

Appendix

Appendix to Introduction

The Public Housing (PH) program category included the Public Housing program and Moving To Work Demonstration Program.(1)

The Housing Choice Vouchers Program (HCV) category included Section 8 Moderate Rehabilitation Programs, Section 8 Housing Choice Vouchers, Homeownership Vouchers, Section 8 Project-Based Vouchers (PBV) program, Project-Based Certificate program, Section 8 Rental Certificate Program, and Moving To Work Demonstration Programs. (1)

The Multifamily Housing Program (MF) category included Project-based Section 8, Section 221(d)(3) Below Market Interest Rate (BMIR) Multifamily Housing, Section 236 Multifamily Housing, Section 236 Rental Assistance Program (RAP), Project-based Section 8 Assistance for Multifamily Housing, Section 202 Housing for the Elderly Program, Section 202 with 162 Assistance—Project Assistance Contract (PAC), Section 811 Supportive Housing for People with Disabilities, and the Rent Supplement Program.(1)

Appendix to Methods

National Health Interview Survey design and HUD data collection

The National Health Interview Survey is a nationally representative, cross-sectional, multistage sample, population health survey of the civilian noninstitutionalized population conducted annually by the National Center for Health Statistics. In this study, nine years of National Health Interview Survey data were pooled for greater stability of estimates. The data for this study were largely obtained from the survey's Sample Adult component. Within each household, a sample adult 18 years of age or older was selected to answer questions about their health status, health care services, and behaviors. The unconditional response rates during 2004-2012 for the Sample Adult component ranged from 60.8% in 2010 to 72.5% in 2004.(2)

Data from HUD are collected by local public housing authorities, private building owners, and managers of apartment buildings. Administrative information collected includes dates of enrollment and participation, basic demographic characteristics, and detailed income information for each household member.(1) Data for the Public Housing and Housing Choice Vouchers program categories were collected via the Public & Indian Housing Information Center, which is responsible for maintaining and gathering data about all public housing authorities' housing, participants, and transactions.(1) Data from Multifamily Housing program categories were collected through the Tenant Rental Assistance Certification System which collects and maintains certified tenant data from owners and managements agents of Multifamily Housing projects.(1)

Within the National Health Interview Survey, informed consent for data linkage is sought at the time of the survey, but it is not specific to any particular administrative data source or sources because new data linkages may happen many years after the survey is conducted. Survey participants were not specifically asked if the National Center for Health Statistics could link their data to HUD administrative data at the time of the survey, and as a result they could not refuse to be linked to HUD administrative data. The National Center for Health Statistics Research Ethics Review Board used the survey question (*[Are you/Is anyone in your family] paying lower rent because the Federal, State, or local government is paying part of the cost?*) as a proxy to a question about linking to HUD administrative data. This question was asked at the family-level and only to families that were renters. The percentage of families that refused (among all in the National Health Interview Survey) was under 1% in all years, ranging from 0.15% in 2011 to .89% in 2006.

Dependent Variables

Questions used for determination of whether the respondent had insurance include:

Question Text: *What kind of health insurance or health care coverage {do/does} {person} have? INCLUDE those that pay for only one type of service (nursing home care, accidents, or dental care). EXCLUDE private plans that only provide extra cash while hospitalized.*

Medicaid

- 1: Mentioned
- 2: Not mentioned
- 7: Refused
- 8: Not ascertained
- 9: Don't know

(Medicaid probe: *There is a program called Medicaid that pays for health care for persons in need. In this state it is also called [state name]. {Are/Is} {person} covered by Medicaid?*

- 1: Yes
- 2: No
- 7: Refused
- 8: Not ascertained
- 9: Don't know)

State Children's Health Insurance Program

- 1: Mentioned
- 2: Not mentioned
- 7: Refused
- 8: Not ascertained
- 9: Don't know

State-sponsored health plan

- 1: Mentioned
- 2: Not mentioned
- 7: Refused
- 8: Not ascertained
- 9: Don't know

Private

- 1: Mentioned
- 2: Not mentioned
- 7: Refused
- 8: Not ascertained
- 9: Don't know

Military health care

- 1: Mentioned
- 2: Not mentioned

- 7: Refused
- 8: Not ascertained
- 9: Don't know

Other government program

- 1: Mentioned
- 2: Not mentioned
- 7: Refused
- 8: Not ascertained
- 9: Don't know

Medicare

- 1: Mentioned
- 2: Not mentioned
- 7: Refused
- 8: Not ascertained
- 9: Don't know

