

Federal Housing Assistance Programs, Food Insecurity and Health Care Hardship among Children in the United States: Differences Across Rental Market Affordability Contexts

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Abstract

Food insecurity and health care hardship are pressing public health problems for families with children in the United States and may be exacerbated by a worsening rental housing affordability crisis that is most acute in urban areas. Federal housing assistance programs funded by the U.S. Department of Housing and Urban Development (HUD) may be a powerful tool for preventing these hardships among children. Yet, little is known about the impact of housing assistance on child food insecurity and health care hardship, or whether any impact of housing assistance on these outcomes is amplified in areas facing greater rental housing affordability problems. We used linked National Health Interview Survey data (1999–2018) and HUD administrative records (1996–2019) and multivariable regression models to compare children currently receiving HUD housing assistance with a pseudo-waitlist comparison group of children who entered HUD housing within two years. We further examined whether associations varied based on whether children resided in counties having “low,” “moderate,” or “severe” rent burden, and by HUD program type. Current HUD recipients had 28% lower odds of food insecurity and significantly lower odds of several health care hardship measures, including 19% lower odds of having any unmet health need due to cost. These relationships were largest in magnitude in areas with the most severe rent burden and for recipients of Housing Choice Vouchers. These findings suggest an income-driven association between housing assistance and child health and hardship, with potentially greater benefits in communities with the worst affordability problems.

Introduction

Food insecurity and health care hardship are persistent and widespread public health problems for families with children in the United States. In 2024, 18.4% (6.7 million) of households with children were food insecure, meaning that access to adequate food for these households was limited by a lack of money and other resources[1]. Likewise, an estimated 8.5% of Americans delay or forego needed medical care due to cost[2], meaning that millions of children reside in households that experience health care hardship, where they or another family member are unable to meet basic health needs because of financial constraints. These forms of material hardship, which are most acute for children in low-income families[3,4], have serious consequences for child health. Prior research links food insecurity with an array of adverse health outcomes among children including increased rates of asthma[5] and other chronic conditions[6,7], more frequent emergency department visits[5] and hospitalizations[8], and worse mental[5,9] and health status[5,8,9]. Health care hardship is also associated with worse health outcomes for children[10,11] and can have impacts that extend beyond childhood, with evidence that unmet health care needs during adolescence are associated with poor adult health outcomes[12].

The experiences of food insecurity and health care hardship are increasingly shaped by a growing rental housing affordability crisis in the U.S. Housing costs represent the single largest share of household budgets[13], and low-income families and children in the U.S. have been disproportionately affected by the increasing unaffordability of rental housing. The number of cost-burdened renter households paying > 30% of income towards rent has increased dramatically over the past two decades, reaching a high of 22.7 million households in 2024, including 83% of households with incomes below \$30,000[14]. Housing unaffordability restricts household spending on health-promoting goods and services and forces difficult tradeoffs between rent and other needs such as food, health care, and medicine[15], and prior research documents an association between housing cost burden and food insecurity and health care hardship[16,17]. Rental housing affordability challenges are most acute in large metropolitan areas, where 86% of low-income renters are cost-burdened, compared to around 70% in non-metropolitan areas [18], thus underscoring the particular salience of housing affordability as a driver of child health in urban communities.

In this context, federal low-income housing assistance programs funded by the U.S. Department of Housing and Urban Development (HUD) offer a potentially powerful policy tool to reduce experiences of food insecurity and health care

hardship and improve the population health of low-income children. Indeed, an emerging body of research points to the positive impacts of housing assistance on an array of child health outcomes[19–24], including reduced utilization of emergency and inpatient care[21], fewer missed school days due to illness[20], reduced odds of frequent ear infection[20], lower blood lead levels[22,23], and improved mental health[24].

However, while there is some evidence that HUD housing assistance is associated with reduced food insecurity and unmet health care needs among adults[25,26], no study has examined these associations for children, a limitation noted in a recent scoping review of studies examining the association between safety net programs and food insecurity[27]. Moreover, we lack even basic evidence about key factors that may amplify or attenuate the effects of HUD housing assistance on health outcomes, a gap in prior work that constrains policymakers' ability to design efficient, effective housing assistance and health policies. One such factor that is particularly important for cost-related outcomes such as food insecurity and health care hardship is local rental housing affordability, which varies considerably across communities in the United States: in the average county in 2021, 36.5% of renters were cost burdened (spending more than 30% of household budget on housing), but this ranged from a low of 0% to a high of 66.3%[28]. Thus, amidst significant variability in local rental housing affordability, a critical question for policymakers and public health advocates is whether health benefits resulting from HUD housing assistance accrue equally to families facing correspondingly varied budget constraints.

