

Cash Transfers and Health

Sicong Sun,¹ Jin Huang,² Darrell L. Hudson,¹
and Michael Sherraden¹

¹Brown School, Washington University in St. Louis, St. Louis, Missouri 63130, USA;
email: sicong.sun@wustl.edu, d.hudson@wustl.edu, sherrad@wustl.edu

²College for Public Health and Social Justice, Saint Louis University, St. Louis, Missouri 63103,
USA; email: jin.huang@slu.edu

ANNUAL
REVIEWS **CONNECT**

www.annualreviews.org

- Download figures
- Navigate cited references
- Keyword search
- Explore related articles
- Share via email or social media

Annu. Rev. Public Health 2021. 42:363–80

First published as a Review in Advance on
January 4, 2021

The *Annual Review of Public Health* is online at
publhealth.annualreviews.org

<https://doi.org/10.1146/annurev-publhealth-090419-102442>

Copyright © 2021 by Annual Reviews. This work is licensed under a Creative Commons Attribution 4.0 International License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. See credit lines of images or other third-party material in this article for license information.

Keywords

social policy, race, income, wealth, social determinants of health, socioeconomic status

Abstract

Financial resources are known to affect health outcomes. Many types of social policies and programs, including social assistance and social insurance, have been implemented around the world to increase financial resources. We refer to these as cash transfers. In this article, we discuss theory and evidence on whether, how, for whom, and to what extent purposeful cash transfers improve health. Evidence suggests that cash transfers produce positive health effects, but there are many complexities and variations in the outcomes. Continuing research and policy innovation—for example, universal basic income and universal Child Development Accounts—are likely to be productive.

INTRODUCTION

Financial resources are fundamental for achieving and maintaining good health across the life course (2, 19, 20, 124). They help “individuals avoid diseases and their negative consequences through a variety of mechanisms” (75, p. 81). People with fewer financial resources are at a greater risk of poor health, including increased comorbidity and disability, diminished quality of life, and lower life expectancy (2, 14, 15, 19, 20, 42, 100).

This article asks whether intentional increases in financial resources transferred to households improve health outcomes and, if so, how. Such improvements may indicate that development and implementation of cash-transfer policies and programs have the potential to extend our understanding of the social determinants of health.

In this review, we define cash transfers broadly to include transfers of cash or cash equivalents (e.g., tax benefits) and vouchers for cash or cash-like in-kind assistance vouchers (e.g., Supplemental Nutrition Assistance Program benefits, known as food stamps). The definition focuses on resource flows designed to support immediate consumption, to maintain a living standard, or to build assets for long-term security (e.g., for homeownership or retirement). Here, cash transfers do not include the provision of particular services (e.g., health care supported by Medicaid or Medicare) or direct provision of public goods (e.g., roads, parks, schools, libraries). We discuss where cash transfers are allocated in society instead of focusing solely on cash transfers to low-income people.

Cash-transfer policies and programs aim to improve individual and household financial stability and well-being through increased consumption (9, 10, 48) and increased asset building (102). With regard to health effects, a cash transfer represents the infusion of income and/or assets that may affect physical and mental health outcomes in households. The assumption that cash transfers are successful reflects the strong influence of neoclassical economics, wherein money is a proxy for level of consumption and level of consumption is an indicator of well-being. The formulation is useful but has limitations. One limitation is that individual circumstances and context matter greatly, as this review indicates. Another is that links between cash transfers and health outcomes may be indirect.

In this review, we pursue a broader understanding of links between cash transfers and health. In the sections below, we place cash transfers in the context of social determinants of health, emphasizing race as primary, and we propose a conceptual model. We then discuss the dimensions and main policy forms of cash transfers, as well as evidence on cash transfers and health. Finally, we point to directions for future research and highlight two ongoing policy innovations.

SOCIAL DETERMINANTS OF HEALTH

Social determinants—including but not limited to race/ethnicity, socioeconomic position (SEP), and gender—are critical for individual and population health. These factors are linked to power and privilege. People with more power and privilege generally experience better health outcomes.

Growing attention has been drawn to social determinants of health in applied health research in the United States (21). Social determinants have been highly explanatory in studies that model them as covariates, but the results have seldom led to testable interventions that might alter those determinants. In research on interventions related to social conditions, cash transfers (broadly defined) provide material means for shelter, nutrition, income security, and other basic social and economic conditions. These social interventions constitute most of what is called social policy and underpin the body of applied research into social determinants of family security and development (for summaries, see 95, 106). Health is typically not a main focus in this social intervention research, but it might become more so. Growing attention from public health researchers can positively contribute to the study of well-being that results from cash transfers and other social policies.

Race/Ethnicity and Health

In the United States (as elsewhere), race/ethnicity has a troubled history with ongoing effects. Race is primary. Racial disparities have been documented in overall mortality and multiple disease outcomes (e.g., 8, 65, 71). It is no coincidence that the weight of the coronavirus disease 2019 (COVID-19) pandemic has fallen disproportionately on African Americans, Native Americans, and Latinos (123). In our view, it is impossible to understand social determinants of health without “putting race at the forefront” (59), and we take that approach in this article.

Race remains a key determinant of health inequities because racism—the social, economic, and political oppression of some racial/ethnic groups—has affected living conditions and health outcomes (e.g., 21, 36, 49, 68, 109, 124), including individual-level outcomes (e.g., 49, 51, 90). Research has paid less attention to structural racism’s contributions to racial health disparities (36). For example, racist policies and practices (e.g., redlining) have purposefully created staggering levels of racial residential segregation throughout the United States (98). Structural racism shapes access to resources and opportunities, fueling inequalities in education, employment, wealth, and other domains (25, 51, 64, 93, 125). These inequalities cascade over the life course and across generations, molding educational preparation, marketable employment skills, and opportunities to accumulate assets among people of color.

Thus, race is strongly linked to SEP (19, 83). For example, median annual household income in 2019 was \$76,057 for non-Hispanic Whites, \$45,438 for Black Americans, and \$56,113 for Hispanics (119). White men receive higher pay than their counterparts in other racial groups (and women), even when analyses adjust for occupation, years of experience, education, and other credentials (69, 124). Furthermore, wealth varies by race. For every dollar of wealth that White households hold, Black households have only seven cents (31). The magnitude of the racial wealth gap is immense, deeply entrenched, and not explained by saving or spending habits (85).

Socioeconomic Position and Health

Like race, SEP is a strong determinant of health (1, 13, 20, 21, 29, 75, 93, 124). SEP involves an array of resources that all protect health, regardless of which health mechanisms are relevant at a given time (75). Individuals with substantial income and assets work in roles with autonomy, job security, and fringe benefits, including paid time off. They have resources to navigate unexpected costs, as well as access to healthy foods and safe green spaces for exercise (61, 73). Their children attend good schools and grow into well-paid jobs of their own (125). These relationships are structural, replicating, and determinative.

Cash Transfers and Health: A Conceptual Model

How might cash-transfer interventions improve health outcomes? Our conceptual model of the relationships among cash transfers, socioeconomic determinants, and health considers race, ethnicity, gender, and other SEP (e.g., income, wealth, education, and occupation) indicators to be upstream factors that shape health outcomes through a series of mediators (**Figure 1**). In this model, cash transfers are an intervention to supplement SEP. Cash transfers and socioeconomic determinants are modeled to operate through multiple pathways and mediators (79, 89, 124): material conditions (i.e., declines in unmet social needs and hardship), environmental factors (i.e., built environments where people live and work), psychosocial factors (e.g., self-efficacy and optimism), health behaviors (e.g., physical activity and healthy diet), access to medical care, and utilization of care. This conceptual model focuses at the individual and household levels, rather than at the level of society, and excludes some large exogenous factors (e.g., genetics and culture).

