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Evaluating Strategies For Reducing Health Disparities By Addressing The Social Determinants Of Health

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ABSTRACT The opportunities for healthy choices in homes, neighborhoods, schools, and workplaces can have decisive impacts on health. We review scientific evidence from promising interventions focused on the social determinants of health and discuss how such interventions can improve population health and reduce health disparities. We found sufficient evidence of successful outcomes to support disparity-reducing policy interventions targeted at education and early childhood; urban planning and community development; housing; income enhancements and supplements; and employment. Cost-effectiveness evaluations show that these interventions lead to long-term societal savings, but the interventions require more routine attention to cost considerations. We discuss challenges to implementation, including the need for long-term financing to scale up effective interventions for implementation at the local, state, and national levels.

Despite improvements in medical care and in disease prevention, health disparities persist and could be increasing for chronic conditions such as obesity, cardiovascular disease, and cancer.[1,2] African Americans and other economically disadvantaged racial and ethnic minorities, and populations of all races with low socioeconomic status, experience large disparities in health. There is growing recognition that social determinants—the conditions in which people live, learn, work, play, and worship—can affect health and produce disparities. Social determinants that negatively affect health and well-being include poverty, lack of access to high-quality education or employment, unhealthy housing, unfavorable work and neighborhood conditions, and exposure to neighborhood violence.[3] Exposure to disadvantage can have deleterious neurodevelopmental and biological consequences beginning in childhood that accumulate and produce disease.[4] Yet current intervention strategies to reduce health disparities do not typically take a "life-course perspective" and tend to be disease specific, often targeting individual and health systems factors without addressing social determinants.

Interventions targeting individuals include improving health and lifestyle behaviors; reducing so-called socio-contextual barriers, such as access to adequate food and employment resources;[5] and delivering culturally and linguistically tailored health programs to specific individuals or groups.[6] Interventions targeting health systems that address discrimination, access to care, and quality of care are also important.[7] However, these approaches are not sufficient to address social determinants such as neighborhood conditions or poverty, which are also fundamental drivers of persistent health disparities.[3,8] For example, if one's neighborhood is unsafe even during daylight hours, interventions targeting outdoor physical activity are unlikely to be effective.[3] As Thomas Frieden's

five-tier Health Impact Pyramid suggests, the greatest health impact likely will come from interventions targeting socioeconomic factors that drive health disparities across multiple conditions.[9]

This article provides an overview of scientific evidence on interventions that address social determinants and can improve population health and reduce disparities. The studies included herein were identified by a working group of investigators from multiple institutions and disciplines who were supported by the National Institutes of Health (NIH)-funded Centers for Population Health and Health Disparities. These centers, located at ten institutions across the country, were established to better understand and address disparities associated with cancer and cardiovascular disease.

Interventions addressing upstream social determinants, such as social structures and policies including education and early childhood, urban planning and community development, housing, income enhancements and supplements, and employment, should be a central focus of health policy development, implementation, and future research. Although the interventions we discuss primarily target a single social determinant, they likely have ripple effects across others.

Surveying The Evidence On Interventions

EDUCATION AND EARLY CHILDHOOD Improving access to high-quality education likely improves health.[10] Early childhood interventions, such as early childhood education and parental support programs, have positive health impacts and help address economic disadvantage and health disparities.[11,12] Because of their potential to improve outcomes for both parents and children, and to produce ongoing health and socioeconomic benefits over time, these interventions can yield a sizable return on investment. As such, there is growing consensus that adopting a life-course perspective (focusing on how experiences early in life can affect health over a lifetime and even across generations) is critical to improving population health and reducing and eliminating health disparities.[3,11]

The Perry Preschool Project—a two-year program carried out in the 1960s in which African American three- and four-year-olds from a disadvantaged community in Michigan were randomized to receive high-quality preschool education or not—was designed to improve educational outcomes and reduce the risk of school failure. While the intervention was not designed to assess health impact, it did find that children receiving the preschool intervention had higher rates of safety-belt use and engaged in fewer risky health behaviors such as smoking and illicit substance use in adulthood, compared to those in the control group.[13] Findings suggested the likelihood of improved health as adults, as well. At age forty, those who received the preschool intervention had higher education, income, and health insurance coverage and lower rates of violent crime, incarceration, welfare receipt, and out-of-wedlock births compared to the control group.[14]

