

Structural Interventions to Reduce and Eliminate Health Disparities

Health disparities research in the United States over the past 2 decades has yielded considerable progress and contributed to a developing evidence base for interventions that tackle disparities in health status and access to care. However, health disparity interventions have focused primarily on individual and interpersonal factors, which are often limited in their ability to yield sustained improvements.

Health disparities emerge and persist through complex mechanisms that include socioeconomic, environmental, and system-level factors. To accelerate the reduction of health disparities and yield enduring health outcomes requires broader approaches that intervene upon these structural determinants. Although an increasing number of innovative programs and policies have been deployed to address structural determinants, few explicitly focused on their impact on minority health and health disparities.

Rigorously evaluated, evidence-based structural interventions are needed to address multilevel structural determinants that systemically lead to and perpetuate social and health inequities. This article highlights examples of structural interventions that have yielded health benefits, discusses challenges and opportunities for accelerating improvements in minority health, and proposes recommendations to foster the development of structural interventions likely to advance health disparities research. (*Am J Public Health*. 2019;109:S72–S78. doi:10.2105/AJPH.2018.304844)

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Reducing health disparities to improve health outcomes is a complex challenge that extends far beyond the reach of traditional health care settings. Increasingly, the structural conditions in which people are born, live, learn, work, worship, play, and age^{1,2} are recognized as critical determinants of health and health disparities. Minority populations often face multiple levels of mutually reinforcing structural disadvantage that contribute to poor health.^{3,4} Although many promising health interventions have targeted individual-, interpersonal-, and, to some extent, community-level factors, the evidence on how enduring these interventions are in supporting sustained improvements in population health and reducing health disparities is limited. Inherent in the challenge to support individual behavioral change is the dynamic interplay of risk and protective factors that cut across social and environmental contexts that can help individuals and their communities attain the highest level of health. Take, for example, the case of obesity disparities: interventions that improve nutrition and physical activity at the individual level are unlikely to succeed when the food and social environments (e.g., unsafe and limited recreational space, ready access to low-cost, calorie-dense food options) and high rates of poverty present severe barriers to maintaining healthy diets and active lifestyles.

Despite increasing national recognition of the relationship of structural determinants to health and health disparities, the majority of health disparities interventions have focused primarily on behavior change at individual and interpersonal levels, which have had limited impact on sustained improvements in health or reductions in health disparities.⁵ The vision for health disparities research is to promote intervention science that addresses the structural drivers of health disparities through multi-sectoral collaborations. This article highlights examples of major national efforts focused on structural determinants that have yielded reductions in health disparities. These examples illuminate common themes inherent in

successful interventions that tackle structural drivers of health and challenges to deploying structural interventions that improve minority health and health equity. We conclude with recommendations to advance the science of health disparities research.

DEFINITION AND CONCEPTUAL FRAMEWORK

Structural interventions attempt to change the social, physical, economic, or political environments that may shape or constrain health behaviors and outcomes, altering the larger social context by which health disparities emerge and persist. They target factors such as

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economic instability, limited educational and employment opportunity, societal racism, systemic discrimination, and lack of resources, which limit neighborhoods' access to healthy food, clean water, physical activity spaces, transportation, and health care. It has long been argued that to effect population-level change and reduce health disparities, multilevel structural interventions are needed.⁶

The National Institute on Minority Health and Health Disparities (NIMHD) Minority Health and Health Disparity Research Framework can guide structural interventions by emphasizing multiple domains of conceptual constructs that may be relevant to the development of structural interventions such as physical and built environments, sociocultural determinants, and multiple levels of influences in addressing health disparities.⁷ Furthermore, the most promising interventions should involve diverse stakeholders from multiple sectors, such as criminal justice, education, transportation, housing, business, and other social services, in addition to the health care system.⁸ For more information on designing, conducting, and analyzing multilevel structural interventions, see the multilevel intervention analytic essay by Agurs-Collins et al. (p. S86) in this special issue.

EVIDENCE-BASED STRUCTURAL INTERVENTIONS

A few promising interventions have addressed structural determinants of health disparities, intervening at the intersection of behavioral, sociocultural, physical and built environment, and policy domains.⁹ However, there

is a dearth of evidence on effective structural interventions focused explicitly on health disparity outcomes. This is not a systematic review article, but an analytic essay to share themes common to nationally recognized structural interventions that reduce health disparities, describe challenges in designing and implementing these programs, and discuss lessons learned toward advancing the science of making meaningful and sustainable improvements in minority health and reductions in health disparities.

