eagle Books. | I brought them to read to my grandchildren We talked about the coyote being the trickster. [Non-Native community librarian noting that all children seemed to identify with the books' characters, whether Native or not, Midwest Woodlands Tribe] |
| | My son was introduced to the books when he was in the child development lab at the university. I read them to his class and the children just surrounded me because they were so captivated by the artwork. [Non-Native educator, Southern Plains Tribe] |
| | Seeing the characters life size; they are in awe every time they see Mr. Eagle. [Health educator, referring to multi-ethnic classrooms, Southern Plains Tribe] |
| | Our family has read all 4 books. We are Latino, but we can relate to the books' messages because a grandfather has diabetes. [Mother and grandmother, Tucson, Arizona] |
| | These children are brown like mine. [African American teacher remarking on Eagle Books' art, Jump-start on a Healthy Lifestyle, University of Maryland, Eastern Shore] |
| Programs serving multiple populations use the Eagle Books. | I have never seen anything like the Eagle Books. We have never had anything this colorful to keep kids' attention, nothing so engaging. Many of our materials for kids are simplified versions of adult materials. Just the facts, no story, no characters, no engagement. [Staff member, American Diabetes Association of Tucson] |
| | The exhibit was a way for us to connect the Eagle Books with our global perspective, in a way that would appeal to kids of all ages. [World of Words Library staff, College of Education, University of Arizona] |
| | Combining the Eagle Books series stories with music, dance, visual tools, magic tricks, and gardening was inspiring and helped Head Start teachers and caregivers at school and at home better understand the message of healthy lifestyle conveyed by the Eagle books." [V.Z., Jump-start on a Healthy Lifestyle, University of Maryland, Eastern Shore] |
| Major theme 11: The Eagle Books encourage children as change agents. | |
| No one can get communities to change faster than our children. | One aspect of Native communities is all powerful – our children. No one can get Indian communities to change faster. [L.D.C., Tribal Council, Great Plains Tribe] |
| | Let the kids teach the elders, and they won't know they're learning. The kids won't even know they're being the teachers. [Librarian, Midwest Woodlands Tribe] |
| | The children are the teachers in their own innocent, honest ways. [Healthy community program staff, Southwest Tribe] |
| Children teach their parents about eating healthy. | My child learned from the books, then turned on me about my habits. "Mom, that's not good!" She brought the books to me. I said, "Why are they trying to teach you when you are so little?" She said, "To be healthy!" [Great Plains Tribe parent] |
| | You know on Mother's Day where it's "I love my mom because?" Well, my youngest son wrote, "I love my mom because she gives me healthy food to eat." [Midwest Woodlands Tribe parent] |
| | My kids look through the cupboard. They say, "Now this isn't healthy, but this is healthy." They are always asking me if something is healthy for them. [Midwest Woodlands Tribe parent] |
| | When I was reading it to my kids, they were getting after me about getting out and moving around. I think I got more of it than they did! [Great Plains Tribe parent] |
| | I was drinking my soda on my couch, and my child said, "Mr. Eagle said soda is not good for you. You will get diarrhea." He meant "diabetes." [Jump-start on a Healthy Lifestyle parent, University of Maryland, Eastern Shore] |
| Older children teach the younger children. | My daughter didn't read it to me, she talked about it, page by page, telling me about it. My son read it to her because she is only in kindergarten. [Southern Plains Tribe parent] |
| | When one of the high schools was doing the high school DETS [Diabetes Education in Tribal Schools] lessons, the kids would take the Eagle Books and go teach the little kids. [Project DESTINY, Midwest Woodlands Tribe] |
| | [The program] worked with the high school's youth leadership program, taking diabetes prevention messages into the pre-K through middle school. They used the Eagle Books [to describe] type 2 diabetes. [Health educator, Southern Plains Tribe] |

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Table 3. Four Studies Representing Three Programs That Used Quantitative Measures to Evaluate the Effectiveness of Eagle Books

| Program | Source | Participants | Intervention/Methods | Results |
|--|---|---|--|---|
| Diabetes Education in Tribal Schools (DETS) curriculum | Dodge-Francis et al (35) tested the salience of Eagle Books for teachers and students in tribal communities as part of the DETS K-4 curriculum. | 385 students in grades K-4; 25 teachers in 12 states: Alabama, California, Florida, Kansas, Michigan, Minnesota, New York, North Dakota, Oregon, South Dakota, Washington, and Wyoming. | Intervention: classroom use of Eagle Books as part of the DETS K-4 curriculum components. Evaluation: postcurriculum surveys administered to students (in class; yes/no questions) and teachers (web survey) from 2007-2008. | 92% of students reported that they liked the Eagle Books and said they were “fun to read.” 100% of teachers (via web survey) agreed that stories support lesson content. |
| Eagle Adventure ^a | Stovall-Amos et al (41) evaluated a USDA SNAP-Ed program using the Eagle Books to address food and physical activity choices, with the goal of preventing type 2 diabetes and obesity among children in tribal communities. | 370 students in first and second grade in 2 schools in Oklahoma | Intervention: semester-long curriculum included scripted-reading play focused on Eagle Book characters; 4 in-school lessons (including Eagle Books) led by Get Fresh! health education staff; daily announcements to reinforce messaging; and Nestwork, which included health homework and the Eagle Books. Evaluation: paired <i>t</i> tests, based on pre-post Likert-scale surveys, determined mean differences in students’ food choices/preferences and physical activity choices, knowledge, and preferences; yes/no responses determined student’s acceptance of program components and participation in take-home activities. | Postsurvey, students had significant increases in choice of healthy food over less healthy food, vegetable preference, and choice of physical activity over sedentary behaviors. The most significant increases were seen in the physical activity measures: The mean (SE) presurvey food choice score of 6.93 (0.07) was significantly less (<i>P</i> = .002) than the postsurvey of 7.15 (0.06). The mean (SE) presurvey vegetable preference score of 6.35 (0.08) was significantly less (<i>P</i> = .001) than the postsurvey score of 6.56 (0.07). The mean (SE) presurvey physical activity choice score of 6.52 (0.07) was significantly less (<i>P</i> < .001) than the postsurvey score of 7.11 (0.06). 90.8% of students reported they saw the Eagle Play; 95.6% liked it. At home, 78.3% read or asked a caregiver to read the Eagle Books; 64.5% asked a caregiver to buy more fruits and vegetables; 62.1% did the Eagle song and dance; 69.3% played an Eagle game; 66.1% did Nestwork. |
| Eagle Adventure ^b | Fox et al (42) further evaluated the USDA SNAP-Ed program using the Eagle Books to address food and physical activity choices, with the goal of preventing type 2 diabetes and obesity in children in tribal communities. | 494 students in grades 1-3; 113 caregivers in Oklahoma | Intervention: same as described by Stovall-Amos et al (41). Evaluation: paired <i>t</i> tests used to determine significant differences (<i>P</i> < .01) in students’ food and physical activity preferences and desirability. Postsurvey for students reporting yes/no responses to take-home activities; and Likert-scale postsurvey for caregivers reporting “more often,” “less often,” and “about the same” for children’s eating and physical activity behaviors, and yes/no responses to family participation in take-home activities. | Student’s food preferences and desirability over less healthy foods; physical activity preference and desirability over sedentary behaviors^c: Mean (SE) presurvey food preference score of 6.4 (0.07) (<i>n</i> = 484) was significantly less (<i>P</i> < .001) than the postscore of 6.9 (0.06). The mean (SE) presurvey food desirability score of 10.0 (0.06) (<i>n</i> = 488) was significantly less (<i>P</i> < .001) than the postscore of 10.3 (0.6). The mean (SE) presurvey physical activity preference score of 6.2 (0.07) (<i>n</i> = 491) was significantly less (<i>P</i> < .001) than the postscore of 6.8 (0.06). And the mean (SE) presurvey physical activity desirability score of 8.4 (0.06) (<i>n</i> = 487) was significantly less (<i>P</i> < .001) than the postscore of 8.7 (0.06). Participation in take-home activities: 68% of students indicated that they and their families read the Eagle Books at home; 67% asked |

Abbreviations: DETS, Diabetes Education in Tribal Schools; SNAP-Ed, US Department of Agriculture Supplemental Nutrition Assistance Program-Education; USDA, US Department of Agriculture.

^a Chickasaw Nation Get Fresh! and partners, including Oklahoma State University, began development of Eagle Adventure in 2008.

^b The partnership expanded to include additional Oklahoma tribes after reorganizing in 2017 as Oklahoma Tribal Engagement Partners.

^c Food and physical activity desirability reflects the social desirability (culturally relevant and meaningful) of foods and physical activities presented in the Eagle Play.