(Medicare probe: *people covered by Medicare have a card that looks like this. {Are/Is} {person} covered by Medicare?*)

- 1: Yes
- 2: No
- 7: Refused
- 8: Not ascertained
- 9: Don't know

Questions used for determination of whether respondent had a usual source of care:

- 1) Question Text: *Is there a place that you USUALLY go to when you are sick or need advice about your health?*

Place USUALLY go when sick

- 1: Yes
- 2: There is NO place
- 3: There is MORE THAN ONE place
- 7: Refused
- 8: Not ascertained
- 9: Don't know

- 2) Question Text: *[If AUSUALPL = 1] What kind of place is it - a clinic, doctor's office, emergency room, or some other place? [Else, if AUSUALPL = 3] What kind of place do you go to most often - a clinic, doctor's office, emergency room, or some other place?*

Place to go when sick (most often)

- 1: Clinic or health center
- 2: Doctor's office or HMO

- 3: Hospital emergency room
- 4: Hospital outpatient department
- 5: Some other place
- 6: Doesn't go to one place most often
- 7: Refused
- 8: Not ascertained
- 9: Don't know

Questions used for determination of whether respondent had unmet need for care due to cost:

- 1) Question Text: *DURING THE PAST 12 MONTHS, has medical care been delayed for {person} because of worry about the cost? (Do not include dental care)*
Has medical care been delayed for - - (cost), 12m
 - 1: Yes
 - 2: No
 - 7: Refused
 - 8: Not ascertained
 - 9: Don't know

- 2) Question Text: *DURING THE PAST 12 MONTHS, was there any time when {person} needed medical care, but did not get it because {person} couldn't afford it?*
Did - - need and NOT get medical care (cost), 12m
 - 1: Yes
 - 2: No
 - 7: Refused
 - 8: Not ascertained
 - 9: Don't know

- 3) Question Text: *DURING THE PAST 12 MONTHS, was there any time when you needed any of the following, but didn't get it because you couldn't afford it? Prescription medicines*
Can't afford prescription medicine, past 12 m
 - 1 Yes
 - 2 No
 - 7 Refused
 - 8 Not ascertained
 - 9 Don't know

- 4) Question Text: *DURING THE PAST 12 MONTHS, was there any time when you needed any of the following, but didn't get it because you couldn't afford it? Mental health care or counseling*
Can't afford mental health care/counseling, 12 m
 - 1 Yes
 - 2 No
 - 7 Refused
 - 8 Not ascertained
 - 9 Don't know

- 5) Question Text: *DURING THE PAST 12 MONTHS, was there any time when you needed any of the following, but didn't get it because you couldn't afford it? Dental care (including check-ups)*
Can't afford dental care, past 12 m
 - 1 Yes

- 2 No
- 7 Refused
- 8 Not ascertained
- 9 Don't know

Similar to others that have combined across medical areas to create a single measure of unmet need in general (3-5), we combine across medical areas to create one single measure of delay or non-receipt of care due to cost and for brevity, we refer to this measure as “unmet need due to cost” (yes/no). Any affirmative answer to a question listed above concerning delay or non-receipt of care categorized that respondent as having unmet need due to cost. Respondents for whom answers of “no” or “don’t know” were obtained, or when no answer was obtained, were categorized as not having unmet need due to cost.

Main Independent Variable

We compare those currently receiving assistance to those who will receive assistance within 24 months, but have not yet received it (future assistance). This compares individuals currently receiving HUD housing assistance to a control group of our best estimate of those on the waiting list to receive HUD housing assistance. We considered using an indicator in the HUD administrative data identifying those actually on the waitlist, but there were multiple disadvantages to this approach. First, waitlist times were not available for participants in the Multifamily Housing program category. Second, missing rates for waitlist data were > 18% across Housing Choice Vouchers and Public Housing programs. Finally, concerns about the validity of the waitlist data exist(1). Therefore, the comparison group of those who will receive assistance within 24 months was used for all programs.

Housing Assistance Definition

Assistance is referred to generally as “housing assistance” in this study because the Housing Choice Vouchers program includes some people who were part of a homeownership assistance program. However, in this study, only 0.3% of those currently receiving assistance as part of the Housing Choice Vouchers program were part of this homeownership program. Therefore, this study overwhelmingly refers to rental assistance programs.

