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# Rental Housing Assistance and Health: Evidence From the Survey of Income and Program Participation

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## ABSTRACT

Interest in the health impacts of renter housing assistance has grown in the wake of heated national discussions on health care and social welfare spending. Assistance may improve renters' health by offering (a) low, fixed housing costs; (b) protection against eviction; and (c) access to better homes and neighborhoods. Using data from the Survey of Income and Program Participation and econometric analysis, I estimate the effect of receiving assistance from the public housing or Section 8 voucher programs on low-income renters' reported health status and spending. Assisted renters spent less on health care over the year than unassisted low-income renters did, after controlling for other characteristics. This finding suggests that assisted housing leads to health benefits that may reduce low-income renters' need to purchase health services. Voucher holders' lower expenditures are influenced by their low, fixed housing costs, but public housing residents' lower expenditures are not explained by existing theory.

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Rental housing; health care; public housing; low-income housing

The United States is undergoing a health care crisis. Americans are spending more on health care than ever before. Health care spending is about \$9,000 per capita annually and about 17% of the U.S. gross domestic product, similar to the share held by housing (Davis, 2015; Schwartz, 2015). Yet the United States has one of the lowest life expectancy rates and highest infant mortality rates among developed nations (Davis, 2015).

Governments have the responsibility to advance their residents' health, as health—"a state of complete physical, mental and social well-being"—is a basic human right (World Health Organization, 2014, p. 1). One way to improve the efficiency of the U.S. health care system is to reinvest in social welfare programs that improve poor people's housing and neighborhood conditions (Bradley & Taylor, 2013). Social welfare programs have helped to mediate disparities in access to healthy food, housing, and neighborhoods over the last half century. Yet spending on these programs in the United States has decreased over time and falls far short of that in other developed countries (Bradley & Taylor, 2013; Center on Budget & Policy Priorities, 2015). Poor people's increasing lack of access to healthy food, housing, and neighborhoods may lead health problems to resurface after treatment and help to explain some of the inefficiencies of our health care system (Bradley & Taylor, 2013; Braubach & Fairburn, 2010; Coburn, 2005).

This research explores the potential health impacts of one kind of social welfare support—rental assistance to low-income people. Providing assistance may improve low-income renters' health in three ways (see Maqbool, Viveiros, & Ault, 2015, for a review). First, assisted renters have low, fixed housing

costs, which may enable them to better meet their basic nonhousing needs, including health care. Second, having low, fixed housing costs combined with the additional protections offered through rental assistance programs may improve renters' housing stability and reduce their stress, particularly from forcible eviction. Third, these programs may enable low-income renters to live in better homes and neighborhoods.

Using data from the nationally representative Survey of Income and Program Participation's 2001 to 2008 panels (U.S. Census Bureau, 2017), I apply descriptive statistics, logistic and linear regression, and propensity score matching to test whether low-income renters who receive assistance through the public housing or Section 8 voucher programs report better health and spend less on health care compared to unassisted low-income renters with similar characteristics. I explore the influence of housing costs, tenure stability, and housing and neighborhood conditions on these outcomes. I also assess whether low-income renters' health status and health care spending change after first receiving assistance and if so, how, and whether having low, fixed housing costs plays a role.

The article proceeds as follows. I first introduce three ways that rental assistance may improve low-income people's health, and consider evidence of these links. I then describe the data and methods used in the research. Next, I explore demographic differences between assisted and unassisted low-income renters and how having assistance and receiving assistance for the first time may affect health and health care spending after controlling for these differences. I conclude by revisiting the proposition that investment in social welfare programs may improve poor people's health, and outline directions for future research needed to more fully understand this relationship.

## **Why Rental Housing Assistance May Improve Low-Income Renters' Health**

There are three theories on how housing assistance may affect low-income renters' health: by offering (a) low, fixed housing costs, (b) protection against eviction, and (c) access to better homes and neighborhoods (see Maqbool et al., 2015, for a review). This section presents these theories and considers relevant evidence.

### ***Low, Fixed Housing Costs***

Rental housing assistance offers low-income renters low, fixed housing costs. Having low, fixed housing costs may protect these renters from shelter poverty, a state that occurs when rent takes up so much income that not enough is left over to pay for other costs, such as health care (Stone, 1993). Getting out of shelter poverty may lead low-income renters to spend more money on health care in the short term but less money on health care in the long term. Having low, fixed housing costs leaves low-income renters with more money left over to pay for health care in the short term, rendering them more able to seek help during health crises and to spend more money to solve these crises. However, having low, fixed housing costs may lead low-income renters to have less stress and more time to take care of their health (e.g., through exercise, cooking healthy meals, or visiting the doctor) in the long term, leading to better health and lower health care costs.

There is some evidence showing that households that have unaffordable housing have poorer health outcomes (see Maqbool et al., 2015 for a review). Researchers have linked high housing burdens to spending less on food and health care (e.g., Fletcher, Andreyeva, & Busch, 2009; Joint Center for Housing Studies, 2014). For instance, researchers at the Joint Center for Housing Studies found that in 2012, low-income households with severe housing burdens (paying half or more of their income on housing costs) had food and health care expenditures that were 39% and 65% less, respectively, than similar households that had affordable housing (i.e., they spent 30% or less of their income on housing costs; Joint Center for Housing Studies, 2014). Two studies found that people who had unaffordable housing (i.e., they spent more than 30% of their income on housing costs) were more likely to report poor health and to delay or not follow protocol for treatment for health problems (Meltzer & Schwartz, 2016; Pollack,

Griffin, & Lynch, 2010). However, another study found no discernible link between housing affordability and children's health (Newman & Holupka, 2015).

### **Protection Against Eviction**

Having low, fixed housing costs may increase low-income renters' housing stability. Assisted renters may be less likely to experience forcible eviction from nonpayment of rent, or frequent moves. Further, participating in rental assistance programs like the public housing or Section 8 voucher programs may offer low-income renters additional protections against forcible eviction. Staff helping to manage these programs may have knowledge of families at risk of eviction and be able to intervene to prevent eviction.

Forcible eviction may adversely affect health in two ways. First, eviction is stressful, and renters who are under greater stress may have poorer health, as earlier described. Second, eviction may require a renter to move away from social networks needed to support their health, such as family and friends who can serve as caretakers, or affordable and culturally competent health clinics.

Research shows that households with greater housing instability have worse health outcomes, such as more stress and poorer mental wellbeing (see Maqbool et al., 2015; for a review). A review of the literature on the determinants of children's health found strong links between residential instability and worse mental health (Leventhal & Newman, 2010). There also is evidence of links between seniors' health and residential stability. One study of seniors found that Latinos who had greater housing stability had a lower incidence of depression (Robison, Schensul, Coman, & Diefenbach, 2009).

### **Housing and Neighborhood Conditions**

Finally, rental assistance may enable low-income renters to access better homes and neighborhoods. The physical conditions of the home and neighborhood influence health. A house may have enough space for residents to live with minimal stress and discomfort, or it may be overcrowded and a source of stress and discomfort. A house may be free from or full of toxins (such as lead-based paint, second-hand smoke, and mold), and pests. Further, a house may provide access to a safe neighborhood that protects its residents from environmental hazards like crime, pollution, and traffic, or may be located in an unsafe neighborhood that exposes its residents to hazards. A home also is a point of access to community health resources and supportive social networks.

There is strong evidence on the adverse health effects of living in a home that is overcrowded or has toxins or poor structural features (Rough, Landrigan, & Claudio, 2008; see also Leventhal & Newman, 2010; for a review). Exposure to lead-based paint, for instance, which is estimated to affect millions of children annually, leads to severe developmental delays and possibly death (Centers for Disease Control & Prevention, 2016). Exposure to environmental hazards, such as crime or traffic, also may detract from low-income renters' health. People in higher crime communities, particularly women, may feel more stressed and walk less—conditions linked to poorer physical health (Bennett et al., 2007; Ohlin, Nilsson, Nilsson, & Berglund, 2004; Roman, Knight, Chalfin, & Popkin, 2009). Exposure to toxins, such as pollution from nearby brownfields or roads, increases residents' susceptibility to asthma and other chronic conditions (e.g., Gauderman et al., 2005; Rough et al., 2008).