In the Carolina Abecedarian Project—a longitudinal study in North Carolina in the 1970s—economically disadvantaged children (mostly African American) up to age five were randomly assigned to an early childhood intervention group or a control group.[15] The intervention consisted of cognitive and social stimulation including supervised play, daily structured academic instruction, and weekly home visits from teachers. At age twenty-one, the intervention group had fewer symptoms of depression, lower marijuana use, a more active lifestyle, and significant educational and vocational benefits compared to the control group.[16,17] By their mid-thirties, intervention-group members had lower body mass index and fewer risk factors for cardiovascular and metabolic disease compared to control-group members.[15] Return-on-investment estimates from these and other early childhood programs range from returns of three dollars to seventeen dollars per dollar invested.[12]

A 2008 report from Washington State showed that the Nurse Family Partnership—an early childhood home visitation program targeting low-income first-time mothers—yielded an estimated $18,054 net benefit per participant over the long term,[18] largely from reductions in crime, violence, child abuse, and other high-risk behaviors. Estimates of benefits included those directly experienced by participants and those to taxpayers and society (for example, via lower crime rates among participants, which would reduce costs to the criminal justice system).

Studies of the federally funded Head Start program, on the other hand, were not as promising and showed no consistent evidence of positive health impacts.[19] This might be because of variability in implementation across sites and lack of adherence to a set curriculum. A 2015 study of Head Start in Michigan did find that participants had decreased obesity rates compared to non participating children.[20] Other early childhood and education interventions have shown improvements in the educational outcomes of disadvantaged children, which likely translate into increasing socioeconomic status and, thus, better health outcomes in adulthood. But the health

impacts of many promising educational interventions have not been assessed.[21] For example, the schools in the Harlem Children's Zone initiative, which combines rigorous education at a Promise Academy charter school with access to multiple community services for children living in a ninety-seven-block area in Harlem, New York, eliminated the black-white academic achievement gap in math over the four years from enrollment in middle school to the completion of ninth grade. Similarly, the racial academic achievement gap in math and English language arts observed at enrollment in elementary school was eliminated by the third grade.[22]

URBAN PLANNING AND COMMUNITY DEVELOPMENT Citing persistent disparities in cardiovascular disease and obesity, the National Prevention Strategy released by the National Prevention, Health Promotion, and Public Health Council in June 2011, emphasized the importance of healthy community environments.[23] Studies have found that changes in nutrition, physical activity, and safety within communities can be achieved through urban planning and community development, which might also improve health behaviors.[24]

Research from the Healthy Food Financing Initiative in Philadelphia, Pennsylvania, suggests that policies and programs addressing access to healthy foods can increase awareness of viable options among residents.[25] While increasing availability and awareness is insufficient by itself, when accompanied by skill-building programs that improve consumers' food-shopping behaviors and nutritional knowledge, stocking policies at stores (including where to place products to make purchase of healthy items the default choice), and price adjustments (such as taxes on unhealthy food or subsidies for healthy food), these interventions can change behavior.[25]

Urban planning and community development can also encourage physical activity. Project U-Turn in Michigan sought to increase active transportation (biking, walking, and transit use), including active transportation to school. The project was associated with an increased proportion of children walking to school and an estimated 63 percent increase in active transportation citywide.[26]

Interventions that address the distribution and density of alcohol outlets in low-income communities can affect substance abuse–related morbidity, crime, and neighborhood safety. Alcohol outlets are often overly concentrated in low-income minority communities.[27] The Centers for Disease Control and Prevention's Guide to Community Preventive Services[28] touts interventions targeted at reducing the density of alcohol outlets as evidence-based approaches for reducing alcohol use, abuse, and related morbidity. Observational studies provide compelling evidence that decreasing the density of and proximity to alcohol outlets can reduce risk of violent crime, as well.[29] Such evidence has informed urban planning and policy efforts in some communities,[30] but rigorous evaluations of urban planning policy reforms aimed at curbing overconcentration of alcohol outlets in disadvantaged communities are needed.

Although the interventions we discuss primarily target a single social determinant, they likely have ripple effects across others.

HOUSING Housing quality and safety are known to affect health.[31,32] Interventions for lead abatement and indoor air quality improvement have reduced childhood lead poisoning and asthma morbidity, respectively.[33,34] Although not originally designed to evaluate health outcomes, housing mobility programs intended to increase low-income families' access to economic opportunity and safer neighborhoods have also demonstrated potential health impacts.[35]

