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The five articles in this issue together support the contention that there are social determinants of health that are at least as influential as access to health care and individual behaviors. The Centers for Disease Control and Prevention identifies these social determinants as “the conditions in the places where people live, learn, work, and play.” In the first article, Geoffrey Swain details how economic and social disadvantage affects health, and describes some policy approaches to improve health and reduce health inequities by addressing socioeconomic disadvantage. Next, Pamela Herd, Robert Schoeni, and James House look at the health effects of the Supplemental Security Income program on single elderly individuals, and find support for the theory that socioeconomic status is a fundamental cause of health differences. In the third article, Janet Currie reviews research that links health at birth to future outcomes, and identifies factors that can account for reductions in health inequality among infants and children. Next, Marni Brownell, Mariette Chartier, and Nathan Nickel evaluate receipt of an unconditional prenatal income supplement in Canada, and find it was associated with reduction in low birth weight and preterm births. Finally, Diana Hernández takes a qualitative view and, drawing from interviews of low-income families living in an inner-city neighborhood, describes the health implications of their strategies to respond to neighborhood safety risks, and suggests alternative approaches to enhance prospects for improved health and social change. Together, these articles provide support for the argument that social and economic policy is also health policy.

How does economic and social disadvantage affect health?

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The World Health Organization (WHO) defines health as not just the absence of disease, but rather in the broad sense of physical, economic, emotional, and social well-being at an individual, family, and community level. Health is thus affected not only by individual risk factors and behaviors, but also by a range of economic and social conditions. These *social determinants of health*—the circumstances in which people are born, grow up, live, work, and age—are shaped

by a variety of economic, social, and political policies and forces. These policies and forces—what the WHO describes as the *social determinants of health inequities*—in turn determine access to life chances and opportunities for health based on social markers of advantage and disadvantage such as race and ethnicity, class, and gender. In this article I explore some of the mechanisms through which social determinants affect health (and life) outcomes, and describe some policy approaches to improving health by addressing socioeconomic disadvantage.

How does socioeconomic disadvantage drive poor health outcomes?

Why is it that the United States has the best health care in the world, but is nowhere near the healthiest country? The County Health Rankings framework developed by the University of Wisconsin School of Medicine and Public Health’s Public

Health Institute, shown in Figure 1, shows that health outcomes, as measured by length and quality of life, are influenced by a set of four modifiable health factors: health behaviors, clinical care, social and economic factors, and the physical environment. (Genetics, while important, is, at present, functionally non-modifiable, and therefore excluded from the model.) These modifiable health factors are in turn strongly influenced by a broad set of policies and programs.

Although this framework is broad and inclusive, our national discussion about improving health outcomes tends to focus on clinical care and on individual responsibility for health behaviors; the other two modifiable health factors, social and economic factors and the physical environment, are generally not included in the conversation. This reflects a widely held belief in the United States that if an individual engages in healthful behaviors (such as exercising, eating healthfully, and not smoking) and goes to the doctor regularly, she will be healthy. However, these two factors, while certainly important, only account for *at most* half of what determines health outcomes.

The other two factors—social and economic factors, and the physical environment—constitute the social determinants of health. Together, they are likely even more important to health outcomes than health behaviors and clinical care. As will be delineated in more detail below, the social determinants of health affect health both indirectly (by affecting access to and quality of clinical care, by influencing health behaviors, and by determining risk of exposure to toxic physical environments) and directly (through hormonal changes due to chronic stress, and through epigenetic changes, which change whether particular genes are expressed in particular cells).

Indirect mechanisms through other health factors

In the three indirect mechanisms described below, social and economic factors affect one of the other three health factors: health behaviors, clinical care, and the physical environment.

First, social and economic factors can support or constrain healthful behaviors. For example, people with social or economic disadvantage may not be able to easily eat a healthful diet, or provide this to their families, if they live in a neighborhood where such food is not easily available or affordable. Similarly, people may not be able to easily exercise if they live in a neighborhood that is not safe enough to walk in, or to permit children to play outside. Work, school, child care, and commuting schedules (especially on public transit) may also not leave enough time in the day to accommodate such healthful behaviors.

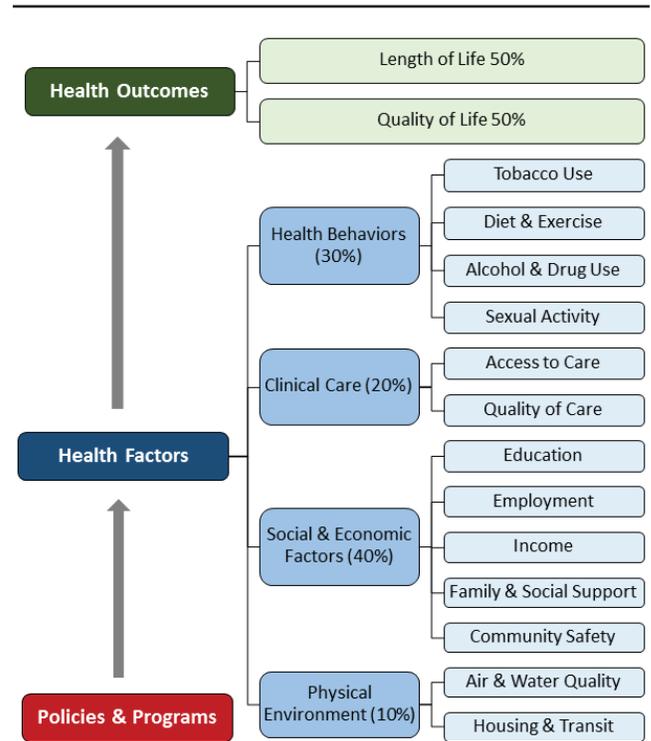


Figure 1. County Health Rankings framework.

Source: University of Wisconsin Population Health Institute, *County Health Rankings 2014*. Accessible at www.countyhealthrankings.org/our-approach.

Second, social or economic disadvantage also affects the ability to access clinical care, as well as the quality of care received. Work hours, work sick-leave policies, clinic hours, and transportation and childcare issues can make seeing a health care professional very difficult. Further, there is ample evidence to show that those with lower educational attainment, those with lower incomes, and people of color all receive lower quality health care.¹

Third, social and economic factors drive one’s exposure to a healthy or unhealthy physical environment. For example, education level largely determines employment choices, which in turn largely determine income level. These factors greatly influence the probability of being able to afford to live in a health-supporting physical environment, such as housing without lead paint or other safety hazards, in a safe community, and at a sufficient distance from industrial polluting sites.

Direct mechanisms

Social and economic disadvantage also directly affects biology, “getting under the skin” through chronic unmitigated

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stress (which drives increases in stress hormone levels) and epigenetic mechanisms. Everybody has stress, but people with higher education, income, and social status have more resources to mitigate that stress, whereas those with lower incomes are likely to have considerably less access to such resources. There are other factors that can compound the adverse effects of chronic stress such as the experience of discrimination on the basis of race, gender, social class, or other characteristics. Research suggests that discrimination can exacerbate health disparities.²

How does chronic stress “get under the skin?” Unmitigated stress results in chronic elevations of stress hormones such as adrenaline and cortisol. These hormones are normally secreted only for short periods of time in response to a perceived threat. While these occasional spikes in stress hormone levels may be advantageous in assisting the body to appropriately respond to a threat, the continuous elevated presence of these hormones results in numerous negative health effects. Increased levels of adrenaline results in increased blood pressure, which raises the risk for heart disease and stroke. Chronically elevated adrenaline levels also raise the risk of preterm labor for pregnant women and low birth weight for infants, which can have enduring negative effects. Chronically elevated levels of cortisol impairs glucose metabolism, which increases the risk of obesity and diabetes; and also impairs the immune system, which increases the risk of cancer and other chronic diseases.³

Chronic unmitigated stress can also directly affect biology through epigenetic changes. The epigenome is a series of on-off switches that controls whether particular genes are expressed in particular cells. When adrenaline and cortisol are chronically elevated, chemical changes to these switches alter the degree to which these genes are expressed or not, resulting in adverse health effects. Moreover, these epigenetic changes can be passed on to the next generation, so a parent who experiences chronic stress can pass these changes to their children, even if those children are not experiencing the conditions that caused their parents’ stress in the past.

Social determinants of health across the life course

Across the life course, the likelihood of someone being healthy depends greatly on their social determinants of health. Thus, someone with a strong positive set of social determinants of health, such as being white, highly educated, and well-off financially, will have a large number of protective factors over their lifetime that increase their likelihood of good health, and relatively few risk factors that depress that potential. In contrast, someone with a more adverse set of social determinants of health, such as being non-white, having a low level of education, and being poor, will begin life with a relatively low likelihood of good health, have few protective factors promoting good health over their lifespan, and many risk factors working against it. In this case, not only is the level of health likely to be much worse

over the life course, but the life span is also likely to be much shorter.

Policy approaches to social determinants of health

The social determinants of health—including material living conditions as well as the factors that make healthy living conditions more or less likely (such as education, income, and being in a group experiencing discrimination)—are in turn shaped by a wider set of forces, including most importantly economic, social, and other public policies. Unfortunately, from the point of view of health inequities, these policies have resulted in the stratification of these social determinants of health based on social markers of advantage or disadvantage. That is, public policy choices to date have ensured that the conditions exist for only a subsection of the population to be as healthy as possible, rather than maximizing good health for everyone.

Figure 2 shows the World Health Organization’s conceptual framework for the social determinants of health. This framework illustrates how the socioeconomic and political context interact with socioeconomic position and other “structural” characteristics, all of which in turn strongly influence material circumstances, behavioral, biological, and psychosocial factors—ultimately all converging to affect equity in health and well-being.

As Figure 2 shows, there are a wide variety of policies that can have an effect on health inequities. Harvard epidemiologist David Williams has noted that any type of policy that improves health and reduces disparities in health can be considered “health policy,” including not only health care policy, but also policies that (among many other possible examples) improve education, reduce poverty, enhance early childhood experiences, enhance neighborhood and housing conditions, expand transportation options, offer transitional jobs to the unemployed, and reduce disparities in incarceration rates.⁴

One policy that improves health by assuring equality of opportunity is the Earned Income Tax Credit (EITC), a refundable tax credit for low-income working families with children. One study found that an increase in income from the EITC reduced the incidence of low birth weight, and increased mean birth weight.⁵ For single mothers with a high school education or less, an increase of \$1,000 in EITC income is associated with a 6.7 to 10.8 percent reduction in the probability of low birth weight (weighing less than 2,500 grams, or 5.5 pounds), with larger positive effects for African American mothers.

