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Federal rental assistance and housing outcomes among disability households: Cost burden relief without health or housing quality gains

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ABSTRACT

Background: Housing is a key social determinant of health, particularly for people with disabilities who face compounded challenges related to affordability, accessibility, and housing quality. Despite the aims of federal rental housing assistance to alleviate these issues, little is known about its association with the health and housing conditions of disability households at the national level.

Objective: To assess disparities in health, housing quality, and housing insecurity between rental households with and without a person with a disability, and to examine whether federal rental housing assistance is associated with these disparities.

Methods: We analyzed data from the 2023 American Housing Survey, focusing on renter households with or without household members with disabilities. Weighted descriptive statistics and logistic regressions (with marginal effects and predicted probabilities) were used to examine associations between disability status, housing assistance, and multiple health and housing indicators.

Results: Households with members with disabilities were significantly more likely to report poor health, housing quality issues, and affordability challenges. For all households, federal rental assistance was associated with lower levels of affordability concern and housing cost burden, but was not associated with health and quality gaps. Interaction terms revealed a more mixed picture as rental assistance was associated with some but not all health disparities for households that included a person with a disability.

Conclusion: Federal rental housing assistance provides partial but insufficient support for households with disabilities. To promote health equity, policy efforts must extend beyond affordability to address structural deficiencies in housing quality, accessibility, and broader determinants of health for people with disabilities.

1. Introduction

Housing is a fundamental social determinant of health and, as such, can play an important role in the health of people with disabilities. For people with disabilities, housing remains a deeply constrained domain, characterized by intersecting challenges related to affordability, quality, accessibility, and systemic exclusion. Although federal rental housing assistance aims to mitigate housing-related hardship, little is known about how such assistance functions at the intersection of disability, health, and housing quality on a national scale.

People with disabilities experience disproportionately high rates of poverty and economic precarity; with disability strongly associated with lower income, underemployment, and greater housing cost burden.[1] People with disabilities may therefore struggle to afford quality housing. Research consistently documents the link between substandard housing conditions and adverse health outcomes, including cardiovascular disease, respiratory illness, and poor mental health[2–5]. These risks are compounded for people with disabilities in the absence of access to affordable, accessible, and safe housing.[6] While previous studies, such as Meschede et al.[7] and Trivedi et al.,[8] show that disability is associated with persistent housing disadvantage, there is a pressing need to understand the role of rental assistance in ameliorating the intersecting burdens faced by people with disabilities.

The present study examines the association between disability, federal rental housing assistance, and a set of housing insecurity and health-relevant housing conditions using newly available nationally representative data. To address the intersecting burdens of disability, affordability, and housing conditions, this study tests a focused set of questions among renting households. We answer whether households that include a person with a disability is associated with higher risks across health

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and housing domains. Further, we investigate whether receipt of federal rental assistance is associated with lower affordability strain, improved housing conditions, and better health for these households.

2. Literature review

Whether renting or owning, housing tenure has a significant impact on residential outcomes for people with disabilities and is a crucial factor in understanding their housing experiences.[9] Renting households that include members with disabilities face particularly severe challenges, as they are more likely to have low incomes and experience "worst-case housing needs", paying an excessive portion of income on housing costs while often living in inadequate conditions.[10,11] Housing cost burden, defined as paying more than 30% of household income for housing, disproportionately affects renters, especially those with disabilities.[12,13] The housing affordability crisis is dire for people with disabilities, often putting them at greater risk of eviction and homelessness.[14]

People with disabilities are disproportionately represented within federal rental housing assistance programs such as public housing, Housing Choice Voucher, or multi-family housing.[15,16] To be eligible to participate in these programs, individuals must apply, meet specific low-income and low-asset eligibility requirements, and typically wait for extended periods (often years) before participation can occur due to limited government program capacity.[17,18] Although participating in these programs helps with housing affordability, there's limited research on whether using federal rental housing assistance is linked to better housing quality, security, and most importantly, health and safety outcomes for people with disabilities compared to people without disabilities or people with disabilities who do not avail of federal housing assistance.