Covariates

Covariates included National Health Interview Survey survey-year, age (18-24, 25-44, and 45-64 of age at time of NHIS interview), sex, and race/ethnicity (non-Hispanic white, non-Hispanic black, non-Hispanic other/multiple race, Hispanic), highest level of education in household (less than high school, high school diploma or GED, greater than high school), family size (1,2,3, ≥4), US Census region (northwest, midwest, south, west) and family income as a percent of the federal poverty level (%FPL) (<50%, 50-<100%, 100-<200%, ≥200%). Additionally, we controlled for health characteristics, including: self-rated health status (excellent/very good, good, fair/poor), number of chronic physical conditions (hypertension, diabetes, coronary heart disease, previous stroke, history of cancer, chronic obstructive pulmonary disease, asthma, renal disease, hepatic disease, arthritis)(6, 7), and serious psychological distress as measured by scores ≥ 13 on the Kessler-6 questionnaire.(8, 9)

Appendix to Discussion

Sensitivity Analyses

We considered the possibility of heterogeneity within our future group, such that some members of the group may not be similar to those in the current assistance group. Specifically, we considered that our results for uninsurance could be due to a possible “Ashenfelter’s dip”.(10) Ashenfelter’s dip is a pre-program-entry decline in income prior to enrollment in job training and adult education programs.(10) Although it has not been shown to exist for HUD housing assistance(11), if such an income decline existed, it could lead to enrollment in both HUD and Medicaid. It is possible that those in the future assistance group might have yet to experience a decline in income (due to job loss

or other factors) that would then make those people eligible for both HUD and for Medicaid. Under this scenario, uninsured people would experience an income decline that would be responsible for enrollment in HUD and potentially also for the increase in insurance rates observed. To some extent, income declines due to job losses might also result in declines in the percentage of people insured, which would act in the opposite direction.

Support for the Ashenfelter's dip hypothesis includes the observed greater income levels in the future assistance group compared to the current group. However, this hypothesis is not consistent with our findings for unmet need due to cost. Although a decline in income could lead to an increase in public insurance coverage, which in turn, could lead to reduced unmet need, we found that insurance only explained some of the effect of HUD-assisted housing on unmet need due to cost (see below). Reductions in income would not likely reduce unmet need due to cost from pathways other than gaining health insurance. Furthermore, a previous study found no evidence of a dip in income prior to receiving HUD housing assistance.(11)

We believe that differences in income between the future group and the current assistance group may be due to sampling variation. Some amount of sampling variation is inherent in national surveys, and observed differences between subgroups can be due to chance. Nonetheless, we cannot rule out the possibility that people in the future assistance group have yet to experience a decline in income, as noted above. To account for this difference between groups in the analysis, we have controlled for income, which limits the comparison to groups of people in equal income categories.

Differences in age between the current and future groups were also observed. Those in the current assistance group were slightly older, on average than those in the assistance group. Again, sampling variation may be responsible for differences between the groups. However, another possible explanation may be that people receiving housing assistance age during their stay in the program, and often stay in the program for a prolonged period. Indeed, data from 2015 suggest that the mean time since moving into HUD assisted housing for those receiving HUD housing assistance was 8.75 years.(12) Nevertheless, we have controlled for age, to limit the comparison to those within equal age categories.

Our comparison between the future assistance group and the current group is based upon the idea that those on the waitlist for HUD are likely similar to those currently receiving HUD housing assistance, as they likely only differ from those in HUD based upon having not yet received HUD housing assistance. However, waitlist times were not available for participants in the Multifamily Housing program category, and missing rates for waitlist data were > 18% across Housing Choice Vouchers and Public Housing programs. Furthermore, there were concerns about the accuracy and comprehensiveness of the waitlist entry dates. As a result, the waitlist data were not used as our main analysis because of missingness, validity concerns, and the greatly decreased sample sizes, and hence limited statistical power. Instead, we used a 2-year window as a substitute for the waitlist, based upon the average waitlist time for those receiving HUD benefits.

We conducted several analyses to assess the robustness of our findings. First, we examined the possibility of heterogeneity within the future assistance group by comparing those in the future assistance group for whom there was an indication in the HUD administrative data that they were on the waitlist (n= 403) to those in the future assistance group that did not appear to be on the waitlist (non-waitlist) (n=208). For this analysis, only those in Housing Choice Vouchers and Public Housing were included, as data for Multifamily Housing program waitlists are missing. Distributions of observed variables across the waitlist vs. non-waitlist were largely similar across the variables of interest (Appendix Exhibit 5). The only exception was that family size was somewhat smaller in the non-waitlist group (p=0.01). Largely, the two groups looked very similar, suggesting that the future assistance group as a whole does not appear to differ from the waitlist group in terms of observed variables. Because family size did not appear to impact the main analysis (data not shown), this difference was unlikely to impact our results.