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Table 3. Four Studies Representing Three Programs That Used Quantitative Measures to Evaluate the Effectiveness of Eagle Books

| Program | Source | Participants | Intervention/Methods | Results |
|---|---|--|--|--|
| | | | | <p>caregivers to buy fruit; 50% asked caregivers to buy vegetables; 52% did the Eagle Books song and dance; 60% played an Eagle Books game; 67% did Nestwork.</p> <p>Caregivers' observations of children's shopping and eating behaviors: Caregivers reported 56% of children more often helped to buy food; 71% more often asked a caregiver to buy fruit; 51% less often asked to buy candy, soda, or sweets at the store. Caregivers reported 52% of children more often eat fruit at lunch; 57% more often eat fruit for a snack; 56% more often eat a vegetable at dinner.</p> <p>Caregivers' yes/no responses to their at-home activities: 52% made Eagle recipes; 70% did moving activities; 84% read Eagle Books with family.</p> |
| Jump-start on a Healthy Lifestyle, University of Maryland Eastern Shore | Zoumenou et al (43) evaluated the effectiveness of the Jump-start on a Healthy Lifestyle curriculum, incorporating the Eagle Books to teach African American children about type 2 diabetes prevention and healthy choices. | 100 students in pre-K, grades K-3, and 40 extension nutrition educators, Head Start, and elementary school teachers in Maryland, Eastern Shore | <p>Intervention: after 1- or 2-day training sessions, educators implemented Jump-start on a Healthy Lifestyle, a nutrition and physical activity education curriculum, including weekly readings of the Eagle Books during 5-week summer camps.</p> <p>Evaluation: pre-post Likert-scale surveys administered to students.</p> | <p>Postsurveys reported intent to choose healthier eating and physical activity: Elementary student preference for oranges and apples increased significantly by approximately 100% ($P < .05$) in the postsurvey. Preference for fries and cookies decreased significantly by more than 75% ($P < .05$).</p> <p>Elementary students' choice of video games over exercise decreased from 23% to 5% in the postsurvey.</p> <p>Students increased diabetes knowledge: Elementary students choosing "Diabetes is when you have too much sugar" increased from 43% to 72% in the postsurvey. Understanding that both exercise and eating fruit and vegetables "keeps away diabetes" increased from 15% to 60%.</p> <p>Gardening activities: 87% of elementary students increased knowledge of planting processes and origins of food.</p> <p>Teachers provided pre-K observational data: Children remembered names of characters, the stories, and Mr. Eagle messages about children trying different foods and moving their bodies.</p> |

Abbreviations: DETS, Diabetes Education in Tribal Schools; SNAP-Ed, US Department of Agriculture Supplemental Nutrition Assistance Program-Education; USDA, US Department of Agriculture.

^a Chickasaw Nation Get Fresh! and partners, including Oklahoma State University, began development of Eagle Adventure in 2008.

^b The partnership expanded to include additional Oklahoma tribes after reorganizing in 2017 as Oklahoma Tribal Engagement Partners.

^c Food and physical activity desirability reflects the social desirability (culturally relevant and meaningful) of foods and physical activities presented in the Eagle Play.

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TOOLS FOR PUBLIC HEALTH PRACTICE

Practical Strategies for Health Equity Researchers to Enhance Analytic Rigor and Generate Meaningful Insights From Qualitative Data

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PEER REVIEWED

Summary

What is already known on this topic?

Integrating qualitative methods in study designs allows researchers to understand the relationships and contexts that influence health.

What is added by this report?

As more health equity researchers employ qualitative methods in their study designs, there is a need for additional pragmatic guidance on how to conduct robust and rigorous qualitative data analyses. We offer a 4-step strategy for analyzing qualitative data and discuss health equity implications for each strategy.

What are the implications for public health practice?

These strategies will guide those who are less experienced in qualitative methodology to use a pragmatic approach to analysis that is sound, reasonable, and produces meaningful insight.

Abstract

Researchers and public health practitioners increasingly need to leverage diverse methodologic approaches in health equity research that will lead to innovations in the assessment of health inequities and development of interventions to decrease health inequities. One well-suited approach is the use of robust qualitative methods (alone or in combination with quantitative methods). As more health equity researchers employ qualitative methods in their study designs, additional guidance is needed on how to conduct robust and rigorous qualitative data analyses. We share a 4-step analytic strategy for health equity researchers and practitioners — particularly those with limited training in qualitative data analysis

— that can be used to effectively execute qualitative analysis to inform health equity-driven efforts. These strategies will guide those less experienced in qualitative methodology to employ a pragmatic approach to analysis that is sound, reasonable, and produces meaningful insight that can be used to inform efforts to advance health equity for communities with the greatest needs.

Introduction

Qualitative methods use nonnumerical or nonstatistical processes to explore human behavior and experiences in context as well as complex social-level and structural-level phenomena, including the social production of health (1–3). Because health equity-driven research prioritizes eliminating socially unjust differences in health such that all have equitable access to resources, quality health care, and opportunities to be healthy, qualitative methods are an important tool in the health equity researcher’s or practitioner’s toolbox. Employing qualitative methods (alone or in combination with quantitative methods) offers opportunities to produce new insights into the sources of health inequities (4–6) and leads to innovations in multilevel intervention development to decrease health inequities (1,5,7).

Major public health funding bodies encourage researchers to propose study designs that integrate qualitative and quantitative data (8). Integrating qualitative methods in study designs allows researchers to develop a more nuanced and holistic understanding of relationships and contexts that influence health than quantitative methods alone can (1,8). As more researchers and practitioners employ qualitative methods, there is a need for accessible and straightforward guidance on how to analyze and identify meaning within qualitative data, particularly among those without formal training in qualitative methods. Understanding qualitative data is especially needed within the context of health equity research, in which qualitative methods may be a primary source of information about how and why inequities exist and what people think should be done to advance health equity for their communities.



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Considerable time and effort are required to develop expertise in qualitative analysis; however, time and resources may be limited for those working in health equity–focused research and public health practice. Therefore, we share an overview of a systematic, yet pragmatic, qualitative analysis approach to explore phenomena in context, elevate voices of those affected by health inequities, and inform health equity–focused interventions and related efforts. We will not delve into additional details on the use of qualitative methods for health equity research, assessment, and evaluation (for a recent review, see Shelton et al [5]). Our pragmatic process follows some of the analytic strategies of applied thematic analysis (9) and other approaches popular in the health sciences, such as constructivist grounded theory (10) and phenomenology (11). Definitions of key terms are provided in Table 1.

Analytic Strategies and Health Equity Implications

We provide a set of analytic steps that we have each applied to multiple qualitative data sources, including data from semistructured and unstructured interviews and focus groups (eg, data in the form of audio files and verbatim transcripts), participant-observation and ethnography (eg, data in the form of field notes), narratives (eg, data in the form of written or published text), and photovoice (eg, data in the form of photos and oral or written analysis of photos). For simplicity, we will focus on analysis of verbatim transcripts herein. These steps can be applied using computer-assisted qualitative data analysis software (CAQDAS; eg, NVivo [QSR International], MAXQDA [VERBI GmbH], Atlas.ti [Atlas.ti Scientific Software Development GmbH], Dedoose [SocioCultural Research Consultants, LLC, 12]); or basic word-processing software and spreadsheets (13,14). A summary of each analysis step and the estimated timeline for completion are provided in Table 2.

The analytic steps outlined herein are a team-based process. We firmly believe in involving diverse research teams in health equity research broadly and in analysis specifically. This means diversity in terms of methodologic or practical training, social identity or position (eg, race, gender, class), or research profession (ie, when possible and germane to the study goals, both professional researchers or public health practitioners and community partners are involved in analysis).

Step 1: Memoing, Annotating, Jotting in the Margins

In the first step of the qualitative analysis process, team members write and apply analytic memos to the data, known as memoing (also referred to as annotating or jotting in the margins). Memos

are brief “notes to self,” capturing initial impressions of the data and salient ideas that may be analytic or reflexive (15). They are usually a few words or sentences and can be directly attached to the data by physically writing notes in margins on hard copy or by using electronic track changes features in software to identify important or salient ideas or thoughts. Writing is an important element of qualitative analysis; writing memos allows researchers to begin immersing themselves in the data from the outset by formulating initial ideas and impressions in narrative form, and it is an initial step in understanding the depth and range of participants’ thoughts, ideas, and expressions (15,16). Additionally, writing memos ensures that subsequent code development (step 2) is grounded in the data.

In this step, each team member is randomly assigned 1 to 2 transcripts to memo. When timelines are very tight, research teams may elect to memo only a subset (eg, 15%–20% of transcripts) of randomly selected or purposefully selected transcripts for maximum variation across data or participant types. Ideally, all transcripts will be memored by a member of the research team.

Implications for health equity

Understanding lived experiences and root causes of health inequities requires deep exploration and inquiry into complex, multilevel factors that may affect multiple domains of a person’s or community’s health. Memoing helps the health equity researcher move beyond simply identifying and applying a priori or index codes (ie, predetermined codes) and enables researchers to be open to the direct lived experiences, thoughts, and ideas that are directly voiced or conveyed by participants. In addition, reflexive memoing can be used by health equity researchers as a process to reflect on their position regarding the research topic and communities of focus, relationship to participants, biases, and power balances that might affect the analysis process and findings generated.

Step 2: Compile Annotations and Develop Codebook

After memoing, or a first pass of writing memos (some researchers memo throughout the analysis process, including during coding [step 3]), is complete, analytic memos can be compiled into a list to inform the identification of codes and development of the codebook. Word processing or CAQDAS can be helpful to easily output the memos into a single document. Reflexive memos may or may not be appropriate to include in this list, depending on the goals of the analysis. Once the memos are in a single document or list, a single researcher or multiple research team members read through the memos and reduce them to a few central words or

short phrases that capture the essence of the memo. We recommend retaining a copy of the memos in their original form, which may be useful at later stages of analysis.

Research team members then read the reduced memos to identify key ideas and group them into “buckets” that are linked through a central idea. This process will inform the development of codes to organize and categorize segments of the data. Codes can be organized in a codebook, with each code represented by a descriptive word or phrase characterizing its meaning. Note that codes are not themes. Codes are simple, descriptive ideas. They are not higher-level concepts based on identified and interpreted patterns in the data. Codes are in service of identifying themes (16). Many researchers conflate these 2 concepts.

Depending on the goals and complexity of the analysis, codes may have a hierarchical structure in which codes are organized within code families of similar topics or ideas or into more fine-grained subcodes. The overall purpose of codes is to organize and categorize segments of data such that main ideas can be identified, interpreted, and shared (step 4b). A practical codebook will include names and definitions for each code and example quotes taken from the data that illustrate when codes should be applied. Often, details will include when to use and when not to use a code. The more detailed the codebook, the easier it will be for those applying codes to do so consistently and reliably.

Research team members should collaboratively develop codes and draft and refine the codebook (eg, clarify definitions, ensure codes are mutually exclusive, ensure code names are sufficiently descriptive). Codes directly informed by memos or reading of the data are referred to as inductive codes (ie, grounded in the data). However, researchers often have predetermined concepts they want to capture based on conceptual or theoretical frameworks, interview or focus group questions, prior research, or research questions or study aims. Codes based on these predetermined concepts are referred to as deductive codes, a priori codes, or index codes and tend to capture more general ideas than inductive codes. Most codebooks will include both inductive and deductive codes.