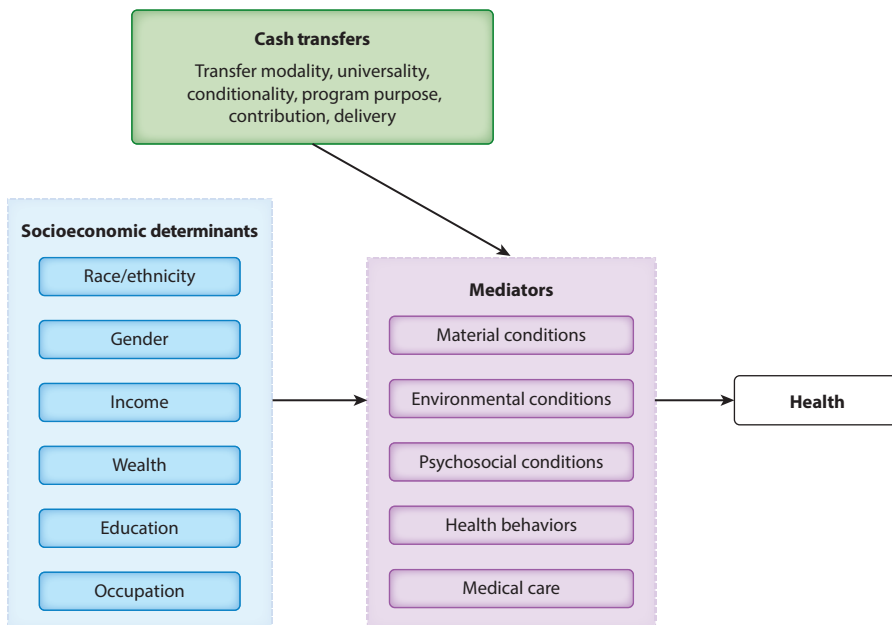


Figure 1

Conceptual model of socioeconomic determinants, cash transfers, and health.

CASH TRANSFERS

Dimensions of Cash Transfers

In this section, to conceptualize and differentiate cash transfers, we examine six structural dimensions of such transfers. They include transfer modality, universality, conditionality, program purpose, contribution, and delivery.

Transfer modality: cash versus in-kind benefits. Two basic forms of social policy provision, cash and in-kind benefits, have generated considerable discussion regarding which is more effective in improving well-being. Compared with in-kind goods and services, cash payments may generate greater well-being for recipients because cash enables flexibility in spending choices (30).

Universality. Cash-transfer programs can be targeted to select program beneficiaries or universal (offering benefits to everyone). Most cash-transfer programs use targeting to determine eligibility for benefits. Methods include geographic targeting, means testing (with income and/or asset thresholds), and community-based targeting. The targeting mechanism is often selected for reasons of political acceptability, fiscal sustainability, and/or cost-effectiveness. But targeting also carries the burden of administrative oversight. It requires outreach to potential beneficiaries, a registration process, reporting, and program recertification. Universality in cash-transfer programs avoids these administrative burdens and the stigma associated with receipt of targeted benefits (10, 38).

Conditionality. Fund allocation in cash transfers is also based in part on recipient compliance with behavioral conditionalities. Examples include requirements to work, engage in a job search, undergo training, participate in financial education, perform community service, attend

school (for children), and submit to health checks. For example, more than 60 countries have implemented programs with cash benefits contingent on participants seeking basic maternal and child health care or education for school-age children. Assessments of conditional cash-transfer programs in the global context have found a mixed but generally positive impact on behavioral change (72, 80, 88, 120).

Program purpose. Cash-transfer programs have one or two purposes: consumption support or asset building. Most programs aim to alleviate liquidity constraints and provide resources for consumption needs. Other programs are designed to support asset accumulation for long-term investments in education, homeownership, entrepreneurship, and retirement. Programs that pursue asset building as a purpose undertake social investment to promote and strengthen individuals' financial and human capabilities and opportunities for inclusive growth (102, 103).

Contribution. The global social welfare discussion on cash transfers generally excludes analysis of programs in which eligibility is contingent on participant contributions. Despite contributory social insurance programs such as Social Security and unemployment insurance, typical social-assistance cash transfers in social safety nets are noncontributory. A broad view of cash transfers combines both social assistance (noncontributory programs) and social insurance (contributory programs) in a social-protection system (10, 38).

Delivery. Cash transfers can be delivered through numerous payment mechanisms, and technology continues to expand delivery options that can minimize costs and promote financial inclusion of the poor (107). Electronic delivery has the potential to reduce leakages due to bureaucracy, mismanagement, and/or corruption, with funds going directly to individual accounts (10). Furthermore, electronic delivery is more effective than in-kind assistance in maintaining social distance during the COVID-19 pandemic (84). See **Table 1**.

Main Policy Forms of Cash Transfers

In this section, we discuss main policy forms of cash transfers. In doing so, we distinguish populations targeted by cash transfers.

Cash assistance for low-income people. In social welfare and economic development policy and research, cash transfers are often defined narrowly as cash assistance, also known as means-tested transfers and/or social assistance, wherein money is given to a targeted vulnerable population. In the United States, such policy examples include Temporary Assistance for Needy Families, the

Table 1 Summary of dimensions of cash transfers

Dimensions	Policy options
Transfer modality	Cash, voucher, and in-kind benefits
Universality	Universal transfers; transfers targeted by means testing, geography, community, age, and gender
Conditionality	Requirements to work, participate in job training, attend school/education, perform community service, and submit to health care visits
Program purpose	Support for the consumption for food, nutrition, health, housing, utility, and other purposes Asset building for education, entrepreneurship, homeownership, health, and other purposes
Contribution	Contributory and noncontributory transfers
Delivery	Cash, check, bank-account transfer, electronic-benefit transfer card, tax benefits, financial technology application

Earned Income Tax Credit (EITC; delivered as a refundable tax benefit—in effect, a negative income tax—to low-wage workers and their families), and the Supplemental Nutritional Assistance Program, among others. Temporary Assistance for Needy Families has shrunk and no longer accounts for a large share of safety-net spending (34). In 2019, about \$361 billion, or 8% of the federal budget, went to safety-net programs (23).

Social insurance. Social insurance policies are universal (i.e., not means tested) but conditioned (e.g., designed for unemployment, old age, or disability). Federal social insurance includes Social Security retirement and disability insurance, survivor insurance, and unemployment insurance. In 2019, the social insurance programs of the Social Security Act distributed cash payments totaling \$1 trillion (23% of the federal budget; 23).

Cash assistance to middle- and high-income people. Many governments provide cash benefits from public funds to middle- and high-income households, mostly through the tax system, where these expenditures are effectively hidden from public and congressional scrutiny (52). The two largest categories of individual tax benefits in the United States are for retirement savings [e.g., tax deferrals for 401(k)s and individual retirement accounts (IRAs)] and homeownership (primarily the home-mortgage interest tax deduction). Tax expenditures for retirement savings totaled more than \$250 billion in 2019 and will likely exceed \$1.5 trillion over the period from 2019 through 2023. In fiscal year 2019, the federal government provided \$196 billion in tax benefits to subsidize homeownership (116). Note that these tax benefits support long-term security rather than immediate consumption.

Asset-building tax subsidies benefit the wealthy but do little to help the poor in building wealth (113). Nearly 80% of the benefits for the four largest asset-building tax incentives (for homeownership, financial investment, retirement saving, and education) have gone to households in the top income quintile (41). In other words, this form of cash transfer is very large (more than means-tested social assistance) and is highly regressive (most of the benefits go to the top).

EVIDENCE ON CASH TRANSFERS AND HEALTH

In this section, we review evidence on cash transfers and health. For high-income countries, we look at both social assistance (targeted to a vulnerable population, means tested) and social insurance policies (universal but conditioned). Then we review evidence on health effects of cash-transfer programs in low- and middle-income countries (LMICs).

Targeted Social Assistance and Health in High-Income Countries

Shahidi and colleagues (101) summarized evidence on the impact of social assistance programs (including cash transfers and in-kind benefits) on population health among high-income countries. Examined outcomes included self-rated health, mental health, chronic conditions, health behaviors, and mortality. Concluding that the health outcomes of social assistance recipients were worse than those of nonrecipients, the authors speculated that these outcomes may be due to reverse causation (e.g., people with preexisting health conditions selected into social assistance programs) and unobserved systematic differences between the groups. Moreover, finding that efforts to limit the receipt of social assistance, reduce its generosity, or increase work conditionalities were associated with adverse health trends, Shahidi and associates (101) suggested that welfare reform led to negative effects on the health of socioeconomically disadvantaged populations. Evidence is mixed on the relationship between cash interventions and health behaviors (16, 62, 91).

A recent meta-analysis examining health effects of randomized social experiments in the United States identified seven cash-transfer interventions and found that they were associated with improvement in self-rated health [odds ratio (OR) = 1.20, 95% confidence interval (CI) 1.06–1.36] but not with smoking status or obesity (28).