We conducted a second sensitivity analyses that compared those currently receiving HUD housing assistance to those in the future assistance group who are currently on the waiting list for HUD. This analysis was conducted only for findings that were significant in our main analysis to determine whether heterogeneity within the future assistance group might account for our findings. Specifically, we considered whether a potential drop in income prior to being placed on the waitlist might both create eligibility for the waitlist and for Medicaid insurance. Again,

this analysis was limited to those in Housing Choice Vouchers and Public Housing programs, as above. Despite the limited statistical power from the reduced sample sizes of the group with waitlist data (n=403) and limiting the concurrent group to Housing Choice Vouchers and Public Housing programs (n=2,394), we were able to examine the directionality of the effects to determine whether they were similar to the main analysis. If there was an income dip prior to actual entrance onto the waiting list, the effect on insurance would disappear and the effect on unmet need due to cost would likely increase.

In this analysis, as expected, due to greatly reduced sample sizes, the confidence intervals around the waitlist group were greater than those for the future assistance group in the main analysis (Appendix Exhibit 6). As a result of reduced statistical power, the difference between the groups was no longer statistically significant, but the directionality and magnitude of the effects were similar to the main results for both measures. In adjusted analyses, the effect for insurance was 0.2 percentage points larger and 3.1 percentage points smaller for unmet need due to cost. These results would suggest that only a small portion of the results for insurance could be attributed to differences between those on the waitlist and those not on the waitlist. The results for unmet need due to cost did not increase, as would be expected under this scenario, providing support for an alternative explanation for our results.

Finally, we considered additional sensitivity analyses. We used propensity score weighted models to balance observed variables between groups, to further address potential selection bias between the future and current groups. Because the groups were already well-balanced with respect to observed variables, results were nearly identical to the main analysis and hence are not presented. Models were also run specifying survey year as a categorical, rather than continuous variable, but results were again similar to the main analysis and are not presented.

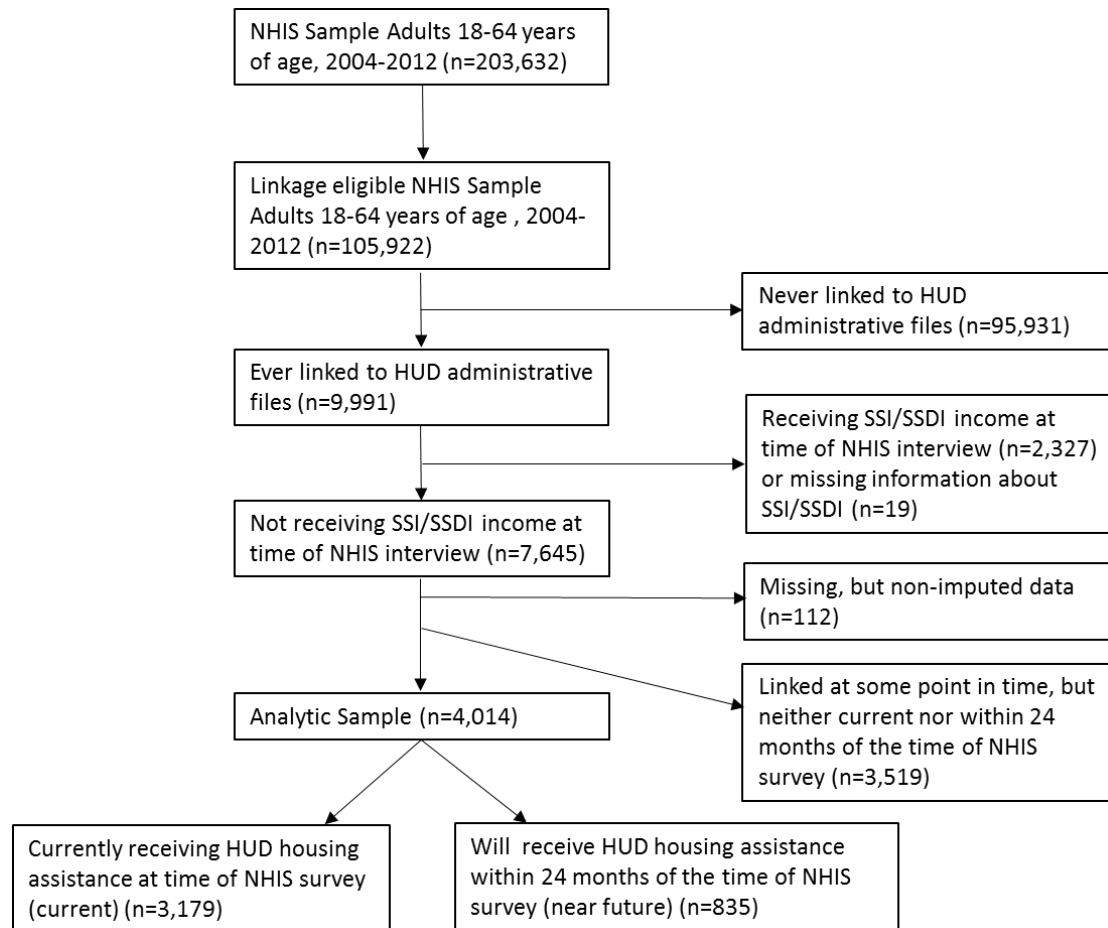
Furthermore, we examined the impact of employment status on our models. Employment status can be an important factor in obtaining health insurance. However, it may be on the causal pathway between obtaining HUD housing assistance and obtaining insurance. That is, as a result of receiving HUD housing assistance and hence, stable housing, some people may newly be able to obtain employment, which may result in obtaining health insurance. To test whether it may be on the causal pathway, we entered it into our models for unmet need due to cost and insurance status. However, this did not change our estimates for the effects of unmet need due to cost or insurance status (or any other variable). This suggests that, for the HUD population, employment is not a strong mediator or a confounder of the relationship between HUD assistance and either insurance or unmet need for care due to cost. This is consistent with previous research that suggests that low-wage employees often are not able to obtain health insurance through their employers.(13)