Another health-improving policy is paid sick leave, which nearly half of all workers in the United States do not receive.⁶ Among the working population receiving the lowest wages, more than three-quarters receive no paid sick leave.⁷ Health impact assessments conducted by a health research

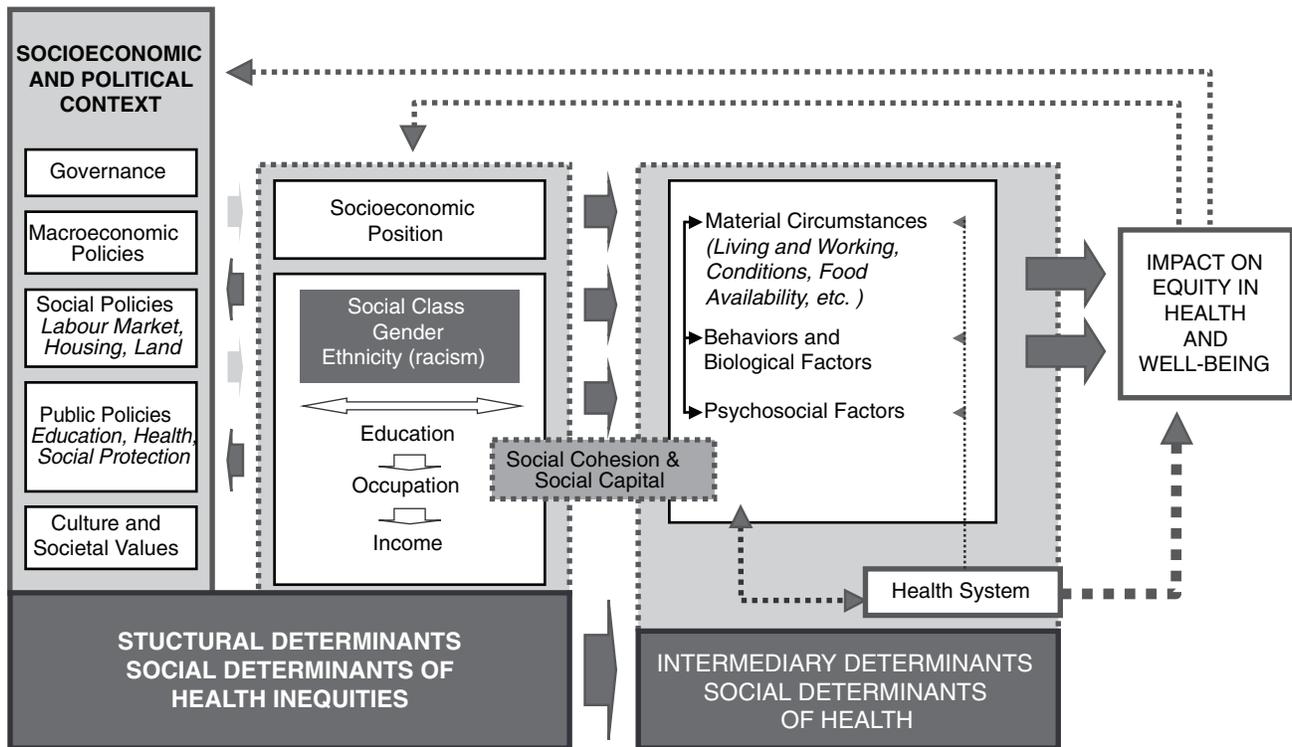


Figure 2. World Health Organization conceptual framework on social determinants of health.

Source: Commission on Social Determinants of Health, *A Conceptual Framework for Action on the Social Determinants of Health*, World Health Organization, Geneva, 2010.

organization suggest that guaranteed paid sick days would significantly improve public health, including reducing the spread of influenza and other communicable disease to the public in community settings such as restaurants and nursing homes.⁸ Such a policy would also likely prevent financial hardship among low-income workers by insuring continued wages while they were sick or needed to care for a sick dependent. Finally, allowing workers to take time off to see primary care physicians during regular business hours could reduce the use of unnecessary (and expensive) emergency room care.

There is strong evidence that universal pre-kindergarten improves cognitive outcomes, especially for disadvantaged children.⁹ There is also evidence that attending good-quality preschools results in gains in both educational attainment and earnings that persist even if short-term improvements in concrete achievement skills fade.¹⁰ Since children from low-income families are less likely to be enrolled in preschool than their peers from higher-income families, increasing preschool access and attendance would help assure equality of opportunity.¹¹

Housing First programs provide rapid access to permanent housing and ongoing support services for homeless people with persistent mental illness or substance abuse problems. Evidence shows that Housing First reduces homelessness and hospital utilization, improves mental health and physical

well-being, and increases treatment for substance use disorders.¹²

Transitional Jobs programs generally provide short term wage-paying work opportunities to previously unemployed individuals. These programs may include support services, placement, and training; they offer significant advantages to employers as well as to the employees. A health impact assessment of a transitional jobs program in Wisconsin found that expansion of this program could be expected to have positive effects on a number of health outcomes including chronic disease, mental health, domestic violence, birth outcomes, and child physical and mental health.¹³

The last example I will highlight of a policy or program that may improve health by addressing social disadvantage is providing treatment rather than prison for people with substance abuse disorders and mental health issues. Health impact assessments suggest that treatment alternatives improve recovery from substance abuse.¹⁴ The great majority of Wisconsin prison growth in the last decade is accounted for by drug offenders and drunk drivers, and dedicated drug courts are six times more likely than prison programs to keep offenders in treatment programs long enough for them to enter recovery. Similarly, dedicated mental health courts, which are intended to diagnose and treat underlying medical/psychological disorders that may lead to crime, have been found to reduce both the future likelihood of psychiatric

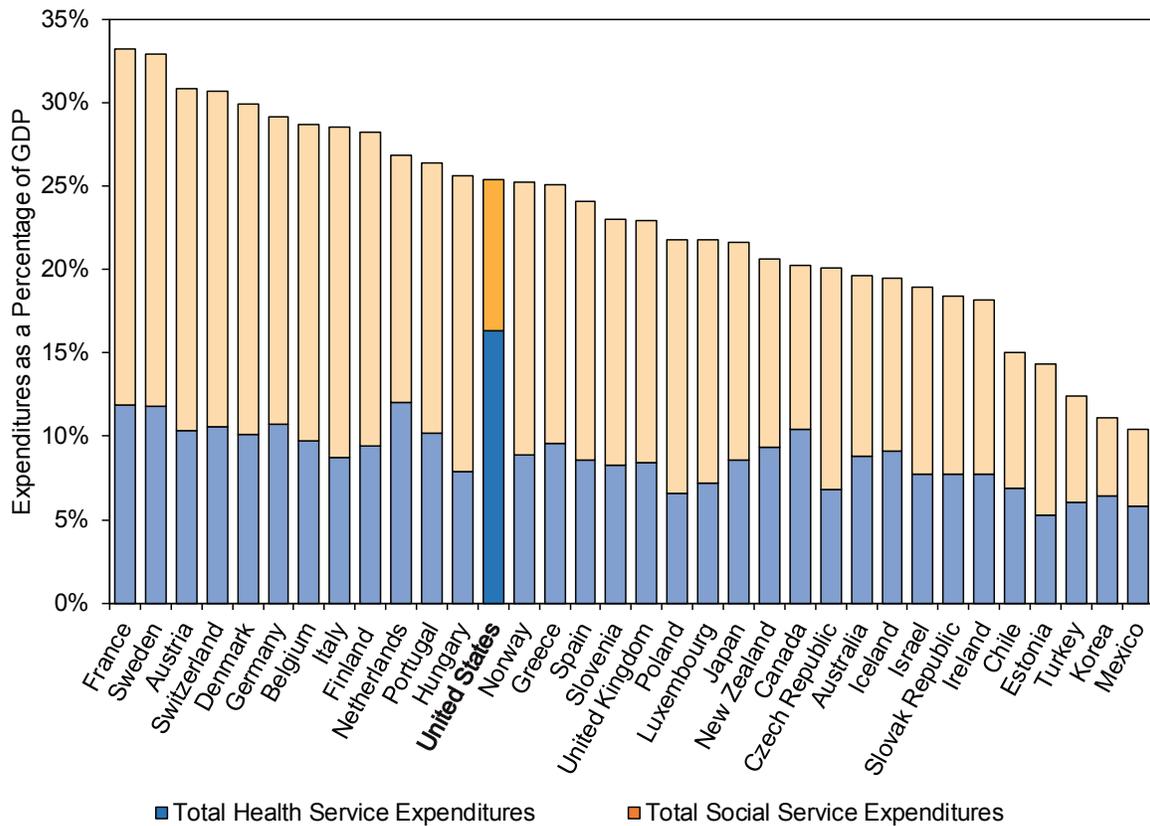


Figure 3. Total health care and social service spending in Organisation for Economic Co-operation and Development countries and the United States, 2009.

Source: E. H. Bradley and L. A. Taylor, *The American Health Care Paradox: Why Spending More is Getting Us Less* (New York: PublicAffairs, 2013).

hospitalization and the amount of future jail time for those who complete the programs to which they are assigned, and in turn improve health.

Economic effects of health equity

In addition to promoting social justice, it turns out that reducing health inequities also makes economic sense. A national study of medical costs and vital statistics reports from 2003 through 2006 found that eliminating health inequities for people of color would have reduced direct medical care expenditure over that period by \$229.4 billion, and indirect costs associated with illness and premature death by more than \$1 trillion.¹⁵ The same study found that nearly one-third of direct medical care expenditures for people of color were excess costs attributable to health inequities. Similarly, an estimate of the benefits of raising the health of all Americans to that of college-educated Americans totaled over \$1 trillion worth of increased health.¹⁶ Although policy change to reduce concentrated disadvantage and provide socioeconomic resources and opportunities needed to achieve well-being between groups with differing levels of social disadvantage would certainly incur costs, these high benefit estimates suggest that eliminating health inequities could result in a net financial gain.

Issues related to social determinants of health may be fundamentally important to explaining why the United States, despite having the best (and most expensive) health care in the world, is nowhere near the healthiest. The United States ranked 43rd among all countries for life expectancy in 2015, and Figure 3 shows differences in total health care and social service spending in OECD countries compared to the United States.¹⁷ In the OECD countries, roughly two dollars are spent on social services for every dollar spent on health care, while in the United States only about 55 cents goes to social services for every health care dollar.

Conclusion

The prevailing, but incorrect, narrative about health is that all one needs to do to be healthy is to engage in healthful behaviors and go to the doctor regularly. While healthful behaviors and access to high-quality health care are certainly important, arguably more important are the social determinants of health; social and economic factors, and the physical environment. Research has shown these factors to be more strongly associated with health outcomes than either health behaviors or clinical care. In addition, these factors appear to be very important in the degree to which some communities and even larger groups of people

experience health inequities, and even why some countries are healthier than others.

Social determinants of health are powerful because they interact with other health factors, by affecting individuals' access to (and quality of) health care, their ability to maintain healthful behaviors, and the safety of the physical environments in which they live, work, learn, and play. They are also powerful because they directly affect health, through physical environmental exposures, the effects of chronically elevated stress hormones, and epigenetic factors.