Finally, the breadth and depth of social ties within a neighborhood affect residents' health. Neighborhoods with stronger social ties have greater social capital and collective efficacy, or an ability to rely on neighbors to access health information and resources or deal with unexpected health crises (Coleman, 1988; Sampson, Raudenbush, & Earls, 1997). People living in more socially cohesive neighborhoods also may have lower stress and better physical and mental health (Robinette, Charles, Mogle, & Almeida, 2013).

## ***Effects of Rental Assistance on Health***

The evidence linking rental assistance to health is weaker than the theory linking rental assistance to health. A longstanding goal of the public housing and Section 8 voucher programs is to offer low-income renters access to high-quality housing. The Section 8 voucher program also has the goal of expanding neighborhood choice for low-income renters. Working to meet these goals should lead renters participating in these programs to have better health than renters not participating in these programs. Yet the Section 8 voucher and public housing programs have mixed track records on meeting their goals (Schwartz, 2015). For instance, evaluations of the Section 8 voucher program have found that having a voucher may improve low-income renters' housing quality and satisfaction but not necessarily their neighborhood conditions (Basolo, 2013; Carlson, Haveman, Kaplan, & Wolfe, 2012; McClure, 2010; Ross, Shlay, & Picon, 2012; Varady & Walker, 2000).

There also is mixed evidence on whether living in low-poverty neighborhoods improves the health of assisted renters. For instance, evaluations of the Moving to Opportunity experiment, which tracked differences in the outcomes of low-income renters who stayed in public housing and those who moved from public housing to low-poverty and nonlow-poverty neighborhoods, found that families who moved to low-poverty neighborhoods were more likely to have improved mental health and body mass index but not necessarily other health improvements (Briggs, Popkin, & Goering, 2010).

The most direct test of the link between rental housing assistance and health is the study by Fenelon et al. (2017), who linked U.S. National Health Interview Survey data to U.S. Department of Housing and Urban Development administrative records to assess differences in reported health status and psychological distress between renters currently receiving and soon to be receiving public housing and Section 8 voucher- and project-based assistance. The researchers found that renters receiving public housing or Section 8 project-based assistance were less likely to report fair or poor health than renters receiving this assistance within the next 2 years after controlling for participants' demographic and neighborhood characteristics. Further, public housing residents were less likely to experience psychological distress. There were no discernible health benefits of having a voucher.

A small but growing body of case studies also examines the link between rental assistance and health, with mixed results (see Leventhal & Newman, 2010 for a review). These studies typically rely on administrative data from individual local public housing authorities, and focus on children's outcomes. A study of differences between children in families receiving subsidized housing and those on the waiting list for subsidized housing in Boston, Massachusetts, from 1998 to 2008 found that children in families receiving subsidized housing had better overall health (March et al., 2009). Another study found that families receiving public housing and Section 8 vouchers were better able to afford health care than similar unassisted families were (Lee, Beecroft, Khadduri, & Patterson, 2003). Meyers et al. (2005) found that young children in households receiving rental assistance were less likely to be underweight but were not otherwise healthier. Mixed results also were reported in a study on the impact of living in public housing on the health of children and their parents (Fertig & Reingold, 2007). A study of the effect of receiving a Section 8 voucher on children's use of inpatient and emergency health care services in Chicago, Illinois, found no relationship (Jacob, Kapustin, & Ludwig, 2015).

The current study pushes our emerging understanding of the link between rental housing assistance and health forward in two ways. First, I use a rich and underexplored nationally representative data set to test whether public housing and Section 8 voucher recipients have better reported health and lower health spending than comparable unassisted low-income renters. Second, I explore whether factors theorized to drive the relationship between rental housing assistance and health help to account for these differences, including assisted renters' low, fixed housing costs, protection against eviction, and better housing and neighborhood conditions.

## Methodology

This research explores the link between renter housing assistance and health using data from the Survey of Income and Program Participation (SIPP). I employ several econometric techniques—linear and logistic regression and propensity score matching—to understand the effects of having assistance and receiving assistance for the first time through the public housing or Section 8 voucher programs (the main independent variables) on two health outcomes experienced by low-income renters: reported health status and health care spending over the year (the dependent variables).

### *Data Sources and Variables*

SIPP is a nationally representative, longitudinal survey of households conducted by the U.S. Census Bureau. The survey is designed to capture demographic and socioeconomic changes in households over time. The survey has especially rich information on income, employment, wealth, and social welfare participation. People who are U.S. residents age 15 and older living in a household, meaning they are not deployed in the military or living in institutionalized settings, are eligible to participate. A unique feature of SIPP is that participants who move out of the originally sampled households remain in the sample; in turn, people who move into originally sampled households, or new households formed by original participants, are eligible to join the sample.

This research uses data from the 2001, 2004, and 2008 panels, which were the most recent available at the start of the project. The panels last between 2.5 and 4 years. Participants are interviewed once every 4 months (with this series of interviews called waves) for the duration of the panel. Questions on topics such as income, employment, and social welfare program participation are asked during each wave. Questions on topics such as wealth and well-being are asked only once a year. Questions on housing and neighborhood conditions are asked once or, in some cases, twice during the panel.

This research draws information from a sample of original respondents to the survey who were low-income renters age 25 to 69. The age range 25 to 69 captures people who are likely able to participate in the workforce. A person living in a low-income family is one who was living in a family earning up to three times the poverty threshold for that family based on their size in the year the family was interviewed.<sup>1</sup> Only people living in households paying cash rent were included, to test the role that housing costs play on health outcomes.

SIPP collects information on three kinds of rental assistance: (a) living in public housing, which is housing owned by a local housing authority or other agency, and having a lower rent because the rent is partially paid by (b) a Section 8 voucher or (c) some other federal, state, or local government program. I examined the effects of living in public housing or participating in the Section 8 voucher program, because these are the largest rental assistance programs and the most discussed in the existing literature. In contrast, the number of participants receiving rental assistance from a program other than the Section 8 voucher program was very small, which made statistical analysis difficult. Low-income renters receiving these other forms of assistance were therefore removed from the sample.

SIPP collects information on a myriad of physical health outcomes. These include reported health status (whether someone rates their current health as excellent, very good, good, fair, or poor), and the experience of illness, hospitalizations, and provider visits and the frequency of these experiences. SIPP also has data on health care spending, or the amount someone has spent on health insurance premiums and their own medical care (e.g., payments for medical providers and supplies) over the past year. I focused on the effects of receiving rental assistance on health status (the likelihood that a person reported good or better health) and health care spending, since these variables address distinct outcomes that are commonly studied in the existing literature.

I used three sets of variables to test existing theories on how rental assistance may affect low-income renters' health. First, I accounted for a person's household housing burden to test the effect of having low, fixed housing costs. A household's housing burden is the percentage of monthly household income spent on rent. I adjusted a household's income to account for economies of scale in household

consumption as household size grows (Burkhauser & Larrimore, 2014).<sup>2</sup> Second, I included a measure of whether a person was evicted in the past 12 months because of nonpayment of rent to assess the effect of housing stability. Third, I included two measures of housing conditions (overcrowding and structural or pest problems) and three measures of neighborhood conditions (safety, traffic, and social support) to assess the effect of access to better housing and neighborhoods. An overcrowded house was defined as having more than one person per room. A person had housing structural or pest problems if they had at least one of the following problems: pests (e.g., rats, mice, or roaches); a leaking roof or ceiling; broken window glass or windows that would not shut; exposed electrical wires; a broken toilet, hot water heater, or other plumbing; or holes or cracks in the walls, ceiling, or floor that are large enough to bring in air or cause injury. The neighborhood conditions included were whether the person felt that their neighborhood (a) was somewhat or very safe from crime, (b) had problematic street noise or heavy traffic, or (c) had friends, family or supportive institutions like churches or social service agencies nearby that could provide all or most of the help needed if they had a problem. Respondents' perceptions of these conditions help to capture the positive effects of neighborhood safety and social networks and the negative effects of neighborhood traffic on health, which are established in the existing literature (e.g., Bennett et al., 2007; Gauderman et al., 2005; Robinette et al., 2013; Roman et al., 2009).

