

# Social and Behavioral Interventions to Improve Health and Reduce Disparities in Health

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## Abstract

Large racial and socioeconomic status (SES) differences in health persist in the United States. In this chapter, we summarize empirical evidence that suggests that promising interventions exist to address the prominent features of these social inequalities in health in the United States. Research indicates that conditions of life linked to SES and geographic location are important drivers of social inequalities in health. We review research showing that policies and procedures that seek to enhance access to economic resources and improve neighborhood and housing conditions can have positive effects on the SES and health of disadvantaged populations. Also, effectively addressing health inequalities among adults requires a life course approach and efforts to address the accumulation of adversity over one's lifetime. Studies suggest that investing in early childhood interventions can lead to striking improvements in both socioeconomic and health indicators in adulthood. Given that there are racial differences in SES at every level of economic status, we also discuss the need for interventions to address the residual effects of race. We consider values affirmation interventions as an example of a race-targeted intervention that is seeking to identify aspects of racial disadvantage that may be missed by interventions that target an overall population. The challenges and opportunities of successfully reducing SES and racial/ethnic disparities are discussed.

## Introduction

In virtually every society, socioeconomic status (SES), whether measured by income, education, occupational status, or wealth, is a strong predictor of variations in health.<sup>1</sup> Similarly, in race-conscious societies such as Australia, Brazil, Canada, New Zealand, South Africa, the United Kingdom, and the United States, racial groups characterized by legacies of social exclusion, economic disadvantage, and political marginalization have worse health than the dominant racial groups in their societies.<sup>2</sup> These large, pervasive, and persistent social inequalities are significant public health challenges of our time.

In this chapter, we review research that suggests we can improve health and reduce inequalities in health through interventions that target the underlying social and psychological conditions that drive health. We begin with salient examples of racial and SES variations in health in the United States. Next, we review research on interventions that have the potential to enhance income, improve

neighborhood and housing conditions, early childhood experiences, and psychological factors linked to stigmatized racial status. Such interventions have the potential to improve both SES and health and reduce social inequalities in health. This review is not exhaustive, but it does seek to showcase research from randomized control trials and other studies that used rigorous evaluation designs. We conclude that there is a pressing need to develop a scientific research agenda for future interventions to reduce social inequalities in health.

### Social Inequities in Health

Coronary heart disease (CHD), the leading cause of death in the United States, accounts for one in every four deaths or about 600,000 deaths annually. Table 1 presents national age-specific CHD mortality rates for blacks and whites.<sup>3</sup> Both black men and black women have death rates from CHD that are substantially higher than those of whites from ages 25 through 84 and are especially elevated in early adulthood. A similar pattern is evident for multiple health outcomes in which disadvantaged racial groups have markedly earlier onset of disease, greater severity of disease, and poorer survival than their more advantaged counterparts.<sup>4</sup>

**Table 1. Age-specific heart disease death rates for 2010 for whites and blacks and black/white ratios**

Age	Males			Females		
	White (W) Rate*	Black (B) Rate*	B/W Ratio	White (W) Rate*	Black (B) Rate*	B/W Ratio
25-34	9.5	20.6	2.17	4.1	11.0	2.68
35-44	33.2	63.5	1.91	13.1	35.5	2.71
45-54	111.2	190.9	1.72	40.7	96.6	2.37
55-64	257.0	437.8	1.70	98.2	218.6	2.23
65-74	536.3	847.8	1.58	268.4	475.9	1.77
75-84	1,475.1	1,807.1	1.23	941.6	1,227.2	1.30
85+	4,943.1	4,202.7	0.85	4,086.7	3,783.8	0.93

Source: National Center for Health Statistics, 2012.<sup>3</sup>

\* Rates per 100,000 population.