In the US context, researchers have extensively examined the health effects of the federal EITC (e.g., 3, 4, 7, 18, 33, 45, 53, 74, 91) and state EITCs (e.g., 11, 12, 67, 76, 115, 121). These studies generally find that receipt of the credit is associated with improvements in various measures of maternal and child health. Other studies found mixed or no effects with certain measures of health outcomes (e.g., inflammatory markers, health care expenditure; 32, 43, 44). Overall, this body of work finds that earned-income credits (a form of negative income tax) are positively associated with health.

Social Insurance and Health in High-Income Countries

Examining the effects of Social Security Act amendments in the 1970s (commonly referred to as the Social Security notch), studies found that Social Security benefit increases led to significant improvements in functional limitations, cognitive functioning, and mental health status (5, 40). Other studies examining this policy change found no effect on weight (22) or demonstrated the paradoxical finding that the higher-income group experienced a higher mortality rate (110). A systematic review of international evidence concluded that unemployment insurance generally attenuates the effects of unemployment on poverty and health (97). The study also found that more generous unemployment insurance systems tend to have a greater protective effect on the health of the unemployed (97). Another study found that higher unemployment insurance generosity was associated with greater health insurance coverage and utilization, as well as improved self-rated health. Effects were stronger during periods of higher unemployment rates (70). However, the study found no effect of unemployment insurance on risky behaviors or on health conditions. A study on US Social Security Disability Insurance found that higher payments were associated with lower mortality rates among low-income beneficiaries (37). Using internationally harmonized panel data from the United States and Europe, another study found that self-reported health stabilized after receipt of disability insurance benefits; mental health improved more for recipients than nonrecipients; and the effect was stronger in countries with more generous disability insurance programs (17). Other objective health outcomes were positive but statistically nonsignificant (17).

Cash Transfers and Health in Low- and Middle-Income Countries

Cash-transfer programs in LMICs provide cash assistance targeting vulnerable populations. Most of the evidence comes from randomized controlled trials. Evaluations of these programs have examined such outcomes as financial poverty, savings and investment, resilience and empowerment, productive capital, education, health care utilization, nutrition, employment, child labor, housing condition and quality, birth registration, child deprivation, social capital and social cohesion, civic participation, morbidity, mental health outcomes, and sexual behaviors (for a summary, see 10, 86). Several systematic reviews on the health effects of cash-transfer programs examined mental health, sexual debut, health service utilization, immunization coverage, anthropometric outcomes, nutritional status, infant and neonatal mortality, health behaviors (contraception use, smoking, and drinking), and morbidity (e.g., diarrhea, anemia, respiratory disease, hypertension, and diabetes; 10, 29, 60, 72, 86, 88, 92, 108).

Bastagli and associates (10) examined 41 studies reporting the effects of cash-transfer programs on health and nutrition indicators. Conducted from 2000 to 2015, the reviewed studies covered Latin America, sub-Saharan Africa, South Asia, and the Asia-Pacific region. The reviewers

concluded that cash-transfer programs in LMICs improve dietary diversity and increase utilization of health care services, especially when conditionalities are attached to the program.

Reviewing 17 studies published between 2006 and 2016 on the health outcomes of children under age 5 in LMICs, Cruz and colleagues (29) concluded that cash transfers were positively associated with immunization rates, vaccination coverage, and improvements in morbidity among disadvantaged children. However, they noted mixed results for the child-mortality indicators and the biochemical and biometric health outcomes. Reviewing five randomized controlled trials, Pega and associates (92) found that unconditional cash transfers reduced by 37% the likelihood of having any illness (95% CI 0.57–0.93). A recent narrative review of health effects of cash-transfer programs in LMICs found substantial heterogeneity on child and adult health but little on sexual and reproductive health (27).

Our review of this evidence highlights the limitations of the available data. First, purposeful examinations have generated experimental data on the health outcomes of cash-transfer programs in LMICs, but most of those data have come from regional experiments with targeted populations. Thus, generalizability is limited. Moreover, many of these experiments collect short- to medium-term data, preventing analysis of long-term health effects. Second, evaluations of large-scale policy change in high-income countries have relied on linked population-based survey data and program administrative data (*a*) to analyze the health of transfer recipients and nonrecipients and (*b*) to leverage quasi-experimental methods (e.g., regression discontinuity, difference-in-differences). In such studies, small samples for some vulnerable groups (e.g., immigrants, Native Americans) preclude tests of pathways and mechanisms.

DISCUSSION AND DIRECTIONS: RESEARCH

Health Effects Should Be More Frequently and Thoroughly Examined

We see cash transfers broadly as social policy and interventions that provide material means for basic social and economic conditions. These measures affect inequality in society and thus have a direct bearing on the extent to which people from different social circumstances have access to health-related resources. However, the health implications of these policies are rarely discussed. To enable assessment of their effects on health inequalities, we recommend producing research-based health-impact statements for such policies (75).

Mechanisms of Change

Despite evidence on the relationships among cash transfers and health outcomes, the mechanisms of change remain understudied. This area of scholarship would benefit from further theoretical specification to ground evidence in program contexts and illuminate mediating and moderating effects of change (87). Moreover, studies showing variations in health outcomes of cash-transfer programs by gender (24, 128) suggest the importance of disaggregating evidence by subgroups. Future research should explore how and why cash-transfer programs work. Studies should identify design and implementation features that influence the effectiveness of cash-transfer programs by specific circumstances and for specific populations.

Measurement

Several steps would improve the measurement of cash transfer programs' effects on health.

Cash transfers. First, future research should measure dimensions and characteristics of cash-transfer programs (e.g., duration, conditionality) to inform program design and implementation

and thereby to improve health. These measures may be available in administrative and experimental data. Population-based health surveys provided little accurate information on program participation or benefits received.

Socioeconomic position. Second, few survey data sets have both comprehensive SEP indicators and health measures. Few panel surveys that document longitudinal dynamics of SEP (e.g., the Survey of Income and Program Participation) collect information on respondents' health. Population health surveys that examine self-reported health outcomes use SEP measures that are fuzzy. In other words, despite the consensus that SEP is complex and multifactorial, most health studies that consider SEP use a single socioeconomic variable measured at a single period or level and include variables that explain why some measures were selected over others (19). Wealth is an underutilized yet important indicator of SEP, and therefore future health studies should measure wealth (94).

Health. Third, to further examine mechanisms of change, research should separate measurement of mediators and distal health outcomes. Some studies have conceptualized mediators (food security, health care utilization, health behaviors, and self-efficacy) as proxy measures of distal health outcomes. In our view, this approach does not contribute to conceptual clarity.

Long-Term Effects

Most evidence stems from evaluations of short-term effects, but cash-transfer policies and programs address fundamental causes and effects of distal health outcomes over time. Program effectiveness should be evaluated over the long-term, ideally with a life-course or intergenerational perspective, to capture these effects. Thus, future research should collect long-term and intergenerational data.

Cost-Effectiveness

Despite efforts to test the cost-effectiveness of cash-transfer programs (35, 96, 99, 112, 118) and policies (81, 82), a lack of benchmarks and comparisons limits our understanding of whether cash transfers are cost-effective (and how they might become so). Future research should (a) collect cost data, (b) establish cost-effectiveness benchmarks for different health outcomes, and (c) accumulate and compare cost-effectiveness evidence in multiple settings. These contributions can inform policy making to achieve the same effect at a low cost and, thereby, to achieve sustainability (50, 118).

DISCUSSION AND DIRECTION: POLICY

Temporary Cash Assistance Versus Structural Equity

Giving temporary cash assistance is different from tackling structural socioeconomic and racial inequity. We cannot eradicate health inequity without addressing socioeconomic and racial inequity. Eradication requires mitigating, resisting, or undoing the structural influences that adversely shape health (39). Williams & Collins (126) argued that reparations are essential to eliminate segregation's negative effects and are likely to dramatically reduce racial differences in health. As structural racism continues to claim a prominent place in US public discourse, one option may be to incorporate reparations and similar historical remedies into cash-transfer policy designs.

Inclusiveness and Progressiveness

Most asset-based policies in the United States deliver benefits through the tax system. However, these policies are not inclusive. They function as a series of institutional barriers that exclude disadvantaged families, people of color, immigrants, refugees, and others who do not own a home or have full-time employment benefits such as retirement accounts. As we have noted, these cash-transfer policies are designed to build assets, and we might ask why equivalent asset-building subsidies are not offered to low-income people (102).