Two subsamples that controlled for these intervening variables were used in the analysis. First, a sample of 16,111 respondents was used to assess the effect of having rental assistance on health outcomes, controlling for low-income renters' demographic characteristics and all of the intervening housing and neighborhood conditions described above.<sup>3</sup> Of the participants in this sample, 16% lived in public housing; 4% had assistance from the Section 8 voucher program. Second, a sample of 19,112 respondents and 28,468 observations was used to assess the impact of moving into assisted rental housing on health outcomes, controlling for low-income renters' demographic and socioeconomic characteristics and only the intervening variable of housing costs.<sup>4</sup> Two percent of participants in this sample first moved into public housing over the year; 1% first received assistance through the Section 8 voucher program.

A diverse set of demographic and contextual control variables related to health were also used in the analysis. I accounted for whether a person had a disability, meaning a physical, mental, or other health condition that affects their ability to work, or subsidized health care through Medicare or Medicaid. Other controls included age, race, sex, marital status, education, employment status, personal monthly income, household net worth or wealth, which was logged to correct for its skew, and the panel year and wave. Information on nativity status was not collected until the 2004 panel, so it was not controlled in the analysis. State of residence was included in modeling health care spending to account for state-by-state differences in health care costs. Health status was controlled in modeling health care spending, and vice versa, given their interrelatedness.<sup>5</sup>

### **Modeling Approaches**

I initially conducted *t* tests of differences in means and proportions among assisted and unassisted renters to better understand their differences in health and related characteristics. Next, I used logistic and linear regression to assess the independent effects that having assistance and receiving assistance for the first time had on health status and spending, controlling for participants' other characteristics. I then progressively controlled for the intervening variables theorized to shape divergent health outcomes among assisted and unassisted renters. I accounted for the clustering within the samples and respondents and generated population estimates using sample weights. The basic models are specified as follows:

$$\text{Log}\left[\frac{Y_i}{1 - Y_i}\right] = \beta_{0i} + \beta_{1i}X_{1i} + \beta_{2i}X_{2i} + \beta_{3i}X_{3i} + e_i$$

$$Y_i = \beta_{0i} + \beta_{1i}X_{1i} + \beta_{2i}X_{2i} + \beta_{3i}X_{3i} + e_i$$

where  $Y_i$  is the health outcome experienced by a low-income renter in the sample (odds of reporting good health ( $\text{Log}[Y_i/(1 - Y_i)]$ ) or health care spending ( $Y_i$ )),  $\beta_{0i}$  is the intercept,  $\beta_{1i}$  is the effect of receiving

rental housing assistance,  $X_{2i}$  is a matrix of the intervening variables with effects captured in a  $\beta_{2i}$  vector,  $X_{3i}$  is a matrix of the control variables with effects captured in a  $\beta_{3i}$  vector, and  $e_i$  is the error term.

Finally, I used propensity score matching to further distill the effect of having assistance and receiving assistance for the first time on health status and spending. This approach helps to correct for self-selection bias, or the tendency for low-income renters who are more motivated, resourceful, or connected with housing institutions to receive rental assistance, by controlling for factors associated with receiving rental assistance. The first step in propensity score matching is to model the likelihood that a person experienced the condition of interest—in this case, received rental assistance—using factors associated with experiencing the condition (see the control variables described earlier).<sup>6</sup> The next step is to use the model estimates to predict the probability of a person receiving rental assistance, which is known as the propensity score. Finally, differences in health status and spending between participants with similar propensity scores are calculated and combined into an overall average effect of receiving rental assistance on health status and spending for a randomly picked respondent from the sample.<sup>7</sup>

### **Limitations**

There are several limitations to the research approach that readers should keep in mind in interpreting the results. First, data are imputed in SIPP when information is missing because of nonresponse using the *hot deck* method, which substitutes information from participants with similar characteristics (U.S. Census Bureau, 2009). This practice allows for the analysis of a larger sample but may introduce bias into the results if the imputed information differs from reality. Other sources of potential bias through the SIPP data include the underrepresentation of African American males and other demographic groups (corrected in part through appropriate weighting), recall error, and the relatively high rate of attrition, as previously noted (see note 3). Despite these issues, SIPP is a rich and carefully constructed but underused resource from which to draw lessons on the links between rental housing assistance and health.

Second, information on participants' experience of eviction, overcrowding, housing problems, and neighborhood conditions was collected 4 months prior to information on their health and health spending. However, in the analysis, I assume that these housing and neighborhood conditions remained constant over the 4-month period for everyone except those who moved, who were excluded from the analysis on the effect of having rental assistance on health. People who experienced changes in eviction, overcrowding, housing problems, and neighborhood conditions may have biased estimates on the effects of these characteristics on their health. On balance, the value of being able to test theories on the intervening factors linking rental assistance to health should outweigh the potential bias caused, especially since drastic changes to housing and neighborhood conditions are unlikely to happen over a 4-month period.

Third, the observational approach used in this research is unable to adequately control for self-selection bias. Unobserved factors may intervene in the relationship between rental housing assistance and health. Unobserved factors that may be correlated with receiving rental assistance and uncorrelated with the controlled demographic and contextual factors linked to receiving rental assistance include growing up in an assisted household, or personality. Quasiexperimental approaches are needed to more fully control for self-selection bias and to understand the direct effects of receiving rental housing assistance on health status and spending. However, observational studies using nationally representative secondary data are still of value as they help to overcome issues of generalizability inherent in quasiexperimental studies, which commonly involve only a few geographies (e.g., the Moving to Opportunity experiment; Briggs et al., 2010).

### **Does Rental Assistance Improve Low-Income Renters' Health?**

This section presents evidence on the link between rental housing assistance and health. I first describe differences in assisted and unassisted renters' health outcomes, demographics, and housing and neighborhood conditions, and model the factors associated with low-income renters' health status



and spending. I then test whether there are differences in health outcomes (a) between assisted and unassisted low-income renters and (b) between low-income renters who moved into and did not move into assisted rental housing over the previous year, controlling for intervening and related factors.

### ***Differences Between Assisted and Unassisted Renters***

Table 1 shows differences in assisted and unassisted low-income renters' health outcomes, demographics, and housing and neighborhood conditions during the 2000s. Assisted and unassisted low-income renters had notable differences in their health outcomes. Assisted renters were far less likely to report being in good health than unassisted renters were. Only about 60% of assisted renters reported being in good health, compared with about 80% of unassisted renters. However, assisted renters spent less money on average on health care over the year (about \$400 less for public housing residents and \$377 less for Section 8 voucher recipients).

Assisted low-income renters' unique demographic characteristics help to explain their lower health status and spending (see Table 1). About half of assisted renters had a disability, compared to less than one-quarter of unassisted renters. Assisted renters were older than and more than twice as likely to receive subsidized health care than unassisted renters. Assisted renters were more likely to be African American, female, and unmarried, and less likely to be employed full time. These renters also had lower earnings and less household wealth. Assisted renters in public housing were more likely to have lower educational attainment; this was not the case for renters with Section 8 vouchers. Public housing residents also were slightly older than renters with Section 8 vouchers and were more likely to be of an *other* race or ethnicity (e.g., Native American or mixed race). Otherwise, there were few differences among assisted renters.