SES—whether measured by income, education, occupational status, or wealth—is patterned by race and ethnicity,<sup>4</sup> and racial differences in SES contribute to disparities in health. Table 2 considers the complex relationship between race, SES, and CHD.<sup>5</sup> For blacks and whites, both males and females, there is a graded association between education and CHD mortality, with each higher level of education associated with a lower rate of death. Blacks who have less than 12 years of formal education have death rates from CHD that are at least twice as high as their counterparts with a

college degree or more education. These differences are even larger among whites. Similar patterns exist for a broad range of outcomes in the United States and elsewhere in which health improves, generally in a stepwise manner as SES levels rise.<sup>1,6</sup> Thus, although the lowest SES groups face the largest shortfalls in health, income and education affect the health of all individuals within a society.

Table 2 also shows that at every level of education, blacks have higher death rates from CHD than whites, with the black/white ratios increasing with every level of education such that the residual effect of race is markedly larger among college graduates than among blacks and whites who have not finished high school. This suggests that individual-level income and education do not fully account for the multiple components of social and economic disadvantage that are linked to minority racial status. Research reveals that income and education are not equivalent across race, with blacks and Hispanics, compared to whites, having lower earnings at each level of education, less wealth at every level of income, and less purchasing power because of higher costs of goods and services in their communities.<sup>4</sup> Added factors linked to racial/ethnic status also adversely affect the health of disadvantaged minority populations. Minorities live in markedly more health-damaging residential environments than whites and have higher exposure to multiple types of acute and chronic stressors over their life course, including the health-damaging aspects of institutional and interpersonal racism.<sup>7,8</sup>

**Table 2. Heart disease death rates, age-standardized, for blacks and whites aged 25-64, 2001**

Education	Females			Males		
	Black (B) Rate*	White (W) Rate*	B/W Ratio	Black (B) Rate*	White (W) Rate*	B/W Ratio
All	106.1	37.9	2.80	194.9	100.7	1.94
<12 years	132.9	97.8	1.36	262.9	214.9	1.22
12 years	142.1	50.1	2.84	258.2	145.2	1.78
13-15 years	73.0	25.1	2.91	120.0	73.1	1.64
16+ years	62.8	16.9	3.72	99.2	51.1	1.94
Low/High Ratio	2.12	5.79		2.65	4.20	

Source: Adapted from Jemal, Ward, Anderson, et al., 2008.<sup>5</sup>

\* Rates per 100,000 population.

Research reveals, for example, that the opportunities and resources that people have to be healthy are strongly patterned by place. There are multiple pathways by which neighborhood conditions can affect health.<sup>9,10</sup> For example, community variation in educational and economic resources, other social assets, and collective efficacy contribute to social inequalities in educational attainment, income, and employment. Neighborhoods also vary in access to health promoting goods and resources, ranging from the quality of the built environment, public services, commercial resources, and shopping that can promote and sustain health. Health-damaging exposures in homes and

neighborhoods tend to co-occur and are clustered in residential spaces where low SES individuals and racial/ethnic minorities comprise a disproportionate share of the residents. These include the density of fast food outlets and liquor stores, the concentration of tobacco advertising, higher levels of chemicals and pollutants in air, soil, and water, as well as greater exposure to social disorder, including crime and violence.

### **Interventions to Address Social Inequalities**

Scientific evidence indicates that reducing economic and social disadvantage, providing infrastructures that promote economic opportunity, and enhancing income to achieve an adequate standard of living can improve the health of disadvantaged populations.

### **Increased Household Income and Health**

Policy initiatives that provide households with additional income can lead to improved health. The Earned Income Tax Credit (EITC), the largest government cash transfer program to low-income working families in the United States, provides a cash award through the tax system. A study using variation in the Federal EITC over time and the presence of State EITCs found that the additional income reduced the rate of low birth weight and increased mean birth weight, with the effects being larger for blacks than for whites.<sup>11</sup> One study used changes in State EITC as a natural experiment and found that State EITCs increased birth weight and reduced maternal smoking,<sup>12</sup> while another study found that additional income from the EITC reduced hearing limitations among adults.<sup>13</sup> Additional income from the Supplemental Security Income (SSI) program also reduced disability in the elderly, with every \$100 increase in maximum monthly SSI benefits found to be associated with a 4.6 percent reduction in disability.<sup>14</sup> Other U.S. research documents that Social Security payments to individuals aged 65 years and older that began in 1940 have been associated with a mortality decline from non-infectious disease among the elderly.<sup>15</sup> Moreover, subsequent legislatively mandated increases in benefit payments were also associated with steeper declines in mortality for the elderly compared to younger people. Similarly, data from 18 OECD countries revealed that pension payments for the elderly were inversely related to all-cause mortality.<sup>16</sup>