Because of this, it is crucial that policies aimed at improving health and reducing health inequities need to address not only health care and healthful behaviors, but also the social and economic conditions that so strongly affect the root causes of health.■

¹See, for example, "Disparities in Healthcare Quality among Racial and Ethnic Groups: Selected Findings from the 2011 National Healthcare Quality and Disparities Report," Agency for Healthcare Research and Quality. Accessible at: <https://archive.ahrq.gov/research/findings/nhqrd1/nhqrd11/minority.pdf>

²D. R. Williams and S. A. Mohammed, "Discrimination and Racial Disparities in Health: Evidence and Needed Research," *Journal of Behavioral Medicine* 32, No. 1 (February 2009): 20–47.

³H. Avey, "How U.S. Laws and Social Policies Influence Chronic Stress and Health Disparities," Politics of Race, Culture, and Health Symposium, Ithaca College, November 14, 2002. http://unnaturalcauses.org/assets/uploads/file/Avey-Chronic_Stress_and_Health_Disparities.pdf

⁴See "Unnatural Causes: Place Matters," television series transcript, California Newsreel, 2008. http://unnaturalcauses.org/assets/uploads/file/UC_Transcript_5.pdf

⁵H. Hoynes, D. Miller, and D. Simon, "Income, the Earned Income Tax Credit, and Infant Health," *American Economic Journal: Economic Policy* 7, No. 1, (February 2015): 172–211.

⁶*A Health Impact Assessment of the Healthy Families Act of 2009*, Summary Report, Human Impact Partners, Oakland, CA, 2009. Accessible at <http://www.humanimpact.org/projects/hia-case-stories/paid-sick-days-hias/>

⁷*A Health Impact Assessment of the Healthy Families Act of 2009*.

⁸*A Health Impact Assessment of the Healthy Families Act of 2009*.

⁹See, for example, M. D. Fitzpatrick, "Starting School at Four: The Effect of Universal Pre-Kindergarten on Children's Academic Achievement," *The B.E. Journal of Economic Analysis & Policy* 8, No. 1 (November 2008): 1935–1682.

¹⁰G. J. Duncan and K. Magnuson, "Early Childhood Interventions for Low-Income Children," *Focus* 31, No. 2 (Fall/Winter 2014–15): 1–5. <http://www.irp.wisc.edu/publications/focus/pdfs/foc312a.pdf>

¹¹<http://www.childtrends.org/?indicators=early-childhood-program-enrollment>

¹²See, for example, S. Tsemberis and R. F. Eisenberg, "Pathways to Housing: Supported Housing for Street-Dwelling Homeless Individuals With Psychiatric Disabilities," *Psychiatric Services* 51, No. 4 (April 2000): 487–493; G. Nelson, W. Laurier, T. Aubry, and A. Lafrance, "A Review of the Literature on the Effectiveness of Housing and Support, Assertive Community Treatment, and Intensive Case Management Interventions for Persons With Mental Illness Who Have Been Homeless," *American Journal of Orthopsychiatry* 77, No. 3 (July 2007): 350–361.

¹³*Transitional Jobs Programs: A Health Impact Assessment*, University of Wisconsin Population Health Institute, January 2013. Accessible at: <http://>

uwphi.pophealth.wisc.edu/publications/other/transitional-jobs-program-hia-full-report.pdf

¹⁴K. Gilhuly, L. Farhang, C. Tsui, K. Puccetti, and D. Liners, "Healthier Lives, Stronger Families, Safer Communities: How Increasing Funding for Alternatives to Prison Will Save Lives and Money in Wisconsin," Health Impact Assessment Report, Human Impact Partners, November 2012. <http://www.humanimpact.org/projects/hia-case-stories/treatment-instead-of-prison-hia/>

¹⁵T. A. LaVeist, D. Gaskin, and P. Richard, "Estimating the Economic Burden of Racial Health Inequalities in the United States," *International Journal of Health Services* 41, No. 2 (2011): 231–238.

¹⁶W. Dow and R. F. Schoeni, "Economic Value of Improving the Health of Disadvantaged Americans," Technical Report for *Overcoming Obstacles to Health*, Report from the Robert Wood Johnson Foundation to the Commission to Build a Healthier America. January 21, 2008.

¹⁷*The World Factbook 2014–15* (Washington, DC: Central Intelligence Agency, 2015).

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Does Supplemental Security Income reduce disability in the elderly?

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A 1982 report found that over a quarter century of universal health care in the United Kingdom had done little to reduce socioeconomic health disparities.¹ This report inspired decades of research documenting a strong relationship between socioeconomic status and health.² This research has given rise to the fundamental cause theory, which posits that socioeconomic status is a fundamental cause of health differences. This theory suggests that policy solutions aimed at ameliorating health disparities should be focused on changes in social and economic policies as much or more than on factors such as health care and behavioral changes. The study described in this article tests the fundamental cause theory by looking at the health effects on single elderly individuals of one particular income support policy in the United States, the Supplemental Security Income (SSI) program, which is intended, in part, to raise the incomes of the poorest elderly Americans (age 65 and older).³

Fundamental cause theory

Researchers who have documented the consistent and inverse relationship between socioeconomic status and health have been challenging the idea that socioeconomic position is simply a proxy for other factors that affect health, including access to and quality of health care and health behaviors, and have instead theorized that socioeconomic status is a fundamental determinant of health.⁴ The key evidence supporting this fundamental cause theory is that although the intervening links between socioeconomic status and health have changed over time, the link between low socioeconomic status and poor health has not. For example, while over the course of the twentieth century the major causes of mortality have changed from infectious disease to chronic conditions, socioeconomic disparities in health during that period have either persisted or increased.⁵ In addition, the strong link between socioeconomic status and health exists in countries with widely varying social, political, and economic conditions.⁶

According to fundamental cause theory, socioeconomic status promotes or limits access to resources that enable individuals to avoid health risk factors for disease and mortality.⁷ Risk factors include a wide range of environmental and social conditions, including neighborhood violence, drinking water contamination, and squalid housing conditions, which wealthier individuals are able to avoid.

Why study income support policy?

If socioeconomic status is indeed a fundamental cause of health, then policy solutions aimed at ameliorating health disparities should be focused on changes in social and economic policies as much or more than on factors such as health care and individuals' behavioral changes. Similarly, research should assess the efficacy of social and economic policies for reducing health disparities, examining, for example, how health is affected when resources are redistributed.

In the study discussed in this article, we focus on income support policy.⁸ Income is a key indicator of socioeconomic status, and there is extensive evidence of a strong association between income and health, particularly for low-income individuals. Income support programs are also arguably the most important mechanisms through which government can affect individual well-being, with billions of dollars of annual distributions.

There are several reasons why income support policy might affect health. First, there is considerable evidence of a strong association between income and mortality and morbidity. People with lower incomes have shorter lifespans on average than those with higher incomes, have more chronic conditions and functional limitations, have higher rates of mental health problems, and generally report a lower health status.⁹ Second, the effects of income on health, and particularly on morbidity, may be larger for those at the bottom of the income distribution.¹⁰ Since many income support policies target the poorest Americans, the extent to which these policies reduce entrenched poverty could have implications for health. Studies have specifically found that the duration of exposure to poverty or low income matters to health; the more prolonged the exposure is, the greater the effect on health.¹¹ For example, compared with those in the 1984 Panel Study of Income Dynamics who had experienced no poverty over the preceding sixteen years, those who had temporarily experienced poverty had self-reported health scores that were 17 percent lower, and those who had persistently experienced poverty had self-reported health scores that were 32 percent lower.¹²

What is it about having a low income that is bad for one's health? Lack of health insurance surely adversely affects one's access to and quality of health care, but this is only part of the puzzle. Perhaps more important than health care and health insurance is the deprivation associated with lower incomes. Poor people have more difficulty meeting basic needs necessary for good health, including good nutrition and safe and healthy environments at home and at work.¹³ Children in low-income families, for example, are far more likely than those in higher income families to report food insufficiencies, and are more likely to be iron deficient.¹⁴ Poor housing quality, including dampness, inadequate heat, presence of mold, and pest infestations, is associated with asthma.¹⁵ Some studies find that a substantial part of the relationship between low incomes and health can be explained by deprivation, such as being unable to afford basic amenities like housing, food, and clothing.¹⁶

Another important explanation is that low incomes are predictive of other psychosocial and behavioral risk factors, which are in turn predictive of health.¹⁷ Low-income people are more likely to face high levels of stress, which play a significant role in the onset of disease.¹⁸ Low-income individuals are more socially isolated and feel they have less control over their lives, both of which are predictive of poor health.¹⁹ Finally, individuals with low incomes are more likely to smoke, be obese, be sedentary, and consume too much (or too little). However, any single set of these factors (health behaviors, stress, social relationships and support, or psychological disparities) accounts for approximately 20 percent of the association between socioeconomic status and health.²⁰

While the potential pathways by which income can influence health are numerous, not all researchers agree that low income has a causal effect on health. Some argue that health is a human capital variable (like education or training) that determines economic well-being rather than the reverse.²¹ Health shocks lead to high out-of-pocket medical expenses, job loss and wage reductions, as well as changes in consumption behavior, all of which limit the ability to accumulate income and assets.²² Alternatively, it has been argued that some other factors may causally influence both income and health. For example, perhaps there are genetic factors that determine both health and income.

Exploring the relationship between income support policies and health may help clarify the relationship between income and health. Most researchers conclude that income is likely a determinant of health and that health is likely a determinant of income, but the strength of the relationship in either direction is contested.²³

Supplemental Security Income

Old-age policy in the United States provides a promising avenue for research because income supports are so substantial among the elderly, especially in comparison with

income supports early in the life course. Social Security, of course, is the most extensive income support program, and it has substantially increased income levels and reduced poverty levels among the elderly.²⁴ Since health events are concentrated among older people, it is often difficult to capture significant levels of variation in health among younger individuals, especially using standard survey measures of health. Looking instead at policies directed at the elderly better provides this variation.

Our study exploits this variation by studying one policy that affects the elderly—SSI. Our study examines the relationship between income and health by testing whether within-state changes in maximum SSI benefits led to changes in disability among the elderly. The SSI program was created in 1972 to provide a minimum income guarantee for the elderly, and is targeted at the poorest elderly Americans. At the time of the program's creation, minimum income guarantees varied greatly at the state level. Congress subsequently established a federal minimum income guarantee, set at about three-quarters of the poverty line. In 2000, the federal monthly maximum benefit for the elderly under SSI was \$512 for single individuals and \$769 for married couples. About 6 percent of the elderly in the United States receive SSI benefits. States may choose to supplement the federal minimum benefit, and twenty-six states do so. Thus, SSI maximum benefits vary between states and within states over time. It is this variation within states over time that allows us to test the effect of changing benefit levels on disability among the elderly.

Do higher benefits reduce disability rates?

We used census data from 1990 and 2000 for single individuals aged sixty-five or older to examine the effect of the SSI program on disability among elderly Americans. Within-state changes in SSI benefit policy over the period provide a natural experiment, offering a way to address the causal direction of the relationship between income and health. Our indicator of disability, obtained from the 1990 and 2000 censuses, is a self-reported measure of whether the respondent had any health condition that had lasted six or more months, and that made it difficult or impossible to function independently in public.