Among them is the Scattered-Site Public Housing Program in Yonkers, New York, which randomized low-income residents to newly constructed low-income housing in middle-income neighborhoods or to continued residence in poorer neighborhoods. Moving to middle-income neighborhoods was associated with better self-reported health and decreased substance use, increased rates of employment, and decreased exposure to neighborhood violence.[35] The Moving to Opportunity (MTO) for Fair Housing Demonstration Program, one of the most rigorous housing mobility evaluations in the United States, also showed significant health impacts.[36,37] A randomized controlled trial of the federally funded Section 8 housing voucher program, MTO included participants in multiple cities who were randomized to one of three conditions: receipt of a housing voucher to move to a low-poverty neighborhood (experimental

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group), receipt of a housing voucher for use anywhere, or continued residence in public housing (control group). Randomization to the experimental group was associated, more than a decade later, with decreased risk of extreme obesity and diabetes and increased physical activity, and improved mental health and well-being, for the study population.[36,37]

INCOME SUPPLEMENTS In the United States, examples of income enhancements and supplements include the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); the Earned Income Tax Credit (EITC) for low-income families; and Social Security income (Old Age and Survivors Insurance) for the elderly. Most evidence on the health impacts of these programs comes from natural experiments.[8] WIC has been associated with reduced rates of low birthweight, and these effects appear stronger for women with lower versus higher education levels.[38] The EITC has been associated with reductions in low birthweight and maternal smoking.[39] The same research suggests that some associated health benefits, such as improved birth outcomes, might be greater for blacks than for whites. The initiation of the Social Security program was associated with decreased mortality for the elderly and larger declines in mortality over time as benefit levels increased.[40]

Conditional cash transfers, a cash benefit that is contingent upon certain behaviors by eligible beneficiaries, are less studied in high-income countries, but research in low- and middle-income countries suggests that they might be effective in increasing preventive care use and improving nutrition, health behaviors, and birth outcomes.[41] They could reduce disparities if the amount of cash transfer increased based on beneficiaries' level of economic disadvantage such that the poorest receive the largest cash amount.[42] The Five Plus Nuts and Beans pragmatic randomized controlled trial conducted at the Johns Hopkins Center for Population Health and Health Disparities, one of the NIH-funded centers mentioned above, suggests that pairing conditional cash transfers for use on groceries with nutritional counseling among African Americans with controlled hypertension is associated with increased fruit and vegetable consumption and improved dietary patterns.[43]

The Great Smoky Mountains Study in North Carolina examined the impact of income supplements to American Indians resulting from casino revenue. These supplements were associated with improved mental health outcomes in adolescence that persisted through early adulthood, increased education and reduced criminal offenses among American Indian youth, and the elimination of the racial disparity on both of these outcomes.[44,45]

EMPLOYMENT Employment can have both positive and negative impacts on health through effects on resources, chronic stress, and political power,[46] but there is limited population-level research examining the health impacts of employment interventions. Research on the effects of civil rights policies, including equal access to employment, indicates that the employment and income gains that resulted led to increases in life expectancy between the mid-1960s and the mid-1970s that were larger for blacks than whites, and greater for black women than black men.[47] Research examining employment interventions for specific vulnerable groups, including low-socioeconomic-status women and people with severe mental illness, also suggests that employment interventions could be effective in reducing health disparities in these populations.[48,49] For people with severe mental illness, employment improves quality of life, finances, and social support.[49] Participation in supported employment, an evidence-based practice assisting people with severe mental illness to obtain and maintain employment, is associated with improved employment outcomes.[50]

Discussion

Health disparities have significant economic impacts, and reducing and eliminating disparities is a moral imperative that is also advantageous to the US economy. Eliminating disparities in morbidity and mortality for people with less than a college education would have an estimated economic value of $1.02 trillion.[51] Furthermore, research suggests that eliminating racial and ethnic disparities would reduce medical care costs by $230 billion and indirect costs of excess morbidity and mortality by more than $1 trillion over four years.[52]

As we have shown, there is sufficient evidence

to support policy interventions that focus on the social determinants of health, including interventions targeted at education and early childhood, urban planning and community development, housing, income enhancements and supplements, and employment. In particular, early childhood interventions have demonstrated consistent effectiveness at improving long-term health outcomes for disadvantaged children and families, are associated with accrued health-related benefits into adulthood, and are cost-effective.[12]

Yet some scholars and public health practitioners continue to oppose strategies that prioritize intervening in early childhood, noting that the prevalence of costly diseases is much higher among adults than children. While the need for prevention and treatment efforts among older populations with disparities remains, intervening in early childhood is the most economical way to interrupt the cascade of events that puts children at increased risk of poor health outcomes in childhood and adulthood.