Inclusiveness may not be enough. A policy that is merely inclusive would likely not be sufficient to reduce inequality in American society, and research suggests that an effective remedy requires progressive measures. The term progressive refers to the allocation of subsidies and supplements to compensate for disadvantage. For example, progressive features in Child Development Account (CDA) policies include larger initial deposits and/or additional deposits for the poorest children over time, as well as greater savings matches for financially vulnerable families. Policy proposals such as “baby bonds” (46), which provide deposits based on intergenerational asset positioning, would also be progressive.

Moving Beyond Local Experiments

Cash transfers, social assistance, and social protections have been tested worldwide, very often with experimental research designs. But the scope and duration of most of these experiments (commonly called randomized controlled trials) tend to be limited. Most use selected (not population) samples, and most occur over short periods of time. Thus, this body of research employs rigorous methods but often with limited implications. In our view, more applied research on cash transfers should move from local applications (which are often not scalable) to inclusive, efficient, and stable policy tests (which can demonstrate scalability). This step would require increased funding and partnerships among researchers, practitioners, and policy makers. In this regard, Williams & Cooper (127) have suggested investments to enhance awareness, build public support, and foster political will. This approach is, of course, ambitious, but examples below document that steps are being taken in this direction.

POLICY INNOVATIONS TOWARD LARGE CASH TRANSFERS: TWO EXAMPLES

Social policy is ever changing, and the two policy innovations discussed below illustrate current applied research and policy formation as well as the potential for cash transfers going forward. We briefly review evidence on universal basic income (UBI) and CDAs as strategies for universal basic assets. Both UBI and CDAs offer universal, unconditional cash transfers. This policy research and innovation are related to the shift to an information age economy, wherein household labor income may not be sufficient to support a large portion of the population (38, 107). Therefore, other policy alternatives (direct provision of income to everyone and asset building for everyone) are now actively considered and studied.

Universal Basic Income

Designed to improve household consumption and material well-being, UBI has garnered attention from policy makers in high- and low-income countries (38, 54). Additional applications of the UBI concept continue to emerge, and the idea gained a foothold in US public discourse during the 2020 presidential primary campaigns (38, 129). The federal passage of widespread stimulus

payments and increased unemployment benefits in response to the COVID-19 crisis might be a precursor to some form of UBI (117).

The Stockton Economic Empowerment Demonstration illustrates the UBI concept. This demonstration started in 2019 as the first mayor-led, guaranteed-income pilot in the United States. The treatment group's 125 randomly selected participants reside in a Stockton, California, neighborhood with median income at or below \$46,033. They receive \$500 per month for 18 months with no work requirement or consumption restrictions (114). Measured health outcomes include psychological distress and physical functioning, as well as some intermediary outcomes: material hardships, health care utilization, perceptions of hope, and stress (77). The demonstration also measures how cash transfers interact with other means-tested benefits and income thresholds (6). Evidence from the experiment is now being collected.

Child Development Accounts: A Step Toward Universal Basic Assets

Proposed in the context of lifelong asset-building policy (102), universal and progressive CDAs are subsidized asset-building accounts to support investments toward life-course goals such as education, homeownership, and eventually greater retirement security. CDAs give all children and families (especially those in vulnerable conditions) a structured, unconditional opportunity to accumulate assets over time. The policy is envisioned as universal in that every newborn would receive a CDA, progressive in that greater subsidies should be provided for vulnerable populations, and potentially lifelong in that they would start at birth. Ideally, CDAs should be delivered through an established and efficient account structure. (In the United States, state 529 college savings plans offer such a structure.) As designed, CDAs build assets through contributions from the public and nonprofit sectors, business organizations, families, and friends, and the design encourages individual contributions from parents. Financial subsidies and incentives from the public sector, nonprofit organizations, and businesses can be delivered through various mechanisms, including initial deposits at the CDA opening, milestone deposits for children's birthdays and achievements, savings matches for family deposits, and tax exemptions for earnings. Investment growth builds assets over time.

A long-term experiment on CDAs has been under way since 2007. Sampling in the full population of births in the state of Oklahoma, the experiment is known as SEED for Oklahoma Kids (105). The tested policy model is sustainable, and the rigorous research design permits attribution of causality and generalizability to the full state population. Findings indicate that the CDAs helped parents of children in the treatment group maintain high expectations for their children's education (66), reduced the intensity of maternal depressive symptoms (57), reduced punitive parenting practices (55), and improved children's early social-emotional development (56). Other studies conducted in sub-Saharan Africa have found that a CDA intervention improved mental health functioning for children and caregivers (e.g., 47, 63, 118, 122) and reduced intentions to engage in sexual risk-taking behavior (78, 111). Overall, findings suggest that CDAs enable disadvantaged families to build long-term savings and achieve positive health outcomes.

These results have directly influenced policy. To date, seven US states have adopted statewide CDA policies (26). After 2020, the CDA asset-building platform will add more than 900,000 child beneficiaries each year (the size of birth cohorts in states with CDA policies) (J. Huang, M. Sherraden, M.M. Clancy, S.G. Beverly, T.R. Shanks, & Y. Kim, unpublished data). All CDA policies in the United States designate the assets for postsecondary education, and about 85% of participants are in CDA programs built on the financial infrastructure of state 529 college savings plans. That infrastructure offers efficiency, investment growth, and sustainability over time.

The most comprehensive CDA system has been implemented in Singapore. It builds assets for purposes (e.g., education, health, and others) that shift focus across life stages. Israel created a universal CDA policy in 2019. It covers all children under age 18. CDAs have also been implemented in the United Kingdom, Canada, South Korea, Taiwan, Uganda, and elsewhere (58, 104).

UBI and universal basic assets (beginning with CDAs) could become large-scale cash-transfer policies during the twenty-first century. As noted, both UBI and universal basic assets are attempts to respond to information-age social and economic conditions that could leave a large portion of the population without adequate support (38, 107). In the larger picture, all social policies—cash transfers included—are responses to the form and effects of economic production. As economic production is transformed and economic and social conditions change, cash transfers are adapted in response. Such changes may be quite extensive in the decades ahead.

CONCLUSIONS

In this review, we conceptualize cash transfers broadly as a policy intervention designed to address social determinants of health. Race is at the forefront of this conceptualization. The proposed conceptual model suggests directions for research and policy innovation.

The overall finding that cash transfers have a positive relationship with health outcomes (in addition to other well-being outcomes not discussed in this review) provides a rationale for expansions of large cash transfers in the information era. But much remains to be done. We lack sufficient knowledge of how particular populations, social conditions, and mechanisms affect the relationship between cash transfers and health. Applied research should embrace two primary goals: (a) documenting the effectiveness and sustainability of cash-transfer interventions; and (b) documenting the health and other outcomes of diverse participants, along with the mechanisms of these effects.

Cash transfers will never be the central health policy—public health and health care will play this role—but the wide scope of cash-transfer policies and programs, the vast resources transferred, and the documented impacts on health suggest that cash transfers cannot be ignored in the assessment of public policy and health outcomes.

DISCLOSURE STATEMENT

The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

ACKNOWLEDGMENTS

The authors express their gratitude to Ross Brownson for suggesting this article. We sincerely thank Ford Foundation and Charles Stewart Mott Foundation for long-term support of the SEED for Oklahoma Kids (SEED OK) experiment and policy application, as well as for their support of MI-SEED and other research on Child Development Accounts and asset-building policies over many years. We also thank our many academic and policy colleagues, too numerous to mention, who have informed our understanding of cash transfers in many forms and of their effects in the United States and other countries. In addition, we are grateful for excellent partnerships in Oklahoma, Maine, Nebraska, Pennsylvania, and other states that are developing these policies. We also thank Chris Leiker for editorial assistance, Lori Siegel and Susan Fowler for helping with the literature search, and staff on the SEED OK team over several years. Finally, we appreciate the reviewers' comments, which improved an earlier version of this article.