### ***Determinants of Renters' Health Status and Spending***

Table 2 shows associations between low-income renters' demographic characteristics and their health status and spending, controlling for state of residence and panel year and wave. Low-income renters were more likely to report good health if they were younger, not disabled or enrolled in Medicare or Medicaid, Latino, Asian or White, single, widowed or married, college educated, employed, or wealthier, or had higher income. Low-income renters spent more on health care if they were older, disabled, not enrolled in Medicare or Medicaid, non-Hispanic white, female, married or widowed, college educated, employed, and wealthier, or had higher income.

Assisted renters were more likely to have demographic characteristics associated with poorer health, which helps to explain their tendency to report poorer health. However, the association between rental housing assistance and spending less on health care is not as clearly linked to the demographic characteristics controlled, since assisted renters were more likely to have some characteristics associated with higher spending (being older and having a disability) but other characteristics associated with less spending (being enrolled in Medicare or Medicaid, being a person of color, having lower educational attainment, not being unemployed, earning less and having less wealth).

### ***Effects of Living in Assisted Housing on Renters' Health***

Tables 3 and 4 show the effects of having rental housing assistance on low-income renters' health status and spending, controlling for their demographic, geographic, and temporal characteristics. Assisted low-income renters spent far less money on health care but did not have a higher likelihood of reporting good health (see Tables 3 and 4). Having public housing or a Section 8 voucher was associated with spending \$167 and \$136 less annually on health care, respectively. This effect persists in the propensity score matching analysis, which compares renters with similar likelihoods of receiving assistance. Low-income renters with public housing or a Section 8 voucher typically spent \$190 and \$256 less, respectively, on health care annually in this analysis.<sup>8</sup> The effects of living in public housing on health

**Table 1.** Low-income renters' average characteristics by receipt of housing assistance ( $n = 16,111$ ).

| Characteristics                                    | Low-income renters      |                                 |                         |                                   | Assisted low-income renters |                         |
|--|-------------------------|---------------------------------|-------------------------|-----------------------------------|-----------------------------|-------------------------|
|  | Lives in public housing | Does not live in public housing | Has a Section 8 voucher | Does not have a Section 8 voucher | Lives in public housing     | Has a Section 8 voucher |
| <b>Health conditions</b>                           |                         |                                 |                         |                                   |                             |                         |
| Reports good health (%)                            | 60***                   | 80***                           | 60***                   | 78***                             | 60                          | 60                      |
| Amount spent on health care during past year (\$)  | 390***                  | 791***                          | 378***                  | 755***                            | 390                         | 378                     |
| Monthly housing burden (%)                         | 31***                   | 45***                           | 28***                   | 44***                             | 31**                        | 28**                    |
| Evicted from home during past year (%)             | 0*                      | 1*                              | 0                       | 1                                 | 0                           | 0                       |
| <b>Housing problems</b>                            |                         |                                 |                         |                                   |                             |                         |
| Overcrowded (%)                                    | 8***                    | 14***                           | 8***                    | 13***                             | 8                           | 8                       |
| Home has damage or pests (%)                       | 24                      | 24                              | 25                      | 24                                | 24                          | 25                      |
| <b>Neighborhood conditions</b>                     |                         |                                 |                         |                                   |                             |                         |
| Neighborhood is safe (%)                           | 74***                   | 86***                           | 77***                   | 85***                             | 74                          | 77                      |
| Neighborhood has heavy street noise or traffic (%) | 30***                   | 23***                           | 29**                    | 24**                              | 30                          | 29                      |
| Neighborhood has social support networks (%)       | 79                      | 81                              | 77**                    | 81**                              | 79                          | 77                      |
| <b>Demographics and socioeconomics</b>             |                         |                                 |                         |                                   |                             |                         |
| Age  | 47***                   | 42***                           | 45***                   | 42***                             | 47***                       | 45***                   |
| Disabled (%)                                       | 51***                   | 20***                           | 48***                   | 23***                             | 51                          | 48                      |
| Receives Medicare or Medicaid (%)                  | 69***                   | 26***                           | 72***                   | 29***                             | 69                          | 72                      |
| <b>Race (%)</b>                                    |                         |                                 |                         |                                   |                             |                         |
| Non-Hispanic white                                 | 34***                   | 46***                           | 35***                   | 45***                             | 34                          | 35                      |
| Latino   | 23***                   | 28***                           | 21***                   | 27***                             | 23                          | 21                      |
| African American                                   | 36***                   | 19***                           | 39***                   | 20***                             | 36                          | 39                      |
| Asian  | 3***                    | 5***                            | 4                       | 4                                 | 3                           | 4                       |
| Other  | 5***                    | 3***                            | 2                       | 3                                 | 5***                        | 2***                    |
| Female (%)   | 70***                   | 52***                           | 73***                   | 54***                             | 70*                         | 73*                     |
| <b>Marital status (%)</b>                          |                         |                                 |                         |                                   |                             |                         |
| Married  | 21***                   | 44***                           | 20***                   | 42***                             | 21                          | 20                      |
| Widowed  | 8***                    | 3***                            | 7***                    | 3***                              | 8                           | 7                       |
| Divorced or separated                              | 31***                   | 23***                           | 33***                   | 24***                             | 31                          | 33                      |
| Single   | 41***                   | 29***                           | 40***                   | 30***                             | 41                          | 40                      |
| <b>Education (%)</b>                               |                         |                                 |                         |                                   |                             |                         |
| No high school degree                              | 33***                   | 26***                           | 28                      | 27                                | 33*                         | 28**                    |
| High school degree                                 | 34**                    | 30**                            | 27*                     | 31*                               | 34***                       | 27***                   |
| At least some college                              | 33***                   | 44***                           | 44                      | 42                                | 33***                       | 44***                   |
| <b>Employment status (%)</b>                       |                         |                                 |                         |                                   |                             |                         |
| Full time  | 19***                   | 46***                           | 19***                   | 44***                             | 19                          | 19                      |
| Part time  | 18***                   | 21***                           | 19                      | 21                                | 18                          | 19                      |
| Personal monthly income (\$)                       | 973***                  | 1,511***                        | 1,045***                | 1,459***                          | 973                         | 1,045                   |

(Continued)

**Table 1.** (Continued).

| Characteristics          | Low-income renters      |                                 |                         |                                   | Assisted low-income renters |                         |
|--------------------------|-------------------------|---------------------------------|-------------------------|-----------------------------------|-----------------------------|-------------------------|
|                          | Lives in public housing | Does not live in public housing | Has a Section 8 voucher | Does not have a Section 8 voucher | Lives in public housing     | Has a Section 8 voucher |
| Household net worth (\$) | 990***                  | 13,563***                       | 2,789***                | 12,342***                         | 989                         | 2,789                   |
| Ln household net worth   | 14.22***                | 14.23***                        | 14.22***                | 14.23***                          | 14.22                       | 14.22                   |
| Number of observations   | 2,506                   | 13,605                          | 679                     | 15,432                            | 2,506                       | 679                     |

Note. Population estimates are reported. Housing burden accounts for the percentage of household income spent on rent. Household income is adjusted to account for economies of scale among larger households.

Data source: U.S. Census Bureau (2017).

\* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

care spending are more robust than the effects of having a Section 8 voucher on health care spending (effects from both models were significant at the 1% level vs. 5% and 10% levels).

Assisted low-income renters did not have a higher likelihood of reporting good health (see Tables 3 and 4). Renters living and not living in public housing had similar odds of reporting good health (coefficient of 1.000). Renters with Section 8 vouchers had lower odds of reporting good health (coefficient of 0.888). However, this effect is not statistically significant at the 10% level or higher, meaning there may be no difference in reported health status between renters with and without Section 8 vouchers. The propensity score matching analysis also supports the finding that there is no significant difference in assisted and unassisted renters' likelihood of reporting good health.