Housing extends beyond shelter, representing a crucial social determinant of health that can either promote well-being or increase vulnerability to disease.[19,20] For people with disabilities, housing shapes health outcomes by influencing safety, independence, and community integration. These health outcomes may be impacted by a number of factors: housing affordability (cost) affects stress levels and ability to afford other necessities; physical characteristics of housing units (conditions) influence exposure to environmental hazards; stability of housing tenure (consistency) impacts continuity of care; and neighborhood characteristics (context) determine access to amenities and social support networks. Thus, housing can and often acts as a "health capital",[20] with particular significance for individuals with disabilities who may require specific accommodations to maintain optimal health and functioning.

Substandard housing conditions directly compromise health outcomes. Inadequate kitchen and plumbing facilities contribute to poor health outcomes among disabled adults.[21] Environmental hazards disproportionately and more broadly affect those in inadequate housing [22–24]. Specific conditions such as dampness and mold lead to respiratory problems,[25] overcrowding increases infectious disease transmission,[22] and unaffordable housing forces families to forgo adequate nutrition and healthcare.[26] Beyond physical health, poor housing quality is also linked to depressive symptoms in persons with disabilities, although this impact can be mitigated by residence type and access to community resources.[27] Conversely, access to stable and affordable housing is directly linked to improved health outcomes for people with disabilities with housing [28]associated with lower rates of uninsurance and unmet medical needs among adults.[15,28] This bidirectional relationship between housing and health for people with disabilities necessitates integrated solutions that address housing accessibility and affordability to optimize health outcomes.

Given the literature review presented above, we have three research questions: (1) whether renter households that include a person with a disability (PWD) have higher odds of adverse health, housing quality, and affordability outcomes than non-PWD renter households; (2) whether receipt of rental assistance is associated with lower odds of adverse housing outcomes; and (3) whether the assistance association differs by disability status. Correspondingly, we hypothesize that PWD households will have higher odds of adverse health outcomes; housing assistance will be associated with lower odds of adverse outcomes, most reliably for housing affordability and, where markets permit, for health-relevant housing conditions; and housing assistance will attenuate the disability penalty.

3. Methods

3.1. Data

This study utilizes public-use data from the 2023 American Housing Survey (AHS). The "integrated sample" includes a representative sample of the nation, a representative oversample of each of the 15 largest metropolitan areas, and a representative oversample of HUD-assisted housing units.[29] The AHS surveys the heads of households and provides comprehensive data on housing quality, costs, and characteristics nationwide. Along with the core modules asked during every iteration of the survey, the 2023 survey randomly selected houses and simultaneously responded to questions on housing security and health and safety characteristics as part of topical modules asked for the first time in 2023.[30] The AHS data also includes regular and replicate weights for the whole sample as well as split weights for different modules.[31] As recommended by the AHS, we use Fay's variation of the balanced repeated replications method to account for the weight.[31,32]

Our analysis uses a subset of data, excluding respondents identifying as homeowners, for a targeted examination of rental housing dynamics and challenges specific to renter populations. Our analytical sample includes 19,799 unweighted rental households, representing approximately 44,960,336 weighted rental households nationally. Among these, 6120 (10,923,694) households reported having at least one member with a disability, coded in the paper as "disability households." The remaining 13,679 (34,036,642) respondents represented households without any member with a disability, coded as "non-disability households."