As with all analytic phases, openness to multiple iterations for refinement is needed. Another consideration among research teams is the level of coding that is needed for a given project. Although there is no predetermined number of codes appropriate for any given project, teams must decide if the analysis requires macro-level coding (codes that capture broader characterizations) or more detailed and specific codes or subcodes.

Implications for health equity

This step is an opportunity to leverage existing health equity–related frameworks, theories, or models to identify additional codes

or code families and to guide the subsequent analytic processes. If researchers aim to understand how a certain health equity–related theory applies to or is aligned with the data, they might use constructs of that theory as codes (or to frame or categorize themes [step 4]). By using in vivo codes (a type of inductive code that use verbatim words or phrases from the data), however, the analysis is grounded in participants’ perspectives and retains their original words and language. Additionally, code development may be an initial step to inform new theory development or refinement when existing theories do not adequately capture relationships found in the data. For example, individual-level health behavior theories are often insufficient when examining a research question with an equity lens. Inductive coding can help researchers uncover multi-level factors that contribute to a person’s ability to enact behavioral change, resulting in theoretical frameworks that consider social and other external factors that affect equitable outcomes.

Step 3: Coding Data

Coding is the process of organizing data by attaching codes to relevant segments of text. We liken this to placing a sticky note on parts of the transcript to flag it for later retrieval. Transcripts (and other documents, such as photos) can be coded with CAQDAS or word processing software and spreadsheets (13,14). Once the data are coded, researcher(s) can then retrieve and review the coded text segments to identify the higher-level concepts across the data (themes). Research teams typically have at least 2 people, referred to as “coders,” who code transcripts, especially when there is a large amount of data.

Selecting text segments or codable units

An important consideration before coding is to determine what will be considered a codable unit. A codable unit is a discrete segment of text to which codes are applied. A common coding mistake is inappropriate determination of a codable unit (or a lack of training for the coders on what to code). When coding text, a codable unit must make sense when standing alone. It is often unhelpful for coders to select a few words or even a single sentence that does not encapsulate meaningful context as a codable unit because it will be difficult to interpret when reducing data (step 4a) and identifying themes (step 4b). For example, the research team may decide that a complete thought is considered a codable unit (which could be a few sentences or paragraphs) or that an entire response to each interview question is a codable unit.

Coding reliability

Before coding data independently, it is common for 2 (or more) coders to both code approximately 10% to 25% of the data to assess how similarly they are applying codes; this is referred to as

intercoder agreement (ICA). If there is insufficient ICA, which means that coders are applying different codes to the same segments of text, there may be codebook issues to be addressed, such as unclear code definitions, missing codes, overlapping or redundant codes, or a need for more training. Once sufficient ICA is reached, coders may begin coding the remaining data independently. Best practice is for an experienced research team member to preselect codable units for the coders during ICA assessment (eg, by highlighting codable units before applying any codes). This will help coders learn what is considered a codable unit for the particular analysis and make it easier to assess coding reliability, because coders will each be working from the same point of reference (as opposed to potentially selecting and coding different segments of text).

Generally, there are 3 approaches to assessing ICA: subjective agreement, percent agreement, and statistical agreement, with debate about which, if any, is the most appropriate to use in qualitative data analysis (9,17,18) (for a useful overview of the debate, see O'Connor and Joffe [19]). Overall, the selected approach to assessing ICA will be driven by project goals, research team skill and access to analytic resources, philosophical underpinnings of the study, and feasibility — each of which may vary by study even if conducted by the same research team. We believe the goal of assessing ICA should be to generate research team dialogue and reflection that will inform codebook improvements and increase the coders' confidence and effectiveness in coding important segments of the data. This assessment should be considered a helpful process, rather than an end goal to "prove" the reliability of an analysis and subsequent findings.

To assess subjective agreement, coders simply compare and contrast their code applications across segments of text and identify instances of differing code applications. Discussion is used to determine which, if any, code application is right, then coders make adjustments to the codebook or their coding as needed (sometimes referred to as consensus coding). Mathematical calculations are not conducted in this assessment of ICA.

To assess percent agreement, a research team member tallies the number of instances in which coders applied the same code(s) to preselected segments of text. That number is divided by the total number of instances in which coders applied the same code(s) to preselected segments of text plus the number of instances in which coders applied different code(s) to preselected segments of text.

Statistical agreement extends percent agreement by calculating a statistic of code agreement accounting for chance. Some suggest statistical agreement is superior to percent agreement because it accounts for chance and as such, should be prioritized to assess coding reliability (19,20). However, we do not ascribe to this no-

tion for every study or research team. The most commonly used statistic is Cohen kappa (κ) and, more recently, Krippendorff alpha (α) (19). These statistics can be calculated by using multiple CAQDAS software programs as well as online calculators. For a free, detailed resource describing how to calculate and use these statistics, see Geisler and Swarts, chapter 5 (17). For a detailed application in applied public health research, see MacPhail et al (21).

Pilot or first round assessment of ICA

As described above, codable units should be the same and be preselected for coders. For first round ICA, 2 or more coders code an entire transcript or only half of a transcript — this is largely dependent on the amount of data. We suggest that when there are fewer than 20 transcripts, the coders may code half of a single transcript during this first round. The research team should predetermine the acceptable minimum standard for reliable ICA; 80% for percent agreement (scale of 0%–100%) and 0.61 for statistical agreement (scale of 0–1) have been identified as common minimum standards, although there is a lack of consensus on these standards (19). On the basis of this minimum standard, the research team can determine if coding is insufficiently reliable and thus codebook updates are needed (they almost always are) or if additional coder training is needed.

Second round assessment of ICA

Once the codebook is refined based on pilot or first round assessment of ICA, coders should code another full transcript (or portion of a transcript), recalculate ICA, and again discuss and implement any needed changes to the codebook in partnership with the broader research team. This process is typically repeated until sufficient reliability is achieved. Notably, sufficient ICA may be more difficult to reach with codebooks that contain a large number of codes and subcodes. However, that is not a reason not to include all necessary codes in a codebook. Coders should predetermine the code level for which they will determine agreement (eg, code family, subcode). Once sufficient ICA is reached, the remaining transcripts can be divided among the coders.

Implications for health equity

Journal reviewers or researchers who are less familiar with qualitative methods tend to rely excessively on the utility of ICA as an attempt to lend quantitative credence to qualitative methodology. Although assessing coding reliability is a useful analytic process that offers the opportunity for refinement to ensure that coding processes and the meaning of codes are valid, it is more important as an opportunity to engage in additional dialogue and reflection that can ensure a health equity stance in the analysis process.

Coding requires deep and focused attention to the data, which enables thorough insights, facilitates validity and transparency in interpretation of findings, is a vehicle for understanding participants' perspectives and identifying and discovering relationships, structures the data, and makes it accessible (22). All of these attributes are critical when seeking to understand the complex interplay of factors that affect health equity. Codes are important guideposts for team members as they discuss, distill, and seek to understand data during the analysis process.

Step 4: Data Reduction and Theme Identification

Step 4a: data reduction

Data reduction is a purely descriptive phase of the analysis process. Data reduction is taking a large amount of data (all data excerpts categorized by code) and distilling it to key distinct points that were conveyed by participants. To achieve this, the next step in the analytic process is to organize or group all coded text segments (ie, excerpts) by each respective code. CAQDAS or other specialized software allows researchers to easily export all coded segments for each code in desired formats (eg, Word, Excel, PDFs). One strategy for reducing data is for 1 or 2 team members to write data summaries for each code or code family by reading excerpts for each code from exported documents and narratively summarizing what was expressed by participants for each code or code family. This will result in data reduction, not in themes. Once summaries are completed, all team members read code summaries and collectively contribute thoughts and ideas for salient themes derived from the data. For quantitative data-oriented researchers, codes may be thought of as variables, excerpts as raw data, and summaries as descriptive results.

We recommend that researchers do not attempt to identify themes during the data reduction phase, although of course, some ideas will begin to form. This phase is only about reducing data before developing themes. Team members should have a thorough understanding of what was expressed by participants, independent of any given team member's thoughts about relationships and associations. This allows each team member to reflexively contribute their own thoughts and ideas related to concepts expressed and sets the stage for increased depth and range of ideas during the theme-generation phase. As with most phases of qualitative data analysis, summarizing results is iterative. For example, after examining initial written summaries, teams may decide that it is necessary to conduct additional data coding to get more granular details of a particular code or code family, or different research questions may require additional examination of a particular phenomenon.

Step 4b: theme generation and meaning-making

At this point, analysis moves from categorization to theme generation and meaning-making. Two key types of qualitative analysis goals should be considered in preparation for this step. The first is descriptive qualitative analysis, which aims to identify and detail the who, what, and where of events. In these analyses, researchers stay close to the data and do not aim to uncover processes or phenomena that are under the surface of the data or develop theoretical or conceptual models based on the data (23). The second is interpretive qualitative analysis, which aims to move beyond description of the data to uncover more complex processes or phenomena, often with the broader goals of developing or informing theoretical or conceptual models and answering research questions. Both descriptive and interpretive analytic goals are often applied to the same set of data; however, it is recommended that researchers identify the goals of their study well before analysis begins to determine whether goals of analysis are descriptive, interpretive, or both. Qualitative health equity research and analysis are often interpretive in nature, given the common goal of identifying root causes of health inequities.