We find that between 1990 and 2000, within-state changes in the maximum state SSI benefit were correlated to changes in self-reported disability rates among elderly individuals, with higher benefits associated with lower disability rates. Among all single elderly individuals, a \$100 increase in the maximum monthly SSI benefit was associated with a decrease in the rate of mobility limitations of 0.46 percentage points. However, this effect size is spread across the entire population of single elderly Americans, only about 10 percent of whom report receiving SSI benefits. Thus, the effect on the population of those receiving SSI could be much larger. We conducted several sensitivity analyses, and found that our results were robust to a number of changes, including in the disability measure and in sample definition.

From a theoretical perspective, our study provides evidence supporting the potential for using social and economic policy solutions to address socioeconomic disparities in health. Fundamental cause theory would predict that by shifting resources to those at the bottom of the income distribution, income supports would improve health. But most policy efforts to improve the population's health have focused on factors such as health care and behavioral changes (e.g., quitting smoking, exercising), and particularly on attempts to expand access to health care through varying health policy mechanisms. While these strategies are effective in improving health, they are likely incomplete, as illustrated by continuing socioeconomic disparities in health in countries with universal access to health care.²⁵ Our study reveals the potentially beneficial impact on elderly disability of increasing income supports, particularly among the poorest Americans, as an alternative or supplemental strategy for improving their health.

Study limitations

There are some important caveats to our findings. First, to address selection effects, we did not restrict the analysis to SSI recipients. Thus, although we correctly estimated the effects on the population we examined—that is, how changes in maximum SSI benefits would affect disability prevalence among single elderly Americans—we were not looking at how increasing SSI benefits affected specific individuals receiving those benefits. Logic and sensitivity analyses that include only SSI recipients suggest that the effect would be larger in this group, but by an amount that is impossible to estimate precisely with the available data. Second, a key assumption of our study is that changes in state SSI policies are unrelated to changes in state old-age disability rates, conditional on changes in sociodemographic and other factors in the state accounted for in the regression. A potential weakness with our model is that there could be unobserved variables that are associated with within-state changes in maximum SSI benefits, which could explain the relationship we observe between SSI and functional limitations among the elderly. In this case, we were concerned that changes in SSI eligibility could be correlated with changes in Medicaid receipt for the elderly; however, we found no evidence for this.

Conclusions

Our study tested the theory that socioeconomic status is a fundamental cause of health differences by exploiting state-level changes in an income support policy over time to address the causal direction of the relationship between income and health. Specifically, we looked at the relationship between changes in the maximum SSI benefit between 1990 and 2000 and disability among single elderly individuals. We did find that higher benefits were linked to lower disability rates; a \$100 increase in the monthly benefit amount was associated with a 4.6 percentage point reduction in the rate of mobility limitations, which is essentially an 11 percent

reduction for a 15 to 20 percent change in income. Because only about 10 percent of single elderly individuals receive SSI, the effect on SSI recipients could be much larger.

We are hesitant to draw strong conclusions about the size of the effect until further studies are done. Nonetheless, it is important to say something about the plausibility of the effect size that we did find. It is difficult to make comparisons with other studies, in part because many of the existing studies do not take into account the possibility that the effects of income may be larger for lower-income people. In addition, the measures used differ across studies, and as mentioned in our introduction, there is little to no agreement in the literature on the magnitude of the effects of income on disability or health. One true income experiment among the poor elderly is PROGRESA, which was conducted in Mexico in the late 1990s, with about one in nine Mexican households receiving PROGRESA benefits, which increased their income by about 20 percent.²⁶ That study found that for those aged 50 and older, the 20 percent increase in income led to about a 20 percent reduction in the number of days reported having difficulty completing normal activities of daily living. Thus, the effect in Mexico was about twice as large as what we found, though this seems reasonable given the greater severity of poverty in Mexico. Thus, it appears that the magnitude of the effect we estimated among poor elderly in the United States is at least plausible.

Further research is needed on the question of whether and how social and economic policies affect health. The United States spends nearly twice as much on health care as other industrialized countries do, but lags behind on basic health measures. While most would agree that access to and the quality of medical care, and access to that care, is an important predictor of good health, it is becoming increasingly clear that medical care is not the only or even the primary predictor of good health. Thus, research that concentrates on connections between social and economic factors and health sets the stage for analyses like ours, which explicitly explore whether there are connections between social and economic policies and health. Ultimately, if public policy is to play a role in improving population health, we must have a clearer understanding of the different ways in which it can do so. ■

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The long-term consequences of children's health and circumstance

Janet Currie

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Pregnancy and early childhood are especially critical periods for child development. Both nature (genes) and nurture (environment), and particularly interactions between the two, are important influences. One way that the nature-nurture interaction can work is through environment affecting how a particular gene is expressed, either mitigating or reinforcing genetic differences between individuals. There are many studies that link health at birth to future outcomes. In this article, I review some of this research, identify several factors that help explain the trends observed over time, and link the implications of these findings for policy.

Health at birth as a predictor of future outcomes

Much of the research examining the connection between health at birth and future outcomes uses birth weight as an indicator of health at birth. The primary reason for using

birth weight rather than other indicators is that it is relatively well measured, and data are available over a long time frame for diverse populations. There is also a demonstrable relationship between birth weight and adult outcomes such as earnings. Some evidence for this comes from the National Longitudinal Survey of Youth, a nationally representative longitudinal survey of Americans who were between the ages of 14 and 21 in 1978. Children of women included in this survey were themselves surveyed beginning in 1986. One study found that those with higher birth weights also had higher earnings as young adults (ages 24 through 27).¹

These relationships have also been explored in more rigorous ways, including using sibling or twin comparisons. Siblings raised together provide a natural control group because they share many aspects of family background, allowing researchers to control for characteristics that are difficult to measure, and thereby better isolate the effects of birth weight. Large-scale sibling and twin studies in the United States and elsewhere have found a connection between birth weight and education, earnings, and health. One of the first studies to use twin comparisons to examine long-term outcomes was done in Norway, using data for all births from 1967 through 1997, matched to administrative data for 1982 through 2002.² The researchers found that higher birth weight twins had better outcomes in adulthood compared to their lower birth weight siblings. For example, a twin who weighed approximately 7.5 pounds at birth is about 10 percent more likely to finish high school than a

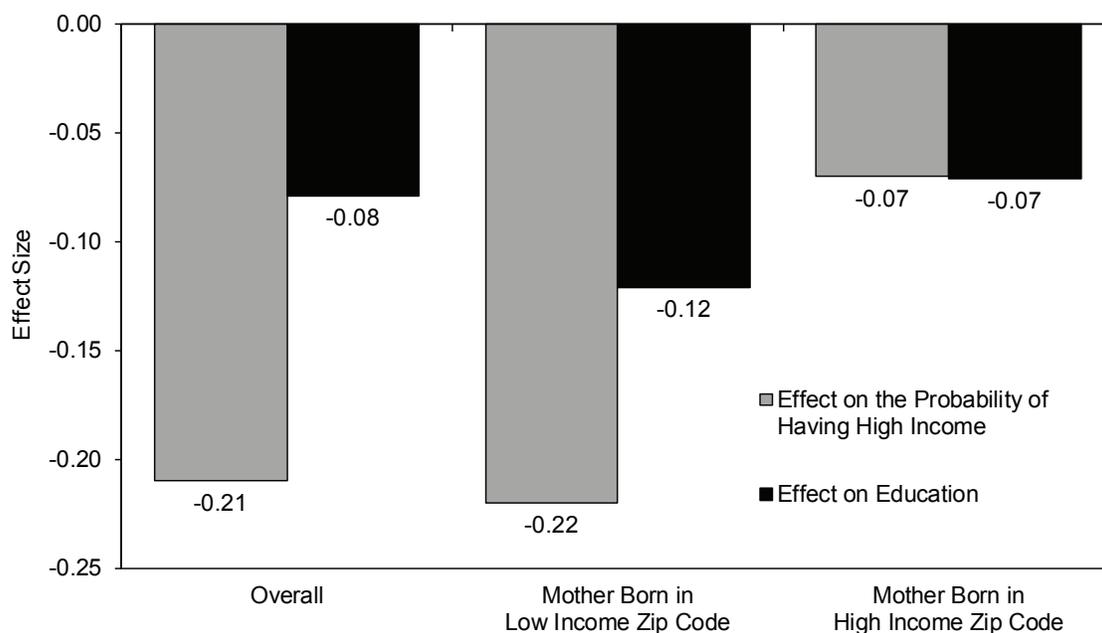


Figure 1. Effect of maternal low birth weight on mother's adult outcomes at time of child's birth.

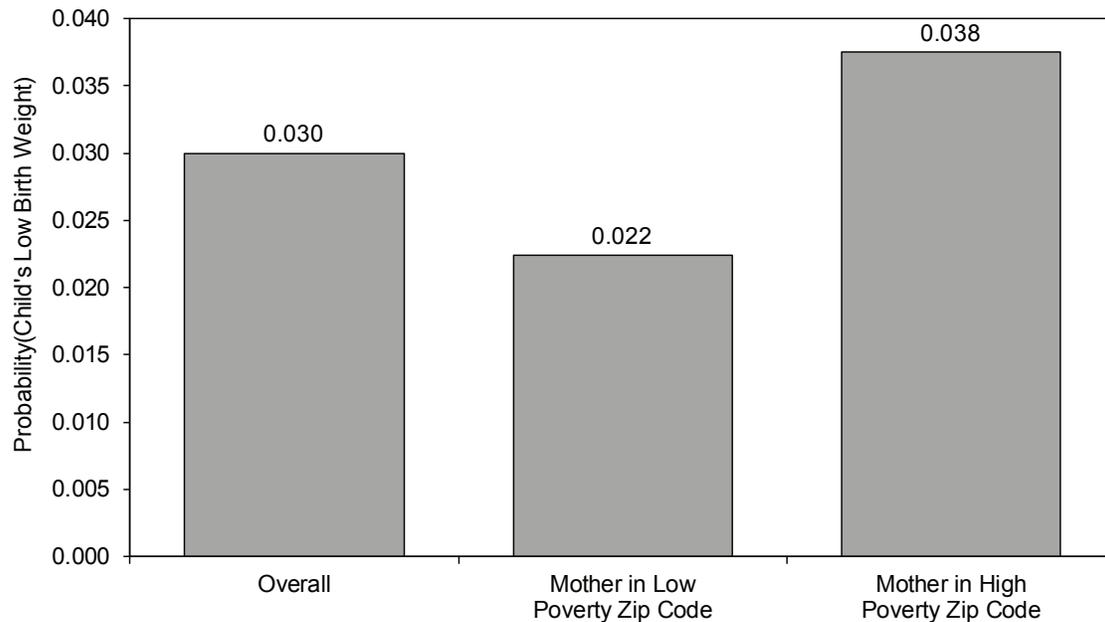


Figure 2. Effect of maternal low birth weight on probability of child having low birth weight, by characteristics of mother's current residence.

twin who weighed approximately 4 pounds. The effect sizes are similar for IQ and earnings, and slightly smaller (but still statistically significant) for adult height.