The Great Smoky Mountains Study in North Carolina is a natural experiment that has documented that income supplements can improve health and reduce disparities. This study assessed the impact of the extra income that American Indian households received, due to the opening of a casino, on the health of the youth. The study found declining rates of deviant and aggressive behavior among adolescents whose families received additional income.<sup>17</sup> The lower risk of psychiatric disorders in adolescence when the youth lived at home persisted into young adulthood.<sup>18</sup> Additional income was also associated with higher levels of education and lower incidence of minor criminal offenses in young adulthood—especially for the households that were poor at the time of the inception of income supplements—and the elimination of Native American-white disparities on both of these outcomes.<sup>19</sup>

Conditional cash transfer (CCT) programs are initiatives that provide cash payments to low income families contingent on regular health care visits, school attendance, or participation in educational programs. They have been widely used in middle and lower income countries. A review of 13 CCT programs in low and middle income countries, all using experimental or quasi-experimental

designs, found that the programs were successful in increasing the utilization of preventive health services and immunization rates, improving nutritional and health outcomes, and encouraging healthy behaviors.<sup>20</sup> Early large scale programs in Latin America showed striking effects of reduced illness rates, child stunting, and rural infant mortality.<sup>21</sup> Design differences exist across the various CCT studies, and we are uncertain of all the optimal conditions.<sup>20</sup> Evidence indicates that additional cash is responsible for observed effects, although conditionality may be important for political support of CCT programs.<sup>22</sup>

Other evidence of the positive health impact of additional income comes from historical data, which have shown that the widening and narrowing of racial economic inequality have been associated with parallel changes in racial health inequalities. The Civil Rights Movement and related social policies addressing poverty led to improvements in the household income of blacks and a narrowing of the black-white gap in income from the mid-1960s to the late 1970s. The economic gains were larger for black women than for black men, and the improvements in life expectancy for African American females were larger than those of black males and whites.<sup>23</sup> Another analysis of national data revealed that between 1968 and 1978, black men and women, aged 35 to 74 years, had a larger percentage decline in mortality from all causes than their white peers.<sup>24</sup> Increases in life expectancy at birth during this period for black men (4.6 years) and women (5.7 years) were larger on both a relative and an absolute basis than those for whites (2.7 years and 2.8 years, respectively).

Another study documented that black women who were born during the time of improved economic well-being for blacks (1967-1969) had better health status as adults and were less likely to have infants with low birth weight and low APGAR scores than those born earlier (1961-1963).<sup>25</sup> In contrast, the health gains between these two cohorts for white women were negligible. The desegregation of Southern hospitals was also associated with a reduction in the black-white gap in infant mortality in Southern States between 1965 and 1975 and enabled an additional 5,000 to 7,000 black babies to survive infancy during this period.<sup>26</sup> However, the racial gap in health worsened when the economic gap widened. In 1978, black households received 58 cents of income for every dollar whites earned, but the income of blacks fell relative to that of whites during the 1980s. In tandem with the widening economic gap, racial disparities in health widened for multiple indicators of health status during that decade.<sup>8</sup> For example, for 5 years in a row, the life expectancy of blacks declined from the 1984 level, while there were small but consistent increases in life expectancy for whites during the same period.