3.2. Measures

The analytical dataset combines measures from core and topical modules of the 2023 AHS. In our analysis, we examine three key domains of outcomes: 1) Health and safety characteristics, 2) Housing quality; 3) Housing insecurity. First, the health and safety domain includes our key focal measure on self-perceived health quality, dichotomized into excellent/good and poor/fair health. Other dichotomized measures under the health and safety domain include a composite sleep quality measure (on eight sources of sleep disturbances: yes/no), drinking water safety (yes/no), and air quality (excellent/good vs. fair/poor rating), all available from the Group 2 module of the survey. Second, the housing quality domain includes dichotomized measures on upkeep problems (less than three vs. three or more upkeep problems), water leakage (no leakage vs. leakage reported indoor or outdoor), uncomfortable temperature (cold and hot) (yes/no), and two composite measures indicating presence of pests (no signs vs. more than few times in last 12 months) and mold problems (yes/no) from the core module of the survey. Finally, the housing insecurity domain has dichotomized measures on housing unaffordability (no difficulty vs. a little to very difficult) and high housing costs (housing costs more than 50% of income: yes/no) from the Group 1 module of the survey.

The two key measures used in our analysis as independent dichotomized variables are availability of federal rental housing assistance (receiving HUD housing assistance or part of Housing Choice Voucher Program vs. all other households) and disability status of the household as indicated by the presence (disability household) or absence (non-disability household) of any person with a disability in the household.

The AHS uses the same set of six questions as used in the American Community Survey (ACS) to inquire about the disability status of the householder and other members of the household.[33] Disability is defined as having an ambulatory, cognitive, independent living, self-care, sensory, or vision limitation and is inquired by asking the householder "Now thinking about everyone in your household …".[34] Understanding whether disability-related health disparities are smaller among rental assistance recipients versus non-recipients directly informs whether federal housing programs are achieving their equity objectives, regardless of the causal pathway, which a four-group comparison allows us to do.

Our analysis also includes a series of control measures capturing key demographic, geographic, and housing characteristics. Race and ethnicity (White Non-Hispanic, Black Non-Hispanic, Hispanic, Two or More Races Non-Hispanic, Asian Non-Hispanic, Other Races Non-Hispanic), gender (Male, Female), marital status (Married, Single), and age categories (Under 24, 25–34, 35–44, 45–54, 55–64, 65+) are at the householder level. At the household level, we included geographic controls encompassing metropolitan area classification (15 largest metropolitan areas, other metropolitan areas, non-metropolitan areas) and U.S. Census division (nine divisions across the United States). We also included the federal poverty level range (below 100% FPL, 100–200% FPL, above 200% FPL) and used cost burden (housing cost less than 50% of income or more than 50% of income). To control for house characteristics, our analysis includes measures indicating building type (mobile home/trailer, one-family detached, one-family attached, 2 apartments, 3–4 apartments, 5 or more apartments, boat/RV/van), and unit size (categorical measure of square footage). Detailed variable construction and the naming schema are available in Appendix A.

3.3. Analytical approach

3.3.1. Descriptive

To assess disparities between rental households with and without members with disabilities, we compared key demographic and housing characteristics in Table 1 and the housing outcome indicators in Table 2. Both Tables 1 and 2 include weighted cross-tabulations to calculate column percentages to compare distributions between non-disability and disability households. All analyses were conducted on complete cases, excluding observations with missing values. Variables with statistically significant differences ($p < .05$) between disability groups were highlighted for further examination in subsequent logistic regression models.

3.3.2. Logistic regression

Table 3 examines the relationship among disability status, federal rental housing assistance, and various housing outcomes. Using appropriate survey weights, we conducted weighted logistic regression analyses using the "survey" package (4.4-2)[35] in R(4.3.3). Regression models included disability status and housing assistance as predictors, including the interaction of both the disability status and housing assistance, while controlling for demographics and housing characteristics. Using complete-case analysis, we estimated adjusted odds ratios (aOR) and average marginal effects (AME) with 95% confidence intervals for each model using the "marginaleffects" package for R.[36] We also tested multicollinearity with variance inflation factors (VIF). We calculated predicted probabilities based on the regressions, presented in Table 4. Our analysis did not reveal any concerning patterns due to missing data; hence, we did not take any additional measures to account for missingness. We also conducted a similar analysis on a subsample of our data, focusing only on households with PWD who received or did not receive housing assistance (see Appendix B).