Theory suggests that the positive impact of HUD housing assistance on food insecurity and health care hardship—and consequently on overall child health—will be amplified in less affordable rental markets because the cost-related benefits of this assistance will be stronger in such areas. Low-income renters in less affordable areas dedicate proportionally more of their income towards rent[29], leaving fewer resources for food, medical care or other determinants of child health. Non-assisted poor households in areas with rising rents experience steeper increases in housing cost burden relative to those receiving HUD housing assistance[30]. Thus, federal housing assistance programs (which typically cap tenant payments at 30% of income) are likely to generate a stronger income effect in less affordable areas, and children in HUD-assisted households in these areas will experience larger reductions in food insecurity and health care hardship, and experience greater improvements in overall health.

In the present study, we address these gaps by assessing the overall relationship between HUD housing assistance, food security, health care hardship and overall child health and by examining differences in these relationships for children and members of their family across communities with different rental affordability contexts. We further examined whether any such differences are more pronounced for children in the Housing Choice Voucher Program as compared to HUD's project-based programs.

Methods

Data

We use a dataset linking responses from the nationally representative National Health Interview Survey (NHIS) for the period from 1999 to 2018 with HUD administrative records[31] from 1996 to 2019. The NHIS is the nation's largest public health surveillance study and the definitive source on the health of the U.S. non-institutionalized civilian population. The NHIS-HUD linkage allows for the identification of whether NHIS respondents were in HUD housing at the time of their interview or entered a HUD-subsidized program before or after the survey. The HUD data also indicate program type: the Housing Choice Voucher (HCV) program; the public housing (PH) program; and Multifamily (MF) programs. All three programs generally require tenants to pay 30% of their income toward rent, though the HCV program allows tenants to select a private-market rental unit, while MF and PH programs require tenants to reside in a

specific unit or development. To account for this difference and following prior research [20], we collapse PH and MF into a combined “project-based” program category.

Sample

In homes with children under 18, the NHIS collects detailed information on a randomly selected “sample child.” Our study includes all NHIS sample children (ages 0-17) from the 1999-2018 survey who were eligible for linkage with HUD administrative data and either current HUD housing assistance recipients (residing in HUD housing at the time of their NHIS interview) or future HUD housing assistance recipients (entered HUD-assisted housing within 2-years). The linked data included 177,637 linkage-eligible NHIS sample children, including 7,287 current and 3,262 future HUD housing assistance recipients. After excluding cases with missing data on one or more study variables (80 current; 43 future HUD recipients) the final analytic sample included 7,207 current (4,043 HCV and 3,164 project-based recipients) and 3,209 future (1,579 HCV and 1,450 project-based recipients) HUD housing assistance recipients.

Measures

Outcomes. Using the NHIS, we constructed measures capturing food security, health care hardship, and overall child health. Food insecurity and very low food security in the past 30 days were measured using the 10 adult-referenced items from the United States Department of Agriculture's food security module[4]. Though families experiencing very low food security also reduce food intake, skip meals, or go hungry, food insecurity is constructed to measure a household's inability to meet food needs because of limited money or other resources and is therefore similar to our measures of healthcare hardship. These items were added to the NHIS in 2011, and our analysis of these outcomes is based on 2011 to 2018. Following previous research[19,32], we defined health care hardship as an inability to meet basic health needs due to cost, measured using questions about whether in the prior 12 months a child had: delayed seeking medical care due to cost; or, needed but could not afford medical care, dental care, prescription medicines, and mental health care. We also constructed measures of whether any other member of a child's family delayed seeking medical care due to cost or needed but could not afford medical care in the prior 12 months. We likewise created a composite measure capturing whether a child or any member of their family experienced any of the foregoing unmet or delayed health needs due to cost. Overall health was based on parent-reported health status (fair or poor health vs. good, very good or excellent).

Independent variables. The key independent variable was an indicator of whether a child was a current (vs. future) HUD housing assistance recipient. We also created separate indicators for each HUD program type.