A meta-analysis of financial incentives in high-income countries found that they were successful, at least in the short-term, in increasing healthy behaviors such as reducing cigarette smoking and drug misuse, with the size of the of the financial payment positively associated with the magnitude of the effect.<sup>27</sup> Similarly, a meta-analysis of nine weight loss trials found no benefit of additional income on long-term weight loss (12 months or longer).<sup>28</sup> On the other hand, a randomized controlled trial focused on smoking cessation found that financial incentives can have long-term effects on health behavior change when the incentive is large (\$750) and provided incrementally, with the largest payment (\$400) at the 12-month benchmark.<sup>29</sup> In sum, there is a dose-response relationship between financial incentives and behavior change, and health behaviors that are complex need a frequent and incremental schedule of incentives and reinforcement payments, with the timing of the financial reward in close proximity to the behavior to both initiate and sustain changes.<sup>30</sup>

## Improving Neighborhood and Housing Conditions

A review of housing interventions that have been evaluated for their health impact concluded that although the assessment of health outcomes has been limited in these studies, improving neighborhood conditions has been associated with better self-reported measures of health.<sup>31</sup> In the Yonkers housing intervention, for example, public housing residents randomized to move to newly constructed public housing with better conditions reported better health, less substance abuse, and less neighborhood disorder and violence 2 years later compared to families that had not moved.<sup>32</sup> People in the intervention group also had higher rates of employment and lower levels of welfare use compared to those in the control group. The strongest evidence comes from the Moving to Opportunity (MTO) project in which low-income public housing residents in five American cities were randomized to a treatment group and two comparison groups. The treatment group received housing vouchers that allowed them to secure housing. After 3 years, criminal victimization was lower, and the health of parents and sons was better in the treatment group.<sup>31</sup> After 10 to 15 years, the treatment group had lower rates of severe obesity and diabetes risk<sup>33</sup> and higher levels of mental health and subjective well-being.<sup>34</sup>

## Interventions that Address Early Childhood Conditions

The foundations of SES and health in adulthood are laid in childhood, and preschool interventions have had striking findings. Since 1977, three large randomized control trials with low income, white, African American, and Hispanic adolescent or unmarried pregnant women have documented that the Nurse-Family Partnership (NFP) program positively affects a number of child and parent health and socioeconomic outcomes.<sup>35</sup> Controls in these trials received standard prenatal and postnatal health care services and transportation vouchers to get to their medical care site. Intervention group participants received home visits by nurses during their pregnancy and the first 2 years of their infants' lives. These visits focused not only on improving maternal health practices and facilitating access to any needed treatment but also sought to assist participants with parenting skills, links to needed human services, planning for subsequent pregnancies, and facilitating maternal educational and employment opportunities. The NFP led to improvements in prenatal health-related behaviors, pregnancy outcomes, intervals between the birth of the first and second child, the stability of relationships with current partners, and maternal employment. It also reduced rates of child abuse and neglect, subsequent pregnancies, and use of welfare programs and food stamps. The positive effects of the program were stronger among mothers at high risk (low income, unmarried, or a teenager). Cost-benefit analysis documented an \$18,054 per family return to society (due to reduced crime, substance abuse, teen pregnancy, child abuse and neglect, and domestic violence).<sup>36</sup>

In the Michigan-based Perry Preschool Program, African American 3 to 4 year olds from a public housing project were randomized to a 2-year school-based early childhood intervention that included sessions at school and home visits by the teacher.<sup>37</sup> At age 10, children who attended the preschool did not have higher IQ scores than the controls, but they had higher test scores.<sup>38</sup> At age 40, the intervention group had higher income, education, health insurance coverage, and home ownership and lower rates of crime, out-of-wedlock births, and welfare assistance compared to the controls.<sup>37</sup> At age 40, the intervention group also had better overall health and engaged in fewer

risky behaviors (driving without a seat belt, smoking, illicit use of sedatives, marijuana, LSD, cocaine, heroin), although there were no differences in reported medical conditions.<sup>39</sup>

The North Carolina Abecedarian Project (ABC) is a randomized long-term study in which economically disadvantaged infants, born between 1972 and 1977, were randomly assigned to a high-quality early childhood program.<sup>40</sup> The early childhood interventions, which enrolled the children from birth to age 5, consisted of cognitive and social stimulation, caregiving, and supervised play for 8 hours per day. At age 21, the intervention group had fewer symptoms of depression, lower marijuana use, a more active lifestyle, and significant educational and vocational benefits compared to the controls.<sup>41,42</sup> By their mid-30s, children who received the preschool intervention had lower levels of multiple risk factors (elevated blood pressure, metabolic syndrome, and excess weight) than controls.<sup>40</sup> Thus, access to pediatric care, good nutrition, and a safe and nurturing environment in the preschool years translated into better health in early adulthood. Economic analyses reveal that early childhood programs have a net return to society of \$3 to \$17 for each dollar invested.<sup>43</sup>