4. Results

As evident in Table 1, in 2023, disability households were over three times more likely to receive rental housing assistance (20.3%) compared to non-disability households (6.3%) ($p < .001$). Regarding demographic characteristics, disability households had a higher proportion of White, Non-Hispanic household heads (56.5% vs 46.0%, $p < .001$) and were more likely to be female-headed (60.7% vs 51.0%, $p < .001$). The age distribution was markedly different, with disability households skewing older - 60.0% of these households were headed by individuals aged 55 or older, compared to just 23.3% of non-disability households ($p < .001$). Geographically, disability households were less likely to be located in the 15 largest metropolitan areas (29.9% vs 39.3%) and more likely to be in non-metropolitan areas (14.7% vs 9.1%) ($p < .001$). Perhaps most notably, disability households faced substantially greater economic challenges, with 34.7% living below the federal poverty level compared to 17.7% of non-disability households ($p < .001$).

Table 1
Comparison of household characteristics by household disability status 2023 American Housing Survey (weighted N = 44,960,336).

Variable	No disabled members	Any disabled members	*p*-value
	Weighted N = 34036642	Weighted N = 10923694	
	Weighted %	Weighted %	
Receive rental housing Assistance			***
No assistance	93.70%	79.70%	
Receives assistance	6.30%	20.30%	
Race/Ethnicity (household head)			***
White, Non-Hispanic	46.00%	56.50%	
Black, Non-Hispanic	20.80%	20.70%	
Hispanic	23.30%	16.50%	
Other Races	2.10%	2.40%	
Asian, Non-Hispanic	6.80%	2.70%	
Multiple Races	1.10%	1.20%	
Sex (household head)			***
Male	49.00%	39.30%	
Female	51.00%	60.70%	
Marital Status			***
Married	28.00%	21.00%	
Single	72.00%	79.00%	
Age (household head)			***
Less than 24 years old	9.40%	3.90%	
25 to 34	28.70%	10.80%	
35 to 44	22.50%	12.00%	
45 to 54	16.00%	13.40%	
55 to 64	12.50%	22.40%	
65 and older	10.80%	37.60%	
Geographic Location			***
In 15 largest metropolitan areas	39.30%	29.90%	
In other metropolitan areas	51.60%	55.40%	
In non-metropolitan areas	9.10%	14.70%	
Federal Poverty Level			***
More than 200% of FPL	62.60%	37.00%	
Between 100% and 200% of FPL	19.70%	28.20%	
Below 100% of FPL	17.70%	34.70%	

Notes.
p represents results from Chi square test of association.
*=<0.05; **=<0.01; ***=<0.001.
NS = Not Significant.

Table 2
Differences in self-reported health and housing quality indicators **between rental households** by household disability status
American Housing Survey (weighted *N* of rental households = 44960336).

Variable	No disability	Any disability	p-value
	Weighted N = 34036642	Weighted N = 10923694	
	Weighted %	Weighted %	
Health and Safety			
Poor health	9.40%	41.40%	***
Poor sleep quality	18.10%	29.50%	***
Unsafe drinking water	12.30%	16.10%	***
Poor air quality	9.50%	14.50%	***
Housing Quality			
Upkeep problems	2.60%	6.20%	***
Water leakage	14.70%	22.20%	***
Uncomfortably cold	7.90%	14.40%	***
Uncomfortably hot	12.30%	18.80%	***
Pest problems	22.90%	30.40%	***
Mold present	4.00%	8.20%	***
Housing Insecurity			
Unaffordable	36.90%	42.90%	***
High housing costs	18.90%	25.10%	***

Notes.
p represents results from Chi square test of association.
*=<0.05; **=<0.01; ***=<0.001.
NS = not significant.