Regardless of the analytic goal (descriptive or interpretive), moving from codes to themes is perhaps the most abstract and time-consuming phase of the analysis process. Sometimes researchers get bogged down with ensuring near perfect ICA when that energy and time is better spent on data interpretation and theme generation. Themes are high-level concepts based on patterns and linkages in the data — representing shared units of meaning connected by a central organizing concept or phenomenon (24,25). We conceptualize themes as the “a-ha,” “so-what,” or “big takeaway” of the data. Clarke and Braun (24) explain that themes differ from basic topic summaries of the data in that “themes [are akin to] key characters in the story we are telling about the data (rather than collection pots into in which we place everything that was said about a particular data domain)” (p. 108). Even a descriptive qualitative analysis should strive to move beyond simply reducing the data and grouping data into buckets (step 4a) to identifying higher-level themes across the data.

So how do researchers identify and detail the themes of their data? Strategies have been described in prior publications (16,26–28). Some key strategies involve identifying 1) repetitions across the data, though repetitions alone are insufficient to signify a theme; 2) metaphors and analogies in the data (this could be found in both the textual, coded data as well as in the analytic memos developed during step 1); 3) transitions in the data (ie, natural or intentional shifts in participants' comments or words that connect ideas or concepts such as “because,” “since,” “if,” or “then”); 4) similarities and differences across the data or multiple sources of data (ie, how a described experience or perspective is similar and different

across transcripts or across data from various sources such as interviews, focus groups, or observations); 5) missing data or “silences in the data” (ie, considering what was left unsaid or not mentioned in and across the data may shed light on topics that participants wish to avoid or that researchers may have thought would be relevant but were in fact not relevant for the participants); and 6) elements of or connections to established theory, which may help place the findings in a broader conceptual or theoretical context (9,26). In addition, it may be helpful to develop thematic networks or maps to visually connect ideas between higher-level organizing themes and more concrete ideas related to the theme (for examples, see Attride-Stirling [29] and Richards et al [30]). Some CAQDAS produce visualizations of relationships between codes or patterns in the data; however, simply drawing these networks or maps by hand is effective. Contrary to some methodologic discourse, we suggest themes do not “emerge” during qualitative data analysis (although we have each been guilty of using this language in the past), but rather are “*produced* by the researcher through their systematic analytic engagement with the dataset, and all they bring to the data” (18, p. 9) on the basis of their own experiences, personal identities and social positions, and training.

In our experience, the most helpful theme-generation process involves some or all of the steps described here plus multiple rounds of research team dialogue based on the coded data and code summaries in the context of the study aim(s). In this approach, research team members apply their own theoretical lenses and knowledge to the reduced data to discuss and identify themes. Moving from summarizing the data to identifying themes takes time, intellectual work, and makes some team members uncomfortable because it requires conceptual leaps that transform lived experiences to higher order concepts. However, just as we make conceptual leaps in quantitative analysis, the same is true for qualitative analysis.

Salient ideas are not necessarily the most commonly occurring; therefore, avoid equating frequency with importance. Ideas expressed by only 1 participant may be as important as ideas expressed by multiple participants. Likewise, a few participants may have discussed a particular idea in depth, resulting in a high frequency of a specific code, but that frequency of code may not indicate a meaningful high-level pattern or phenomenon. Some researchers working with qualitative data may choose to use counting or numbers when relevant for their analytic goals and audience, or when frequency has theoretical or practical meaning (31), but we suggest this be used carefully and sparingly.

Implications for health equity

Perhaps the most important function of qualitative research for the health equity researcher is the opportunity to elucidate and contex-

tualize lived experiences and social processes to inform intervention and program development, policy, evaluation, and theory. Those affected by health inequities are often prey to underrepresentation; a lack of understanding about their experiences; and the social structures, norms, and ideologies that perpetuate health inequities. Data derived from qualitative methods must accurately and appropriately describe conveyed experiences, and interpretations and implications of data must be thoroughly examined and considered among diverse research teams (eg, by discipline, social identity, training).

An important opportunity to apply the analytic processes we have outlined is within the context of community-based participatory research (CBPR) projects. CBPR has the potential to link research and action to advance health equity by authentically and equitably involving community partners in all aspects of the research process (32,33) (for examples of participatory qualitative data analyses, see Dill [34], Hebert-Beirne et al [35], and Switzer and Flicker [36]). Care should be taken to determine the extent to which community partners wish to engage in each step of the analytic process. Such involvement of community partners has the potential to ensure that findings are sufficiently grounded in the needs, ideas, and experiences of those affected by health inequities and that recommendations adequately reflect community priorities. At a minimum, if the analysis process itself is not participatory within a CBPR project, it should be done with “accountability to the community” (37, p. 851), such as sharing preliminary findings (often referred to as “member-checking” [38]) with community partners or other stakeholders to validate and offer additional considerations regarding researchers’ interpretations and recommendations to advance health equity through intervention development or policy making.

Beyond Analysis: Reporting Findings

Qualitative data analysis is iterative in nature, and the multiple steps involved, even if nonlinear, should be thoroughly described in publications and presentations of findings (including processes such as memoing, codebook development, testing and refinement, and approaches to theme generation) (39). Typically, researchers report findings by theme, including description and interpretation of the theme, and use verbatim excerpts (quotes) from the data to provide evidence for the theme and honor participants’ voices. Quotes should be edited only for clarity (it should be clearly noted when an excerpt has been edited) and must stay close to participants’ original words or phrases, because it is inappropriate to correct grammar or change a participant’s words. We caution against using too many quotes to support a theme, as a high volume of verbatim text can be cumbersome for a reader to digest — it is the researchers’ job to explain the theme for the reader, not

the reader's job to discern the underlying meaning of multiple quotes. For a resource on how to report findings for dissemination to various audiences, see Guest et al, chapter 10 (9); for a how-to on writing thematic statements to enhance presentation and translation of findings for public health and health sciences audiences, see Sandelowski and Leeman (27).

Applications of Analytic Process in Health Equity Research

The steps we have laid out are a foundation for a meaningful yet pragmatic analytic process, rather than a strict recipe for how to analyze qualitative data within the context of health equity research. Indeed, every project has different goals; thus, the application of these steps may vary considerably between projects, even those led by the same team of researchers or practitioners. In the Box, we provide brief examples of how this broad analysis process was applied to 2 studies focused on elucidating the determinants of and identifying solutions to health inequities affecting 2 different communities.

Box. Application of Analytic Process in Health Equity Research

In Exploratory Research

In 2017, J.K.F. led a community-based participatory research (CBPR) study in partnership with a group of young adult co-researchers to examine the experience of low-income young adults of color (various races and ethnicities, predominantly Black and Latinx) aging out of lesbian, gay, bisexual, transgender, queer, or questioning (LGBTQ) social services for youths (40,41). Our collaborative research team gathered multiple sources of qualitative data, including focus groups with youths and analyzed data by using an adaptation of analysis steps 1 through 4. This adaptation ensured the young adult co-researchers could actively participate in analysis by removing barriers to participation, such as lack of computer access or experience with computer-assisted qualitative data analysis software (CAQDAS). In turn, the research team could produce findings and recommendations with local validity.

Memoing verbatim transcripts (step 1) was neither appealing nor accessible to our collaborative research team, and as such might have alienated the young adult co-researchers from the analysis process. Instead, we listened to audio recordings of the focus groups and wrote notes about what we each found useful to answer the study's research questions between group meetings.

Then in collaborative analysis meetings, J.K.F. played preselected segments of focus group recordings most germane to the analytic goals of the study and asked the young adult co-researchers to verbally respond to the following questions: "What big ideas do we hear in this clip? What words or phrase might we use to categorize what participants are discussing?" (41, p. 116) — akin to verbal memos. These became the basis for an initial set of predominately inductive codes and definitions (step 2). After multiple rounds of discussion and code edits and adaptations, we manually applied codes to copies of the transcripts by highlighting text segments and writing in the margins (step 3), making coding decisions and iteratively editing the codebook as needed in real time — akin to subjective agreement (9). J.K.F. then applied the codes to the transcripts in CAQDAS Dedoose (SocioCultural Research Consultants, LLC). As a group, we re-

viewed hard copies of coded excerpts exported from Dedoose, narratively summarized key ideas for each code (step 4a), and used a thematic network approach to visually document connections between codes and identify the "so-whats" of the data (themes, step 4b).

We presented preliminary findings to the community, including clients and service providers at LGBTQ-serving organizations, local groups of youth leaders, and other researchers, in multiple settings and used their feedback to finalize themes and make recommendations. This process facilitated community participation in data analysis to inform actionable solutions to advance health equity for low-income adolescents and young adults of various races and ethnicities, predominately Black and Latinx, aging out of LGBTQ social services for youths.

In Intervention Development

Black women at risk for inherited genetic mutations that increase their chances of getting breast cancer are only half as likely to receive genetic counseling and testing as non-Hispanic White women, yet Black women are 41% more likely to die from breast cancer (42,43). V.H. and a research team developed a culturally responsive narrative intervention video for Black women with hereditary risk for breast cancer to facilitate decision making about genetic counseling attendance (44).

To inform content and development of the intervention, our research team recruited Black women with a family history of breast cancer from a previous study to participate in one-on-one qualitative interviews regarding personal beliefs and experiences related to breast cancer and breast cancer risk and participate in story circles regarding community and family-related experiences and beliefs about cancer. To analyze the data, our team developed deductive codes based on the Integrative Model of Behavioral Prediction (45) and inductive codes based on our team's analytic memos. After coding the data, our team reduced it by narratively summarizing coded excerpts and creating various data displays (matrices, networks, charts) that mapped onto our theoretical framework.

Themes from interviews and story circles were triangulated to detect commonalities, contradictions, and expansions. Themes from lived experiences and direct quotes shared during interviews and story circles were used to create the storyline, messaging, and educational content of the intervention video script. Our research team then conducted a series of multiple focus groups with additional cohorts of Black women with a family history of breast cancer, health care providers, and representatives from community-based organizations to get iterative feedback on scripts, storyboards, visual style and images, and the final video. Our team analyzed these data by using the same approaches as used for the interview and story circle data. The collection and analysis of these qualitative data resulted in an intervention that was culturally informed, responsive, and representative of Black women with increased breast cancer risk. This strategy can be applied to intervention development of decision aids that are aimed at mitigating inequities among any marginalized communities.