I next tested whether assisted renters' low and fixed housing costs, protections against eviction, and better housing and neighborhood conditions accounted for their lower health care spending. Assisted renters had much lower housing burdens than unassisted renters did (31% and 28% for those with public housing and Section 8 vouchers, respectively, compared to 45% and 44%, respectively, for the comparison groups; see Table 1). Assisted renters also were less likely to be overcrowded (difference of 6 and 5 percentage points, respectively, for those with public housing and Section 8 vouchers compared to other low-income renters). Renters in public housing were less likely to have experienced eviction over the year, although this relationship was only statistically significant at the 10% level. Having low, fixed housing costs, more space within the home, and greater tenure stability may lead to better health outcomes for assisted renters and help to explain their lower health care spending.

However, assisted renters had poorer neighborhood conditions than unassisted renters did. Assisted renters were less likely to live in neighborhoods they perceived as safe and more likely to report living in noisy and congested neighborhoods (see Table 1). Further, renters with Section 8 vouchers were less likely to report having nearby supportive social networks or institutions. These factors may lead assisted renters to have poorer health than unassisted renters.

Tables 3 and 4 test whether accounting for these intervening variables helps to explain assisted renters' lower health care spending. The effect of living in public housing on health care spending is virtually unchanged after accounting for the intervening variables (difference of \$2 to \$6, significance level consistent). Yet a small portion of the effect of having a Section 8 voucher on health care spending is accounted for by voucher recipients' lower housing burdens. Having a Section 8 voucher was associated with spending \$136 less on health care annually before accounting for renters' housing burdens, and \$126 less annually after accounting for renters' housing burdens. The statistical significance of the difference in estimated health care spending between assisted and unassisted renters also drops from the 5% level to the 10% level. None of the other intervening variables (experience of eviction or housing and neighborhood conditions) influences the association between having rental housing assistance and health care spending.

**Table 2.** Factors affecting low-income renters' health ( $n = 16,111$ ).

| Characteristics                              | Reports good health<br>(odds ratio) | Amount spent on health care during past<br>year (\$) |
|--|-------------------------------------|--|
| Age  | 0.967***<br>(0.002)                 | 11.821***<br>(1.366)                                 |
| Disabled                                     | 0.122***<br>(0.007)                 | 135.509***<br>(44.390)                               |
| Receives Medicare or Medicaid                | 0.740***<br>(0.050)                 | -409.010***<br>(34.022)                              |
| Race (non-Hispanic White omitted)            |                                     |  |
| Latino                                       | 0.996<br>(0.083)                    | -295.084***<br>(38.254)                              |
| African American                             | 0.838***<br>(0.053)                 | -232.322***<br>(33.690)                              |
| Asian  | 1.156<br>(0.189)                    | -335.351***<br>(62.613)                              |
| Other  | 0.754*<br>(0.103)                   | -115.270<br>(83.924)                                 |
| Female                                       | 0.967<br>(0.056)                    | 154.778***<br>(29.347)                               |
| Marital status (married omitted)             |                                     |  |
| Widowed                                      | 0.997<br>(0.118)                    | -6.893<br>(72.854)                                   |
| Divorced or separated                        | 0.846***<br>(0.054)                 | -211.205***<br>(35.092)                              |
| Single                                       | 1.122<br>(0.090)                    | -184.730***<br>(30.732)                              |
| Education (at least some college omitted)    |                                     |  |
| No high school degree                        | 0.607***<br>(0.041)                 | -308.855***<br>(30.433)                              |
| High school degree                           | 0.813***<br>(0.053)                 | -178.830***<br>(31.492)                              |
| Employment status (not employed omitted)     |                                     |  |
| Full time                                    | 1.790***<br>(0.152)                 | 236.624***<br>(43.587)                               |
| Part time                                    | 1.474***<br>(0.119)                 | 167.594***<br>(38.286)                               |
| Personal monthly income                      | 1.000***<br>(0.000)                 | 0.169***<br>(0.018)                                  |
| Ln household net worth                       | 53.070***<br>(67.306)               | 1415.594***<br>(476.750)                             |
| Amount spent on health care during past year | 1.000***<br>(0.000)                 |  |
| Reports good health                          |                                     | -237.369***<br>(48.178)                              |
| Prob > F                                     | 0.000                               | 0.000  |

Note. Standard errors are given in parentheses. Population estimates are reported.

State of residence, panel years, and waves are controlled but estimates are suppressed.

Data source: U.S. Census Bureau (2017).

\* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

These findings suggest that having low, fixed housing costs may lead to better health outcomes for low-income renters with Section 8 vouchers and may help to explain their lower health care spending. However, additional theory-building is needed to explain the lower health care spending of low-income renters living in public housing.

### **Effects of Moving Into Assisted Housing on Renters' Health**

I further explored the effect that rental housing assistance plays on health status and spending by comparing low-income renters who did and did not receive rental housing assistance for the first time from the public housing or Section 8 voucher programs over the previous year. Table 5 shows average

**Table 3.** Effect of living in public housing on low-income renters' health status and spending ( $n = 16,111$ ).

| Characteristics                                | Reports good health (odds ratio) |                                    |                            | Amount spent on health care during past year (\$) |                                    |                         | Propensity score matching analysis |                         |                         |                         |                         |
|--|----------------------------------|------------------------------------|----------------------------|---|------------------------------------|-------------------------|------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|  | Logistic regression analysis     | Propensity score matching analysis | Linear regression analysis | Linear regression analysis                        | Propensity score matching analysis |                         |                                    |                         |                         |                         |                         |
| Public housing                                 | 1.000<br>(0.068)                 | 1.017<br>(0.068)                   | 1.012<br>(0.071)           | 1.028<br>(0.071)                                  | -0.022<br>(0.017)                  | -166.555***<br>(27.441) | -160.774***<br>(29.928)            | -168.007***<br>(27.394) | -168.073***<br>(27.927) | -160.914***<br>(30.512) | -189.625***<br>(63.295) |
| Monthly housing burden                         | 1.098<br>(0.106)                 | 0.502**<br>(0.160)                 | 0.554*<br>(0.188)          | 1.123<br>(0.108)                                  |                                    | 35.823<br>(46.149)      |                                    |                         |                         | 55.846<br>(46.728)      |                         |
| Evicted from home during past year             |                                  |                                    |                            |   |                                    |                         |                                    |                         |                         |                         |                         |
| Housing problems                               |                                  |                                    |                            |   |                                    |                         |                                    |                         |                         |                         |                         |
| Overcrowded                                    |                                  |                                    |                            |   |                                    |                         |                                    |                         |                         |                         |                         |
| Home has damage or pests                       |                                  |                                    |                            | 1.059<br>(0.107)                                  | 1.042<br>(0.105)                   |                         |                                    |                         |                         |                         |                         |
| Neighborhood conditions                        |                                  |                                    |                            | 0.740***<br>(0.051)                               | 0.740***<br>(0.051)                |                         |                                    |                         |                         |                         |                         |
| Neighborhood is safe                           |                                  |                                    |                            | 1.315***<br>(0.099)                               | 1.316***<br>(0.100)                |                         |                                    |                         |                         |                         |                         |
| Neighborhood has heavy street noise or traffic |                                  |                                    |                            | 0.887*<br>(0.058)                                 | 0.889*<br>(0.058)                  |                         |                                    |                         |                         |                         |                         |
| Neighborhood has social support networks       |                                  |                                    |                            | 1.521***<br>(0.100)                               | 1.515***<br>(0.101)                |                         |                                    |                         |                         |                         |                         |
| Prob > F                                       | 0.000                            | 0.000                              | 0.000                      | 0.000   | 0.000                              | 0.000                   | 0.000                              | 0.000                   | 0.000                   | 0.000                   | 0.000                   |

*Note.* Standard errors are given in parentheses. Population estimates are reported. Demographic and socioeconomic characteristics shown in Table 2 are controlled, along with state, panel years, and waves; estimates suppressed. Housing burden accounts for the percentage of household income spent on rent. Household income is adjusted to account for economies of scale among larger households. Data source: U.S. Census Bureau (2017).

\* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

**Table 4.** Effect of having a Section 8 voucher on low-income renters' health status and spending ( $n = 16,111$ ).

| Characteristics                                | Reports good health (odds ratio) |                                    |                            | Amount spent on health care during past year (\$) |                                    |                   | Propensity score matching analysis |
|--|----------------------------------|------------------------------------|----------------------------|---|------------------------------------|-------------------|------------------------------------|
|  | Logistic regression analysis     | Propensity score matching analysis | Linear regression analysis | Linear regression analysis                        | Propensity score matching analysis |                   |                                    |
| Section 8 housing                              | 0.888<br>(0.098)                 | 0.900<br>(0.104)                   | 0.886<br>(0.098)           | 0.903<br>(0.100)                                  | 0.917<br>(0.107)                   | -0.049<br>(0.040) | -126.866*<br>(66.728)              |
| Monthly housing burden                         |                                  | 1.082<br>(0.109)                   |                            |   | 1.105<br>(0.111)                   |                   | 77.524*<br>(43.479)                |
| Evicted from home during past year             |                                  |                                    | 0.501**<br>(0.160)         |   | 0.553*<br>(0.188)                  |                   | -277.732***<br>(94.113)            |
| Housing problems                               |                                  |                                    |                            |   |                                    |                   |                                    |
| Overcrowded                                    |                                  |                                    |                            | 1.057<br>(0.108)                                  | 1.042<br>(0.105)                   |                   |                                    |
| Home has damage or pests                       |                                  |                                    |                            | 0.739***<br>(0.051)                               | 0.739***<br>(0.051)                |                   | 4.040<br>(30.917)                  |
| Neighborhood conditions                        |                                  |                                    |                            |   |                                    |                   |                                    |
| Neighborhood is safe                           |                                  |                                    |                            | 1.314***<br>(0.099)                               | 1.314***<br>(0.099)                |                   | -121.879***<br>(37.247)            |
| Neighborhood has heavy street noise or traffic |                                  |                                    |                            | 0.888*<br>(0.058)                                 | 0.889*<br>(0.058)                  |                   | 4.875<br>(30.917)                  |
| Neighborhood has social support networks       |                                  |                                    |                            | 1.520***<br>(0.100)                               | 1.513***<br>(0.101)                |                   | -130.820***<br>(37.815)            |
| Prob > F                                       | 0.000                            | 0.000                              | 0.000                      | 0.000   | 0.000                              | 0.000             | 87.028***<br>(30.922)              |
|  |                                  |                                    |                            |   |                                    |                   | 86.185***<br>(31.050)              |
|  |                                  |                                    |                            |   |                                    |                   | 87.445***<br>(32.455)              |
|  |                                  |                                    |                            |   |                                    |                   | -28.297<br>(32.791)                |
|  |                                  |                                    |                            |   |                                    |                   | 0.000<br>(33.013)                  |

Note. Standard errors are given in parentheses. Population estimates are reported. Demographic and socioeconomic characteristics shown in Table 2 are controlled, along with state, panel years, and waves; estimates are suppressed. Housing burden accounts for the percentage of household income spent on rent. Household income is adjusted to account for economies of scale among larger households. Data source: U.S. Census Bureau (2017).

\* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

**Table 5.** Average changes in low-income renters' characteristics according to whether they moved into assisted rental housing during the past year.

| Characteristics                                   | Moved into public housing | Did not move into public housing | Received a Section 8 voucher | Did not receive a Section 8 voucher |
|---|---------------------------|----------------------------------|------------------------------|-------------------------------------|
| <b>Health conditions</b>                          |                           |                                  |                              |                                     |
| Reported good health this year, not last year (%) | 12***                     | 8***                             | 10                           | 8                                   |
| Reported good health last year, not this year (%) | 10                        | 8                                | 11                           | 8                                   |
| Change in amount spent on health care (\$)        | -90                       | -1                               | -100                         | -1                                  |
| <b>Housing conditions</b>                         |                           |                                  |                              |                                     |
| Change in monthly housing burden (% pt)           | -13***                    | -2***                            | -24***                       | -2***                               |
| Number of observations                            | 587                       | 27,881                           | 249                          | 28,219                              |

Note. Population estimates are reported. Housing burden accounts for the percentage of household income spent on rent. Household income is adjusted to account for economies of scale among larger households. People who moved into subsidized housing were only those who moved into it for the first time. People who moved from Section 8 housing to public housing and vice versa were categorized as having not moved into either type of housing. A small minority of respondents fell into this category.

Data source: U.S. Census Bureau (2017).

\* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

changes in health status and spending over the year for recently and not recently assisted renters. Average changes in housing burdens over the year are also displayed to aid in understanding whether changes in housing costs might contribute to changes in health outcomes. Dynamics relating to eviction, housing problems, and neighborhood conditions are not displayed, since information on these factors was only collected once during the 2001 and 2004 panels (preventing an analysis of change over time), and there were too few observations to model changes in these characteristics during the 2008 panel.

Two trends are notable in Table 5. First, renters who moved into public housing were more likely to experience a positive change in reported health status over the year relative to renters who did not move into public housing. Twelve percent of renters who moved into public housing reported improved health over the year, compared with only 8% of renters who did not move into public housing (significant at the 1% level). Second, renters moving into public housing or receiving a Section 8 voucher experienced tremendous reductions in their housing burdens. The housing burdens of renters who moved into public housing or received a Section 8 voucher declined by 13 percentage points and 24 percentage points, respectively, over the year compared with a 2-percentage-point decrease among renters who did not recently receive assistance. Changes in housing burdens may contribute to positive changes in reported health among low-income renters moving into public housing.

Another notable observation is that renters who moved into public housing or received a Section 8 voucher spent less money on health care over the year relative to the previous year compared with renters who did not recently receive assistance ( $-\$90$  and  $-\$100$ , respectively, vs.  $-\$1$  for renters not recently receiving assistance). However, differences in changes in health care expenditures were not statistically significant at the 10% level or higher.

Table 6 shows how moving into public housing or receiving a Section 8 voucher is related to health status and spending after controlling for changes in renters' housing burden and other associated characteristics. The effect of moving into public housing on health status remains, though at a marginal significance level. Renters who move into public housing have higher odds of reporting positive changes in health status over the year than do low-income renters who do not move into public housing (odds ratio of 1.302, significant at the 10% level). This effect persists even after controlling for the reduction

**Table 6.** Effect of moving into assisted rental housing on low-income renters' health during the past year ( $n = 28,468$ ).

| Characteristics                         | Reported good health this year, not last year<br>(odds ratio) |  | Reported good health last year, not this year<br>(odds ratio) |  | Change in amount spent on health care (\$) |                               |  |
|---|---|--|---|--|--|-------------------------------|--|
|   | Logistic<br>regression analysis                               | Propensity<br>score matching<br>analysis | Logistic<br>regression analysis                               | Propensity<br>score matching<br>analysis | Linear<br>regression analysis              | Linear<br>regression analysis | Propensity<br>score matching<br>analysis |
| Moved into public housing               | 1.302*<br>(0.190)   | 0.026<br>(0.019)                         | 1.078<br>(0.232)  | 1.077<br>(0.231)                         | -69.699<br>(80.250)                        | -66.345<br>(79.861)           | -141.770<br>(115.252)                    |
| Change in monthly housing burden (% pt) | 0.912<br>(0.072)  |  | 0.989<br>(0.083)  |  |  | 27.491<br>(42.213)            |  |
| Prob > F                                | 0.000   |  | 0.000   |  | 0.005                                      | 0.005                         |  |
| Received a Section 8 Voucher            | 1.020<br>(0.283)  |  | 1.221<br>(0.308)  | 1.218<br>(0.309)                         | -77.613<br>(101.614)                       | -71.303<br>(102.299)          | 57.720<br>(186.506)                      |
| Change in monthly housing burden (% pt) | 0.905<br>(0.071)  |  | 0.990<br>(0.084)  |  |  | 27.583<br>(42.560)            |  |
| Prob > F                                | 0.000   |  | 0.000   |  | 0.005                                      | 0.005                         |  |

Note. Standard errors are given in parentheses. Population estimates are reported. Housing burden accounts for the percentage of household income spent on rent. Household income is adjusted to account for economies of scale among larger households. People who moved into subsidized housing were only those who moved into it for the first time. People who moved from Section 8 housing to public housing and vice versa were categorized as having not moved into either type of housing. A small minority of respondents fell into this category. Demographic and socioeconomic characteristics shown in Table 2 are controlled, along with state, panel years, and waves; estimates are suppressed.