Table 2 compares measures of health and safety, housing quality, and housing insecurity between households that include and exclude a person with a disability. Broadly, results indicate significant disparities between disability and non-disability households across nearly all measured variables. More specifically, disability households reported substantially higher rates of poor/fair health (41.4% vs 9.4%, $p < .001$), poor sleep quality (29.5% vs 18.1%, $p < .001$), unsafe drinking water (16.1% vs 12.3%, $p < .001$), and poor air quality (14.5% vs 9.5%, $p < .001$). Housing quality measures showed similar patterns, with disability households experiencing a significantly higher prevalence of upkeep problems (6.2% vs 2.6%, $p < .001$), water leakage (22.2% vs 14.7%, $p < .001$), having uncomfortably cold (14.4% vs 7.9%, $p < .001$) and hot (18.8% vs 12.3%, $p < .001$) temperatures, pest problems (30.4% vs 22.9%, $p < .001$), and mold presence (8.2% vs 4.0%, $p < .001$). For housing insecurity measures, disability households were more likely to report unaffordable housing (42.9% vs 36.9%, $p < .001$). Disability households also reported higher rates of high housing costs (25.1% vs 18.9%, $p < .001$).

Table 3 shows the results of logistic regressions estimating the odds of each health and safety, housing quality, and housing insecurity indicator among rental households, controlling for sociodemographic characteristics. Across health and safety outcomes, disability status was significantly associated with greater odds of all four indicators: poor or fair health (aOR = 5.79, 95% CI: 4.72–7.11, $p < .001$), poor sleep quality (aOR = 2.09, 95% CI: 1.69–2.58, $p < .001$), unsafe drinking water (aOR = 1.54, 95% CI: 1.23–1.92, $p < .001$), and poor air quality (aOR = 1.77,

Table 3
Logistic regressions of housing quality indicators among rental households, controlling for sociodemographic characteristics
2023 American Housing Survey, Rental household weighted N = 44960336.

Outcome variable	Independent variable	Adjusted OR (95% CI)	p-value	AME (95% CI)
Poor health	Housing Assistance	1.83 (1.34-2.51)	***	0.037 (0.003-0.071)
	Disability Status	5.79 (4.72-7.11)	***	0.237 (0.208-0.266)
	Housing Assistance × Disability Status	0.51 (0.35-0.73)	***	0.249 (0.196-0.303)
Poor sleep quality	Housing Assistance	1.31 (0.98-1.75)	NS	0.036 (−0.003-0.074)
	Disability Status	2.09 (1.69-2.58)	***	0.122 (0.09-0.155)
	Housing Assistance × Disability Status	0.84 (0.59-1.21)	NS	0.149 (0.097-0.202)
Unsafe drinking water	Housing Assistance	1.13 (0.84-1.52)	NS	0.005 (−0.024-0.034)
	Disability Status	1.54 (1.23-1.92)	***	0.044 (0.019-0.069)
	Housing Assistance × Disability Status	0.79 (0.54-1.14)	NS	0.036 (−0.003-0.075)
Poor air quality	Housing Assistance	1.41 (1.03-1.93)	*	0.023 (−0.004-0.05)
	Disability Status	1.77 (1.36-2.3)	***	0.048 (0.022-0.073)
	Housing Assistance × Disability Status	0.72 (0.48-1.08)	NS	0.059 (0.021-0.097)
Upkeep problem	Housing Assistance	1.27 (0.85-1.9)	NS	0 (−0.011-0.011)
	Disability Status	3.34 (2.42-4.61)	***	0.041 (0.028-0.055)
	Housing Assistance × Disability Status	0.58 (0.37-0.92)	*	0.031 (0.013-0.049)
Water leakage	Housing Assistance	0.85 (0.7-1.04)	NS	−0.009 (−0.031-0.012)
	Disability Status	2.04 (1.77-2.36)	***	0.113 (0.093-0.132)
	Housing Assistance × Disability Status	1.27 (0.98-1.64)	NS	0.119 (0.083-0.154)
Uncomfortably cold	Housing Assistance	1.18 (0.92-1.52)	NS	0.012 (−0.005-0.03)
	Disability Status	2.23 (1.81-2.74)	***	0.076 (0.056-0.095)
	Housing Assistance × Disability Status	0.93 (0.67-1.31)	NS	0.088 (0.059-0.117)
Uncomfortably hot	Housing Assistance	1.38 (1.11-1.71)	**	0.031 (0.01-0.052)
	Disability Status	2.38 (2.05-2.76)	***	0.108 (0.089-0.127)
	Housing Assistance × Disability Status	0.82 (0.6-1.11)	NS	0.131 (0.097-0.164)
Pests present	Housing Assistance	1.18 (0.99-1.41)	NS	0.027 (0.001-0.053)
	Disability Status	1.71 (1.5-1.96)	***	0.098 (0.075-0.121)
	Housing Assistance × Disability Status	0.95 (0.74-1.22)	NS	0.122 (0.085-0.16)
Mold present	Housing Assistance	1.54 (1.14-2.09)	**	0.016 (0.002-0.029)
	Disability Status	2.71 (2.09-3.51)	***	0.051 (0.037-0.066)
	Housing Assistance × Disability Status	0.72 (0.48-1.08)	NS	0.063 (0.04-0.085)
Affordability issue	Housing Assistance	0.92 (0.74-1.13)	NS	−0.043 (−0.08–0.005)
	Disability Status	1.77 (1.46-2.14)	***	0.107 (0.07-0.145)
	Housing Assistance × Disability Status	0.7 (0.53-0.92)	*	0.027 (−0.026-0.079)
High housing cost	Housing Assistance	0.92 (0.68-1.25)	NS	−0.063 (−0.097–0.03)
	Disability Status	1.55 (1.23-1.95)	***	0.022 (−0.01-0.054)
	Housing Assistance × Disability Status	0.29 (0.19-0.46)	***	−0.105 (−0.14–0.07)