We identified common themes that provide key insights for researchers interested in advancing the science of health disparities research. These examples also illustrate the need for more such programs, common frameworks, and measures to fill the knowledge gap.

Context

Understanding the various contexts that influence individual- and community-level risk for health disparities is central to identifying points of intervention and the mechanisms by which risk and protective factors interact and are mutually reinforcing. These contexts vary at multiple levels (e.g., individual, interpersonal, community, and societal) and domains of influence (e.g., biological, physical and built environment, sociocultural, and health care). Structural interventions by definition should tackle 1 or more contexts across domains and levels of influence to reinforce environments and social norms that support positive behavior change. For example, reduction of obesity disparities may require interventions that tackle structural drivers across sectors related to access to fresh fruits and

vegetables and safe recreational spaces among low-income school-aged children and their families in poor neighborhoods,^{10,11} family-based interventions that improve education, and collective efficacy to reinforce social and built environments to sustain healthy lifestyles.¹²

The importance of integrating the geographic context in health is exemplified by the Moving to Opportunity study, a randomized housing mobility trial that offered housing vouchers to low-income families who resided in public housing in high-poverty communities to encourage them to move to lower-poverty neighborhoods. After 10 to 15 years of follow-up, the intervention group had improvements in physical and mental health, including reductions in rates of extreme obesity, diabetes, psychological distress, and major depression.^{13–15}

Authentic Engagement

Authentic community and stakeholder engagement is critical to the development, implementation, and sustainability of interventions to tackle structural drivers of health disparities. Community-based participatory research manages power imbalances, ensures transparent access to resources, and fosters shared decision-making^{16,17} to support genuine and lasting partnerships across sectors, researchers, community members, and policy-makers. Successful structural interventions demonstrate that in populations affected by disparities, community stakeholders can be active equal partners in designing and evaluating structural interventions and in the advocacy and policy translation processes needed to sustain and scale these efforts.

As an example, between 2002 and 2009, the Delaware Colorectal Cancer Coalition galvanized diverse policy, health care, and community stakeholders to sharply reduce or eliminate African American–White disparities in colorectal cancer screening, incidence, and mortality.¹⁸ In 2 Los Angeles County, California, programs—Community Partners in Care and the Health Neighborhoods Initiative—the formation of multistakeholder coalitions to address mental health disparities resulted in a broadened definition of mental health “treatment” to include structural factors that can be intervened upon (e.g., homelessness, unemployment, safety, school dropout, incarceration) to improve mental wellness, increase housing stability, and reduce hospitalizations for adults with depression.^{19,20}

Disease-Agnostic Interventions

Structural interventions that successfully address health disparities and improve minority health are disease-agnostic in their approach, enabling them to tackle common risk factors that lead to multiple health disparities, thereby altering the context(s) that yield social inequalities. Among these are policies and practices that focus on changing the mechanisms and trajectory of risk factors that lead to health disparities. For example, Parent-Corps, which was designed to tackle gaps in academic achievement and mental health status among impoverished children in New York City, had a significant effect on reducing childhood obesity, anxiety, and depression in minority and low-income communities.^{12,21} The Earned Income Tax Credit, which aimed to increase

individual wealth among low-income working families, had cascading effects that included higher rates of prenatal care among pregnant women, reductions in low birth weight rates, particularly among low-income African American mothers, and enhanced child nutrition.^{22–25} Thus, interventions focused on education and fiscal policy resulted in long-term impact on minority health outcomes and health disparities reduction.

Timing and Location

A crucial challenge is optimizing the timing and location of structural interventions to have the largest impact on reducing disparities. The Moving to Opportunity housing mobility experiment found that children from low-income and minority families who relocated to low-poverty areas had better long-term outcomes if the move occurred before age 13 years. Both Moving to Opportunity and the Earned Income Tax Credit demonstrated the profound effect of prenatal and childhood interventions on life course social, economic, and health trajectories. Similarly, identifying geographic risks associated with residential neighborhood factors can inform local-area capacity building and propel cross-sectoral interventions that directly or indirectly reduce health disparities and improve health outcomes.²⁶

Unintended Consequences

The complex nature of structural interventions makes it important to examine their intended and unintended consequences—positive and negative—on health disparities and how to measure and interpret them. This concern is particularly

important when one is evaluating how such programs and policies affect disparities. If population-wide health improvements disproportionately benefit the most advantaged members of society, disparities may widen among vulnerable underserved populations, as in the case of tobacco control in the United States,^{27–30} which has been of less benefit to some minority communities compared with the general population. Longitudinal analyses of Moving to Opportunity actually uncovered potential harms for some subgroups associated with this intervention, including social stressors that many low-income and minority families face regardless of neighborhood, the impact of multi-generational poverty and racism, and disrupted social ties engendered by the move to a new neighborhood.^{13,31}