Data source: U.S. Census Bureau (2017).

\* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .



in housing burden typically experienced by these renters (odds ratio of 1.286, significant at the 10% level). The propensity score matching analysis also suggests that renters who move into public housing have a higher likelihood of reporting improved health over the year compared to other renters with a similar likelihood of moving into public housing (difference of about 3 percentage points). However, this effect was not significant at the 10% level or higher.

Renters who moved into public housing or received a Section 8 voucher had lower health care expenditures (– \$70 and – \$78, respectively) after controlling for their other characteristics, but these effects are not statistically significant at the 10% level or higher.<sup>9</sup> The propensity score matching analysis shows even lower health care expenditures for renters who move into public housing (– \$141) but higher health care expenditures for renters who receive a Section 8 voucher (+ \$58). Yet these effects were not statistically significant at the 10% level or higher, meaning there may be no short-term benefit of receiving rental housing assistance for health care spending.

These findings suggest that moving into public housing may improve the health of low-income renters who have felt in poor health in the past, which is consistent with the findings of Fenelon et al. (2017). The lower and fixed housing costs experienced by renters moving into public housing do not help to explain this effect. Additional analysis using a larger sample is needed to more confidently establish the link between moving into public housing and changes in reported health, given the effect's marginal statistical significance. There is not enough evidence to suggest that assisted renters reap the benefit of lower health care spending shortly after receiving assistance; rather, this effect may arise in the long term.

## Discussion and Conclusion

The potential health benefits of rental housing assistance are relatively unexamined, despite current heated national conversations about health care provision and funding for social welfare programs, and growing awareness of the environmental determinants of health. This research has helped to fill this gap by using the SIPP to explore the link between rental housing assistance and health during the 2000s. The findings show two main benefits of assisted housing that health and housing advocates can use to justify and protect investments in national subsidized housing programs.

The first finding is that providing rental assistance to low-income households may lead them to have more efficient health care spending. Low-income renters assisted by the public housing or Section 8 voucher programs spent between \$167 and \$136 less on health care annually than unassisted low-income renters with similar characteristics did. These savings allow assisted renters to (a) better meet their other needs, such as transportation; (b) save to meet life goals, such as furthering their education or starting a business; and (c) more fully contribute in other ways to their local economy and the national economy, such as through other consumer spending.

The lower health care expenditures of Section 8 voucher holders are partly explained by their low, fixed housing costs. Having low, fixed housing costs leaves voucher holders with more money left over each month to pay for health care. Recent voucher recipients may be more likely to use surplus funds to address their pressing health concerns, potentially increasing their health care spending in the short term. However, the positive health benefits of having low, fixed housing costs on voucher holders' stress and time available to engage in preventative behaviors, such as exercise or cooking healthy meals, may eventually reduce their need to purchase health services, lowering their health care spending in the long-term.

The lower health care expenditures of public housing residents are not explained by existing theory. Public housing residents still have lower health care expenditures than other low-income renters do even after accounting for differences in their housing burdens, experiences of eviction, housing problems, and neighborhood conditions. Additional theory-building is needed to understand this link. One possibility is that public housing residents receive more informal social support than other renters, which helps to improve their health and lower their health care spending (Keene & Geronimus, 2011). However, public housing residents in the present sample were not statistically more likely to report

having supportive social networks nearby than were Section 8 voucher recipients or unassisted renters (see Table 1). Another possibility is that the denser, project-based nature of public housing assistance allows residents access to more supportive health services in their communities, which helps to lower their health care spending. SIPP does not collect data from participants on supportive community health services, so further research is required to test this theory. A final possibility is that public housing residents' lower health spending is a product of their unobserved differences from other low-income renters, such as greater resourcefulness.

The second valuable finding from this research is that moving into public housing may improve the health of low-income renters who are in poor health. Renters who moved into public housing had higher odds of reporting improved health compared to similar renters who did not move into public housing. This finding is consistent with the only other national study on the link between rental housing assistance and health (Fenelon et al., 2017). However, the effect observed in the present study was only significant at the 10% level after controlling for renters' shared characteristics, and was not statistically significant in the propensity score matching analysis, which compares renters with similar likelihoods of moving into public housing. Public housing residents' lower housing burdens do not help to explain this gain. It is important to further test this effect using a larger sample, and to explore the role of other theories, such as differences in housing stability and housing and neighborhood conditions. The release of the 2014 SIPP panel in the late 2010s will provide housing scholars an unprecedented opportunity to build a sample large enough to accomplish these tasks.

Our awareness of the environmental determinants of health is growing. Yet social inequalities in access to health-improving resources and in exposure to health-debilitating hazards persist. Poor people and persons of color are most at risk of experiencing poor health outcomes because of their social and environmental context (Braubach & Fairburn, 2010; Coburn, 2005). The findings from this research support the claim that social welfare programs can help to lessen longstanding health disparities. Housing policymakers may further health equity by protecting and expanding programs that provide rental housing assistance to poor people.

## Notes

1. About 90–98% of people living in subsidized housing were in a low-income family across the panels. About 62–68% of the total sampled people living in renter households were in a low-income family.
2. This method entails dividing household income by the square root of household size: Adjusted household income = household income/(household size<sup>0.5</sup>). This adjustment assumes that a two-person household only needs 1.414 times the income of a one-person household to be equally well off (Burkhauser & Larrimore, 2014).
3. This sample is smaller than the complete sample of original respondents who were low-income renters age 25 to 69 (26,073), because information on participants' experience of eviction and housing and neighborhood conditions was only gathered once during the 2001 and 2004 panels and not until several years into the panel, when some attrition had occurred. SIPP has relatively high attrition rates. About 20% of the original sample typically drops out during the course of the study period; about half of all attrition occurs between the first and second interviews (Van Hook & Glick, 2007). Information on eviction and housing and neighborhood conditions was gathered twice during the 2008 panel, but similarly not until several years in, after some attrition had occurred. The second set of 2008 observations on participants' housing and neighborhood conditions was excluded from the analysis to avoid over-weighting that panel's trends in the analysis.
4. This sample is larger than the first sample, because information on participants' health and housing costs was collected 3 times (once a year) during the 2001 and 2008 panels and 2 times (once a year) during the 2004 panels; information on receiving housing subsidies and demographic and socioeconomic conditions was collected every 4 months in all panels. Information on changes in participants' health and housing situation was available twice in the 2001 and 2008 panels and once in the 2004 panel.
5. Spending less money on health care was associated with better health among assisted and unassisted renters. Members of both groups who reported being in good health spent on average about \$100 less per year on health care than those who did not report being in good health (difference significant at the 5% level).
6. Most of the control variables were statistically associated with receiving public housing or a Section 8 voucher. Two exceptions were being Asian and working part time, which were categories of the variables race and employment status, respectively. Results from this stage of the propensity score matching analysis are available upon request.

7. The matching method was one-to-one matching with replacement. Abadie–Imbens standard errors are reported. The caliper is 0.02 standard deviations of the propensity score.
8. I used the Rosenbaum bounds method to assess how sensitive the estimated effects of having assisted housing on health spending were to potential hidden bias (see Rosenbaum, 2002). The analysis did not show evidence of overt hidden bias.
9. I tested interaction effects between housing burden and moving into public or Section 8 housing in unreported iterations of the model, but none of these effects was statistically significant at the 10% level or higher.

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## Disclosure Statement

No potential conflict of interest was reported by the author.