LITERATURE CITED

1. Adler N, Ostrove JM. 1999. Socioeconomic status and health: what we know and what we don't. *Ann. N. Y. Acad. Sci.* 896:3–15
2. Adler NE, Stewart J. 2010. Health disparities across the lifespan: meaning, methods, and mechanisms. *Ann. N. Y. Acad. Sci.* 1186:5–23
3. Averett S, Wang Y. 2013. The effects of Earned Income Tax Credit payment expansion on maternal smoking. *Health Econ.* 22:1344–59
4. Averett S, Wang Y. 2018. Effects of higher EITC payments on children's health, quality of home environment, and noncognitive skills. *Public Finance Rev.* 46(4):519–57
5. Ayyagari P. 2015. *Evaluating the impact of social security benefits on health outcomes among the elderly*. CRR Work. Pap. 2015–25, Cent. Retire. Res., Boston Coll. <https://doi.org/10.2139/ssrn.2669699>
6. Baker AC, Martin-West S, Samra S, Cusack M. 2020. Mitigating loss of health insurance and means tested benefits in an unconditional cash transfer experiment: implementation lessons from Stockton's guaranteed income pilot. *SSM Popul. Health* 11:100578
7. Baker K. 2008. *Do cash transfer programs improve infant health: evidence from the 1993 expansion of the Earned Income Tax Credit*. Work. Pap., Dep. Econ., Univ. Notre Dame, South Bend, IN. https://economics.nd.edu/assets/24011/baker_paper.pdf
8. Bancks MP, Kershaw K, Carson AP, Gordon-Larsen P, Schreiner PJ, Carnethon MR. 2017. Association of modifiable risk factors in young adulthood with racial disparity in incident type 2 diabetes during middle adulthood. *JAMA* 318:2457–65
9. Barrientos A. 2015. *Social Assistance in Developing Countries*. Cambridge, UK: Cambridge Univ. Press
10. Bastagli F, Hagen-Zanker J, Harman L, Barca V, Sturge G, et al. 2016. *Cash transfers: What does the evidence say? A rigorous review of programme impact and of the role of design and implementation features*. Rep., Overseas Develop. Inst., London. <https://www.odi.org/sites/odi.org.uk/files/resource-documents/10749.pdf>
11. Baughman RA. 2012. *The effects of state EITC expansion on children's health*. Natl. Issue Brief 48, Carsey Sch. Public Policy, Univ. N. H., Durham. <https://doi.org/10.34051/p/2020.168>
12. Baughman RA, Duchovny N. 2016. State earned income tax credits and the production of child health: insurance coverage, utilization, and health status. *Natl. Tax J.* 69:103–32
13. Baum A, Garofalo JP, Yali AM. 1999. Socioeconomic status and chronic stress: Does stress account for SES effects on health? *Ann. N. Y. Acad. Sci.* 896:131–44
14. Berkowitz SA, Meigs JB, DeWalt D, Seligman HK, Barnard LS, et al. 2015. Material need insecurities, control of diabetes mellitus, and use of health care resources: results of the Measuring Economic Insecurity in Diabetes study. *JAMA Intern. Med.* 175(2):257–65
15. Blazer DG, Sachs-Ericsson N, Hybels CF. 2005. Perception of unmet basic needs as a predictor of mortality among community-dwelling older adults. *Am. J. Public Health* 95(2):299–304
16. Bolton KL, Rodriguez E. 2009. Smoking, drinking and body weight after re-employment: Does unemployment experience and compensation make a difference? *BMC Public Health* 9(1):77
17. Börsch-Supan AH, Bucher-Koenen T, Hanemann F. 2018. *Does disability insurance improve health and well-being?* MEA Discuss. Pap. 09–2017, Munich Cent. Econ. Aging, Munich, Ger. <https://doi.org/10.2139/ssrn.3124187>
18. Boyd-Swan C, Herbst CM, Ifcher J, Zarghamee H. 2016. The Earned Income Tax Credit, mental health, and happiness. *J. Econ. Behav. Organ.* 126:18–38
19. Braveman PA, Cubbin C, Egerter S, Chideya S, Marchi KS, et al. 2005. Socioeconomic status in health research: One size does not fit all. *JAMA* 294(22):2879–88
20. Braveman PA, Cubbin C, Egerter S, Williams DR, Pamuk E. 2010. Socioeconomic disparities in health in the United States: what the patterns tell us. *Am. J. Public Health* 100(Suppl. 1):S186–96
21. Braveman P, Egerter S, Williams DR. 2011. The social determinants of health: coming of age. *Annu. Rev. Public Health* 32:381–98
22. Cawley J, Moran J, Simon K. 2010. The impact of income on the weight of elderly Americans. *Health Econ.* 19(8):979–93

23. Cent. Budg. Policy Prior. 2020. *Where do our federal tax dollars go?* Policy Basics Brief, Cent. Budg. Policy Prior., Washington, DC. <https://www.cbpp.org/sites/default/files/atoms/files/4-14-08tax.pdf>
24. Cheema I, Farhat M, Hunt S, Javeed S, Pellerano L, O'Leary S. 2016. *Benazir Income Support Programme: first follow-up impact evaluation report*. Rep., Oxf. Policy Manag., Oxford. <https://www.opml.co.uk/files/Publications/7328-evaluating-pakistans-flagship-social-protection-programme-bisp/bisp-final-impact-evaluation-report.pdf>
25. Chetty R, Hendren N, Jones MR, Porter SR. 2018. *Race and economic opportunity in the United States: an intergenerational perspective*. NBER Work. Pap. w24441, Natl. Bur. Econ. Res., Cambridge, MA. <https://doi.org/10.3386/w24441>
26. Clancy MM, Sherraden M, Huang J, Beverly SG, Kim Y. 2019. *Statewide Child Development Accounts and local partnerships: a scalable model that can include all children*. CSD Policy Brief 19-45, Cent. Soc. Dev., Washington Univ., St. Louis, MO. <https://doi.org/10.7936/q310-7h95>
27. Cooper JE, Benmarhnia T, Koski A, King NB. 2020. Cash transfer programs have differential effects on health: a review of the literature from low and middle-income countries. *Soc. Sci. Med.* 247:112806
28. Courtin E, Kim S, Song S, Yu W, Muennig P. 2020. Can social policies improve health? a systematic review and meta-analysis of 38 randomized trials. *Milbank Q.* 98(2):297-371
29. Cruz RCS, Azevedo de Moura LB, Soares JN. 2017. Conditional cash transfers and the creation of equal opportunities of health for children in low and middle-income countries: a literature review. *Int. J. Equity Health* 16(1):161
30. Currie J, Gahvari F. 2008. Transfers in cash and in-kind: theory meets the data. *J. Econ. Lit.* 46(2):333-83
31. Darity W Jr., Hamilton D, Paul M, Aja A, Price A, et al. 2018. *What we get wrong about closing the racial wealth gap*. Rep., Samuel DuBois Cook Cent. Soc. Equity, Insight Cent. Community Econ. Devel., Duke Univ., Durham, NC. <https://socialequity.duke.edu/wp-content/uploads/2019/10/what-we-get-wrong.pdf>
32. Dench D, Joyce T. 2020. The Earned Income Tax Credit and infant health revisited. *Health Econ.* 29(1):72-84
33. Evans WN, Garthwaite CL. 2014. Giving mom a break: the impact of higher EITC payments on maternal health. *Am. Econ. J. Econ. Policy* 6(2):258-90
34. Floyd I. 2020. *Cash assistance should reach millions more families*. Rep., Cent. Budg. Policy Prior., Washington, DC. <https://www.cbpp.org/sites/default/files/atoms/files/6-16-15tanf.pdf>
35. García S, Saavedra JE. 2017. Educational impacts and cost-effectiveness of conditional cash transfer programs in developing countries: a meta-analysis. *Rev. Educ. Res.* 87(5):921-65
36. Gee GC, Ford CL. 2011. Structural racism and health inequities. *Du Bois Rev.* 8(1):115-32
37. Gelber A, Moore T, Strand A. 2018. *Disability insurance income saves lives*. Work. Pap. 18-005, Stanford Inst. Econ. Policy Res, Stanford, CA. <https://siepr.stanford.edu/sites/default/files/publications/18-005.pdf>
38. Gentilini U, Grosh M, Rigolini J, Yemtsov R, eds. 2020. *Exploring Universal Basic Income: A Guide to Navigating Concepts, Evidence, and Practices*. Washington, DC: World Bank Group. <https://doi.org/10.1596/978-1-4648-1458-7>
39. Geronimus AT. 2000. To mitigate, resist, or undo: addressing structural influences on the health of urban populations. *Am. J. Public Health* 90(6):867-72
40. Golberstein E. 2015. The effects of income on mental health: evidence from the Social Security notch. *J. Ment. Health Policy Econ.* 18(1):27-37
41. Greer J, Levin E. 2014. *Upside down: tax incentives to save and build wealth*. Fed. Policy Brief, Prosperity Now, Washington, DC. https://prosperitynow.org/sites/default/files/resources/Policy_Brief_-_Tax_Incentives.pdf
42. Gundersen C, Ziliak JP. 2015. Food insecurity and health outcomes. *Health Aff.* 34(11):1830-39
43. Hamad R, Collin DF, Rehkopf DH. 2018. Estimating the short-term effects of the Earned Income Tax Credit on child health. *Am. J. Epidemiol.* 187(12):2633-41
44. Hamad R, Niedzwiecki MJ. 2019. The short-term effects of the Earned Income Tax Credit on health care expenditures among US adults. *Health Serv. Res.* 54(6):1295-304
45. Hamad R, Rehkopf DH. 2015. Poverty, pregnancy, and birth outcomes: a study of the Earned Income Tax Credit. *Paediatr. Perinat. Epidemiol.* 29:444-52