The share of cost-burdened renters (i.e. renter households who spend greater than 30% of their income on housing) is a commonly used metric to gauge community-level rental housing affordability [33] and we thus use the county-level share of this metric as our measure of local rental housing affordability. Additional details about the construction of this measure are available in the Appendix. We stratified children into three groups, based on whether their county of residence was in the lower, middle or top third of the distribution of the share of cost-burdened renters. We label these communities as having “low,” “moderate,” or “severe,” rent burden. In constructing these strata, we pooled all counties across all years of the study period; sensitivity analysis stratifying counties into affordability strata within years produced similar results.

Covariates. We obtained covariates from the NHIS paralleling those used in prior studies of HUD housing assistance and child health and including: child age; sex; race/ethnicity; family type; highest household level of education; employment status; Supplemental Nutrition Assistance Program (SNAP) receipt; health insurance status; household income; and Census region of residence.

Analysis

A key challenge in assessing the impact of HUD housing assistance on health is selection bias, as recipients tend to be worse-off in ways associated with assistance receipt and health. To address this concern and following previous work[20,24,25,34], we compare children currently receiving HUD assistance at the time of their NHIS interview with those entering HUD housing within two years. Because average wait times for HUD housing assistance averaged roughly two years during our study period[35], we follow prior research[20,24] and conceptualize these future entrants as a pseudo-waitlist comparison group that is likely similar to current recipients.

To execute this approach, we estimated binary logistic regression models for each outcome, first examining overall associations with HUD assistance while adjusting for county-level rent burden strata, then estimating separate models for each strata (low, moderate, severe rent burden). To examine heterogeneity by program type, we estimated parallel models comparing current versus future HCV and project-based housing recipients. All models adjusted for the previously described covariates and survey year and accounted for the complex survey design of the NHIS. Food security models adjusted for past-year SNAP receipt, and models examining self-reported health and health care hardship also controlled for health insurance status. Analyses used restricted HUD-NHIS data, accessed through the Census Research Data Center located at the National Bureau for Economic Research in Cambridge, MA.

Results

Descriptive analysis indicates that a slightly higher share of current vs. future HUD recipients received assistance from the HCV program (58.4% vs. 54.8%) versus project-based housing (41.7% vs. 45.2%). Current recipients were also more likely than future recipients to reside in counties with serious affordability problems (53.8% vs. 32.7%). Sociodemographic characteristics were generally similar between groups, though current recipients were slightly older, more likely to be in single-parent families, and less likely to have a working household member (Table 1). Families currently receiving assistance also had lower incomes on average than future recipients, although current recipients were more likely to receive SNAP benefits and to have health insurance. Unadjusted comparisons show current recipients had similar self-rated health as future recipients but were less likely to experience several types of health care hardship and food insecurity.

Any HUD Housing Assistance

In models including all counties (Figure 1, Appendix Table 1), receipt of any HUD housing assistance was not significantly associated with self-rated health, but current HUD housing assistance recipients had 28% lower odds of experiencing any food insecurity relative to future recipients ($p < .01$). HUD housing assistance was also associated with significantly lower odds of several health care hardship measures including delaying medical care due to cost (AOR = 0.64, $p < .01$), having any household member delay medical care due to cost (AOR = 0.82, $p < .05$), and needing but not being able to afford prescription medicines (AOR = 0.69, $p < .05$). When considering the composite health care hardship measure, children currently receiving any HUD housing assistance had 19% lower odds ($p < .01$) of having any unmet health need due to cost as compared to future HUD housing assistance recipients.

In models stratified by county-level rent burden, HUD housing assistance receipt was not significantly associated with any outcomes in low rent burden counties and was only significantly associated with reduced odds of delaying medical care due to cost in counties with moderate rent burden. In counties with severe rent burden, however, receipt of HUD housing assistance was associated with a 34% reduction in the odds of experiencing any food insecurity. Similarly, HUD housing assistance was significantly associated with lower odds of multiple forms of health care hardship in these counties, including having any household member delay medical care due to cost (AOR = .71, $p < .01$) or needing,

but not being able to afford medical care (AOR = 0.67, $p < .001$), and a child needing but not being able to afford prescriptions (AOR = 0.56, $p < .01$). Overall, in counties with severe rent burden, children currently receiving HUD assistance had 31% lower odds of any unmet health need due to cost as compared to future HUD housing assistance recipients ($p < .01$). Although the coefficients in the models estimated for the severe rent burden strata were consistently in the expected direction and of larger magnitude than for the other strata, in supplementary pooled models, interaction terms between rental affordability strata and HUD assistance receipt were not statistically significant and we cannot conclude that the association between HUD assistance and our outcomes differs significantly across strata.