Conclusion

We have shared strategies that can be used to effectively conduct qualitative analysis and generate meaningful results to inform health equity-related efforts. These strategies may be particularly useful for less-experienced health equity researchers and practitioners. Participants in health equity-focused qualitative and mixed methods studies give of their time and energy, often sharing intimate details of their needs, perceptions, experiences, and even fears. It is up to us as health equity researchers to honor these precious data by analyzing them thoroughly and with care.

As a final note, we invite readers to consider that qualitative methods in and of themselves are not aligned with the goals of health equity research. The research worldview and approach to knowledge generation of the researcher(s) and the practical goals of the research are more important than the methods used when it comes to advancing health equity through research (46). Thus, a health equity-focused research project should begin with a goal aligned with a health equity stance, such as identifying the roots of health inequities, facilitating the voices of communities affected by health inequities, or intervening on the socio-structural determinants of inequities. The selection of methods (qualitative or otherwise) and analytic strategies can then flow from said goal.

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Tables

Table 1. Key Definitions for Qualitative Analysis Processes in Health Equity Research

| Term or Concept | Definition |
|---|---|
| Code, coding, codable unit | <ul style="list-style-type: none"> Codes are key ideas in the form of a word or short phrase used to organize and categorize segments of data; codes provide a structure to identify main ideas and higher-level phenomena across the data (ie, themes). Codes are like sticky notes attached to important parts of data to be retrieved later. Note: codes are not the same as themes. Coding is the process of organizing the data by attaching codes to relevant segments of text to later retrieve that segment for identification of themes. A codable unit is a discrete segment of data or text to which codes are applied or attached. |
| Codebook | A codebook is a comprehensive compendium of codes (including code families and subcodes). A practical codebook will include code names and definitions, when to use or not use a code, and an example quote taken from data that illustrates application of the code. |
| Code family | Code families are sets of codes that share similar topics or ideas and are grouped together in the codebook |
| Code summary | A code summary is a data reduction technique that summarizes information conveyed by participants for each code or code family. |
| Computer-assisted qualitative data analysis software (CAQDAS) | CAQDAS uses computer-based software to assist in qualitative data management and coding processes. Examples include NVivo (QSR International), Maxqda (Verbi GmbH), Atlas.ti (Atlas.ti Scientific Software Development GmbH), and Dedoose (SocioCultural Research Consultants, LLC). It is not necessary to use CAQDAS to conduct sound qualitative data analysis, but the advanced tools available may be helpful and increase the speed of the analytic process. |
| Constructivist grounded theory | Constructivist grounded theory is a qualitative research approach that aims to develop new, midlevel theories to explain social phenomena or processes. The approach is inductive and iterative in nature, with each step in data collection and analysis informing the next. Researchers employing Constructivist Grounded Theory do not propose to be neutral observers, but rather acknowledge that data and theory development are co-constructed by both the researcher and participants. |
| Deductive code | Deductive codes are predetermined codes (identified before analysis); also referred to as a priori or index codes. Deductive codes tend to capture general ideas that lack the nuance of more specific ideas expressed in the data. These are often based on existing or working theories or conceptual models, prior literature, and research questions. |
| Descriptive qualitative analysis | Descriptive qualitative analysis aims to generate a comprehensive summary and overview of the data, focused on the who, what, and where of events. Researchers stay close to the data and do not necessarily analyze the data with the goal of identifying complex processes or theoretical understandings of phenomena. |
| Inductive code | Inductive codes are those that are not predetermined (a priori) and are grounded in the data (ie, the researcher[s] did not identify the codes before beginning the analysis process). These codes are typically identified through memoing, close reading of the data, or both. In vivo codes are a type of inductive code which use verbatim words or phrases from 1 or more participants. |
| Intercoder agreement | Intercoder agreement (ICA) is an assessment of how similarly (ie, reliably) 2 or more coders are applying codes to the data. |
| Interpretive qualitative analysis | Interpretive qualitative analysis aims to move beyond description to uncover more complex processes or phenomena, often with the broader goal of developing theoretical or conceptual models based on analysis. |
| Memo, memoing, and analytic memos | <ul style="list-style-type: none"> Memos are brief, written “notes to self” (a few words or sentences) used to capture initial impressions of the data and salient ideas; they are useful to immerse the researcher(s) in the data and to inform the development or identification of inductive codes. Memoing (the process of writing memos) is also referred to as “annotating” or “jotting in the margins.” Analytic memos capture ideas or reflections about the data, analytic choices, or revelations that occur during coding and other analytic procedures. |
| Percent agreement | Percent agreement is an approach to assessing ICA by calculating number of instances when coders agree (ie, apply codes the same way) divided by the number of instances of coding agreement and coding disagreement (number of codes in agreement divided by [number of codes in agreement plus number of codes in disagreement]); >80% agreement is often considered sufficient. |
| Phenomenology | Phenomenology is a qualitative approach that aims to identify the essence of a phenomenon or process. Phenomenology focuses on deeply understanding and elucidating the lived experiences of a group of participants with respect to a specific phenomenon or process. |
| Reflexive memo | Reflexive memos capture thoughts about one’s positionality, relationship to participants, biases, and power balances between researcher(s) and participants or the communities from which they come. |

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(continued)

Table 1. Key Definitions for Qualitative Analysis Processes in Health Equity Research

| Term or Concept | Definition |
|-----------------------|--|
| Statistical agreement | Statistical agreement is an approach to assessing ICA by calculating a statistic of coding agreement that accounts for chance; a Cohen kappa is a popular statistical approach, with >0.61 often considered sufficient. |
| Subcode | Subcodes are finer-grained concepts that are related to a higher-level code (sometimes referred to as child codes in contrast to higher-order parent codes). |
| Subjective agreement | Subjective agreement is a nonmathematical or statistical approach to assessing ICA in which coders simply compare and contrast their code applications across segments of text and identify instances where they have applied different codes. |
| Thematic analysis | Thematic analysis identifies and describes implicit and explicit ideas within and patterns across the data, that is, themes. |
| Theme | A theme is a cross-cutting, high-level concept that links ideas across data; the “a-ha,” “so-what,” or “big take-away” from the data; themes are more abstract than codes and are often identified from the coding process. Most analyses will yield multiple themes (ie, multiple “so-whats?”) and may also yield subthemes (a more fine-grained concept that is related to a specific element of a theme). |

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Table 2. Summary of Analysis Steps and Estimated Timeline^a

| Analysis step | Key process | Estimated time for completion |
|-----------------|--|--|
| 0 | <ul style="list-style-type: none"> Transcribe audio data verbatim Data organization (collate transcripts) | Usually takes 2–3 weeks for a set of transcripts to be returned from a professional transcription service; allow extra time for in-house transcription by members of the research team; allow extra time if transcripts need to be transcribed and then translated into another language |
| 1 | Memo subset of transcripts (or all transcripts, as relevant for analytic goals) | 1–2 h per transcript (dependent on length and familiarity with data) |
| 2 | <ul style="list-style-type: none"> Compile and reduce memos Develop initial codebook (code families, subcodes, code definitions, criteria or directions for code application) | 1–4 weeks (dependent on amount of data and number of memos and codes) |
| 3 | <ul style="list-style-type: none"> Access intercoder agreement Update or refine codebook | 2–4 weeks (dependent on length of transcripts, number and skill or experience of coders, level of difficulty or ease of achieving desired percent agreement in coding) |
| 3 | Code all transcripts (continue to refine codebook if needed) | 1–3 h per transcript for ~1 h of audio (speed will increase as coders become familiar with codebook) |
| 4a | <ul style="list-style-type: none"> Export quotes by code, code frequencies, code co-occurrences, and any other visualization of interest (eg, code networks) Write code summaries of each code and code family Share code summaries with all team members | <ul style="list-style-type: none"> If 1 researcher or team member is writing code summaries: 2–3 weeks (dependent on amount of data and researcher skill) ~ 1–2 weeks to allow for team to read summaries and contribute themes |
| 4b | <ul style="list-style-type: none"> Develop themes or overarching concepts Use code summaries to help explain each theme, as relevant Identify which themes address specific research or analytic goals, as relevant Refine themes through dialogue and writing | 2–4 weeks (highly dependent on amount of data, complexity of analysis, researcher skill) |
| Beyond analysis | Write up or prepare presentation of results for dissemination | 1–3 weeks (dependent on complexity of analysis, researcher skill, and dissemination outlet [eg, article vs presentation]) |

^a Estimated timeline based on total of 20 hours of work per week. May vary depending on how much time is dedicated to each step and how many team members are working on certain aspects of analysis.

ESSAY

Advancing Racial Health Equity Through Family-Focused Interventions for Chronic Disease Management

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PEER REVIEWED

The family context has long been regarded as a key setting for health and a target for efforts to strengthen social support for health goals. While improving racial health equity in chronic disease among children and adolescents may more instinctively point toward parent-child experiences, it is not surprising when efforts to improve equity in adults also recognize the role of the family. Broadly speaking, theories and frameworks often bring attention to the family context within considerations of the social environment and social network influences on disease outcomes. In clinic settings, health professionals may speak with adults about their family health history, availability of caregiving, and disease prevention and management within the home environment. Despite these efforts, calls for advancing chronic disease research with families abound. For example, the 2001 Institute of Medicine (IOM) report *Health and Behavior: The Interplay of Biological, Behavioral, and Societal Influences* described family intervention research for chronic disease management among adults as “in its infancy” (1). Deeper attention to the family relationship context, it was argued, was needed to improve chronic disease outcomes for adults. A decade later, the IOM’s 2011 report *Living Well with Chronic Illness: A Call for Public Health Action*, detailed psychosocial, economic, and health-related consequences of chronic illness for families and advocated for greater public health action (2). Moving forward, it is vital that we center racial health equity in our work with adults and their families, including efforts *inside*, *outside*, and *alongside* families.