## Psychological Interventions to Address Racism

As noted, the residual effects of race when SES is controlled reminds us of the importance of intervening on race-related aspects of social experience that can affect SES and health. Research reveals that racial discrimination is ubiquitous in the lives of racial minorities and can lead to elevated risk of a broad range of negative health outcomes and explain some of the residual effect of race when SES is controlled.<sup>8</sup> Given historical and contemporary institutional bias, stereotypes, and discrimination, one need not encounter overt discrimination for the effect of race-related stress to undermine well-being. For instance, an African American patient visiting a white physician could have concerns that he or she will be perceived as unintelligent and noncompliant. Experiencing such concerns, termed “stereotype threat,” is stressful and can trigger a coordinated set of neuro-physiological responses involving the hypothalamic-pituitary-adrenocortical (HPA) axis, the cardiovascular system, and the immune system.<sup>44</sup> Psychological interventions can reduce at least some of the negative health effects of race-related stressors and thus contribute to a reduction of health disparities. While they do not eliminate exposure to race-related stressors, psychological interventions can buffer people from their pernicious effects by altering how they perceive, appraise, and respond to psychologically threatening situations. Such interventions can be easy, cost effective, and have enduring benefits, particularly when the efforts are well-timed.<sup>44</sup>

Research shows that the effects of stereotype-threat on academic performance can be mitigated by short, structured writing exercises, called values-affirmations.<sup>44</sup> With this exercise, individuals select and write about a personally relevant value (e.g., humor, honesty, relationships with others, religion). Affirmations buffer people’s sense of self-integrity—their sense of being competent, effective, and able to control important outcomes—in environments that are threatening the negative effects of racial stigmatization on academic performance. Thus, people are better able to tolerate and cope with a threat (e.g., poor health) if they affirm their global sense of personal worth in a different domain (e.g., strong family). Affirmed individuals retain their awareness of environmental threats, such as racial bias or awareness of negative stereotypes implicating

their group, but such threats lose some of their power to undermine well-being. Research using randomized, double-blind field experiments shows that values-affirmations raised minority students' academic performance during a 2-year study, reducing the racial achievement gap in this sample.<sup>44</sup>

One recent values-affirmation experiment tested whether the intervention could reduce racial disparities in weight over the course of 2 years.<sup>45</sup> Latino and white college students were randomly assigned to either a values-affirmation or control writing exercise. Results showed that Latinos' perception of social identity threat in their freshmen year was associated with a greater likelihood of being clinically overweight 2 years later. The intervention severed this relationship for affirmed Latino students, leading to a 35 percent drop in the likelihood of being overweight 2 years later relative to controls.<sup>45</sup> Another double-blind randomized psychological intervention, using a variation of values-affirmation termed "social belonging intervention" examined overall health and physician visits.<sup>46</sup> The intervention was a 2-hour procedure implemented once during college students' freshman year and sought to neutralize the psychological perception of threat that many minority college students have. It did so by providing information to students that social adversity on campus was initially common to all students, but temporary, and sought to help them internalize this message. This study documented that the intervention reduced physician visits and improved self-reported health over a 3-year observation period among African American but not white college students.<sup>46</sup> The intervention also improved African Americans' academic performance, reducing the black-white achievement gap in this sample by one half.

Another randomized controlled trial found that a values-affirmation intervention may have contributed to behavioral change in hypertensive patients.<sup>47</sup> In this experiment, all patients received an educational intervention. The intervention group additionally received both positive-affect induction (small gifts throughout the year) and values-affirmation. The experiment found that compared to those in the control group, African Americans in the intervention group had higher medication adherence (as assessed by electronic pill monitors) over 12 months, but there was no effect on blood pressure levels.