46. Hamilton D, Darity W Jr. 2010. Can ‘baby bonds’ eliminate the racial wealth gap in putative post-racial America? *Rev. Black Political Econ.* 37(3–4):207–16
47. Han C-K, Ssewamala FM, Wang JS-H. 2013. Family economic empowerment and mental health among AIDS-affected children living in AIDS-impacted communities: evidence from a randomised evaluation in southwestern Uganda. *J. Epidemiol. Community Health* 67(3):225–30
48. Hanlon J, Barrientos A, Hulme D. 2010. *Just Give Money to the Poor: The Development Revolution from the Global South*. West Hartford, CT: Kumarian
49. Harrell CJP, Burford TI, Cage BN, Nelson TM, Shearon S, et al. 2011. Multiple pathways linking racism to health outcomes. *Du Bois Rev.* 8(1):143–57
50. Harris DN. 2009. Toward policy-relevant benchmarks for interpreting effect sizes: combining effects with costs. *Educ. Eval. Policy Anal.* 31(1):3–29
51. Hicken MT, Lee H, Hing AK. 2018. The weight of racism: vigilance and racial inequalities in weight-related measures. *Soc. Sci. Med.* 199:157–66
52. Howard C. 1997. *The Hidden Welfare State: Tax Expenditures and Social Policy in the United States*. Princeton, NJ: Princeton Univ. Press
53. Hoynes H, Miller D, Simon D. 2015. Income, the Earned Income Tax Credit, and infant health. *Am. Econ. J. Econ. Pol.* 7:172–211
54. Hoynes H, Rothstein J. 2019. Universal basic income in the United States and advanced countries. *Annu. Rev. Econ.* 11:929–58
55. Huang J, Nam Y, Sherraden M, Clancy MM. 2019. Impacts of child development accounts on parenting practices: evidence from a randomised statewide experiment. *Asia Pac. J. Soc. Work Dev.* 29(1):34–47
56. Huang J, Sherraden M, Kim Y, Clancy MM. 2014. Effects of child development accounts on early social-emotional development: an experimental test. *JAMA Pediatr.* 168(3):265–71
57. Huang J, Sherraden M, Purnell JQ. 2014. Impacts of child development accounts on maternal depressive symptoms: evidence from a randomized statewide policy experiment. *Soc. Sci. Med.* 112:30–38
58. Huang J, Zou L, Sherraden M, eds. 2020. *Inclusive Child Development Accounts: Toward Universality and Progressivity*. New York: Routledge
59. Hudson DL. 2020. Introduction to race at the forefront. *J. Race Inequal. Soc. Mobil. Am.* 2(1):1
60. Hunter BM, Harrison S, Portela A, Bick D. 2017. The effects of cash transfers and vouchers on the use and quality of maternity care services: a systematic review. *PLOS ONE* 12(3):e0173068
61. Jackson JS, Knight KM, Rafferty JA. 2010. Race and unhealthy behaviors: chronic stress, the HPA Axis, and physical and mental health disparities over the life course. *Am. J. Public Health* 100(5):933–39
62. Kaestner R, Tarlov E. 2006. Changes in the welfare caseload and the health of low-educated mothers. *J. Policy Anal. Manag.* 25(3):623–43
63. Karimli L, Ssewamala FM. 2015. Do savings mediate changes in adolescents’ future orientation and health-related outcomes? Findings from randomized experiment in Uganda. *J. Adolesc. Health* 57(4):425–32
64. Katznelson I. 2005. *When Affirmative Action Was White: An Untold Story of Racial Inequality in Twentieth Century America*. New York: Norton
65. Kershaw KN, Diez Roux AV, Burgard SA, Lisabeth LD, Mujahid MS, Schulz AJ. 2011. Metropolitan-level racial residential segregation and black-white disparities in hypertension. *Am. J. Epidemiol.* 174(5):537–45
66. Kim Y, Sherraden M, Huang J, Clancy M. 2015. Child development accounts and parental educational expectations for young children: early evidence from a statewide social experiment. *Soc. Serv. Rev.* 89(1):99–137
67. Komro KA, Markowitz S, Livingston MD, Wagenaar AC. 2019. Effects of state-level earned income tax credit laws on birth outcomes by race and ethnicity. *Health Equity* 3(1):61–67
68. Krieger N. 2000. Refiguring “race”: epidemiology, racialized biology, and biological expressions of race relations. *Int. J. Health Serv.* 30(1):211–16
69. Krieger N, Williams DR, Moss NE. 1997. Measuring social class in US public health research: concepts, methodologies, and guidelines. *Annu. Rev. Public Health* 18:341–78
70. Kuka E. 2020. Quantifying the benefits of social insurance: unemployment insurance and health. *Rev. Econ. Stat.* 102:490–505

71. Kumanyika SK, Whitt-Glover MC, Haire-Joshu D. 2014. What works for obesity prevention and treatment in black Americans? Research directions. *Obesity Rev.* 15:204–12
72. Lagarde M, Haines A, Palmer N. 2007. Conditional cash transfers for improving uptake of health interventions in low- and middle-income countries: a systematic review. *JAMA* 298(16):1900–10
73. LaVeist T, Pollack K, Thorpe R Jr, Fesahazion R, Gaskin D. 2011. Place, not race: disparities dissipate in Southwest Baltimore when blacks and whites live under similar conditions. *Health Aff.* 30(10):1880–87
74. Lenhart O. 2019. The effects of income on health: new evidence from the Earned Income Tax Credit. *Rev. Econ. Houseb.* 17(2):377–410
75. Link BG, Phelan JC. 1995. Social conditions as fundamental causes of disease. *J. Health Soc. Behav.* 1995:80–94
76. Markowitz S, Komro KA, Livingston MD, Lenhart O, Wagenaar AC. 2017. Effects of state-level earned income tax credit laws in the U.S. on maternal health behaviors and infant health outcomes. *Soc. Sci. Med.* 194:67–75
77. Martin-West S, Baker AC, Balakrishnan S, Rao K, Tan GY. 2019. *Pre-analysis plan: Stockton Economic Empowerment Demonstration*. Rep., Stockton Econ. Empower. Demonstr., Stockton, CA. <https://www.stocktondemonstration.org/wp-content/uploads/2019/08/SEED-Pre-analysis-Plan.-8.6.19-1.pdf>
78. Masa R, Chowa GAN, Sherraden M. 2020. An evaluation of a school-based savings program and its effect on sexual risk behaviors and victimization among young Ghanaians. *Youth Soc.* 52:1083–106
79. McGovern L, Miller G, Hughes-Cromwick P. 2014. *The relative contribution of multiple determinants to health*. Health Policy Brief, Health Aff., Robert Wood Johnson Found., Princeton, NJ. <https://www.rwjf.org/en/library/research/2014/08/the-relative-contribution-of-multiple-determinants-to-health-out.html>
80. Molina-Millán T, Barham T, Macours K, Maluccio JA, Stampini M. 2016. *Long-term impacts of conditional cash transfers in Latin America: review of the evidence*. Work. Pap. IDB-WP-732, Inter-Am. Dev. Bank, Washington, DC
81. Muennig P, Caleyachetty R, Rosen Z, Korotzer A. 2015. More money, fewer lives: the cost effectiveness of welfare reform in the United States. *Am. J. Public Health* 105(2):324–28
82. Muennig PA, Mohit B, Wu J, Jia H, Rosen Z. 2016. Cost effectiveness of the Earned Income Tax Credit as a health policy investment. *Am. J. Prev. Med.* 51(6):874–81
83. Nuru-Jeter AM, Michaels EK, Thomas MD, Reeves AN, Thorpe RJ Jr, LaVeist TA. 2018. Relative roles of race versus socioeconomic position in studies of health inequalities: a matter of interpretation. *Annu. Rev. Public Health* 39:169–88
84. Nyoni T, Okumu M. 2020. COVID-19-compliant strategies for supporting treatment adherence among people living with HIV in sub-Saharan Africa. *AIDS Behav.* 24:2473–76
85. Oliver ML, Shapiro TM. 1995. *Black Wealth/White Wealth: A New Perspective on Racial Inequality*. New York: Routledge
86. Owusu-Addo E, Cross R. 2014. The impact of conditional cash transfers on child health in low- and middle-income countries: a systematic review. *Int. J. Public Health* 59(4):609–18
87. Owusu-Addo E, Renzaho AM, Smith BJ. 2018. Evaluation of cash transfer programs in sub-Saharan Africa: a methodological review. *Eval. Progr. Plan.* 68:47–56
88. Owusu-Addo E, Renzaho AM, Smith BJ. 2018. The impact of cash transfers on social determinants of health and health inequalities in sub-Saharan Africa: a systematic review. *Health Policy Plan.* 33(5):675–96
89. Owusu-Addo E, Renzaho AM, Smith BJ. 2019. Cash transfers and the social determinants of health: a conceptual framework. *Health Promot. Int.* 34(6):e106–18
90. Paradies Y, Ben J, Denson N, Elias A, Priest N, et al. 2015. Racism as a determinant of health: a systematic review and meta-analysis. *PLOS ONE* 10(9):e0138511
91. Pega F, Carter K, Blakely T, Lucas PJ. 2013. In-work tax credits for families and their impact on health status in adults. *Cochrane Database Syst. Rev.* 2013(8):CD009963
92. Pega F, Liu SY, Walter S, Pabayo R, Saith R, Lhachimi SK. 2017. Unconditional cash transfers for reducing poverty and vulnerabilities: effect on use of health services and health outcomes in low- and middle-income countries. *Cochrane Database Syst. Rev.* 2017(11):CD011135