In another study, Enrico Moretti and I used data from three generations of California births, comparing mothers who are sisters, where one sister had a low birth weight and the other did not.³ Low birth weight sisters tended to have lower educational achievement compared to their higher birth weight sibling, and were more likely to live in a high-poverty zip code at the time of her own child's birth. As shown in Figure 1, these effects were stronger for women born in high-poverty zip codes; nearly all the negative effect of a mother's low birth weight is concentrated among those who were also born in a poor neighborhood. This suggests that environment plays a strong role in whether the negative effects of poor health at birth can be remediated.

If a characteristic is observed at birth and passed from one generation to the next, we tend to attribute it to genetics. However, these data on three generations of California births suggest that poor health at birth that is induced by environmental factors can be transmitted from one generation to the next, and also ameliorated by more favorable conditions.⁴ Figure 2 suggests that low birth weight can be transmitted from mother to child; the probability that a child is low birth weight is almost 50 percent higher if her mother was low birth weight, even after controlling for income or poverty levels in the mother's zip code of residence at the time of her own birth. However, the figure also shows that mothers who are in better circumstances are less likely to pass on this characteristic; the effect of maternal low birth weight is smaller if, at the time of the child's birth, the mother is living in a low-poverty zip code. This result demonstrates the important role of the maternal environment in determining a child's health at birth.

Inequalities in health at birth

The research discussed above strongly suggests that health at birth is an important aspect of child development, which influences future outcomes including earnings, employment, education, and the health of the next generation. Given this evidence, any large inequalities in health at birth are cause for concern. Figure 3 shows that there are indeed large inequalities in the incidence of low birth weight both by race and by indicators of socioeconomic status.⁵

The good news is that these inequalities seem to be diminishing over time. For example, Figure 4 shows trends in the percentage of children with low birth weight, by maternal socioeconomic status. While the incidence of low birth weight has remained steady over time for advantaged mothers (defined as those who are non-Hispanic white, married, and college educated), it has declined for disadvantaged mothers (defined as those who are African American, unmarried, and have less than a high school education), thus narrowing the gap between the two.⁶

Further evidence for health inequalities diminishing over time comes from comparison of mortality rates for children under age 4 in 1990 and 2010, by county poverty rate.⁷ Over that 20-year period, mortality fell most for the poorest counties, suggesting decreasing inequality in child mortality. There were also very large reductions in mortality among black children.

What factors can account for reductions in health inequality among infants and children?

The time trends described above pose a puzzle: evidence shows that child health is strongly linked to socioeconomic status, and inequalities in socioeconomic status have

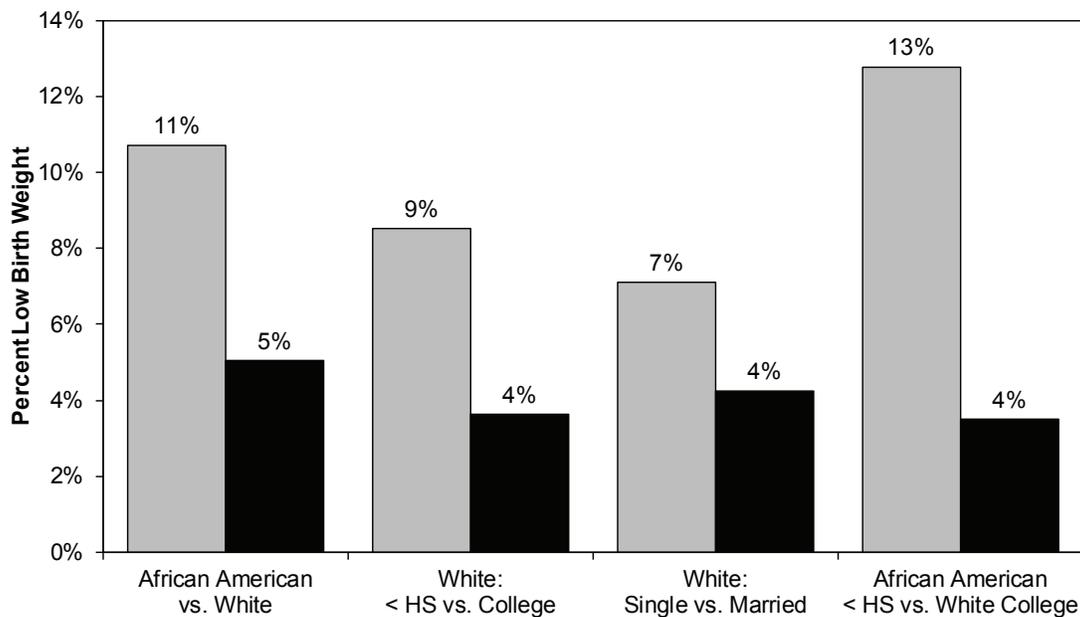


Figure 3. Percent of U.S. infants with low birth weight, by maternal characteristics, 2011.

Source: A. Aizer and J. Currie, “The Intergenerational Transmission of Inequality: Maternal Disadvantage and Health at Birth,” *Science* 344, No. 6186 (2014): 856–861.

Notes: The data come from birth certificates for 36 U.S. states with complete information for mothers ages 19 through 39. “Low birth weight” is defined as under 2,500 grams (5.5 pounds). Only single births are counted because multiple births are much more likely to be low birth weight, and many multiple births result from assisted reproductive technology. Sample sizes range from 65,184 for African American < HS, to 1,651,397 for white. Given the large sample sizes, the standard errors of the means are very small (< 0.15 percentage points).

increased over time, especially in the United States, and yet inequalities in child health have been decreasing.⁸ Below, I discuss four pieces of the puzzle that appear likely to explain at least some of the observed reductions in health inequality among infants and children: improvements in medical care, long-term improvements in maternal health, reductions in toxic environments, and changes in maternal health behaviors. Each of these seems to have improved child health, particularly for those of lower socioeconomic status, thus contributing to a reduction in children’s health inequality in spite of the concurrent increase in socioeconomic inequality.

Improvements in medical care

In the late 1980s, the United States greatly expanded public insurance for low-income pregnant women and children. Jonathon Gruber and I found that this expansion lowered the incidence of infant mortality for this disadvantaged group.⁹ More recent research has shown that the expansion has had positive long-term effects on children’s health, including on hospitalizations, mortality, and adult earnings. For example, a study looking at hospitalizations for chronic illness among black children born before and after the health care expansion found a dramatic decrease in hospitalizations for those born after the change, with the largest reductions in hospitalizations for mental illness.¹⁰ Because the population for which public insurance was expanded was by definition

disadvantaged, this reduction in hospitalizations also reflects a reduction in children’s health inequality.

Long-term improvements in maternal health

Another factor that appears linked to reducing children’s health inequality is long-term improvements in maternal health. Since healthier children become healthier adults, and healthier adults are more likely to have healthy babies, improvements in mother’s early life could lead to improved infant health.

During the 1960s and 1970s, racial inequalities in early life health were reduced dramatically, in part due to the Civil Rights Act of 1964. For example, one study found that the rate of hospital births for blacks in the South grew dramatically following the Civil Rights Act, which prohibited discrimination and segregation in public hospitals.¹¹ The study also found that this increase was correlated with substantial improvements in the relative health of black children during the decade following the federal intervention.

Do these children, who benefited from better health in infancy as a result of civil rights legislation, pass on this better health to their own children? Research suggests that they do. A study I did with Douglas Almond and Mariesa Herrmann looked at the effect of the post-neonatal

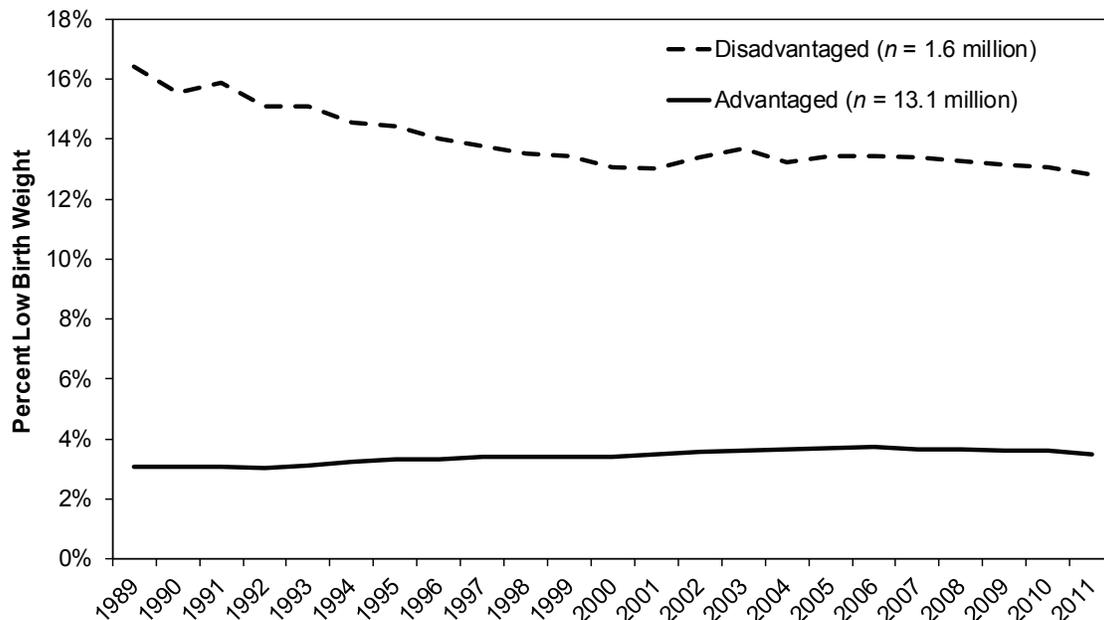


Figure 4. Trends in percent low birth weight from 1989 through 2011 by maternal socioeconomic status.

Source: A. Aizer and J. Currie, “The Intergenerational Transmission of Inequality: Maternal Disadvantage and Health at Birth,” *Science* 344, No. 6186 (2014): 856–861.

Notes: The data comes from birth certificates for 36 U.S. states with complete information, for mothers age 19 through 39. “Low birth weight” is defined as under 2,500 grams (5.5 pounds). Only single births are counted. “Disadvantaged” is defined as black, unmarried, and less than high school education. “Advantaged” is defined as non-Hispanic white, married, and college education.

environment on maternal health and infant health. We found that an indicator of the infectious disease environment at the time of the mother’s birth was associated with a higher probability of the mother having diabetes at the time she gives birth herself.¹² This probability is higher for black mothers than for white mothers. These results suggest that conditions in the mother’s childhood contribute to her health many years later when she becomes a mother, and that this can in turn affect her child’s outcomes. Thus, improvements in early childhood health for black women as a result of the Civil Rights Act could be expected to narrow children’s health inequality when those women have their own children.