Discordance between interventions and local community cultures, norms, or other entrenched structures can also contribute to unintended consequences.^{32–35} If changes promoted in structural interventions conflict with existing social, cultural, religious, or other structures of the local community, the intervention may be less efficacious or generate adverse effects. Structural interventions must be developed and evaluated with sensitivity and appropriateness to existing local sociocultural structures, should be planned and tailored in collaboration with the communities directly impacted by the intervention, and should integrate the cultural, historical, and psychological factors that influence targeted behaviors.^{36–39} Finally, it is critical that these programs undergo rigorous, long-term evaluations to understand their intended and unintended impact on health disparities.

CHALLENGES

We identified several challenges to developing and deploying structural interventions that have the potential to reduce disparities. To fill knowledge gaps, new research and policies are needed in several domains, including theoretical frameworks, measurement, study design, funding, evaluation, and dissemination.

Common Framework and Research on Mechanisms

The task of identifying the distinct social-ecological factors that contribute to health risks and disparities and targeting these multiple contexts and levels of influence can be complex and pose several challenges to developing, implementing, and evaluating structural interventions.⁴⁰ The domains and levels of influence are often dynamic, juxtaposed, and interact with one another, resulting in synergistic intervention effects. These interacting factors complicate the measurement of individual and collective impacts, particularly over short timeframes, and potentially hinder the ability to prioritize meaningful solutions. Standard epidemiologic methods may not adequately measure the outcomes and the impact on disparities. For naturally occurring social experiments, such as universal pre-K in poor neighborhoods, tax credits, and food environment interventions, this challenge of attribution remains salient despite the emerging science in this area. Better understanding of the mechanisms through which structural interventions succeed or fall short in improving minority health and reducing disparities is critical to informing and advancing the development, scalability, and

sustainability of these programs and policies.

Improved Measurement and Methods

Measurement and methodological issues are critical to narrowing the evidence gap and elucidating the role of structural interventions in reducing and eliminating health disparities. The literature reviewed for this article revealed that interventions targeting social and, specifically, structural determinants represent a broad class of strategies and approaches that cut across multiple sectors and domains of influence. As described in the previous section, these interventions target a range of issues, from early childhood education, fiscal and tax policies, housing access, and neighborhood environments, to structural racism. Although individual interventions may have positive effects, the lack of standardized definitions of structural factors and consistent criteria for classifying different sets of relevant interventions and the limited inclusion of process and outcome measures related to health in many of these interventions impede opportunities to compare and evaluate their impact on a range of health disparities.

Despite opportunities for analyzing and linking existing data across systems, such as electronic health records, registry data, and non-health sector data, there are limitations in utilizing these data for evaluating structural interventions. Investigators and evaluators may not have contributed to intervention design, implementation, or evaluation; therefore, the measures needed to determine causal inferences are lacking or unavailable. Consistent and valid measurement across different

sectors is also a concern if, for example, important variables such as race or ethnicity are inadequately measured or specified.

Rigorous Study Designs

There is limited capacity and technical expertise for linking large data sets across multiple sectors to evaluate the impact of structural interventions. Related to this issue is the need for greater interoperability and harmonization across different data systems and for a common set of minority health and disparities-related data elements that can be captured across health and nonhealth sectors. In this era of big data, a number of challenges continue to impede the culling of disparate data sets to meaningfully analyze community-wide and system-level interventions.

Limited Funding for Structural Interventions

Tackling structural determinants, such as a lack of affordable housing, poverty, and limited educational attainment, requires substantial investment from the national to the local community level across health and nonhealth sectors. However, funding is often siloed within sectors and allocated in tightly restricted ways that limit

innovation and collaboration, even when organizations recognize the value of working collectively around shared goals and strategies.

Changing Priorities and Longer-Term Investment

Structural interventions often evolve in response to emerging policy, funding, or political priorities, and thus may be implemented in an iterative, discontinuous manner. Another challenge is the long follow-up periods required to observe and measure health outcomes, and especially to document decreases in health disparities, thus necessitating prolonged, multilevel evaluations that extend far beyond typical funding cycles. Structural interventions may require years, sometimes decades, of follow up before improvements in health outcomes can be observed.^{14,15,18} Most research grants are between 3 and 5 years, a timeline too short to assess long-term impact on reducing health disparities. The examples of ParentCorps and the Earned Income Tax Credit illustrate the need in disparities research for long-term interventions to understand downstream effects of these structural interventions on minority health and health disparities.