93. Phelan JC, Link BG, Tehranifar P. 2010. Social conditions as fundamental causes of health inequalities: theory, evidence, and policy implications. *J. Health Soc. Behav.* 51(Suppl.):S28–40
94. Pollack CE, Chideya S, Cubbin C, Williams B, Dekker M, Braveman P. 2007. Should health studies measure wealth? A systematic review. *Am. J. Prev. Med.* 33(3):250–64
95. Popple PR. 2018. *Social Work Practice and Social Welfare Policy in the United States: A History*. New York: Oxford Univ. Press
96. Remme M, Vassall A, Lutz B, Luna J, Watts C. 2014. Financing structural interventions: going beyond HIV-only value for money assessments. *AIDS* 28(3):425–34
97. Renahy E, Mitchell C, Molnar A, Muntaner C, Ng E, et al. 2018. Connections between unemployment insurance, poverty and health: a systematic review. *Eur. J. Public Health* 28(2):269–75
98. Rothstein R. 2017. *The Color of Law: A Forgotten History of How Our Government Segregated America*. New York: Norton
99. Sarkar S, Corso P, Ebrahim-Zadeh S, Kim P, Charania S, Wall K. 2019. Cost-effectiveness of HIV prevention interventions in sub-Saharan Africa: a systematic review. *ECLin. Med.* 10:10–31
100. Seligman HK, Schillinger D. 2010. Hunger and socioeconomic disparities in chronic disease. *N. Engl. J. Med.* 363(1):6–9
101. Shahidi FV, Ramraj C, Sod-Erdene O, Hildebrand V, Siddiqi A. 2019. The impact of social assistance programs on population health: a systematic review of research in high-income countries. *BMC Public Health* 19:2
102. Sherraden M. 1991. *Assets and the Poor: A New American Welfare Policy*. Armonk, NY: ME Sharpe
103. Sherraden M. 2018. Asset building as social investment. *J. Sociol. Soc. Welf.* 45(4):35–54
104. Sherraden M, Cheng L-C, Ssewamala FM, Kim Y, Loke V, et al. 2018. International child development accounts. In *Encyclopedia of Social Work*, ed. C Franklin. New York: Oxford Univ. Press. <https://doi.org/10.1093/acrefore/9780199975839.013.1261>
105. Sherraden M, Clancy MM. 2005. *The universal model in SEED*. Brief, Cent. Soc. Dev., Wash. Univ., St. Louis. <https://doi.org/10.7936/K71R6Q03>
106. Sherraden M, Stuart P, Barth RP, Kemp S, Lubben J, et al. 2015. *Grand accomplishments in social work*. Work. Pap. 2, Grand Chall. Soc. Work, Baltimore, MD. <https://aaswv.org/wp-content/uploads/2015/12/WP2-with-cover.pdf>
107. Sherraden MS, Huang J, Jacobson Frey J, Birkenmaier J, Callahan C, et al. 2015. *Financial capability and asset building for all*. Work. Pap. 13, Grand Chall. Soc. Work, Am. Acad. Soc. Work Soc. Welf., Cleveland, OH. <http://grandchallengesforsocialwork.org/wp-content/uploads/2016/01/WP13-with-cover.pdf>
108. Siddiqi A, Rajaram A, Miller SP. 2018. Do cash transfer programmes yield better health in the first year of life? A systematic review linking low-income/middle-income and high-income contexts. *Arch. Dis. Child.* 103(10):920–26
109. Smedley A, Smedley BD. 2005. Race as biology is fiction, racism as a social problem is real: anthropological and historical perspectives on the social construction of race. *Am. Psychol.* 60(1):16–26
110. Snyder SE, Evans WN. 2006. The effect of income on mortality: evidence from the Social Security notch. *Rev. Econ. Stat.* 88(3):482–95
111. Ssewamala FM, Han C-K, Neilands TB, Ismayilova L, Sperber E. 2010. Effect of economic assets on sexual risk-taking intentions among orphaned adolescents in Uganda. *Am. J. Public Health* 100(3):483–88
112. Ssewamala FM, Wang JS-H, Neilands TB, Bermudez LG, Garfinkel I, et al. 2018. Cost-effectiveness of a savings-led economic empowerment intervention for AIDS-affected adolescents in Uganda: implications for scale-up in low-resource communities. *J. Adolesc. Health* 62(1):S29–36
113. Steuerle CE, Harris BH, McKernan S-M, Quakenbush C, Ratcliffe C. 2014. *Who benefits from asset-building tax subsidies?* Oppor. Ownersh. Initiat. Fact Sheet, Urban Inst., Washington, DC. <https://www.urban.org/research/publication/who-benefits-asset-building-tax-subsidies>
114. Stockton Econ. Empower. Demonstr. 2019. *Our vision for SEED: A discussion paper*. Discuss. Pap., Stockton Econ. Empower. Demonstr., Stockton, CA. <https://www.stocktondemonstration.org/wp-content/uploads/2019/12/SEED-Discussion-Paper-12.19.pdf>
115. Strully KW, Rehkopf DH, Xuan Z. 2010. Effects of prenatal poverty on infant health: state earned income tax credits and birth weight. *Am. Sociol. Rev.* 75(4):534–62

116. Tax Policy Cent. 2019. *The Tax Policy Center's Briefing Book*. Washington, DC: Urban-Brookings Tax Policy Cent. <https://www.taxpolicycenter.org/briefing-book/how-large-are-tax-expenditures-retirement-saving>
117. Thomas C, Kalkstein D, Walton G. 2020. How the coronavirus crisis is opening the door to universal social policies in the U.S. *Time*, June 17. <https://time.com/5855091/coronavirus-crisis-is-opening-the-door-universal-social-policies/>
118. Tozan Y, Sun S, Capasso A, Wang JS-H, Neilands TB, et al. 2019. Evaluation of a savings-led family-based economic empowerment intervention for AIDS-affected adolescents in Uganda: a four-year follow-up on efficacy and cost-effectiveness. *PLOS ONE* 14(12):e0226809
119. US Census Bur. 2020. *Income and poverty in the United States: 2019*. Curr. Popul. Rep. P60–270, US Census Bur., Washington, DC. <https://www.census.gov/content/dam/Census/library/publications/2020/demo/p60-270.pdf>
120. Valencia Lomeli E. 2008. Conditional cash transfers as social policy in Latin America: an assessment of their contributions and limitations. *Annu. Rev. Sociol.* 34:475–99
121. Wagenaar AC, Livingston MD, Markowitz S, Komro KA. 2019. Effects of changes in Earned Income Tax Credit: time-series analyses of Washington DC. *SSM - Popul. Health* 7:100356
122. Wang JS-H, Sewamala FM, Han C-K. 2014. Family economic strengthening and mental health functioning of caregivers for AIDS-affected children in rural Uganda. *Vulnerable Child. Youth Stud.* 9(3):258–69
123. Webb Hooper M, Nápoles AM, Pérez-Stable EJ. 2020. COVID-19 and racial/ethnic disparities. *JAMA* 323:2466–67
124. Williams DR, Collins C. 1995. US socioeconomic and racial differences in health: patterns and explanations. *Annu. Rev. Sociol.* 21:349–86
125. Williams DR, Collins C. 2001. Racial residential segregation: a fundamental cause of racial disparities in health. *Public Health Rep.* 116(5):404–16
126. Williams DR, Collins C. 2004. Reparations: a viable strategy to address the enigma of African American health. *Am. Behav. Sci.* 47(4):977–1000
127. Williams DR, Cooper LA. 2019. Reducing racial inequities in health: using what we already know to take action. *Int. J. Environ. Res. Public Health* 16:606
128. World Bank. 2011. *Program Keluarga Harapan: main findings from the impact evaluation of Indonesia's pilot household conditional cash transfer program*. Rep., World Bank Off., Jakarta, Indones. <http://documents1.worldbank.org/curated/en/589171468266179965/pdf/725060WP00PUBL0luation0Report0FINAL.pdf>
129. Yang A. 2018. *The War on Normal People: The Truth About America's Disappearing Jobs and Why Universal Basic Income Is Our Future*. New York: Hachette