Reductions in toxic environments

A third factor that has contributed to reductions in children’s health inequality is reductions in toxic environments. The Clean Air Act of 1970 set national air quality standards for six common air pollutants also called criteria pollutants: carbon monoxide, ozone, lead, nitrogen dioxide, particulate matter, and sulfur dioxide. The Toxic Release Inventory, a database compiled by the Environmental Protection Agency (EPA), began in 1990 as a result of the Emergency Planning and Community Right-to-Know Act of 1986. This act requires that factories report their emissions to the EPA if they are using any chemicals from a particular list. Although this law is not an obligation to reduce emissions, the public reporting requirement has been followed by a significant reduction of the six criteria pollutants identified in the Clean Air Act.¹³

Disadvantaged mothers are more likely to be exposed to pollution, as they are more likely to live near busy roads, Superfund hazardous waste sites, and factories with toxic emissions.¹⁴ Again, there are differences by race and ethnicity. Some 40 percent of white mothers live within 2,000 meters of a Toxic Release Inventory site, an industrial site using amounts of specified chemicals that exceed threshold levels; among black mothers, 60 percent live near a site.¹⁵

The existing literature does not provide full information about which pollutants are harmful, nor about how close a home needs to be to one of these factories for there to be any negative health effect. In order to address these questions, Lucas Davis, Michael Greenstone, Reed Walker, and I used birth records from five large states, linked to information about the openings and closings of 1,600 plants known to have emitted toxic chemicals.¹⁶ We found that many pollutants can be detected up to one mile from the site of origin. We then compared infants whose families lived within one mile of an operating Toxic Release Inventory plant to infants whose families lived one to two miles from a plant.¹⁷ We found a significantly higher incidence of low birth weight for infants whose families lived within one mile of an operating plant.

Combining these findings—that black mothers are more likely to live near a Toxic Release Inventory site, and that infants whose families live near a plant are more likely to have a low birth weight—we estimate that about 6 percent of

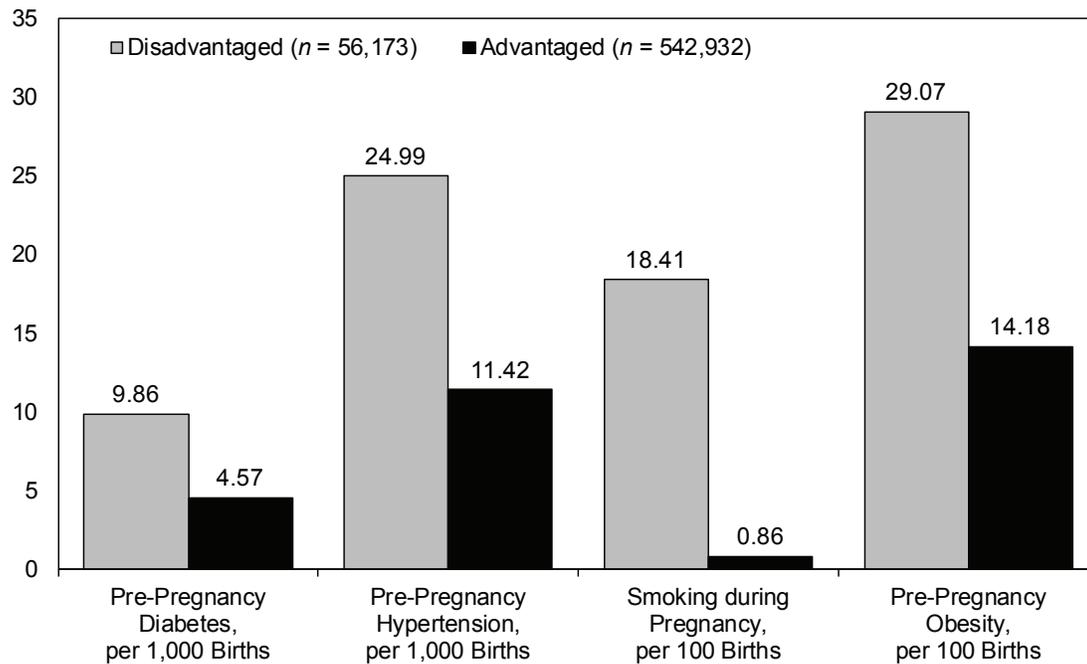


Figure 5. Differences in maternal health and behavior by maternal socioeconomic status.

Source: A. Aizer and J. Currie, “The Intergenerational Transmission of Inequality: Maternal Disadvantage and Health at Birth,” *Science* 344, No. 6186 (2014): 856–861.

Notes: The data comes from birth certificates for 36 U.S. states with complete information, for mothers age 19 through 39. “Low birth weight” is defined as under 2,500 grams (5.5 pounds). Only single births are counted. “Disadvantaged” is defined as black, unmarried, and less than high school education. “Advantaged” is defined as non-Hispanic white, married, and college education. Given the large sample sizes, the standard errors of the means are very small (<0.2 units). Note that basis of rates varies by indicator, as specified in axis labels.

the gap in low birth weight incidence between white college-educated mothers and black high school dropout mothers could be due to differential exposure to pollutants. Thus, reductions in pollution as a result of increased environmental regulation could be expected to reduce this gap.

Reductions in unhealthy behaviors

The final factor that has contributed to reductions in children’s health inequality is a reduction in unhealthy maternal behaviors. Behaviors that can be measured on the birth certificate include the use of prenatal care, weight gain during pregnancy, and smoking. It is also possible to observe whether mothers have obesity, hypertension, and diabetes. There are large differences in maternal health and behavior by socioeconomic status, as shown in Figure 5. The most economically disadvantaged mothers (those who are black, unmarried, and have less than a high school education) are more likely to have diabetes, hypertension, smoke during pregnancy, or be obese, compared to the most economically advantaged mothers (those who are non-Hispanic white, married, and college educated).¹⁸ Again, these gaps are changing over time; for example, although disadvantaged women are much more likely to smoke during pregnancy than more advantaged women, this difference has narrowed over time. Anti-smoking policies, including cigarette taxes and bans on smoking in the workplace, while reducing smoking in general, have also helped to reduce

this smoking gap. These reductions in smoking gaps over time also match up well with trends in diminishing low birth weight gaps. These matching trends are not surprising, given earlier research showing that smoking during pregnancy has negative effects on child birth weight.¹⁹

Other behavior trends have not had as positive trajectories. Extremes of weight gain during pregnancy (either very low weight gain or very high weight gain), for example, have both been trending upwards over the past two decades, and are both associated with negative pregnancy outcomes.²⁰

Other factors that may reduce children’s health inequality

In addition to the four factors discussed above—increased access to medical care, improved maternal health, and reduction in toxic environments and unhealthy maternal behaviors—other recent work has suggested additional reasons for reduction in health inequality at birth in the face of increasing economic inequality. Initiatives such as nutrition programs, income transfers, and child care programs have all been found to have a positive effect on infant health, particularly for those of lower socioeconomic status. For example, the rollout of the Food Stamp Program in the 1960s and early 1970s was found to have improved birth outcomes for both white and black mothers, with larger effects among black mothers.²¹ Another study found that the Earned Income Tax Credit reduced the incidence of low birth

weight and increased mean birth weight, with larger effects on births to black mothers.²² Finally, an examination of two early childhood interventions targeted to disadvantaged children, the Perry Preschool Project and the Abecedarian Project, found that both interventions had positive effects on the healthy behavior and health of their participants.²³

Conclusions

Health at birth is very strongly linked to socioeconomic status, but inequalities in economic status have increased over the last 25 years, especially in the United States, while inequalities in the health of young children have decreased. This trend suggests that we do not need to be resigned to health inequalities, but rather that public policy can work with the family to improve health outcomes for disadvantaged women and their children even when family incomes are stagnant.

Improvements in medical care, long-term improvements in maternal health, reductions in toxic environments, and changes in maternal health behaviors have all been partly responsible for reducing inequality in child health. I think that the specific policies within these broader areas that are most responsible for this reduction are improvements in access to medical care for both mothers and children; reductions in pollution; and reductions in smoking due to cigarette taxes, smoking bans, and other anti-smoking public policies. ■

¹J. Currie, "Inequality at Birth: Some Causes and Consequences," *American Economic Review* 101, No. 3 (May 2011): 1–22.

²S. E. Black, P. J. Devereux, and K. G. Salvanes, "From the Cradle to the Labor Market? The Effect of Birth Weight on Adult Outcomes," *The Quarterly Journal of Economics* 122, No. 1: pp. 409–439.

³J. Currie and E. Moretti, "Biology as Destiny? Short- and Long-Run Determinants of Intergenerational Transmission of Birth Weight," *Journal of Labor Economics* 25, No. 2: pp. 231–263.

⁴Currie and Moretti, "Biology as Destiny?"

⁵A. Aizer and J. Currie, "The Intergenerational Transmission of Inequality: Maternal Disadvantage and Health at Birth," *Science* 344, No. 6186 (May 2014): 856–861.

⁶Aizer and Currie, "The Intergenerational Transmission of Inequality."

⁷J. Currie and H. Schwandt, "Inequality in Mortality Decreased Among the Young While Increasing for Older Adults, 1990–2010," *Science* 352, No. 6286 (May 2016): 708–712.

⁸For evidence that inequalities in socioeconomic status have increased over time, see, for example: D. H. Autor, "Skills, Education, and the Rise of Earnings Inequality Among the 'Other 99 Percent'," *Science* 344, No. 6186 (May 2014): 843–851.

⁹J. Currie and J. Gruber, "Saving Babies: The Efficacy and Cost of Recent Changes in the Medicaid Eligibility of Pregnant Women," *Journal of Political Economy* 104, No. 6 (1996): 1263–1296.

¹⁰L. R. Wherry, S. Miller, R. Kaestner, and B. D. Meyer, "Childhood Medicaid Coverage and Later Life Health Care Utilization," NBER Working Paper No. 20929, National Bureau of Economic Research, February 2015. <http://www.nber.org/papers/w20929>

¹¹K. Y. Chay and M. Greenstone, "The Convergence in Black–White Infant Mortality Rates During the 1960's," *American Economic Review* 90, No. 2 (2000): 326–332.

¹²D. Almond, J. Currie, and M. Herrmann, "From Infant to Mother: Early Disease Environment and Future Maternal Health," NBER Working Paper No. 17676, National Bureau of Economic Research, December 2011. <http://www.nber.org/papers/w17676>

¹³Information about air quality standards and trends for the six common air pollutants known as criteria pollutants can be found at <http://www.epa.gov/airtrends/>.

¹⁴J. Currie, "Inequality at Birth: Some Causes and Consequences," NBER Working Paper No. 16798, National Bureau of Economic Research, February 2011. <http://www.nber.org/papers/w16798>

¹⁵Based on 1989–2003 data from five states: Texas, New Jersey, Michigan, Pennsylvania, and California.

¹⁶J. Currie, L. Davis, M. Greenstone, and R. Walker, "Do Housing Prices Reflect Environmental Health Risks? Evidence from More than 1600 Toxic Plant Openings and Closings," NBER Working Paper No. 18700, National Bureau of Economic Research, January 2013. <http://www.nber.org/papers/w18700>

¹⁷We would expect both groups in this case to be similarly affected by the labor market and economic effects of a plant opening or closing.

¹⁸Aizer and Currie, "The Intergenerational Transmission of Inequality."