Dissemination and Implementation Gaps

Although the evidence base for structural interventions to address health disparities is growing, evaluation data are still lacking on sustainability, scalability, and replicability of successful interventions.^{41,42} Furthermore, the growth of evidence-based strategies has not been matched by data that inform understanding of the processes that lead to adoption and implementation in different geopolitical contexts and resource environments. The costs of structural interventions pose additional challenges as communities determine which interventions may offer the best return on investment in population health improvement and reduction in health disparities. There is a lack of clarity of the trade-offs for choosing one set of interventions versus another and how much those strategies cost per person in different communities.

FUTURE DIRECTIONS

Structural interventions are fundamentally rooted in understanding, and often altering, the contexts through which health disparities emerge and persist. They tackle complex combinations of structural determinants of health, including culture, social

position, racism, environmental settings, and policies. Their common features that have successfully mitigated or eliminated disparities include accounting for the social and physical contexts that produce or perpetuate disparities, authentic engagement and integration of community and other stakeholders in all phases of the research process, and taking a disease-agnostic approach to promote disparities reduction across different conditions and at multiple levels. Furthermore, effective implementation and evaluation require close attention to the timing and location of the intervention and both intended and unintended outcomes. However, significant gaps remain in our knowledge. The following sections and the box on this page present recommendations for reducing these knowledge gaps and advancing the science of health disparities research.

Promote Community and Stakeholder Engagement

A key element of successful structural interventions is the critical role of community and stakeholder engagement in identifying the needs of disparity populations and communities, developing shared goals, and supporting meaningful, sustainable, and scalable interventions.

KEY RECOMMENDATIONS FOR STRUCTURAL INTERVENTIONS TO REDUCE HEALTH DISPARITIES

- Promote the science of community and stakeholder engagement in assessing structural determinants of health and designing meaningful relevant interventions to reduce health disparities.
- Strengthen scientific frameworks to evaluate long-term impact of structural interventions on health disparities.
- Develop robust methods and measures to evaluate structural intervention impact in reducing disparities.
- Support dissemination and implementation science research for structural interventions on health disparities to enhance understanding of what strategies work across different populations, disease conditions, and geographic settings.
- Harness innovative and evidence-based approaches to addressing disparities.
- Support multilevel and multisectoral interventions that tackle structural determinants with rigorous evaluation methods and population-level data infrastructure building to assess changes over time in reducing health disparities.

The development, implementation, evaluation, translation, and dissemination of structural interventions require early and continuous input by the communities who bear the disproportionate burden of disease and by the stakeholders who are instrumental in efforts to sustain and scale successful practices. Community-engaged approaches result in the development of strategies that have direct relevance and practical benefits to local communities, leading to better integration of science, practice, and policy. Stakeholder engagement also informs the development of strategic partnerships across a range of sectors (such as housing, food systems, transportation, criminal justice, and health care) to address domains that contribute to health disparities at each level of influence.

Strengthen Scientific Frameworks

As noted earlier, few interventions aimed at structural determinants are guided by scientific frameworks. The effectiveness of these real-world efforts may be influenced by intersecting political, legal, economic, cultural, and biomedical factors that should be considered and accounted for in their design and evaluation. A critical step in addressing the inherent complexity of structural interventions is developing and adopting a scientifically credible conceptual framework or theory of change that incorporates these diverse factors and the roles they are anticipated to play in health disparities.

Develop Robust Methods and Measures

Robust evaluation designs and measures—derived from a broad range of disciplines and capable of

harnessing big data across sectors—are needed to address the evidence gap in our understanding of the impact and reproducibility of structural interventions developed to reduce health disparities. Big data science is rapidly evolving and should engage health disparities researchers who have expertise in social and structural determinants of health. Addressing measurement and data collection challenges requires broad-based strategies, among them, mixed-method evaluation, stakeholder involvement in designing the intervention and evaluation, multisector agreement on common nomenclature and measurement, standardized measurement systems, effective methods to harmonize disparate data, and novel modeling strategies⁴³

Some structural interventions may not be suited to traditional research designs because of cost and time constraints, ethical considerations, an inability to randomize sites or individuals, or the continually evolving nature of the intervention. Robust and validated approaches, such as stepped-wedge or staggered interventions, interrupted time-series, quasi-experimental designs, and cluster or group-randomized trials can facilitate rigorous evaluation at the individual, interpersonal, community, and societal levels.⁴⁴

Construct and Analyze Connected Data Sets

Optimally, studies should be prospective and should include data from multiple sectors that allow examination of the impact of structural interventions on population health and health disparities. Historical data from various sectors may provide important insights into the

development and evaluation of long-term impact of structural interventions by identifying simultaneous changes in social and health indicators over time that are associated with health disparities. Predictive analytics and other robust methods can inform decision-making on the nature and scope of various structural interventions and strategies to optimize health impact and disparities reduction.