Individual HUD Program Types

Results comparing current to future HCV recipients were similar to those examining any HUD assistance: current HCV recipients had significantly lower odds of food insecurity and very low food security than future HCV recipients. HCV receipt was also associated with significantly lower odds of having a family member delay medical care due to cost, needing but not being able to afford prescriptions, and having any unmet need due to cost (Figure 2, Appendix Table 2). In stratified models, HCV receipt was not significantly associated with any outcomes among children in counties with low or moderate rent burden. However, children in counties with severe rent burden who received HCV assistance had 42% lower odds of experiencing both any food insecurity and very low food security relative to future HCV recipients. Similarly, among children residing in counties with severe rent burden, HCV receipt was associated with lower odds of several of health care hardship measures (having any member of a child's family delay medical care due to cost, a child or a member of their family needing but not being able to afford medical care, needing but not being able to afford prescriptions), and a 30% reduction in the odds of having any unmet health care need due to cost.

Findings were less consistent in the project-based housing assistance models. Across all counties, residing in HUD project-based housing was associated with lower odds of delaying medical care due to cost, needing but not being able to afford medical care, and needing but not being able to afford mental health care (Figure 3, Appendix Table 3). In the stratified models, receipt of project-based housing assistance in a low rent burden county was associated with a nearly threefold increase in the odds of a child being in fair/poor health but also a 93% reduction in odds of needing but not being able to afford mental health care. In counties with moderate rent burden, children currently receiving project-based housing assistance had significantly lower odds of delaying care due to cost and needing but not being able to afford medical care. In counties with severe rent burden, project-based housing assistance was associated with significantly lower odds of a child having fair/poor self-rated health, needing but not being able to afford mental health care and having any unmet health need due to cost.

Discussion

This study used national survey data merged with HUD administrative data to assess the relationship between federal housing assistance receipt and child health and hardship, examining whether impacts were more or less pronounced in areas with higher or lower rent burden and whether results varied by program. To our knowledge, ours is the first to use these linked administrative data to examine child health care hardship (joining previous analyses of adults) and is the first to examine whether the benefits of federal housing assistance vary by local rental market affordability. In general, we found that receipt of housing assistance was associated with reductions in the odds of household food insecurity, and with reductions in the odds that children or their families delayed care due to cost or needed but could not afford care, with reduced odds of needing but being unable to pay for prescriptions or experiencing any unmet medical need. Our additional analyses suggest that these relationships may be particularly pronounced in areas with the most severe rent burden and for HCV recipients, though we cannot rule out similar effects in areas with lower rent burden.

These findings have both important theoretical and applied implications. First, and consistent with our expectations, our findings – significant decreases in food insecurity and health care hardship only in areas with the most severe affordability problems - strongly suggest that receipt of housing assistance impacts child health via an income effect. That is, because federal housing assistance typically caps tenant payments at 30% of household income, it frees up resources for other basic needs like health care, an effect we identify only in areas where housing is most expensive and the benefit is therefore most valuable. Our results further suggest that receipt of Housing Choice Vouchers drives these results in the most cost-burdened counties.

Beyond these conceptual contributions, our findings point to the potential value of targeting assistance to areas with the worst affordability problems and/or varying tenant contributions to reflect local conditions. However, and given that only a fraction of currently eligible households receive federal housing assistance[36], the most natural conclusion of our results is to expand the scope of HUD assistance, with a particular emphasis on expansion of the HCV program first to areas with the greatest need.

Our finding of reduced food insecurity for all recipients, and especially for voucher holders in areas with severe cost burden, is particularly novel. Unlike prior work[26] linking HUD administrative data with the National Health and Nutrition Examination Study (NHANES), which found only project-based housing was associated with reduced food insecurity, we found that HCV use was associated with an approximate 40% reduction in the odds of both food insecurity and very low food security among children overall and in the most cost-burdened areas. These findings speak to the potential value of housing assistance as a tool to counter food insecurity and highlight the dire trade-offs faced by the low-income families of children eligible for these benefits.

There are several limitations to our study that bear mentioning. First, while the study benefited from highly reliable data on housing assistance receipt, all outcomes were based on survey responses and thus subject to usual concerns about bias and misreporting. Additionally, while our approach of comparing current and future HUD recipients addresses a major source of endogeneity, our findings might nonetheless be subject to selection bias. However, our use of robust controls and consistency with the approaches of other recent analyses using these data lend confidence to our approach and findings.