¹⁹E. Tominey, "Maternal Smoking During Pregnancy and Child Birth Weight," CEPDP, 828. Centre for Economic Performance, London School of Economics and Political Science, London, UK, 2007.

²⁰W. Lin, "Why has the Health Inequality Among Infants in the U.S. Declined? Accounting for the Shrinking Gap," *Health Economics* 18, No. 7 (2008): 823–841.

²¹D. Almond, H. W. Hoynes, and D. W. Schanzenbach, "Inside the War on Poverty: The Impact of Food Stamps on Birth Outcomes," *The Review of Economics and Statistics* 93, No. 2 (May 2011): 387–403.

²²H. Hoynes, D. Miller, and D. Simon, "Income, the Earned Income Tax Credit, and Infant Health," *American Economic Journal: Economic Policy* 7, No. 1 (2015): 172–211. <http://dx.doi.org/10.1257/pol.20120179>

²³G. Conti, J. Heckman, and R. Pinto, "The Effects of Two Influential Early Childhood Interventions on Health and Healthy Behaviors," IZA DP No. 9247, Institute for the Study of Labor, August 2015. <http://ftp.iza.org/dp9247.pdf>

Do unconditional income supplements improve poor pregnant women's birth outcomes?

Marni D. Brownell, Mariette J. Chartier, and Nathan C. Nickel

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Prenatal development is crucial to a child's health, not only in infancy, but also throughout her life. Exposure to risk factors such as material stress, poor prenatal nutrition, and substance abuse can lead to adverse birth outcomes such as low birth weight (under 2,500 grams or 5.5 pounds) and preterm birth (birth before 37 completed weeks of gestation).¹ These birth outcomes are in turn associated with health and development challenges throughout the life course. Women who live in poverty are more likely than women above the poverty line to have risk factors for poor birth outcomes, including high stress levels, inadequate nutrition, and smoking, drinking alcohol or using drugs during pregnancy; they are also more likely to give birth to preterm or low birth weight children.² This article describes three approaches to improve birth outcomes, and summarizes a study we conducted that assessed whether an unconditional cash transfer was associated with improved birth outcomes.³

Improving birth outcomes for low-income women

Much effort has been made, in both developed and developing countries, to improve birth outcomes for women living in poverty. Program models include cash transfers (with or without conditions attached) and in-kind programs that offer services during the prenatal and postnatal time periods.

The research summarized here is reported at length in Marni D. Brownell, Mariette J. Chartier, Nathan C. Nickel, Dan Chateau, Patricia J. Martens, Joykrishna Sarkar, Elaine Burland, Douglas P. Jutte, Carole Taylor, Robert G. Santos, and Alan Katz, "Unconditional Prenatal Income Supplement and Birth Outcomes," *Pediatrics* 137, No. 6 (June 2016).

Conditional cash transfers

Conditional cash transfer programs have been developed in several Latin American countries, among other places. These programs, including Oportunidades in Mexico and the Bolsa Familia program in Brazil, tie cash payments to particular behaviors such as obtaining prenatal care. Although many of these programs were not designed specifically for the prenatal period, they have been found to influence birth outcomes.⁴ A review of ten conditional cash transfer programs found strong evidence of positive effects on health care use and health outcomes, although the specific role that cash payments played in these efforts was unclear.⁵ An evaluation of the Mexican Oportunidades program concluded that its health benefits were attributable to the cash payment itself.⁶

In-kind transfers

Programs in the United States that promote prenatal health for women in poverty tend to follow a different model, providing in-kind transfers rather than conditional cash payments.⁷ For example, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) provides low-income women with food supplements, nutrition education, and access to health care services, during the prenatal and postnatal time periods. Identifying an appropriate comparison group for WIC recipients is challenging, and evaluations of the program have not yet produced definitive results.⁸ One review concluded that previous studies may have overestimated positive associations between WIC and birth outcomes.⁹

Unconditional cash transfers

Our study examined a program in the Canadian province of Manitoba that offers a cash transfer, but unlike the conditional programs described above, the low-income pregnant women who receive these payments do not have to meet any conditions beyond eligibility. Manitoba began offering the Healthy Baby Prenatal Benefit (HBPB) in 2001, hoping to improve prenatal health and birth outcomes. Canada's universal health care system already provides free prenatal care. HBPB augments the health care with a cash benefit of up to \$81.41 in Canadian dollars each month (around \$60 in current U.S. dollars) to low-income women in their second and third trimesters. The monthly payments are accompanied by pamphlets containing information about the importance of good prenatal nutrition, breastfeeding, and healthy infant development, but the mothers are free to spend the money as they choose.

Any woman with an annual income under \$32,000 in Canadian dollars whose pregnancy has been confirmed by

a physician can enroll in HBPB. Data were collected for over 14,500 women who had received cash welfare and who gave birth in Manitoba during the period from 2003 through 2010.¹⁰ Pregnant women receiving welfare represent a very-low-income population that is at particular risk for poor birth outcomes. About three-quarters of the women in the study received the HBPB; the remaining one-quarter did not. Both groups had mean annual incomes of slightly under \$10,000 in Canadian dollars, so the HBPB increased the average monthly income of study participants receiving the benefit by nearly 10 percent.

Improved birth outcomes for those who received an unconditional cash transfer

Women who received the HBPB had better birth outcomes than those who did not. Looking first at unadjusted rates, about 5 percent of those in the group receiving the benefit had infants with low birth weight, compared to about 8 percent of those in the group that did not receive the benefit. Similarly, about 8 percent of the HBPB group and 11 percent of the no-HBPB group had preterm births.

After adjusting for differences in measured characteristics between the two groups, we calculated ratios that represent the declines in low birth weight and preterm birth that could be achieved in the population by providing HBPB.¹¹ As illustrated in Figure 1, we found that the reductions in low birth weights and preterm births associated with HBPB translate into the prevention of 21 percent of all low birth weight births and 17.5 percent of all preterm births for the population of women receiving welfare.

Most benefit programs impose multiple conditions on the recipients, such as providing in-kind transfers good only for particular goods or services, or requiring recipients to participate in specific activities, rather than trusting low-income people to make good choices. Indeed, when the Manitoba HBPB program was introduced, concerns were raised about the program's lack of conditions or

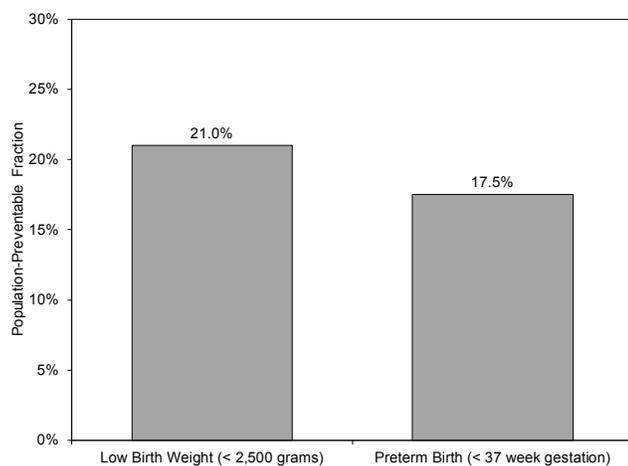


Figure 1. Estimated population decreases in low birth weight and preterm birth associated with HBPB.

accountability for receipt. The evidence suggests these concerns were unfounded. In fact, among the very-low-income population of women receiving welfare, those who received the unconditional cash benefit had more favorable birth outcomes than those who did not. This finding is in line with a growing body of evidence showing that increased family income is associated with improved child outcomes.¹²

Although our study did not address the mechanisms through which the HBPB improved birth outcomes, there are a number of possible pathways, including that the additional money was used to purchase more nutritious food, or that stress was reduced because important bills could be paid in time. This aligns with findings from other programs. For example, research on the Earned Income Tax Credit suggests that increased income improves women's nutritional intake, decreases the proportion of pregnant women who smoke, and increases receipt of prenatal care.¹³ The receipt of Food Stamps has been found to be associated with increased infant birth weight, suggesting that improved prenatal nutrition may have a positive effect on birth outcomes.¹⁴

Accounting for potential bias in results

It is possible that there are systematic differences between women who did and did not apply for HBPB, and that these differences, rather than the benefit itself, explain any observed differences between the two groups. We attempted to account for any such bias in three ways. First, to ensure comparability of income between the group receiving HBPB and the group that did not, we limited our evaluation to women receiving welfare. Low-income women who received HBPB but were not on welfare were excluded from the study. This approach limits the generalizability of our findings, although the very-low-income population we examined may be similar enough to women participating in the WIC program to make our findings applicable to that population.

Second, we used propensity scores to adjust for differences between the groups in measured characteristics. We were fortunate to have access to data on a wide variety of characteristics for all study participants, including risk factors for poor birth outcomes such as maternal mental illness, smoking during pregnancy, and pregnancy or labor complications. Using these data, a propensity score was calculated for each study participant representing the probability of receiving HBPB given an individual's measured characteristics. Use of propensity scores makes the groups receiving and not receiving HBPB more comparable.

Third, we conducted sensitivity analyses to measure how robust the results were to differences between the two groups in unmeasured characteristics. For example, there could be differences between the two groups in whether the pregnancy was planned, or in self-care factors such as nutritional intake and stress reduction. It is also possible that these differences in unmeasured characteristics, rather than receipt of HBPB, could explain any observed differences

between the two groups. The sensitivity analyses determine how strongly related an unmeasured variable would need to be to nullify any statistically significant results. Based on these analyses, our findings that receipt of HBPB was associated with decreases in the proportion of newborns with low birth weight and preterm birth were robust to variation between the groups in unmeasured variables.

Conclusions

Poor women are at greater risk for poor birth outcomes, and efforts to improve these outcomes have met with varying degrees of success. Our study evaluated receipt of an unconditional prenatal income supplement by low-income pregnant women and found it was associated with reductions in low birth weight and preterm births. Since birth outcomes improved without requiring any specific actions from recipients in order to receive the income benefit, these results suggest that placing conditions on income supplements may not be necessary to improve birth outcomes. Future research should include qualitative analyses to explore the mechanisms through which HBPB improved birth outcomes for low-income pregnant women, and to identify any barriers that prevent eligible women from participating in the program. ■

¹⁰About one-half of those eligible for HBPB receive welfare. Only women who had a singleton birth (as opposed to a multiple birth) were included in the study.

¹¹The study included additional outcome variables, see Brownell et al., “Unconditional Prenatal Income Supplement and Birth Outcomes” for details.

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Poor families, housing, and health

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Low-income families seeking housing must figure out how to make the most of a limited budget, while also trying to ensure their health and safety. This task is especially challenging given the inadequate housing choices and poor neighborhood conditions poor families face, so much so that the constrained decision-making itself may create or exacerbate health risks. This article illustrates how low-income families navigate and balance housing decisions, and the health implications of their choices.¹ The qualitative study described here uses in-depth interviews and ethnographic observations to explore the links between housing, neighborhood, and health for 72 low-income families in the inner-city neighborhood of Dorchester, Massachusetts. The low-income inner-city residents included in this study devised a variety of strategies in response to neighborhood safety risks, many of which led to them spending more time at home. This reliance on the home environment exposed residents to other health and safety risks within their homes. Based on results from the in-depth interviews as well as ethnographic observations, I propose two alternate approaches that may more effectively address the conditions poor families face in their homes and neighborhoods.