## Notes on Contributor

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## References

- Basolo, V. (2013). Examining mobility outcomes in the Housing Choice Voucher Program: Neighborhood poverty, employment, and public school quality. *Cityscape*, 15, 135–153.
- Bennett, G. G., McNeill, L. H., Wolin, K. Y., Duncan, D. T., Puleo, E., & Emmons, K. (2007). Safe to walk? Neighborhood safety and physical activity among public housing residents. *PLOS Medicine*, 4(10), 1599–1607.
- Bradley, E. H., & Taylor, L. A. (2013). *The American health care paradox: Why spending more is getting us less*. New York, NY: Public Affairs.
- Braubach, M., & Fairburn, J. (2010). Social inequities in environmental risks associated with housing and residential location—A review of evidence. *European Journal of Public Health*, 20(1), 36–42.
- Briggs, X. D. S., Popkin, S. J., & Goering, J. (2010). *Moving to Opportunity: The story of an American experiment to fight ghetto poverty*. New York, NY: Oxford University Press.
- Burkhauser, R. V., & Larrimore, J. (2014). Median income and income inequality: From 2000 and beyond. In J. Logan (Ed.), *Diversity and disparities: America enters a new century* (pp. 105–138). New York, NY: Russell Sage Foundation.
- Carlson, D., Haveman, R., Kaplan, T., & Wolfe, B. (2012). Long-term effects of public low-income housing vouchers on neighborhood quality and household composition. *Journal of Housing Economics*, 21, 101–120.
- Center on Budget and Policy Priorities. (2015). *Policy basics: Federal rental assistance*. Washington, DC: Author. Retrieved from <http://www.cbpp.org/research/housing/policy-basics-federal-rental-assistance>
- Centers for Disease Control and Prevention. (2016). *Childhood lead poisoning data, statistics, and surveillance*. Washington, DC: Author. Retrieved from <https://www.cdc.gov/nceh/lead/data/index.htm>
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94(Supplement), S95–S120.
- Coburn, J. (2005). Urban planning and health disparities: Implications for research and practice. *Planning, Practice, & Research*, 20(2), 111–126.
- Davis, K. (2015, July 14). To lower the cost of health care, invest in social services. *HealthAffairs Blog*. Retrieved from <http://healthaffairs.org/blog/2015/07/14/to-lower-the-cost-of-health-care-invest-in-social-services/>
- Fenelon, A., Mayne, P., Simon, A. E., Rossen, L. M., Helms, V., Lloyd, P., ... Steffen, B. L. (2017). Housing assistance programs and adult health in the United States. *American Journal of Public Health*, 107(4), 571–578.
- Fertig, A. R., & Reingold, D. A. (2007). Public housing, health, and health behaviors: Is there a connection? *Journal of Policy Analysis and Management*, 26(4), 831–860.
- Fletcher, J. M., Andreyeva, T., & Busch, S. H. (2009). Assessing the effect of changes in housing costs on food insecurity. *Journal of Children and Poverty*, 15(2), 79–93.

- Gauderman, W. J., Avol, E., Lurmann, F., Kuenzli, N., Gilliland, F., Peters, J., & McConnell, R. (2005). Childhood asthma and exposure to traffic and nitrogen dioxide. *Epidemiology*, *16*(6), 737–743.
- Jacob, B. A., Kapustin, M., & Ludwig, J. (2015). The impact of housing assistance on child outcomes: Evidence from a randomized housing lottery. *The Quarterly Journal of Economics*, 465–506.
- Joint Center for Housing Studies. (2014). *The state of the nation's housing*. Boston, MA: Author.
- Keene, D. E., & Geronimus, A. T. (2011). Community-based support among African American public housing residents. *Journal of Urban Health*, *88*(1), 41–53.
- Lee, W., Beecroft, E., Khadduri, J., & Patterson, R. (2003). *Impacts of welfare reform on recipients of housing assistance: Evidence from Indiana and Delaware*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- Leventhal, T., & Newman, S. (2010). Housing and child development. *Child and Youth Services Review*, *32*, 1165–1174.
- Maqbool, N., Viveiros, J., & Ault, M. (2015). *The impacts of affordable housing on health: A research summary*. Washington, DC: Center for Housing Policy.
- March, E. L., Cuba, S. E., Gayman, A., Cook, J., Frank, D. A., Meyers, A., ... Morton, S. (2009). *Rx for hunger: Affordable housing*. Boston, MA: Children's HealthWatch and Medical-Legal Partnership.
- McClure, K. (2010). The prospects for guiding Housing Choice Voucher households to high-opportunity neighborhoods. *Cityscape*, *12*(3), 101–122.
- Meltzer, R., & Schwartz, A. (2016). Housing affordability and health: Evidence from New York City. *Housing Policy Debate*, *26*(1), 80–104.
- Meyers, A., Cutts, D., Frank, D., Levenson, S., Skalicky, A., Heeren, T., & Zaldivar, N. (2005). Subsidized housing and children's nutritional status: Data from a multisite surveillance study. *Archives of Pediatrics & Adolescent Medicine*, *159*, 551–556.
- Newman, S. J., & Holupka, C. S. (2015). Housing affordability and child well-being. *Housing Policy Debate*, *25*(1), 116–151.
- Ohlin, B., Nilsson, P. M., Nilsson, J. A., & Berglund, G. (2004). Chronic psychosocial stress predicts long-term cardiovascular morbidity and mortality in middle-aged men. *European Heart Journal*, *25*(10), 867–873.
- Pollack, C. E., Griffin, B. A., & Lynch, J. (2010). Housing affordability and health among homeowners and renters. *American Journal of Preventive Medicine*, *39*(6), 515–521.
- Raugh, V. A., Landrigan, P. J., & Claudio, L. (2008). Housing and health: Intersection of poverty and environmental exposures. *Annals of the New York Academy of Science*, *1136*, 276–288.
- Robinette, J. W., Charles, S. T., Mogle, J. A., & Almeida, D. M. (2013). Neighborhood cohesion and daily well-being: Results from a diary study. *Social Science & Medicine*, *96*, 174–182.
- Robison, J., Schensul, J. J., Coman, E., & Diefenbach, G. J. (2009). Mental health in senior housing: Racial/ethnic patterns and correlates of major depressive disorder. *Aging & Mental Health*, *13*(5), 659–673.
- Roman, C. G., Knight, C. R., Chalfin, A., & Popkin, S. J. (2009). The relation of the perceived environment to fear, physical activity, and health in public housing developments: Evidence from Chicago. *Journal of Public Health Policy*, *30*(S1), S286–S308.
- Rosenbaum, P. R. (2002). *Observational studies*. New York, NY: Springer.
- Ross, L. M., Shlay, B., & Picon, M. G. (2012). You can't always get what you want: The role of public housing and vouchers in achieving residential satisfaction. *Cityscape*, *14*(1), 36–54.
- Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science*, *277*(5328), 918–924.
- Schwartz, A. F. (2015). *Housing policy in the United States* (3rd ed.). New York, NY: Routledge.
- Stone, M. E. (1993). *Shelter poverty: New ideas on housing affordability*. Philadelphia, PA: Temple University Press.
- U.S. Census Bureau. (2009). *Survey of income and program participation users' guide*. Revised chapters included as supplement to the Third Edition published in 2001. Washington, DC: Author. Retrieved from <http://www.census.gov/sipp/>
- U. S. Census Bureau. (2017). *SIPP 2008–2001 panel data*. Washington, DC: Author. Retrieved from: <https://www.census.gov/sipp/>
- Van Hook, J., & Glick, J. E. (2007). Immigration and living arrangements: Moving beyond economic need versus acculturation. *Demography*, *44*(2), 225–249.
- Varady, D. P., & Walker, C. C. (2000). Vouchering out distressed subsidized developments: Does moving lead to improvements in housing and neighborhood conditions? *Housing Policy Debate*, *11*(1), 115–162.
- World Health Organization. (2014). *Basic documents* (48th ed.). Geneva, Switzerland: Author. Retrieved from <http://apps.who.int/gb/bd/>