Finally, we further examined the observed relationship between HUD housing assistance and insurance. Although the total effect showed greater insurance among the current assistance group, we further examined whether the effect of HUD assistance on public insurance and private insurance differed. In unadjusted analyses, 53.6% (SE: 1.3%) of the current assistance group had public insurance compared to 41.8% (SE: 2.2%) of the future group (p<0.01 for difference). However, 15.8% (SE: 0.9%) of current assistance group had private insurance compared to 21.8% (SE: 1.9%) of the future group (p<0.01 for difference). This suggests that the overall increase in insurance observed was due to an increase in public insurance, and that some of the increase in public insurance may be offset by a decrease in private insurance. Because private insurance would be most likely gained through employment, this is consistent with our analysis above which suggests that employment did not appear to be on the causal pathway between HUD assistance and insurance. It is also consistent with previous research that has suggested, as stated above, that low-wage employees often are not able to obtain health insurance through their employers.(13) Furthermore, it is consistent with some previous research that has suggested little impact of HUD on employment.(11, 14)

Appendix Exhibits

Appendix Exhibit 1:

Caption: Inclusion and exclusion criteria



Source/Notes: SOURCE [Authors analysis of 2004-2012 National Health Interview Survey linked with 2002-2014 HUD administrative data.] NOTES [NHIS—National Health Interview Survey; SSI—Supplemental Security Income; SSDI—Social Security Disability Insurance]

Appendix Exhibit 2: Insurance type among those with and without receipt of Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI), adults 18-64 years of age, United States, 2004-2012

	SSI/SSDI Receipt (SE)	No receipt of SSI/SSDI (SE)
Insurance Type		
Private	4.7 (0.6)	16.8 (0.8)
Medicare	45.3 (1.5)	3.2 (0.4)
Medicaid	47.8 (1.5)	45.9 (1.1)
Other	0.8 (0.3)	2.3 (0.3)
Uninsured	1.3 (0.3)	31.7 (1.0)

SE—Standard Error

Appendix Exhibit 3: Characteristics of adults 18-64 years of age currently receiving HUD housing assistance and receiving HUD housing assistance in the future, by type of HUD program (public housing, housing choice vouchers, and multifamily housing), 2004-2012, United States.