A values-affirmation intervention improved patient-physician communication among low SES African American patients with hypertension in a randomized controlled trial.<sup>48</sup> Patients were randomly assigned to complete a values-affirmation task (treatment) or a control task at their health care clinic immediately before their appointment with their primary care provider. The study found that affirmed patients gave and requested more information about their medical condition and their interaction style (based on audio-recordings) and were characterized as being more interested, friendly, responsive, interactive, and respectful and less distressed. Interestingly, no differences were found on self-report measures of satisfaction, trust, stress, and mood.

## Research Implications

Our review suggests that a broad range of interventions have the potential to improve SES and health and to possibly reduce or eliminate disparities. Notably, these interventions address factors

outside of the health care system. Medical care is a determinant of health, and there are well-documented disparities by race and SES in access to care and the quality of care.<sup>49</sup> At the same time, contemporary medical care delivery places little emphasis on prevention and on the underlying determinants of illness, and not surprisingly, although the United States leads the world in health care spending, it ranks at or near the bottom of industrialized nations on indicators of health status.<sup>49</sup> Thus, eliminating disparities in health requires investment in the social and economic factors like income, education, and housing that are the fundamental causes of disease and the behaviors that drive the onset of illness. Investing in addressing the social determinants of health has the potential to improve health, reduce social inequalities in health, enhance the quality of life, and even slow down the growth of medical expenditures.<sup>49</sup> Research reveals that addressing social determinants to eliminate disparities would save more lives than expenditures on medical care. For example, one study calculated that 176,000 deaths were averted in the United States during the decade of the 1990s due to declines in overall mortality.<sup>50</sup> It showed that even if we credited all of this decline to advances in medical care, five deaths (a total of 886,000 over the decade) would be averted by eliminating the black-white gap in mortality for every life saved by medical advances.

Yet, there is also much that we do not understand. For example, although research suggests that improving housing and neighborhood quality can enhance health, studies like the Moving to Opportunity (MTO) program<sup>a</sup> have been too small to affect racial segregation and the concentration of poverty in the participating cities (key factors that initiate and sustain poor neighborhood and housing conditions). Importantly, the observed effect sizes are small, and we do not know the specific aspects of the programs that lead to variation in outcome and the number, type, and size of the key components of the multifaceted interventions that are needed to observe maximal impact. Moreover, these studies did not address or dismantle either the institutional or individual mechanisms of discrimination that contribute to residential segregation.<sup>31</sup> It is not feasible to think that the problem of disadvantaged neighborhoods will be solved by moving people, and families should not have to move out of their neighborhoods to live in a better neighborhood. Research is needed to identify the conditions under which improvements in housing and neighborhood conditions can translate into health improvement and to identify the specific underlying mechanisms. We also need to better understand the potential health consequences of mixed-income developments and gentrification processes.

We also currently lack a firm empirical base to determine which strategies to improve health and reduce disparities are likely to have the greatest impact, and we do not know which domains should be tackled first. Research is needed that would provide data on the relative costs and benefits of the full range of promising social and behavioral interventions. This is of critical importance, since social disadvantages tend to cluster in people and places, and cost constraints often limit the ability to implement multiple interventions simultaneously. The Great Smoky Mountains Study<sup>18</sup> highlighted issues of timing, sensitive periods, and sequencing that may matter for the impact of additional income. The reduction in adolescent risk behaviors was seen only in the youngest cohort (age 12 when the income supplements began) who had experienced the longest exposure to the additional income with no effect evident in the two older cohorts (age 14 and age 16) at initial

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<sup>a</sup> See Moving to Opportunity for Fair Housing at <http://portal.hud.gov/hudportal/HUD?src=/programdescription/mt0>.

supplement. Research is needed that would provide a clearer blueprint of the maximally effective timing and sequencing of specific interventions and the needed clustering and combinations of interventions that are likely to generate the greatest impact for specific health behaviors and indicators of health status. Research is also needed to identify the thresholds of additional income that would be needed to trigger health benefits for various target populations in a range of contexts.