Centering Equity: *Inside* Families

The collection and discussion of health history with individuals is where many health professionals regularly engage *inside* families. Indeed, a comprehensive family health history is a valuable tool for assessing risk and determining actions that may enhance health and well-being (eg, start, frequency, and types of cancer screenings; lifestyle changes). Gaps in family history information, particularly by race, hamper these efforts. Innovative tools and creative programs have led to success in improving the completeness of family history collection (eg, collecting information at family reunions) (3). As family history data become more complete, we should ask the question, Is there more we can do with this information? Indeed, there is. Despite its reference to the past, an individual’s family health history can also provide an entree into the extent of family multimorbidity (ie, family members’ co-occurring health issues) and opportunities for family disease management support (4). A family’s experiences with disease management over time have likely led them to develop significant skills and strengths that can be leveraged in intervention efforts. The identification of family-level factors, resources (eg, cooperation, role flexibility), and constraints (eg, conflict, rigid roles) likely associated with disease management are integral to these efforts.

Centering Equity: *Outside* Families

Interrogating broader sociocultural and contextual factors *outside* of families that shape members’ lives and livelihoods is crucial for equitable intervention design. These factors, and the relationships between them, contribute to family health historically and contemporarily. Over time, families can benefit in some ways and be disadvantaged in other ways by exposure to these inequitable conditions. For example, structural racism influences the community and the built and social environment of families, their ability to access and receive quality preventive and curative care, and their educational and economic opportunities. The distant and recent past is replete with examples of how racism affects the overall health of families. Families often serve as a buffer to racism and



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discrimination among its members, including providing resources to fortify instabilities resulting from broken, inequitable systems. Families from racially marginalized groups may also take on a greater responsibility to support the health of their members for several reasons, including past experiences with health systems that make accessing services more difficult (eg, poor and/or discriminatory interactions), inadequate treatment when services are provided, and greater disease burden. These caregiving and supportive efforts by families, even when successful, may come at a cost to families' individual and collective well-being (eg, caregiver burden, network stress).

Care systems in the US are organized such that families are expected to take on varying levels of *responsibility* for the chronic disease welfare of their members. Often lacking with this orientation is attention to variations in the *response-ability* of families (5). What we observe as the ability of families to help their members with the myriad aspects of chronic disease prevention and management is reflective of lifelong and multigenerational embeddedness in inequitable social contexts (6). Thus, our work has to be responsive to the accumulation of advantages and disadvantages across the family life course (7,8) through differential exposures to risk and protective factors in various domains of life. This approach also requires considering the varying levels of health and functioning and the interconnectedness of health and well-being among members of a family unit.

Centering Equity: *Alongside* Families

Another key component of advancing racial health equity in chronic disease is being committed to working *alongside* families. Individuals are often willing to support their family members in managing chronic illnesses, and there are many organizations and groups at the forefront of these issues. Using community-engaged and participatory approaches to this work is critical. In advocating for an *alongside* approach, Anderson (9) expounds on the importance of balance in working with African American families, arguing for the continued promotion of family "resources and cultural strengths" while simultaneously actively dismantling inequitable and unjust social constraints. In the context of chronic disease prevention and management, this requires tackling the upstream and downstream, proximal and distal factors, long identified as important for chronic disease outcomes.

Reflecting on our disciplinary and personal backgrounds can be useful for building effective partnerships with families we aim to serve while working toward this balance. Hardeman and Karbeah (10) provide a valuable framework for engaging in disciplinary self-critiques that can help us examine how racism has hampered our efforts to achieve health equity. They argue for an examina-

tion of our research questions, methodologic approaches, interpretations of our findings, reliance on White-dominant narratives, and what evidence is considered real. These steps toward epistemic justice could also be enhanced by reflecting on additional questions that can help us to identify how personal beliefs, experiences, and biases about family influence our work. For example, how do we define family, personally and professionally, and how might this conceptualization help or hamper our efforts? What do we believe can or should be the role or involvement of families in helping adults manage their health issues? In what ways do we value or promote the needs of the individual over those of the collective (or vice versa)? To what do we attribute the challenges that families such as our own have with managing their health, and how is this similar to or different from the attributions we make about other families? How might our past and ongoing work contribute to narratives about health among the families we serve? Thinking carefully and deeply about these issues can best position us to create meaningful partnerships that can lead to sustainable and practical solutions.

Conclusion

Inequities in chronic disease outcomes by race in the US are distressing, persistent, and unjust. These inequities have exerted an incalculable toll on generations of families and communities. The policies and practices that will increase racial equity in chronic disease will likely need to be multifaceted and intentional about incorporating a familial approach. Working *inside* families intentionally focuses on family-level factors and processes that influence health outcomes, including concurrent health problems, competing demands of family systems, roles, and relational aspects. Working *outside* families includes bolstering institutional and systemic efforts to redress the social inequities that contribute to disproportionate chronic disease morbidity and mortality rates. Lastly, working *alongside* families includes a commitment to engaging with and partnering with families to design, implement, and evaluate policies and practices designed to improve their chronic disease-related health outcomes. Making progress in complementary *inside-outside-alongside* approaches can lead to positive, synergistic effects that can help families thrive.

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COMMENTARY

Community Engagement of African Americans in the Era of COVID-19: Considerations, Challenges, Implications, and Recommendations for Public Health

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Summary

What is already known on this topic?

African Americans are more likely to contract coronavirus disease 2019 (COVID-19), be hospitalized for it, and die of the disease when compared with other racial/ethnic groups. Psychosocial, sociocultural, and environmental vulnerabilities, compounded by preexisting health conditions, exacerbate this health disparity.

What is added by this report?

This report adds to an understanding of the interconnected historical, policy, clinical, and community factors associated with pandemic risk, which underpin community-based participatory research approaches to advance the art and science of community engagement among African Americans in the COVID-19 era.

What are the implications for public health practice?

When considered together, the factors detailed in this commentary create opportunities for new approaches to intentionally engage socially vulnerable African Americans. The proposed response strategies will proactively prepare public health leaders for the next pandemic and advance community leadership toward health equity.

Abstract

African Americans, compared with all other racial/ethnic groups, are more likely to contract coronavirus disease 2019 (COVID-19), be hospitalized for it, and die of the disease. Psychosocial, so-

ciocultural, and environmental vulnerabilities, compounded by preexisting health conditions, exacerbate this health disparity. Interconnected historical, policy, clinical, and community factors explain and underpin community-based participatory research approaches to advance the art and science of community engagement among African Americans in the COVID-19 era. In this commentary, we detail the pandemic response strategies of the Morehouse School of Medicine Prevention Research Center. We discuss the implications of these complex factors and propose recommendations for addressing them that, adopted together, will result in community and data-informed mitigation strategies. These approaches will proactively prepare for the next pandemic and advance community leadership toward health equity.

Introduction

Racial/ethnic minority populations have historically borne a disproportionate burden of illness, hospitalization, and death during public health emergencies, including the 2009 H1N1 influenza pandemic and the Zika virus epidemic (1–4). This disproportionate burden is due to a higher level of social vulnerability — “individual and community characteristics that affect capacities to anticipate, confront, repair, and recover from the effects of a disaster” — among racial/ethnic minority populations than among non-Hispanic White populations (5). These characteristics include, but are not limited to, low socioeconomic status and power, predisposing racial/ethnic minority populations in general and African Americans in particular to less-than-optimal living conditions. Some racial/ethnic minority populations are more likely than non-Hispanic White populations to live in densely populated areas, overcrowded housing, and/or multigenerational homes; lack adequate plumbing and access to clean water; and/or have jobs that do not offer paid leave or the opportunity to work from home (6,7). These factors contribute to a person’s ability to comply with



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the mitigation mandates of the coronavirus disease 2019 (COVID-19) pandemic established to reduce risk for infection, such as physical distancing and sheltering in place (8).

The COVID-19 pandemic presents new challenges for public health evaluators, policy makers, and practitioners, yet it mirrors historical trends in health disparities and poor health outcomes among African Americans. African Americans are more likely to contract, be hospitalized, and die of COVID-19–related complications (9–12). Social vulnerability is often compounded by preexisting health conditions, exacerbated during times of crisis (13–17).

Public health leaders are now at a critical juncture to advance health equity among vulnerable African Americans. To advance this health equity, we must first have a comprehensive understanding of the factors that create health disparities and the factors that can contribute to an effective, multilevel response. With this understanding, we can then deploy effective mitigation strategies based on a community-based participatory research framework that fosters and sustains community leadership in the assessment and implementation of culturally appropriate and evidence-based interventions that enhance translation of research findings for community and policy change (18,19). The objective of this commentary is to 1) detail the interconnected historical, policy, clinical, community, and research challenges and considerations central to comprehensively advancing the art and science of community engagement among African Americans in the COVID-19 era; 2) describe The Morehouse School of Medicine Prevention Research Center (MSM PRC) pandemic response strategies, driven by community-based participatory research (CBPR); and 3) discuss community-centered implications and next steps for public health action.

Challenges and Considerations

Historical context

Racial/ethnic health disparities have always existed in the United States. Differential health outcomes between African Americans and non-Hispanic White Americans have been part of the American landscape for more than 400 years (20). Many measures of health status have been used to assess differences among racial/ethnic groups; more recently, health researchers have advanced concepts and constructs of health equity and social determinants of health (21). Reaching back to the mid-20th century, the US government documented that African Americans were far more likely than non-Hispanic White Americans to have a wide range of potentially fatal illnesses, including noncommunicable diseases such as type 2 diabetes, asthma, end-stage renal disease, and cardiovascular disease (21). In 1985, the US Department of Health and Hu-

man Services published the landmark *Report of the Secretary's Task Force on Black and Minority Health*, better known as the Heckler report (21). The report documented an annual excess 60,000 deaths among African American and other racial/ethnic minority populations. These underlying determinants can only result in disproportionately adverse health outcomes for racial/ethnic minority populations during the COVID-19 pandemic.