The studies described also have several limitations. First, most of the interventions discussed were not designed a priori to assess health impacts, or health disparities per se. Second, several of the studies were natural experiments that did not randomize participants to intervention or control groups, which means that systematic differences between intervention recipients and historical controls might exist, and effects of secular trends might not have been measured. Finally, given the long lag time between the intervention and measurement of health outcomes (particularly for early childhood studies), it is possible that other unmeasured factors are responsible for observed outcomes. Nevertheless, many of the interventions described—particularly in the early childhood and housing domains and those using long-term follow-up and randomization—represent high-quality scientific evidence of the health impacts of social determinants interventions that are far removed from traditional health policy.

Efforts to reduce disparities should focus on scaling up these interventions for implementation at the regional, state, and national levels. Effective implementation will likely require government investment and social welfare reforms, such as universal access to high-quality early childhood education programs, greater access to affordable housing, and efforts to increase housing mobility coupled with strategies for revitalizing neighborhoods. Obstacles remain, including lack of political will and access to long-term financing for these interventions, and threats to maintaining the high quality of interventions when scaling up. Funding and sustaining programs such as those presented here will be key, perhaps through public-private partnerships, social impact bonds (whereby investments in social programs that achieve desirable societal outcomes are funded by leveraging savings generated from program successes to spur private-sector investment), or tax reform. For example, 2006 legislation approved by voters in Denver, Colorado, sets aside a portion of sales tax revenue to fund the Denver preschool program. Also, voters in San Antonio, Texas, approved a sales tax increase to fund "Pre-Kindergarten for San Antonio," which offers high-quality, full-day preschool for all four-year-olds.[53]

The complex interplay of factors that has resulted in persistent health disparities cannot be reversed with short-term investments.

There is a critical need to invest in research designed a priori to evaluate the potential of social determinant–related interventions to improve health outcomes and reduce health disparities. This includes research designed to understand and minimize unanticipated negative consequences of interventions. For instance, interventions to optimize housing and supplement income have been associated with unanticipated negative health impacts. The income supplements received in the Great Smoky Mountains Study were also associated with increased accidental deaths and substance use in the specific months that households received payments[54] and in increased adolescent obesity among teens in low-income families.[55] In a subanalysis of MTO data, assignment to the group receiving housing vouchers to move to a low-poverty neighborhood was associated with increased mental health problems among boys.[56] Efforts to evaluate the health impacts of housing mobility programs should also assess their impacts on residential stability, social networks, access to services, and exposure to new stressors associated with moving.[57,58]

Furthermore, housing mobility interventions

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alone do not eliminate the threats to health that remain for those unable to move, and it is not feasible to move all poor households. Research evaluating the health impacts of neighborhood transformation and revitalization initiatives is also needed.

Data on the impacts of social determinant–focused interventions on health cannot come solely from randomized controlled trials. While such trials might be the gold standard for research, they are not the only source for generating valuable scientific information. In the real world, policy makers should act on the basis of the best available data, including natural experiments and demonstration projects.[59]

The complex interplay of factors that has resulted in persistent health disparities cannot be reversed with short-term investments. Social determinant–related interventions designed to create structural changes must be coordinated with long-term efforts to change social and cultural norms, build on existing community strengths, and change the opportunity costs associated with healthy behaviors to make the healthy choice the default choice. For such interventions to have sustained, intergenerational positive health impacts, they must be coupled with attention to social marketing, behavioral economics, social services, and other supports.

Quantifying cost savings more globally—that is, including savings accrued later in life and from nonhealth sources—is also critical. It also raises important questions about how to reallocate savings accrued in the health care sector that result from investments in other sectors, such as education, housing, employment, finance, and community development and urban planning. Individual program cost-effectiveness studies, although valuable, are insufficient to quantify the economic impact of social determinants interventions, which may have life-long ripple effects across multiple domains. Instead, long-term modeling studies are needed and must address indirect and opportunity costs, and account for indirect effects of upward social mobility on health.

To optimize health outcomes, we must also use existing research to "connect the dots" between interventions in multiple domains. Future research should also identify how best to deliver interventions to both improve overall population health and reduce health disparities.[60] For example, a community development intervention that improves physical activity for all community residents could actually widen disparities if increases in physical activity are greater for advantaged versus disadvantaged groups.

Conclusion

Interventions focused on the health care sector are insufficient to address population-level health disparities. Future research, policy, and implementation efforts should concentrate more on interventions targeting upstream social determinants of health, focusing in particular on interventions targeting children and families. Efforts should focus on scaling up proven interventions in the fields of early childhood and education, housing, urban planning and community development, employment, and income enhancements. They should also focus on strengthening the evidence base through future research and efforts to more comprehensively understand the economic impact of widespread implementation of social determinant–targeted interventions. ■

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