As rental housing affordability challenges intensify nationwide, our study provides evidence that can guide policy decisions about how current HUD housing assistance resources—and any future expansions—can be allocated most efficiently. We find that HUD assistance reduces the likelihood of children experiencing cost-related barriers to health care and food insecurity, consistent with the idea that lowering housing costs enables families to afford basic needs and supports child health. This relationship appears to be particularly pronounced in areas with the most severe housing affordability problems, suggesting that targeting or tailoring assistance to these communities may produce the largest impacts on child health.

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Table

Table 1-Characteristics of current and future child recipients of HUD housing assistance

	Current HUD recipients (n = 7,207)	Future HUD recipients (n = 3,209)
Type of Assistance		
Housing Choice Voucher	58.3	54.8
Project-based	41.7	45.2
County-Level Rental Housing Affordability Strata		
Limited affordability problems	12.5	34
Moderate affordability problems	33.7	33.3
Serious affordability problems	53.8	32.7
Age category		
Less than 2	7.9	18.8
2 to 5	25.2	26.9
6 to 12	44.8	38.2
13 to 17	22.1	16.1
Sex		
Female	49.9	48.0
Male	50.1	52.0
Race/ethnicity		
Non-Hispanic White	21.5	26.4
Non-Hispanic Black	49.7	47.4
Non-Hispanic other race	7.6	6.4
Hispanic, any race	21.2	19.8
Family Type		
Married/partnered parents	36.9	50.9
Single parent	63.1	49.1
Household highest level of education		
Less than high school	25.0	24.2
High school/GED	33.9	36.6
More than high school	41.1	39.2
Household employment		
No worker in household	40.9	31.6
Worker in household	59.1	68.4

Receiving SNAP		
Yes	77.2	67
No	22.5	32.6
Unknown	0.3	0.3
Health insurance status		
Has insurance	95.9	91.8
No insurance	3.9	7.9
Unknown	0.2	0.3
Income (mean (SD))	17839.9 (19183.8)	21269.7 (21378.9)
Region	19.6	19.6
Northeast	19.6	19.6
Midwest	23.9	21.7
South	40.8	43.5
West	15.7	15.2
Sample Child		
Fair/poor self-rated health	4.7	4.8
Delayed medical care due to cost	2.7	5.2
Needed but couldn't afford medical care	1.9	3.6
Needed but couldn't afford dental care ^a	6.4	8.4
Needed but couldn't afford mental health care ^a	1.5	1.8
Needed but couldn't afford prescriptions ^a	3.7	5.9
Had any unmet health need due to cost	26.5	34.9
Member of household		
Delayed medical care due to cost	16.6	21.4
Needed but couldn't afford medical care	16.4	19.5
Any food insecurity^b	28.7	32.9
Very low food security^b	12.9	14

NOTES: "Current recipients" includes those who were receiving HUD assistance at the time of their response to the National Health Interview Survey. "Future recipients" includes those who received HUD housing assistance within twenty-four months of responding to the National Health Interview Survey. a-Only asked for children years age 2-17; b-Only asked in the National Health Interview Survey from 2011-2018