The COVID-19 pandemic is intensified by the long-standing income inequality between non-Hispanic White people and racial/ethnic minority populations. Economists use the Gini coefficient to measure income inequality. Values for this measure range from 0 to 1, with higher values representing greater income inequality. From 1990 to 2018, the Gini coefficient in the United States rose from 0.43 to 0.49 — an increase in income inequality. When income disparities exist along with other disparities (eg, health insurance, employment, education, social justice, access to quality health care), public health pandemics marginalize racial/ethnic minority groups, and this marginalization requires a strong and strategic response (22).

Policy landscape

Racial/ethnic minority populations are disproportionately affected by COVID-19 (23), as they are by many diseases. In the United States, African Americans, Hispanics/Latinos, Native Americans, Native Hawaiians, and Pacific Islanders are more likely than other racial/ethnic groups to die of COVID-19 (24). The pandemic has not affected all populations equally for several reasons, including social, behavioral, and environmental determinants of health. In addition, economic and social policies have not benefitted all populations equally. Obesity, asthma, depression, diabetes, heart disease, cancer, HIV/AIDS, and many other disorders that put vulnerable populations at greater risk of dying of COVID-19 can often be linked to a policy determinant (25). Air pollution; climate change; toxic waste sites; unclean water; lack of fresh fruits and vegetables; unsafe, unsecure, and unstable housing; poor-quality education; inaccessible transportation; lack of parks and other recreational areas; and other factors play a large role in overall health and well-being (26). These factors increase a person's stress and limit opportunities for optimal health (27). Too often, public health researchers and practitioners stop at the social determinants of inequities. These social determinants do, indeed, play an outsized role in these human-made inequities, but underlying each one is a policy determinant that should be addressed to improve health equity.

Consider, for example, the problem of asthma among many racial/ethnic minority populations. One community, in East Harlem, one of Manhattan's poorest neighborhoods, found that a bus depot caused the high rates of asthma among children who lived near it

(28). Six of 7 bus depots in Manhattan are located in East Harlem, and East Harlem has the highest rate of asthma hospitalizations in the country (29–31). In another community, the exhaust and dust from the vehicles traveling a major highway that cut through the middle of the community was found to contribute to the high rates of asthma among residents who lived near it (32). In both of these examples, an underlying policy determined the placement of the bus depots and the highway, which led to the eventual health inequities.

Examples of how legislative and policy change can immediately affect the social determinants of health are demonstrated in government and public responses during the first 3 months of the COVID-19 pandemic in the United States. Federal, state, and local policies were implemented to stimulate local economies and infuse communities with free food and direct revenue, including increases in SNAP (Supplemental Nutrition Assistance Program) benefits and expanded unemployment benefits. These initiatives have helped communities and individuals during the crisis. Despite these programs, however, some marginalized African American communities have not benefitted. As the nation adjusts to the “new normal,” it is imperative that the social, economic, and health gaps in these communities also conform to a “new normal” that is driven by new or expanded *and* sustained policies.

Clinical mechanisms, chronic conditions, and increased risk of COVID-19

African Americans are twice as likely as non-Hispanic White Americans to die of heart disease and 50% more likely to have hypertension and/or diabetes (33,34). This elevated risk increases the likelihood of other complications and death from COVID-19 (35,36). Let us consider, for example, people living with diabetes. Their immune system is depressed overall, because their blood glucose is not well controlled (hyperglycemia) (37). It is hypothesized that hyperglycemia causes an increase in the number of a particular receptor in the lungs, pancreas, liver, and kidneys; this increase impairs the function of white blood cells, which are designed to fight off infections (37). This impairment predisposes the person living with diabetes to an increased risk of bacterial and viral infections. When severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) enters the lungs by way of this particular receptor, it overwhelms the alveoli (air sacs) in the lungs and disables the exchange of oxygen and carbon dioxide (38). As a result, some people with diabetes may need supplemental oxygen, intubation, and/or admission to an intensive care unit (37). Hyperglycemia in combination with a disease such as COVID-19 makes recovery difficult (37). People with diabetes who are in good mental health, know the names and dosages of their medications, and know their blood pressure, blood glucose, and other laboratory values, such as hemoglobin A_{1c}, tend to have better

control of their disease and have lower levels of illness and death (16,37). Emphasizing the importance of good blood glucose control to prevent diabetes complications and associated COVID-19 risk is more important now than ever (36–38). Mental health plays a major role in a person’s ability to maintain good physical health and optimally manage their chronic conditions, and mental illnesses may affect the ability to participate in health-promoting behaviors (39).

Mental and behavioral health

The constellation of stressors triggered by the COVID-19 pandemic undermines the nation’s mental health (40–42). Various disruptions in daily life, coupled with the threat of contracting the deadly virus, is leading some people to experience anxiety and depression, sometimes to the extreme. Reports of family violence and use of suicide prevention hotlines have increased (43,44). Physical distancing, shelter-in-place orders, business and school closures, and widespread unemployment have radically changed ways of life and contributed to a sense of hopelessness, isolation, loneliness, helplessness, and loss (45,46). Pandemic-related factors, including quarantine, have led to posttraumatic stress disorder, confusion, and anger (47). One study indicated that a constant consumption of media reports had detrimental psychological effects on some people (48). If interrelated mental, behavioral, and emotional issues are not adequately addressed, disorders among racial/ethnic minority populations and other vulnerable populations (eg, the medically underserved, homeless, and disabled; inmates in the criminal justice system) will surge and exacerbate disparities (49).

Interrelated COVID-19–related stressors include childcare and safety, elder care, food insecurity, and interpersonal relationships (50). These stressors may trigger aspects of unresolved trauma. Poor coping mechanisms (eg, use of illicit drugs, excessive alcohol consumption, overeating, inadequate sleep) may develop or worsen. In addition to facing chronic stressors, communities of racial/ethnic minority populations often deal with the stigma associated with seeking mental and behavioral health care. A Surgeon General’s report, *Mental Health: Culture, Race, and Ethnicity*, concluded that racial/ethnic minority populations, compared with the non-Hispanic White population, have less access to mental health care, are less likely to receive treatment, and when treated, often receive poorer quality of care (51). As a result, racial/ethnic minority populations often have a greater burden of behavioral disorder–related disability (51). Addressing the multifaceted mental and behavioral health needs of racial/ethnic minority populations in the United States is a complex issue that warrants attention from clinicians, researchers, scientists, public health professionals, and policy makers. It is imperative to recognize the signi-

ficant role of community leaders in exploring solutions to COVID-19–related mental and behavioral health problems among racial/ethnic minority communities. Their lived experiences are central to the co-creation of pandemic response strategies for these populations.

Perspectives of community leaders

The realities of research, evaluation, and clinically focused community engagement after the COVID-19 pandemic may change for the foreseeable future. Efforts to initiate and sustain culturally competent engagement of racial/ethnic minority groups previously relied on face-to-face interactions in homes, churches, and other community settings. Social or physical distancing has nearly stopped communities and their collaborators from real-time gathering. These changes challenge the human need for connection and in-person exchange. Although the adjustment has been difficult, the pandemic has resulted in new modes of engagement. Webinar and digital technology are now accessible for most people at low or no cost. Many community residents have newfound capacities to use technology for social and professional interactions as part of daily life.

Current health communication and messaging require community-informed improvements. The use of terms like *sheltering in place*, *social distancing*, and *flattening the curve* do not naturally resonate with many people. For some, these terms foster anxiety and distrust of systems perceived to separate communities rather than promote COVID-19 mitigation strategies. Community leaders, as well as business and faith leaders, have found themselves in a space of terminology and descriptions that are understood mostly by public health practitioners. Therefore, health literacy and the interpretation of current health conditions are vital.

The pandemic has intensified the economic strains among low-income and moderate-income people and families (52). Low-wage workers, many on the frontlines of the pandemic since it began, have had little to no increase in income (53). African American families who struggled to make ends meet before COVID-19 are now facing dire economic circumstances in making the best decisions for their families. Stressors include, but are not limited to, deciding how to pay rent or a mortgage, paying for food, assisting children with virtual learning, and protecting themselves with minimal or no health care benefits. The mental and behavioral health implications of these problems, along with the economic and practical challenges, have made a fragile ecosystem even more unstable. Low-wage workers in hospitality, food service, and retail industries cannot work from home. Workers who depend on employer-provided health insurance now have the additional burden of how to maintain health insurance coverage (54). Ulti-

mately, lack of adequate access to health care, along with the complex realities of the COVID-19 pandemic, will increase health disparities for socially vulnerable African American employees and their families.

Local examples of COVID-19 response strategies driven by community-based participatory research

The MSM PRC relies on a deeply rooted, community partnership model that responds to the health priorities of vulnerable African American residents before, during, and after public health emergencies such as the COVID-19 pandemic. For more than 20 years, the MSM PRC has applied dynamic CBPR approaches that focus on prevention, establish partnerships between communities and research entities, and are culturally tailored (6,55–57).

The MSM PRC capitalizes on community wisdom through a community coalition board (CCB) that has governed the center since its inception. The CCB is composed of 3 types of members: neighborhood residents (always in the majority), academic institutions, and social service providers (58). Neighborhood residents hold the preponderance of power, and all leadership seats and are at the forefront of all implemented approaches. Neighborhood resident members are intentionally recruited from census tracts with a high incidence and prevalence of chronic and infectious diseases. The communities served by the MSM PRC are majority (87%) African American, have an average household income of \$23,616, and rank lowest among other local communities in other socioeconomic conditions and community neighborhood health factors (55).

The MSM PRC has strategically partnered with the CCB and the community to facilitate health research and related interventions based on a comprehensive understanding of historical, political, clinical, and community considerations. The community governance model was developed to address CBPR challenges that exist when academics are not guided by neighborhood leaders in understanding a community's ecology, when community members do not lead discussions about their health priorities, and when academics and neighborhood leaders do not work together as a single body with established rules to guide roles and operations (59,60).