	Public housing (SE) (n=993)	Housing choice vouchers (SE) (n=2,012)	Multifamily housing (SE) (n=1,009)	Total (SE) (n=4,014)
Currently receiving HUD housing assistance	70.8 (2.9)	77.9 (1.3)	71.6 (2.7)	74.6 (1.1)
Receiving HUD housing assistance within 24 months	29.2 (2.9)	22.2 (1.3)	28.5 (2.7)	25.4 (1.1)
Sociodemographic variables				
Age groups				
18-24 years	30.9 (2.0)	24.7 (1.3)	34.1 (2.1)	28.5 (1.0)
25-44 years	41.4 (1.8)	55.3 (1.4)	43.1 (2.0)	49.0 (1.0)
45- 64 years	27.7 (1.8)	20.0 (1.1)	22.9 (1.9)	22.5 (0.9)
Sex				
Male	27.9 (1.7)	22.1 (1.3)	24.3 (1.7)	24.0 (0.9)
Female	72.1 (1.7)	77.9 (1.3)	75.7 (1.7)	76.0 (0.9)
Race/ethnicity				
Non-Hispanic white	24.2 (2.3)	28.7 (1.6)	38.1 (3.6)	30.0 (1.4)
Non-Hispanic black	47.8 (2.8)	46.8 (1.6)	39.0 (3.1)	45.1 (1.4)
Non-Hispanic other and multiracial	4.8 (1.4)	4.0 (0.7)	2.8 (0.6)	3.9 (0.5)
Hispanic	23.3 (2.3)	20.5 (1.2)	20.1 (2.1)	21.1 (1.0)
Highest level of education in family				
Less than high school	22.9 (1.6)	17.7 (0.9)	21.8 (1.6)	20.0 (0.7)
High school/GED	36.8 (1.9)	35.4 (1.3)	38.8 (1.9)	36.6 (0.9)
More than High School	40.3 (2.0)	46.9 (1.4)	39.4 (1.9)	43.4 (1.0)
Family Income as a percent of FPL				
0 - <50%	27.4 (2.0)	26.8 (1.1)	31.6 (2.1)	28.2 (0.9)
50% - <100%	27.6 (1.9)	30.7 (1.3)	24.7 (1.7)	28.4 (0.9)
100% - <200%	25.2 (1.6)	28.1 (1.3)	25.4 (1.6)	26.7 (0.9)
≥ 200	19.7 (1.8)	14.4 (1.2)	18.4 (2.2)	16.8 (0.9)
Family Size				
1	15.1 (1.2)	12.2 (0.8)	19.3 (1.4)	14.7 (0.6)
2	22.2 (1.5)	20.2 (1.1)	25.3 (1.7)	22.0 (0.8)
3	21.2 (1.5)	24.3 (1.1)	22.6 (1.5)	23.1 (0.8)
4+	41.5 (2.0)	43.4 (1.4)	32.8 (1.9)	40.2 (1.0)
Region				
Northeast	26.3 (4.2)	18.9 (1.4)	16.3 (3.1)	20.1 (1.5)
Midwest	20.9 (3.1)	23.8 (1.6)	36.7 (5.6)	26.3 (1.9)
South	40.6 (4.1)	37.2 (1.7)	37.1 (4.7)	38.0 (1.7)
West	12.2 (4.4)	20.0 (1.5)	9.9 (1.9)	15.6 (1.4)

Health				
Serious psychological distress				
Yes	9.8 (1.2)	9.8 (1.0)	10.6 (1.4)	10.0 (0.6)
No	90.2 (1.2)	90.2 (1.0)	89.4 (1.4)	90.0 (0.6)
Number of chronic physical conditions				
0	49.7 (2.1)	53.0 (2.4)	54.5 (2.2)	52.6 (1.1)
1	26.1 (1.9)	26.0 (1.2)	23.1 (1.5)	25.3 (0.9)
2-3	20.2 (1.8)	16.6 (1.0)	18.6 (2.0)	17.9 (0.8)
4+	4.0 (0.8)	4.5 (0.8)	3.7 (0.7)	4.2 (0.5)
Health status				
Excellent/very good	42.5 (2.3)	44.7 (1.5)	46.5 (2.2)	44.6 (1.1)
Good	32.5 (2.2)	33.9 (1.4)	31.5 (1.8)	33.0 (1.0)
Fair/poor	25.1 (1.8)	21.4 (1.2)	22.0 (1.9)	22.5 (0.9)

SE—Standard Error

%FPL—Percent of Federal Poverty Level

Appendix Exhibit 4: Unadjusted and adjusted percentages (and 95% confidence intervals) of uninsurance, not having a usual source of care, and unmet need due to cost for receiving HUD housing assistance in the future (within 24 months) vs. currently among adults 18-64 years of age, 2004-2012, United States