Relatedly, interventions need to be evaluated for the extent to which they are differentially effective across social groups.<sup>51</sup> For example, when CCTs have not targeted the poorest segment of society, groups that are better off economically have received greater benefit.<sup>20</sup> In the future, researchers should give greater attention to the potential of the differential impact of interventions for various subgroups of the population. Higher SES populations are more likely to be aware of, receptive to, and maximally utilize new information regarding minimizing health risks. Thus, the policies most likely to benefit disadvantaged social groups are the upstream interventions that address the underlying social determinants of health.

It is instructive that the studies reviewed here that found clear evidence of reducing disparities in health were interventions that explicitly targeted supplemental income to blacks and American Indians. The Civil Rights initiatives that sought to enhance the economic well-being of disenfranchised and economically disadvantaged racial groups were associated with improved health and a reduction in health disparities. Similarly, the Great Smoky Mountains study,<sup>17</sup> in which supplemental income was provided to American Indians, also documented reductions in disparities. Reductions in disparities in academic performance were also evident for values-affirmation interventions. These interventions were offered to both blacks and whites but reduced the racial gap in academic performance because these theoretically driven interventions were designed to address a race-related risk factor. Future research needs to give greater attention to the effects of intervention for various population subgroups, and interventions should collect the data that would facilitate the identification of any differential effects. Relatedly, the cost-effectiveness of interventions needs to be assessed for population subgroups.

Another subgroup that is important is gender. Reanalysis of data from the Perry Preschool and the Abecedarian and Early Training projects reveals that females benefit more than males from these early childhood interventions.<sup>52</sup> For some outcomes, significant effects are evident only for males. At the same time, the effects for males are larger in the Abecedarian project (an intensive program that began at birth) than in the Perry and Early Training programs,<sup>52</sup> and the health benefits in the mid-30s of the Abecedarian project, as noted earlier, are larger for males than females. These data highlight the importance of explicitly testing for group differences and attending to features of interventions (such as intensity and timing) that may account for variation.

We considered values-affirmation interventions as an example of interventions to address one aspect of racism. Racism adversely affects health through multiple pathways,<sup>8</sup> and future research must deploy a comprehensive set of strategies to minimize the negative effects of the multiple pathogenic effects of racism. Racism's most pernicious effects are likely to operate through institutional mechanisms such as residential segregation that lead to dramatic racial differences in living conditions and economic resources.<sup>53</sup> The racial gap in wealth is an example of a distinctive social disadvantage created by institutional racism. Racial differences in wealth are much larger

than those for income. For example, in 2009, for every dollar of income that white households earned in the United States, black households earned 63 cents, and Hispanics earned 73 cents.<sup>54</sup> More strikingly, blacks have 6 cents and Latinos have 7 cents for every dollar of wealth owned by whites.<sup>55</sup> Data on economic hardship illustrate how blacks are more economically distressed than whites. One national study found that, even after adjustment for multiple indicators of SES (income, education, transfer payments, home ownership, employment status, disability, and health insurance) and demographic characteristics (age, gender, marital status, children, and residential mobility), blacks were more likely than whites to experience economic hardships such as being unable to meet essential expenses; unable to pay full rent or mortgage; unable to pay full utility bills, had utilities shut off; had telephone service shut off; or being evicted from their apartment or home.<sup>56</sup> Thus, the African American and Latino poor are poorer than the white poor, and initiatives targeted at low SES groups need to take the full depth of this racial economic inequality into account.

An important challenge moving forward is to identify how we can best design interventions to ensure maximal benefits to populations in greatest need. A related issue is the need to identify when global interventions can reduce racial disparities and when race-specific interventions are indispensable. Some of the values-affirmation interventions reviewed earlier were used alone, while some were used with other psychological strategies to change health behaviors. More research is needed to identify specific conditions, populations, and health outcomes that modulate the effect of psychological interventions on reducing health disparities. More generally, we need to understand the mechanisms and pathways responsible for observed effects. In the Great Smoky Mountains Study, improved parenting appeared to be responsible for the health enhancing effects that came from additional household income.<sup>19</sup>

Understanding the pathways might help us to identify why the health effects of some interventions are evident for some health outcomes but not others. For example, positive effects of additional income that were evident for alcohol and cannabis abuse and dependence in the Great Smoky Mountains Study did not exist for nicotine dependence.<sup>57</sup> Similarly, additional income from the EITC reduced hearing limitations but was unrelated to self-reported health and functional limitations.<sup>13</sup> We also need to better understand the conditions under which interventions targeted at multiple levels are more impactful. For example, we do not know if we would observe greater health effects in an intervention focused on additional income if it were combined with a values-affirmation intervention.