Neighborhood strategies

When asked, “Is there anything that you do to stay safe in this neighborhood?” most study participants described implementing an intricate set of strategies such as limiting outside interactions, restricting family activities to the home, and being selective about which neighbors to socialize with. One respondent, acknowledging safety issues, said:

We avoid the areas that are known for violence, or known for troublesome people—especially in the summertime, we really don’t stay down here [in Dorchester] as often. We try to be everywhere but here.

Another respondent noted the need to avoid being outdoors at night:

I don’t be outside late at night and that’s about it. I’ve been here a long time so I know everyone and everyone knows me. What they would do to a newcomer, they wouldn’t do it to me. I don’t have the kids out late ‘cause a lot of things can happen at nighttime.

In addition to staying home, parents in this study noted the need to limit personal networks and employ discretion in their own and their children’s interactions with others. One noted:

Even though I say, “hi” and my goodbyes to some neighbors, you know, I stay to myself because I don’t really socialize too much. I figure if you’re too in people’s business you’re just gonna get, you know, problems. So I’m to myself. I don’t have time to go around with people here.

Limited engagement with neighbors and the neighborhood environment due to safety concerns frequently equated to more time spent at home and fewer opportunities for socializing with others. Unfortunately, staying home did not necessarily make them safe, as study participants also coped with a wide range of housing problems that involved material hardship and poor housing conditions that made being home hazardous to their health.

Housing strategies

At the time of the study, around two-thirds of households in Dorchester earning less than \$35,000 a year paid rent amounting to at least 35 percent of their household income.² This is slightly higher than the rent standard of 30 percent used by most housing programs. Those fortunate enough to have a housing subsidy were often responsible for a third of the rent and, in some cases, utilities. Others reportedly waited on a subsidized housing list anywhere from 3 to 5 years, which is consistent with recent estimates at the national level.³ Household budgets were often insufficient to cover food, rent, utilities, clothing, diapers, and other basic necessities. Families often needed to make tradeoffs, use benefits and subsidies, or pool resources with family members or friends to make ends meet. Respondents reported:

The thing is no matter how much we try to get ahead we just can’t. It’s either we pay for food or we pay for the bills so I told my boyfriend, the reality is I have no other choice but to let the bills go, the food’s more important.

So we found this place and rent is 1,000 dollars. My husband is a construction worker, so sometimes he works, sometimes he doesn’t. Since I don’t work, my husband brought a friend to live in our apartment. It’s hard for us because the four of us have to live in a room. We pay our part of the rent and the rest he pays. . . . He sometimes helps us with the kids.

The challenges of assembling sufficient financial resources to meet household expenses produced an atmosphere of

instability for families as they feared hunger, utility shut-offs, and evictions.

Along with material hardships, many participants also encountered challenges with housing quality issues. About two-thirds reported pest infestation in their home, nearly half had walls with cracks, holes, or mold, or plumbing and fixture leaks, and over one-third experienced heating, cooling, or ventilation system deficiencies. Insect and rodent infestations were extremely common and hard to control.

Approaches to problems

Most respondents attempted to do *something* in response to these common problems, including performing home repairs themselves, such as patching up holes, placing rodent traps, spraying toxic chemicals, or using household pets to deter cockroaches and mice. Some moved to evade the conditions altogether, although with no guarantee that the new place would be any better.

Prior research, including work done by Kathryn Edin and Maria Kefalas, has noted that negotiating the circumstances of poverty is a slow and arduous process.⁴ Seeking help often involves long lines and administrative delays, and requires significant personal resourcefulness. Many respondents made use of institutional resources, were persistent in their requests, and used creative strategies to achieve their desired results. In general, parents used proactive rather than passive measures when they were empowered with information through previous experiences or social and organizational relationships and had a clear understanding of tenant rights and the bureaucratic process. For instance, one respondent had lived in several apartments with housing code violations, and had learned that by calling the Inspectional Services department, she could get the landlord to make necessary repairs. She explained:

The inspectors came because of the stove problem and plus, the closet things were all broken and they didn't want to fix it. So I called inspectional services and they came. They made me buy the stove out of the rent, and gave them a set amount [of time] to make the other repairs. Fourteen, I think it was fourteen days to fix it. They didn't do it real well but they fixed everything that needed to be fixed.

Affording housing at the expense of health

The constant negotiation of housing and neighborhood problems has implications for health. Most often respondents cited stress, depression, and asthma as the primary health conditions they encountered as a result of housing and neighborhood hardship. One respondent reported feeling “stressed,” “overwhelmed,” and “shutting down” while trying to figure out how to pay bills. Another participant mentioned getting asthma from the pesticide she used to rid

her home of cockroaches. Other parents described coping with depression as they contended with not having enough resources to cover all of their expenses:

[My depression] comes when I'm dealing with some money situation and I know I don't have it. The way I see it, as long as we have a roof over our head and we have food in the house, I don't really try to worry about it. . . . As you see, I've got so much stuff I gotta deal with that I let everything else go for a while . . . for a long time before I even get to it. But I get to that stage where I don't want to see anybody, don't wanna be around nobody. I just wanna sit here not having to deal with anything. I know it's hard. I have kids. But my kids are fine. They know mommy sometimes is upset.

The connections to health were not always explicitly made by participants, but a broader literature on chronic stress demonstrates how poverty, “gets under the skin” and increases the probability of poor health.⁵ Lack of affordability, instability, and poor quality conditions in housing have been linked to health risks including developmental delays, depression, and stress in children, parents, and other household members.⁶ Similarly, uncomfortable home temperatures can cause health problems, and also increase the risk of carbon monoxide, nitric oxide, and black carbon emission, while unconventional heating methods such as space heaters or ovens may themselves be hazardous to health, leading to injuries, death, fires, and asthma among other health risks.⁷ Restricting family activities to the home environment reduces opportunities for physical activity, which can lead to obesity and other health issues, and also restricts the development of social support through connections with neighbors, other community members and institutional resources.⁸

The neighborhoods and housing units that individuals and families of limited economic means can access are limited by the restrictions of poverty, discrimination, and segregation. Low-income families experience disproportionate exposure not only to the neighborhood violence that may result in more time spent at home, but also to environmental burdens that leads to health disparities.

Expanding the strategies toolkit

The strategies employed by study participants were primarily directed toward internal resources that were, at best, restricted in their reach. Many participants chose to stay home to avoid neighborhood dangers, but then were not always able to adequately address the housing quality issues associated with the housing they could afford. Poor housing conditions have health implications above the stress and depression experienced as a result of material hardships and neighborhood safety concerns. There remains a need to identify alternate approaches that can more effectively address the housing, neighborhood, and health concerns of this vulnerable population. To that end, I offer two

recommendations for expanding the strategies available to low-income households: legal strategies and community engagement.

Legal Strategies

Legal strategies may present a viable option for securing adequate housing, promoting housing stability, and protecting child and family health and well-being. They entail the use of a lawyer to advocate for the protection of civil rights including, for example, securing entitlements to social benefits and addressing housing violations. In the case of low-income tenants, legal advocacy may be more effective than challenging powerful institutions on their own. For example, lawyers can place demands on landlords and property managers to remediate unfavorable housing conditions or negotiate payments to protect against evictions or utility shut-offs. Legal representation in housing or family court, or at official proceedings with another institution such as social services or school settings, may help balance power differentials and meet clients' needs. By focusing on the home and its problems, families may see not only immediate results on those issues, but also be empowered to handle other civil legal infractions they may face.⁹

The demand for legal aid among poor clients far outweighs the supply. It is estimated that 80 percent of the poor have unaddressed civil legal needs, with housing constituting a critical but untended need.¹⁰ This "justice gap" has been shown to reproduce social inequality and further disenfranchise less privileged groups.¹¹ Legal strategies can be made more available to those who need them through established legal channels such as legal aid, or in innovative ways as with the Medical Legal Partnership (MLP) model, which seeks to simultaneously address health and legal disparities in clinical settings.¹² Dorchester residents such as the participants in this study have been served by a program following the MLP model which began at Boston Medical Center and has been serving residents at local community health centers since 1993, with housing as one of its main areas of legal advocacy. In a recent study, MLP participants experienced significantly better housing resolution outcomes when compared to similarly disadvantaged non-MLP participants.¹³ In general, more needs to be done to increase opportunities for low-income householders to mobilize the law and benefit from legal strategies to address housing problems, reduce health risks, facilitate greater access to justice, and ensure a better quality of life.

Community Engagement

Many Dorchester community members, particularly low-income residents, did not regularly participate in local forms of governance such as neighborhood watch groups, tenant association meetings, and other community gatherings. Despite experiencing many challenges at the neighborhood level, study respondents resorted to restricting social network ties and limiting time outdoors rather than building strong associations with neighbors and making connections with local leaders. This approach constitutes a

short-term solution to the problems of neighborhood crime and safety that puts little pressure on politicians and law enforcement officials to address these issues in the long term. An alternative approach involving greater community engagement creates an opportunity for collective action, developing interpersonal and institutional ties, mobilizing members around pertinent issues, and calling for action and policy change.¹⁴ The challenge of organizing a community is formidable, but efforts that seek to increase capacity for community engagement are necessary in order to motivate policy change, increase accountability, and advance opportunities for health, social and economic well-being, particularly in low-income inner-city communities.

From a social capital perspective, the lack of community engagement can itself be detrimental to health.¹⁵ For families like the ones in this study, a concerted effort is needed to trust and invest in personal relationships that materialize into enhanced social and health opportunities. Social Capital Inc. (SCI), a Dorchester-based nonprofit organization, was formed in 2002 with a mission to increase civic engagement for health, youth empowerment, and economic development. The purpose of the organization is to mobilize community members to motivate positive changes by connecting local residents to each other and to pertinent information. Through active civic engagement and fostering an opportunity to get to know one another, SCI seeks to dispel myths, reduce fear of socializing, and promote the idea that health is fundamentally a social process. SCI is just one example of a broader effort that ought to be made to encourage community engagement and strengthen social network ties in order to reap social, economic, and health benefits at the individual, household, and community levels.

Conclusion

The study described in this article illustrates how low-income families navigate challenging housing and neighborhood situations, the ways in which various problem-solving tactics are employed to deal with poor housing and unsafe neighborhoods, and the health implications of these approaches. Study participants employed carefully crafted neighborhood and housing strategies to avoid danger, afford housing, and control housing quality through a combination of passive and proactive approaches. They also noted the connection of housing and neighborhood hardship to health, citing stress, depression, and asthma triggers as common ailments. While effectively managing one problem by avoiding neighborhood danger, risks in the home also jeopardize the health and well-being of household members. In essence, they are affording housing at the expense of health. The article explores two alternative approaches—legal strategies and community engagement—that could expand the present scope of available strategies and enhance prospects for improved health and social change. ■

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