	Unadjusted	Adjusted [†]
Percent uninsured		
Currently receiving HUD housing assistance (Ref)	30.3 (28.1-32.4)	31.8 (28.2-35.5)
Receiving HUD housing assistance in the future	36.0 (31.8-40.2)**	37.2 (32.7-41.7)**
Difference ^{††}	5.7 (1.2 – 10.3) **	5.3 (0.8 – 9.8) **
Percentage not having a usual source of care		
Currently receiving HUD housing assistance (Ref)	23.9 (21.8-26.0)	24.0 (21.9-26.0)
Receiving HUD housing assistance in the future	25.5 (21.7-29.3)	25.0 (21.5-28.6)
Difference ^{††}	1.7 ((-2.6) – 6.0)	1.0 ((-3.1) - 5.1)
Percentage having a delay or non-receipt of needed medical, mental, specialist, prescription drugs, or dental health care (unmet need due to cost)		
Currently receiving HUD housing assistance (Ref)	40.4 (37.7-43.1)	40.0 (37.6-42.3)
Receiving HUD housing assistance in the future	46.2 (42.0-50.3)**	47.8 (43.9-51.7)***
Difference ^{††}	5.8 (0.8 – 10.8) **	7.9 (3.2 – 12.6)***

[†]Adjusted model includes program type (public housing, housing choice vouchers, multifamily housing), survey year, sociodemographic variables (age, sex, race/ethnicity, highest level of family education, family size, US Census region, and family income as a percent of FPL), and health status variables (serious psychological distress, number of chronic physical conditions, self-reported health status).

^{††}Due to rounding, adjusted differences may differ from those calculated from estimates in the adjusted percentage column.

** P<0.05 compared to reference of currently receiving HUD housing assistance.

*** P<0.01 compared to reference of currently receiving HUD housing assistance.

Source: Authors analysis of 2004-2012 National Health Interview Survey linked with 2002-2014 HUD administrative data.

Appendix Exhibit 5: Characteristics of adults 18-64 years of age receiving HUD housing assistance in the future (within 24 months), by survey waitlist status

	On Waitlist (n=403)	Not on Waitlist (n=208)
Housing assistance type		
Public housing	36.6 (3.4)	40.6 (4.4)
Housing choice vouchers	63.4 (3.4)	59.4 (4.4)
Multifamily housing		
Sociodemographic variables		
Age groups*		
18-24 years	32.8 (3.3)	34.6 (4.2)
25-44 years	48.0 (3.3)	43.2 (3.9)
45- 64 years	20.2 (2.1)	23.2 (3.8)
Sex		
Male	26.1 (2.9)	28.4 (4.0)
Female	73.9 (2.9)	71.6 (4.0)
Race/ethnicity		
Non-Hispanic white	26.6 (3.0)	30.3 (3.9)
Non-Hispanic black	49.3 (3.3)	46.5 (4.0)
Non-Hispanic other and multiracial	3.1 (1.0)	2.8 (1.5)
Hispanic	20.9 (2.7)	20.4 (3.6)
Highest level of education in family		
Less than high school	21.7 (0.9)	20.3 (1.7)
High school/GED	35.2 (1.2)	35.3 (2.2)
More than High School	37.7 (1.2)	36.3 (2.2)
Family income as a percent of FPL		
0 - <50%	23.8 (2.5)	24.9 (3.4)
50% - <100%	27.5 (2.8)	22.4 (3.4)
100% - <200%	26.8 (2.7)	25.9 (3.6)
≥ 200%	21.9 (3.0)	26.8 (4.4)
Family Size**		
1	9.3 (1.4)	20.2 (2.8)
2	20.3 (2.5)	22.5 (3.4)
3	21.4 (2.6)	20.2 (3.4)
4+	49.1 (3.4)	37.1 (4.2)
Region*		
Northeast	22.6 (3.1)	15.5 (3.2)
Midwest	19.2 (2.6)	30.0 (4.1)
South	43.5 (3.3)	41.6 (4.3)
West	14.7 (2.5)	12.8 (2.6)
Health		
Serious psychological distress		
Yes	10.2 (2.0)	12.1 (2.8)
No	89.8 (2.0)	87.9 (2.8)

Number of chronic physical conditions		
0	56.3 (3.2)	54.4 (4.3)
1	22.3 (2.6)	19.7 (3.0)
2-3	16.7 (2.4)	24.0 (3.8)
4+	4.6 (1.2)	1.9 (1.0)
Health status		
Excellent/very good	46.9 (3.4)	45.1 (4.3)
Good	32.8 (3.2)	34.7 (4.2)
Fair/poor	20.3 (2.6)	20.2 (3.1)

*p-value <0.10 from Chi-square test of the difference in the distributions of each variable between those currently on waitlist and those not on waitlist among those who will receive HUD housing assistance in the future.