There is also an urgent need to identify, better understand, and minimize negative unintended effects that were evident for some of the interventions reviewed. In the Great Smoky Mountains Study, negative effects on health linked to additional income were documented. There was an increase in accidental deaths during the specific months that households actually received the cash payments, probably due to increases in vehicular travel and increased substance use.<sup>58</sup> Additional income was also associated with increased adolescent obesity among Indian families whose incomes were low before the receipt of the casino income with no effect for those families whose income had been high.<sup>59</sup> The gains in obesity in adolescence persisted into young adulthood. These findings highlight the importance of being attentive to unintended consequences of interventions that seek to improve health.

Future research and intervention also need to consider that some race-related aspects of life may have broader application to other stigmatized social groups. For example, interventions focused specifically on a race-related aspect of life such as discrimination, may have wider currency. A recent study of white adolescents found that perceived discrimination based on social class accounted for 13 percent of the association between poverty and allostatic load (a summary measure of biological dysregulation), suggesting that discrimination based on social class may be an important but neglected contributor to SES differences in health.<sup>60</sup> Similarly, research on the effects of discrimination on health also finds that although racial minorities report higher levels of interpersonal discrimination than whites, the negative effects of discrimination on health are very similar across races.<sup>61</sup>

## Practice Implications

Our review reveals that improvements in living conditions can have decisive health consequences. It implies that a seismic shift is needed in health policy. Health initiatives are needed that pay greater attention to the social determinants of health. They also need to have a dual focus: improving the health of the overall population and reducing gaps in health. While it is true that even the highest SES Americans, in almost every State, are not experiencing a level of good health that is attainable now,<sup>62</sup> there are large shortfalls in health by race and SES, and global strategies that may have the largest impact on improving population health will likely widen disparities.<sup>63</sup> Thus, the implementation and evaluation of health initiatives need to go beyond demonstrating that they improve health for low SES and vulnerable racial/ethnic populations. In order to reduce social inequalities in health, interventions need to be designed to evaluate their impact on health equity. Reducing social inequalities in health will require targeted interventions that improve the health of disadvantaged groups more rapidly than that of the rest of the population.<sup>64</sup> This issue has received inadequate attention in the world of health policy and intervention.

The research reviewed indicates that while there is much we need to learn, there is a substantial and growing body of scientific evidence suggesting that social and behavioral interventions, far removed from traditional health policy, can improve health and potentially reduce shortfalls in health faced by low SES and economically disadvantaged racial and ethnic populations. Braveman and colleagues<sup>65</sup> have persuasively argued that policymakers should not wait for the optimal evidence but should take action based on the best available science. They articulated the importance of using evidence from multiple sources, evaluating the quality of evidence based on multiple criteria with study design being only one factor informing the strength of the evidence, and taking responsible actions in the face of less-than-certain knowledge. Accordingly, decisionmakers should give greater attention to applying our current knowledge to improving the Nation's health. Equally important, efforts are needed to explicitly allocate resources to capitalize on opportunities such as natural experiments that can expand our knowledge base and help us to make strategic investments in social and behavioral research that will strengthen the science of improving health and reducing and ultimately eliminating gaps in health that are avoidable and unfair.

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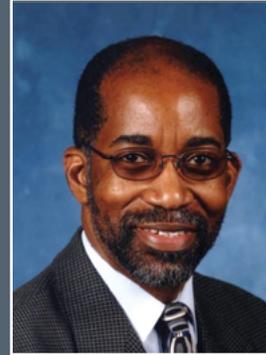
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