Notes.
p represents significance levels from logistic regressions.
*=<0.05; **=<0.01; ***=<0.001.
NS = not significant.

Table 4
Predicted probabilities (%) of independent variables across housing quality indicators **among rental households**, controlling for sociodemographic characteristics.

Predicted probabilities (%) (95% CI)				
Outcome variable	Disability = 0, Housing Assistance = 0	Disability = 1, Housing Assistance = 0	Disability = 0, Housing Assistance = 1	Disability = 1, Housing Assistance = 1
Poor Health	7.9% (6.9–8.9)	39.2% (36.1–42.4)	22.4% (18.9–25.8)	48.9% (44.5–53.3)
Poor Sleep Quality	17.3% (15.8–18.8)	28.2% (25.2–31.2)	25.1% (21.2–29.0)	35.0% (31.2–38.8)
Unsafe Drinking Water	11.6% (10.6–12.7)	15.6% (13.4–17.9)	15.1% (12.0–18.2)	15.9% (13.0–18.8)
Poor Air Quality	8.6% (7.7–9.5)	13.5% (11.3–15.8)	16.4% (13.0–19.8)	17.9% (14.6–21.1)
Upkeep Problem	2.5% (2.0–3.0)	6.4% (5.1–7.8)	4.0% (2.9–5.1)	5.3% (4.0–6.5)
Water Leakage	15.0% (14.1–15.9)	22.2% (20.1–24.3)	12.3% (10.5–14.1)	22.7% (20.2–25.2)
Uncomfortably Cold	7.6% (7.0–8.3)	14.0% (12.2–15.9)	9.1% (7.4–10.9)	14.8% (12.9–16.8)
Uncomfortably Hot	12.2% (11.4–13.0)	19.3% (17.5–21.0)	13.7% (11.6–15.9)	18.3% (16.0–20.5)
Pests Present	22.2% (21.2–23.3)	28.8% (26.5–31.2)	27.0% (24.2–29.9)	33.1% (30.2–36.0)
Mold Present	3.6% (3.2–4.1)	7.9% (6.6–9.3)	6.4% (4.8–7.9)	9.7% (7.9–11.4)
Affordability Issue	37.0% (35.1–39.0)	44.7% (41.2–48.1)	36.1% (32.4–39.9)	34.6% (30.9–38.3)
High Housing Cost	18.6% (17.2–20.0)	27.2% (24.4–30.0)	24.8% (20.6–28.9)	12.3% (9.6–15.1)