**p<0.05

SE—Standard Error

%FPL—Percent of Federal Poverty Level

Appendix Exhibit 6: Unadjusted and adjusted percentages (and 95% confidence intervals) of uninsurance, and unmet need due to cost for those on waitlist for receiving HUD housing assistance vs. currently receiving HUD housing assistance among adults 18-64 years of age, 2004-2012, United States

	Unadjusted	Adjusted [†]
Percent uninsured		
Currently receiving HUD housing assistance (Ref)	30.3 (27.9-32.8)	32.6 (29.0-36.2)
On waitlist for receiving HUD housing assistance	34.5 (28.3-40.7)	38.6 (32.2-45.1)*
Percentage having a delay or non-receipt of needed medical, mental, specialist, prescription drugs, or dental health care due to cost (unmet need due to cost)		
Currently receiving HUD housing assistance (Ref)	40.2 (37.3-43.2)	42.9 (39.3-46.6)
On waitlist for receiving HUD housing assistance	44.7 (39.3-50.1)	48.0 (41.7-54.3)

[†]Adjusted model includes program type (public housing and housing choice vouchers), survey year, sociodemographic variables (age, sex, race/ethnicity, highest level of family education, family size, US Census region, and family income as a percent of FPL, and health status variables (serious psychological distress, number of chronic physical conditions, self-reported health status).

*P<0.10 compared to reference of currently receiving HUD housing assistance

References to Online Appendix

1. Lloyd PC, Helms VE. NCHS-HUD Linked Data: Analytic Considerations and Guidelines. In: Epidemiology DoHaHS-NCfHS-OoAa, editor. Hyattsville, Maryland: National Center for Health Statistics; 2016.
2. Division of Health Interview Statistics; National Center for Health Statistics. 2012 National Health Interview Survey (NHIS) Public Use Data Release; NHIS Survey Description Hyattsville, MD2013 [Available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NHIS/2012/srvydesc.pdf.
3. Federal Interagency Forum on Child and Family Statistics. America's Children: Key National Indicators of Well-Being, 2015: Access to Care Washington, DC: DC: U.S. Government Printing Office; 2015 [Available from: <http://www.childstats.gov/americaschildren/special5.asp>.
4. Hoilette LK, Clark SJ, Gebremariam A, Davis MM. Usual source of care and unmet need among vulnerable children: 1998-2006. *Pediatrics*. 2009;123(2):e214.
5. Newacheck PW, Hughes DC, Hung YY, Wong S, Stoddard JJ. The unmet health needs of America's children. *Pediatrics*. 2000;105(4 Pt 2):989-97.
6. Ward BW, Schiller JS. Prevalence of multiple chronic conditions among US adults: estimates from the National Health Interview Survey, 2010. *Preventing chronic disease*. 2013;10:E65.
7. Ward BW, Schiller JS, Goodman RA. Multiple chronic conditions among US adults: a 2012 update. *Preventing chronic disease*. 2014;11:E62.
8. Andrews G, Slade T. Interpreting scores on the Kessler Psychological Distress Scale (K10). *Aust N Z J Public Health*. 2001;25(6):494-7.
9. Aldworth J, R. CJ, Foster M, Heller D, Novak S. 2004 National Survey on Drug Use and Health: Serious Psychological Distress Report. In: Substance Abuse and Mental Health Services Administration USDoHaHS, editor. Resesarch Triangle Park, NC: RTI International; 2005.
10. Heckman JJ, Smith JA. The Pre-Programme Earnings Dip and the Determinants of Participation in a Social Programme. Implications for Simple Programme Evaluation Strategies. *The Economic Journal*. 1999;109(July):313-48.
11. Newman S, Holupka C, Harkness J. The Long-term effects of housing assistance on work and welfare. *Journal of Policy Analysis and Management*. 2009;28(1):81-101.
12. U.S Department of Housing and Urban Development. Picture of Subsidized Housing: 2015 Based on 2010 Census. 2016 [Available from: <https://www.huduser.gov/portal/datasets/picture/yearlydata.html>.
13. Long SH, Marquis MS. Low-wage workers and health insurance coverage: can policymakers target them through their employers? *Inquiry*. 2001;38(3):331-7.
14. Wood M, Turnham J, Mills G. Housing Affordability and Family Well-Being: Results from the Housing Voucher Evaluation. *Housing Policy Debate*. 2008;19(2):367-412.