Support Research

Understanding how structural interventions that were successfully developed in one community might be adapted, scaled up, and transferred to another setting is of critical importance. Promising and evidence-based structural interventions do not easily translate into improved health and reduced health disparities because it takes time, resources, and multidisciplinary teams to improve the relevance, uptake, and implementation of evidence-based interventions in real-world settings. Dissemination and implementation research training has great potential to improve the reach and impact of structural interventions on minority health and health disparities.

Harness Innovation

Advances in several disciplines are rapidly changing the ability to design, implement, and evaluate structural interventions. Technological advances, including big data science, can be mobilized to explain and address disparities. Many health system interventions have made innovative use of electronic health records as tools to characterize social and structural characteristics of populations, identify targets for intervening, and deploy interventions.

Geographic information system platforms can link individuals to social and structural risks and resources. Similarly, advances in fields such as personalized medicine, personalized public and population health, systems science, and computational biology may result in powerful predictive tools to identify those at highest risk for disparities and link them to appropriate structural interventions.

Fund Cross-Sector Interventions

To conduct well-designed structural interventions and robust evaluations, resources are needed to promote interactions among stakeholders from disparate sectors to plan and develop large-scale meaningful structural interventions that can effectively reduce health disparities in populations and communities. Trans-federal agency collaborations and public-private partnerships may be promising approaches to intervening on health disparities. Standardizing approaches for motivating multistakeholder collaborations is a critical need in disparities research. Future efforts should focus on building partnerships among sectors in the earliest phases of intervention design by providing resources to support multisector partners. These early partnerships can plan effectively by using a collective impact framework and group facilitation to support consensus building that effectively translates evidence into practice. In addition, these collaborations should have an explicit emphasis on informing the collection of shared metrics and facilitating opportunities to support interoperable data systems to access large classes of epidemiological, environmental, social, and biological data

to determine the impact on advancing health equity and improving population health.⁴⁵

Develop Decision-Making Tools

Many local communities recognize the role of structural determinants on health and social outcomes but face the challenge of identifying the interventions most likely to influence their populations' social and health outcomes. An emerging solution is the collation of evidence-based interventions in registries and reports, among them the National Registry of Evidence-Based Programs and Practices, the What Works Clearinghouse, and the Community Guide, along with an increasing number of databases that aim to help local communities examine health and social indicators at the state, county, and local level, such as the 500 Cities: New Data for Better Health and County Rankings Projects and The Opportunity Atlas. NIMHD is currently developing an Intervention Portal to serve as a repository for interventions that have successfully improved minority health or reduced health disparities. This portal is part of *HDPulse* (<https://hdpulse.nimhd.nih.gov>), an ecosystem that provides access to data and resources to design, implement, and evaluate evidence-based interventions to improve minority health and reduce health disparities. There is potential to harness expertise in predictive modeling and analytics to help local communities and states determine which structural interventions may yield the most meaningful reductions in health disparities.

Systems science—in particular, agent-based modeling—may aid in evaluating the influence of structural factors on health

behaviors, outcomes, and costs, both independently and as they interact with other factors within the social-ecological framework.⁴⁶ When paired with community-based data tailored to local settings, simulation modeling may facilitate prioritization of programs and interventions in communities, particularly resource-constrained environments.⁴⁷

CONCLUSIONS

Health and health disparities are the result of more than individual, interpersonal, or biological factors. Social, economic, environmental, and policy drivers also determine the health status of individuals and populations. Structural determinants play a vital role in health outcomes and the ability to seek preventive and treatment services or support for quality of care. Structural interventions should seek to change the social and environmental contexts that yield and perpetuate social and health inequalities. They can advance health equity by changing the conditions in which people live, work, learn, and play, and the community norms that influence and derive from these conditions. To tackle health disadvantage and gradients in populations, researchers must build the scientific base for multisector stakeholder engagement; extend beyond individual outcomes to community and system-level outcomes; expand methods for implementing, evaluating, and disseminating multilayered, multifaceted interventions; support the data science and infrastructure for more robust evaluations of social and health indicators; and prioritize funding for well-designed

structural interventions and rigorous evaluations. **AJPH**

CONTRIBUTORS

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The authors declare no conflicts of interest.

HUMAN PARTICIPANT PROTECTION

Human participant protection was not required because this work did not involve human participants.

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