95% CI: 1.36–2.30, $p < .001$). Housing assistance was significantly associated with higher odds of poor health (aOR = 1.83, 95% CI: 1.34–2.51, $p < .001$) and poor air quality (aOR = 1.41, 95% CI: 1.03–1.93, $p < .05$) but was not significantly associated with sleep quality or unsafe drinking water. A significant interaction was observed only for poor health (aOR = 0.51, 95% CI: 0.35–0.73, $p < .001$), indicating that the positive association of housing assistance with poor health was significantly smaller for disability households than for non-disability households; the magnitude and direction of this interaction are clarified by the predicted probabilities in Table 4.

For housing quality outcomes, disability status was significantly associated with higher odds across all measures, with the strongest associations for upkeep problems (aOR = 3.34, 95% CI: 2.42–4.61, $p < .001$), mold presence (aOR = 2.71, 95% CI: 2.09–3.51, $p < .001$), and uncomfortably hot temperatures (aOR = 2.38, 95% CI: 2.05–2.76, $p < .001$), followed by uncomfortably cold temperatures (aOR = 2.23, 95% CI: 1.81–2.74, $p < .001$), water leakage (aOR = 2.04, 95% CI: 1.77–2.36, $p < .001$), and pest presence (aOR = 1.71, 95% CI: 1.50–1.96, $p < .001$). Housing assistance was significantly associated with higher odds of uncomfortably hot temperatures (aOR = 1.38, 95% CI: 1.11–1.71, $p < .01$) and mold presence (aOR = 1.54, 95% CI: 1.14–2.09, $p < .01$) but was not significantly associated with the remaining housing quality outcomes. A significant interaction was observed only for upkeep problems (aOR = 0.58, 95% CI: 0.37–0.92, $p < .05$), indicating that the odds ratio for disability was smaller among assisted households than unassisted households. Disability remained associated with higher upkeep problems in both groups. For housing insecurity outcomes, disability status was significantly associated with higher odds of both affordability issues (aOR = 1.77, 95% CI: 1.46–2.14, $p < .001$) and high housing costs (aOR = 1.55, 95% CI: 1.23–1.95, $p < .001$); housing assistance alone was not significantly associated with either outcome. Significant interactions were observed for both affordability issues (aOR = 0.70, 95% CI: 0.53–0.92, $p < .05$) and high housing costs (aOR = 0.29, 95% CI: 0.19–0.46, $p < .001$).

Table 4 shows the predicted probabilities of health and safety, housing quality, and housing insecurity outcomes by disability and assistance status. Across the health and safety measures (poor health, poor sleep quality, unsafe drinking water, poor air quality), disability households consistently exhibited higher predicted probabilities of adverse outcomes compared to households without disabilities. For poor or fair health, the disability-associated disparity was 31.3 pp among unassisted households (7.9% vs. 39.2%) and 26.5 pp among assisted households (22.4% vs. 48.9%), indicating that the disability gap narrowed by 4.8 pp among assisted households (26.5 pp) relative to unassisted households (31.3 pp), but was not eliminated; notably, housing assistance was associated with higher predicted probabilities of poor health for both disability and non-disability households, and the absolute probability remained highest among assisted disability households (48.9%). For poor sleep quality, the disability-associated disparity was 10.9 pp without assistance (17.3% vs. 28.2%) and 9.9 pp with assistance (25.1% vs. 35.0%); disability households receiving assistance had higher rates of poor sleep quality than those not receiving assistance (35.0% vs. 28.2%). For unsafe drinking water, the disparity was modest and largely consistent across assistance groups (4.0 pp unassisted: 11.6% vs. 15.6%; 0.8 pp assisted: 15.1% vs. 15.9%), with rates nearly identical for disability households regardless of assistance status (15.9% vs. 15.6%). For poor air quality, housing assistance was associated with notably higher rates among non-disability households (8.6% without vs. 16.4% with assistance), while the disability-associated disparity was smaller across both groups (4.9 pp unassisted: 8.6% vs. 13.5%; 1.5 pp assisted: 16.4% vs. 17.9%).