Figures

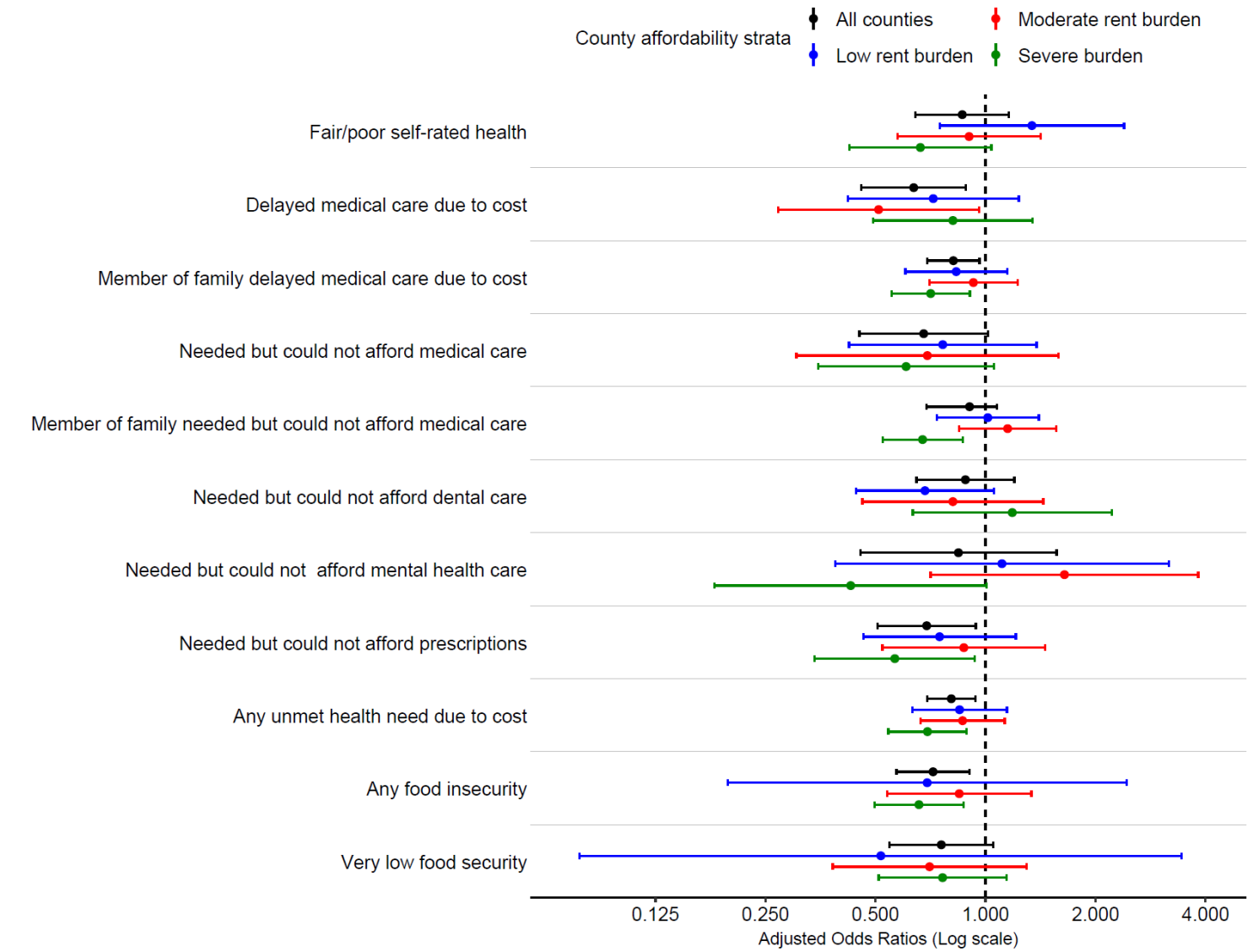


Figure 1

Adjusted Associations Between Receipt of any HUD housing assistance and Child Health, Healthcare Hardship, and Household Food Insecurity, Results for All Counties and Stratified by Housing Affordability

NOTES: All odds ratios adjusted for child age, sex, race/ethnicity, family type, highest household level of education, employment status, household income, Census region of residence and survey year. Odds ratios for models examining self-reported health and health care hardship also adjusted for health insurance status, and odds ratio for any food insecurity and very low food security models adjusted for past-year receipt of benefits from the Supplemental Nutrition Assistance Program (SNAP). Analysis of following outcomes only included children ages 2-17: Needed but couldn't afford dental care, Needed but couldn't afford mental health care, Needed but couldn't afford prescriptions. Food insecurity and very low food security outcomes were only included in the National Health Interview Survey starting in 2011, and models for these outcomes only include respondents to the 2011-2018 National Health Interview Survey.