The MSM PRC conducts a recurring (every 4 years) community health needs and assets assessment (CHNA²) process through the CCB, empowering community members to take on roles as citizen scientists who develop locally relevant research questions and identify priority health strategies (60). The recently completed CHNA² (February 2018) was co-led by neighborhood residents to advance a community health agenda. Survey development, data analyses, and response strategies are reviewed, monitored, and evaluated by the CCB and its Data Monitoring and Evaluation

Committee (55). This 7-member committee, established in 2011, is designed to extend the CBPR engagement of CCB members in the work of the MSM PRC. It exists through academic–community co-leadership (a CCB neighborhood resident member and the MSM PRC assistant director of evaluation) of a group of CCB members tasked with leading assessments. For CHNA², members met bimonthly (every other month, when the CCB did not meet) to discuss and inform evaluation and data collection activities and prepare for reporting of evaluation findings and interim results to the broader CCB to determine corresponding respond strategies. CHNA² primary data included surveys administered to 607 community residents. The most frequently cited community health concerns were diabetes, nutrition, high blood pressure, overweight/obesity, and mental health. County-level, top-ranking causes of illness and death, including cardiovascular disease, diabetes, and mental health disorders, align with these community perspectives (61).

CHNA² is relevant, despite being administered before the outbreak of COVID-19. The chronic conditions and health problems identified are those exacerbated by COVID-19 (diabetes, cardiovascular disease, and mental health), thereby making their focus even more relevant to the community.

The mental and behavioral health components of CHNA² were amplified to address the stress and anxiety caused by the pandemic. First, during National Mental Health Awareness Month (May 2020), the MSM PRC convened a virtual forum, *Our Mental and Behavioral Health Matters*. It was strategically designed to address the culturally bound mental health stigma in racial/ethnic minority communities that is due, in part, to the schism between religion and therapy. The forum also addressed challenges related to social isolation. Concerns centered on how to navigate a virtual mental health checkup and support for parents seeking to help their children process the realities of the pandemic and minimize childhood trauma. Featuring psychologists, researchers, and community- and faith-based pioneers, the forum engaged more than 230 local and national participants. Second, a CCB member representing Fulton County’s Department of Behavioral Health and Developmental Disabilities helped the MSM PRC to develop and disseminate an infographic on mental and behavioral health services for insured and uninsured residents. Third, the MSM PRC will offer annual Mental Health First Aid (62) trainings to community residents and professionals over the next 4 years.

The MSM PRC leads the Georgia Clinical and Translational Science Alliance’s Community Engagement Program, which is designed to advance community-engaged clinical and translational research (63,64). The Program is led by a community steering board adapted from the CCB model and includes co-leaders (faculty and staff, including a community health worker) from Emory

University, the Georgia Institute of Technology, and the University of Georgia. The program conducted a webinar, *Community Engagement in the Era of COVID — Opportunities, Challenges and Lessons Being Learned*, in May 2020. The webinar addressed the challenges and opportunities associated with initiating or sustaining community-engaged research during physical-distancing and shelter-in-place mandates. Clinicians, scientists, and community leaders from Atlanta, Athens, and Albany, Georgia, discussed uniquely nuanced issues for urban and rural community engagement and the basic need for social connectedness through virtual navigation of community engagement strategies (eg, via Zoom) and newly expanded access to telehealth medical visits (65). The webinar emphasized the importance of being a credible source of COVID-19 information and linkage across social and economic services, given heightened community anxiety and preexisting mistrust of medical research.

The MSM PRC is a central collaborator in a national initiative led by the National Center for Primary Care at Morehouse School of Medicine and the Satcher Health Leadership Institute, also at Morehouse School of Medicine. The National COVID-19 Resiliency Network is designed to mitigate COVID-19 in racial/ethnic minority, rural, and socially vulnerable communities. The initiative will work with community organizations to deliver education and information on resources to help fight the pandemic. The information network will strengthen efforts to link communities to COVID-19 testing, health care services, and social services through the institution’s leadership in policy, community engagement, and primary care. The MSM PRC’s CCB model will be scaled to collaborate with community organizations in highly affected geographic areas to assess and inventory community assets for COVID-19 testing, vaccination, and other health care and social services through a national community coalition board. The MSM PRC CHNA² model will also be scaled to inform mitigation approaches implemented by community-based organizations through establishment of a centralized inventory of culturally appropriate COVID-19 response strategies, by geography and population vulnerability. Approaches will engage community health workers, who are mission-critical stakeholders, nationally galvanized, and locally deployed.

These MSM PRC activities are founded on long-standing, community-partnered, and informed relationships in response to preexisting health priorities that are simply heightened by the COVID-19 pandemic. Ideally, this CBPR framework is established before a public health crisis. This framework and the practice of identifying community needs and mobilizing strengths are now poised, adapted, and scaled up in response to the COVID-19 pandemic. The continued evolution of the pandemic means that

these approaches and solutions must be flexible in response to changing needs and new data.

Implications for Public Health

Public health practitioners, evaluators, policy makers, researchers, and clinicians with a community-engaged mindset have long understood, grappled with, and proclaimed the complexities of health disparities in the context of historic and current social determinants (66). When considered together, the challenges and realities detailed in this commentary create opportunities for new approaches to intentionally engage socially vulnerable African Americans. The response strategies proposed below reflect the complex web of historical and current policy and clinical, mental and behavioral, and community factors. Use of a CBPR framework undergirds all response strategies proposed.

Promote local community leadership to proactively inform mitigation strategies. The importance of CBPR and related needs assessments and response strategies are heightened during the COVID-19 era. Health promotion for chronic conditions such as diabetes, obesity, and cardiovascular diseases may have previously been structured to result in poor health or premature death for racial/ethnic minority populations through reduced or nonexistent access to health care; these conditions now require more immediate attention because they increase vulnerabilities and risks that can lead to poor health outcomes or death. Community knowledge, perceptions, and approaches to culturally responsive mitigation strategies must be prioritized. Carefully constructed local community governance boards that include multidisciplinary leadership (clinical, policy and social service, and research, among others), should be formed to lead assessments toward community and data-informed COVID-19 mitigation strategies for vulnerable populations in highly affected geographic areas.

Strategically engage public health and community-attuned policy leaders and prioritize community stimulus strategies. The political landscape calls for public health leadership by mitigation response teams (25). These teams are key informants from the beginning of public health initiatives designed to mitigate the pandemic, and their engagement is essential. They will provide another lens through which to examine the structures and processes that enable inequities to systematically develop and flourish or be eradicated through community co-created responses.

The essential areas of policy for optimal community health are in prioritized economic development, food security, and access to health care protection for vulnerable African American communities. Collectively, these areas present opportunities for intervention in response to chronic disease self-management (clinical), economic strains (community), and health care protections (policy)

associated with the COVID-19 vulnerabilities of many African American communities. These essential policy areas represent a proposed foundation that rests on 4 “Es” hypothesized to narrow disparity gaps and offer opportunities for self-sufficiency and community resiliency.

- Employ trained/certified, compensated community health workers, coaches, and ambassadors who are charged with cultural messaging and education, contact tracing, and surveillance toward increased adherence to policies on physical distancing and sheltering in place.
- Expand SNAP programs with vouchers to include the purchase of household and personal care items rather than encouraging recipients to barter for basic care products.
- Enhance school lunch programs so that all children receive high-quality, balanced meals throughout the year, regardless of the ability to pay.
- Ensure universal broadband internet access to reduce education, health care, and information barriers.

Cultivate community-informed public health disaster health literacy. Health literacy concepts, modes, and education must be reframed. The media have newly exposed the lay public to the realities of unequal treatment and unequal pandemic risk. The public is, thereby, witnessing the more rapid connection between who they are, where they live, and who is more likely to suffer from and die of COVID-19. Marketing frameworks for community-based prevention can be used to position community leaders to inform and lead health communication strategies. These marketing frameworks will ensure that messages resonate, engage, and foster action with objectivity and community/cultural sensitivity.

Foster culturally tailored behavioral and mental health dialogue and response. Multidimensional prevention education strategies that encourage resilience (positive adaptation to adversity) must be promoted in African American communities. This promotion should involve advocating for proactive self-care, reducing stigma, and encouraging integrated health care. These strategies should be promoted and proactively integrated as cross-cutting components of any research and health initiative.

Prioritize patient-centered medical homes and neighborhood models. Patient-centered medical home infrastructures that include models of integrated care (mental and behavioral health care services in primary health care settings) can help overcome barriers to comprehensive health care and overall wellness. This model engages comprehensive resources to care for a patient, regardless of race/ethnicity, sex/gender, sexual orientation, language, socioeconomic status, or health insurance coverage. Primary care providers are encouraged to incorporate this model into their practices to decrease illness and death among African Americans at heightened risk of COVID-19 (67,68).

Redefine essential workers. Although the accomplishments of first responders — physicians, nurses, scientists, and other people fighting to preserve life — are laudable and undeniable, many African American nonclinical frontline workers, such as maintenance, janitorial, or food processing workers, are excluded from the definition of essential workers. The social vulnerability of nonclinical frontline workers, who often have chronic health conditions that place them at particular risk for contracting COVID-19, should be acknowledged and considered in planning.

Community and public health leaders in health care, behavioral health, and policy must consider the implications of health inequities among racial/ethnic minority populations, seriously tackle their root causes, and develop culturally responsive COVID-19 strategies for socially vulnerable African Americans. CBPR-driven approaches that elevate marginalized communities as senior partners in planning, implementing, and evaluating strategies will promote community leadership and increase adherence to health communication messages as the COVID-19 pandemic evolves. Efforts should be characterized by strong data (research or evaluation), contextually relevant community engagement strategies, and action (policy, systems, and environmental change approaches). The COVID-19 pandemic has presented an optimal opportunity to reprioritize and sustain approaches toward advancing community engagement of vulnerable African Americans. These new approaches will prepare us for the next pandemic. More importantly, they will foster CBPR leadership in advancing health equity.

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