Contents

Commentary

Climate Change Disinformation and How to Combat It
Stephan Lewandowsky 1

Epidemiology and Biostatistics

Considerations for Developing an Agenda for Gun Violence
Prevention Research
Mark Rosenberg 23

Influenza Virus: Tracking, Predicting, and Forecasting
Sheikh Taslim Ali and Benjamin J. Cowling 43

Prediabetes and What It Means: The Epidemiological Evidence
Justin B. Echouffo-Tcheugui and Elizabeth Selvin 59

Reproducible Research: A Retrospective
Roger D. Peng and Stephanie C. Hicks 79

Vaccine Hesitancy, Acceptance, and Anti-Vaccination: Trends and
Future Prospects for Public Health
Ève Dubé, Jeremy K. Ward, Pierre Verger, and Noni E. MacDonald 175

Declining Life Expectancy in the United States: Missing the Trees
for the Forest
Sam Harper, Corinne A. Riddell, and Nicholas B. King 381

Trends in Abortion Policies in Low- and Middle-Income Countries
Pascale Allotey, T.K. Sundari Ravindran, and Vithiya Sathivelu 505

Social Environment and Behavior

Prediabetes and What It Means: The Epidemiological Evidence
Justin B. Echouffo-Tcheugui and Elizabeth Selvin 59

A Critical Review of the Social and Behavioral Contributions to the Overdose Epidemic <i>Magdalena Cerdá, Noa Krawczyk, Leah Hamilton, Kara E. Rudolph, Samuel R. Friedman, and Katherine M. Keyes</i>	95
Early Childhood Adversity, Toxic Stress, and the Impacts of Racism on the Foundations of Health <i>Jack P. Shonkoff, Natalie Slopen, and David R. Williams</i>	115
Expanding Implementation Research to Prevent Chronic Diseases in Community Settings <i>Stephanie Mazzucca, Elva M. Arredondo, Deanna M. Hoelscher, Debra Haire-Joshu, Rachel G. Tabak, Shiriki K. Kumanyika, and Ross C. Brownson</i>	135
Understanding and Responding to Health Literacy as a Social Determinant of Health <i>Don Nutbeam and Jane E. Lloyd</i>	159
Vaccine Hesitancy, Acceptance, and Anti-Vaccination: Trends and Future Prospects for Public Health <i>Ève Dubé, Jeremy K. Ward, Pierre Verger, and Noni E. MacDonald</i>	175
 Environmental and Occupational Health	
Air Quality in Africa: Public Health Implications <i>Asmaw Abera, Johan Friberg, Christina Isaxon, Michael Jerrett, Ebba Malmqvist, Cheryl Sjöström, Tabir Taj, and Ana Maria Vargas</i>	193
At the Water's Edge: Coastal Settlement, Transformative Adaptation, and Well-Being in an Era of Dynamic Climate Risk <i>William Solecki and Erin Friedman</i>	211
Climate Change, Food Supply, and Dietary Guidelines <i>Colin W. Binns, Mi Kyung Lee, Bruce Maycock, Liv Elin Torheim, Keiko Nanishi, and Doan Thi Thuy Duong</i>	233
Environmental Health Threats to Latino Migrant Farmworkers <i>Federico Castillo, Ana M. Mora, Georgia L. Kayser, Jennifer Vanos, Carly Hyland, Audrey R. Yang, and Brenda Eskenazi</i>	257
Environmental Influences on the Human Microbiome and Implications for Noncommunicable Disease <i>Jiyoung Ahn and Richard B. Hayes</i>	277

Extreme Weather and Climate Change: Population Health and Health System Implications <i>Kristie L. Ebi, Jennifer Vanos, Jane W. Baldwin, Jesse E. Bell, David M. Hondula, Nicole A. Errett, Katie Hayes, Colleen E. Reid, Shubhayu Saba, June Spector, and Peter Berry</i>	293
Green Infrastructure and Health <i>Mark J. Nieuwenhuijsen</i>	317
Public Health Practice and Policy	
Climate Change Disinformation and How to Combat It <i>Stephan Lewandowsky</i>	1
Expanding Implementation Research to Prevent Chronic Diseases in Community Settings <i>Stephanie Mazzucca, Elva M. Arredondo, Deanna M. Hoelscher, Debra Haire-Joshu, Rachel G. Tabak, Shiriki K. Kumanyika, and Ross C. Brownson</i>	135
Addressing Social Needs in Health Care Settings: Evidence, Challenges, and Opportunities for Public Health <i>Matthew W. Kreuter, Tess Thompson, Amy McQueen, and Rachel Garg</i>	329
Benchmarking as a Public Health Strategy for Creating Healthy Food Environments: An Evaluation of the INFORMAS Initiative (2012–2020) <i>Gary Sacks, Janelle Kwon, Stefanie Vandevijvere, and Boyd Swinburn</i>	345
Cash Transfers and Health <i>Sicong Sun, Jin Huang, Darrell L. Hudson, and Michael Sherraden</i>	363
Declining Life Expectancy in the United States: Missing the Trees for the Forest <i>Sam Harper, Corinne A. Riddell, and Nicholas B. King</i>	381
Enhancing Community Engagement by Schools and Programs of Public Health in the United States <i>Mindi B. Levin, Janice V. Bowie, Steven K. Ragsdale, Amy L. Gawad, Lisa A. Cooper, and Joshua M. Sharfstein</i>	405
Progress in National Policies Supporting the Sustainable Development Goals: Policies that Matter to Income and Its Impact on Health <i>Amy Raub and Jody Heymann</i>	423
Sugar-Sweetened Beverage Reduction Policies: Progress and Promise <i>James Krieger, Sara N. Bleich, Stephanie Scarmo, and Shu Wen Ng</i>	439

Health Services

Extreme Weather and Climate Change: Population Health and Health System Implications <i>Kristie L. Ebi, Jennifer Vanos, Jane W. Baldwin, Jesse E. Bell, David M. Hondula, Nicole A. Errett, Katie Hayes, Colleen E. Reid, Shubbayu Saha, June Spector, and Peter Berry</i>	293
Addressing Social Needs in Health Care Settings: Evidence, Challenges, and Opportunities for Public Health <i>Matthew W. Kreuter, Tess Thompson, Amy McQueen, and Rachel Garg</i>	329
Improving Access to Care: Telemedicine Across Medical Domains <i>William Barbosa, Kina Zhou, Emma Waddell, Taylor Myers, and E. Ray Dorsey</i>	463
The Effects of Home Care Provider Mix on the Care Recipient: An International, Systematic Review of Articles from 2000 to 2020 <i>Norma B. Coe, R. Tamara Konetzka, Melissa Berkowitz, Emily Blecker, and Courtney H. Van Houtven</i>	483
Trends in Abortion Policies in Low- and Middle-Income Countries <i>Pascale Allotey, T.K. Sundari Ravindran, and Vitbiya Sathivelu</i>	505

Indexes

Cumulative Index of Contributing Authors, Volumes 33–42	519
Cumulative Index of Article Titles, Volumes 33–42	526

Errata

An online log of corrections to *Annual Review of Public Health* articles may be found at <http://www.annualreviews.org/errata/publhealth>