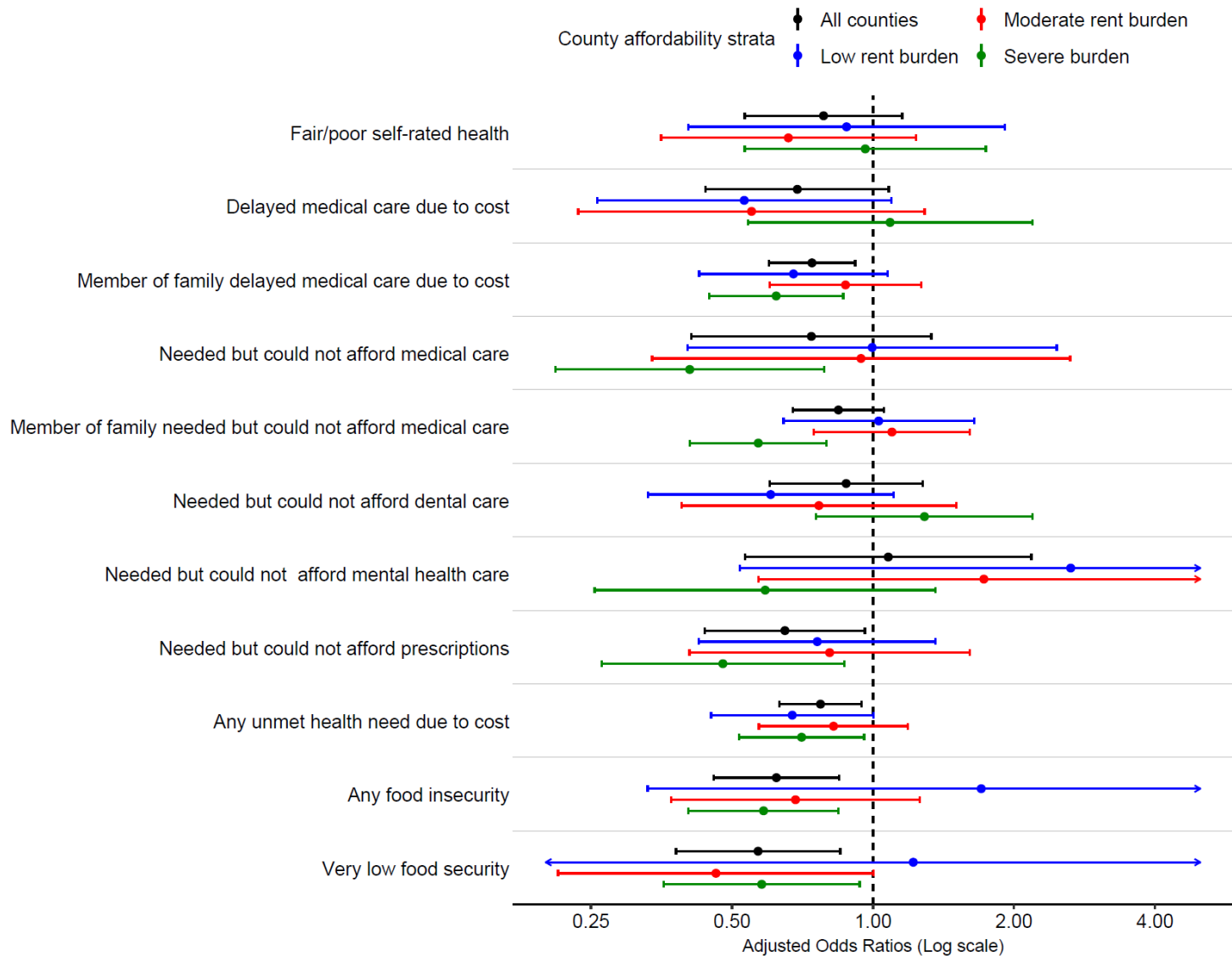


Figure 2

Adjusted Associations Between Housing Choice Voucher Receipt and Child Health, Healthcare Hardship, and Household Food Insecurity, Results for All Counties and Stratified by Housing Affordability

NOTES: All odds ratios adjusted for child age, sex, race/ethnicity, family type, highest household level of education, employment status, household income, Census region of residence and survey year. Odds ratios for models examining self-reported health and health care hardship also adjusted for health insurance status, and odds ratio for any food insecurity and very low food security models adjusted for past-year receipt of benefits from the Supplemental Nutrition Assistance Program (SNAP). Analysis of following outcomes only included children ages 2-17: Needed but couldn't afford dental care, Needed but couldn't afford mental health care, Needed but couldn't afford prescriptions. Food insecurity and very low food security outcomes were only included in the National Health Interview Survey starting in 2011, and models for these outcomes only include respondents to the 2011-2018 National Health Interview Survey.

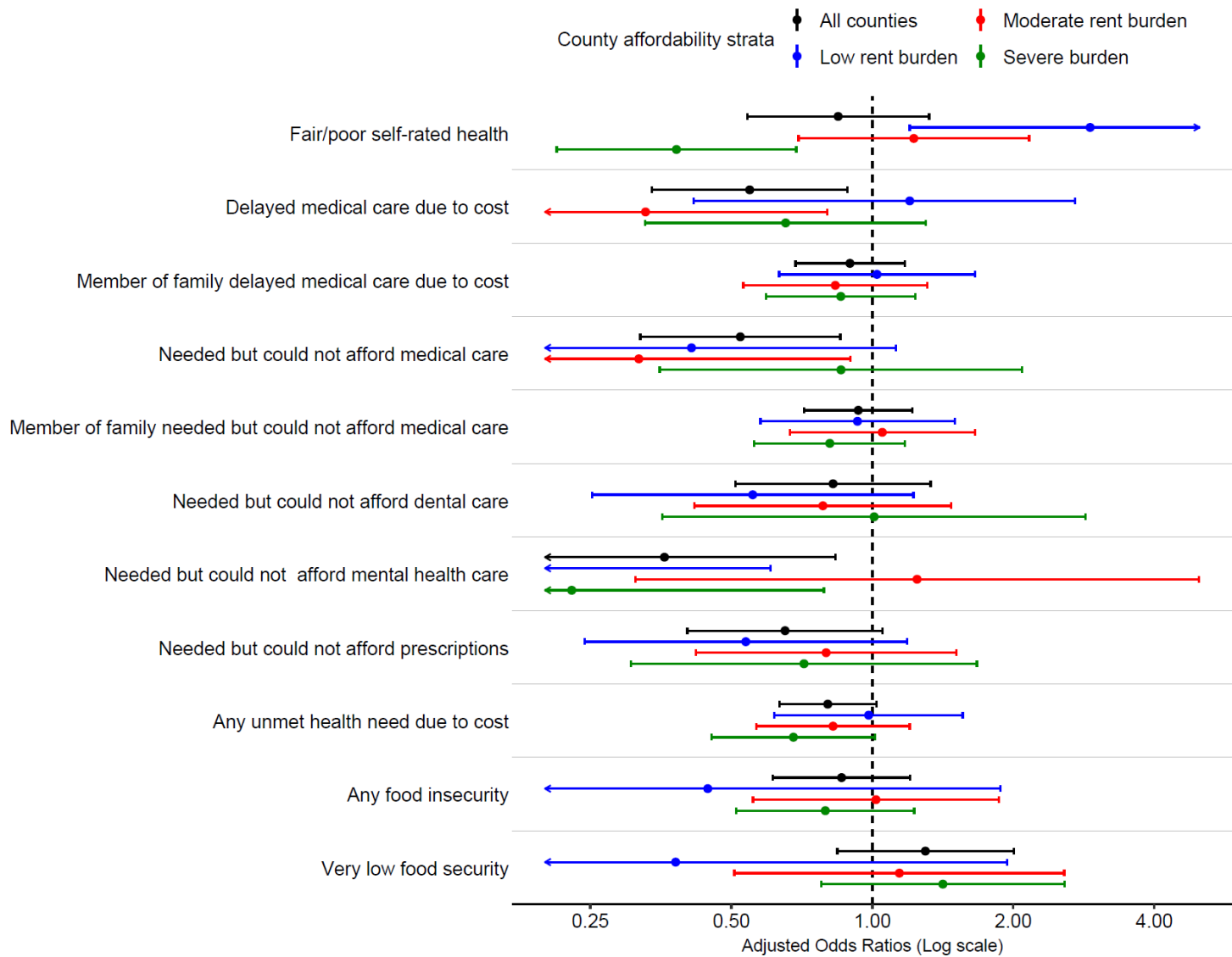


Figure 3

Adjusted Associations Between Receipt of Project-Based Housing Benefits and Child Health, Healthcare Hardship, and Household Food Insecurity, Results for All Counties and Stratified by Housing Affordability

NOTES: All odds ratios adjusted for child age, sex, race/ethnicity, family type, highest household level of education, employment status, household income, Census region of residence and survey year. Odds ratios for models examining self-reported health and health care hardship also adjusted for health insurance status, and odds ratio for any food insecurity and very low food security models adjusted for past-year receipt of benefits from the Supplemental Nutrition Assistance Program (SNAP). Analysis of following outcomes only included children ages 2-17: Needed but couldn't afford dental care, Needed but couldn't afford mental health care, Needed but couldn't afford prescriptions. Food insecurity and very low food security outcomes were only included in the National Health Interview Survey starting in 2011, and models for these outcomes only include respondents to the 2011-2018 National Health Interview Survey.

Supplementary Files

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