For housing quality outcomes, disability households had higher predicted probabilities across all measures. For upkeep problems, the disability-associated disparity was smaller among assisted households (+1.3 pp; 4.0% vs. 5.3%) compared to unassisted households (+3.9 pp; 2.5% vs. 6.4%), and disability households receiving assistance had lower rates than those not receiving assistance (5.3% vs. 6.4%). Water leakage showed a persistent disability-associated disparity regardless of assistance status (7.2 pp unassisted: 15.0% vs. 22.2%; 10.4 pp assisted: 12.3% vs. 22.7%), with rates nearly identical for disability households with and without assistance (22.7% vs. 22.2%). For uncomfortably hot temperatures, the disability disparity was 7.1 pp without assistance (12.2% vs. 19.3%) and 4.6 pp with assistance (13.7% vs. 18.3%), and disability households receiving assistance had marginally lower rates than those not receiving assistance (18.3% vs. 19.3%). For mold presence, housing assistance was associated with higher rates for both disability and non-disability households (3.6% vs. 7.9% unassisted; 6.4% vs. 9.7% assisted), with disability households receiving assistance having higher rates than those not receiving assistance (9.7% vs. 7.9%).

For housing insecurity outcomes, Table 4 reveals the most pronounced assistance-related differences. For affordability issues, the disability-associated disparity of 7.7 pp without assistance (37.0% vs. 44.7%) was essentially eliminated among assisted households (−1.5 pp; 36.1% vs. 34.6%), indicating that housing assistance was associated with a meaningful reduction in affordability concerns specifically for disability households; disability households receiving assistance also reported lower affordability concern than those not receiving assistance (34.6% vs. 44.7%). For high housing costs, the pattern was even more striking: the disability-associated disparity of 8.6 pp without assistance (18.6% vs. 27.2%) was fully reversed among assisted households, with disability households showing the lowest predicted probability across all four groups (12.3%), compared to 24.8% for non-disability assisted households — and compared to 27.2% for disability households not receiving assistance.

5. Discussion

Our findings lend important insights to understanding the health and safety characteristics, housing quality, and housing insecurity experienced by rental households that include a person with a disability and

the association of federal rental housing assistance with these characteristics. First and most importantly, our first research question is strongly supported: PWD renter households experience consistently worse health and greater exposure to harmful housing conditions. Our second research question receives partial support; receipt of assistance is associated with lower concerns about affordability, but has a more mixed or adverse association with several conditions. For our third research question, we see interaction effects for several disparities among assisted PWD households, yet absolute risks remain highest for PWD.

The results strongly confirm the extensive disparities between disability and non-disability rental households documented in previous research. Consistent with findings from Meschede et al.,[7] our study demonstrated that households with disabilities experience substantially worse housing quality, neighborhood quality, and housing affordability compared to households without disabilities. The magnitude of these disparities, with 41.4% of disability households reporting poor/fair health compared to 9.4% in non-disability households, aligns with the theoretical framework proposed by Swope and Hernandes,[37] which conceptualizes housing as influencing health through cost, conditions, consistency, and context. The elevated rates of water leakage, upkeep problems, and mold presence found in our study also align with the environmental health disparities framework outlined by Braveman[22] and Jacobs & Jacobs,[23] which emphasizes how inadequate housing conditions disproportionately affect vulnerable populations.

Perhaps the most intriguing finding of this study is the relationship between housing assistance and health outcomes. While housing assistance was strongly associated with reducing the housing cost burden, it was not associated with significantly better health and housing quality outcomes, and in some cases, was associated with higher rates of adverse outcomes. This pattern challenges the straightforward assumption that housing assistance uniformly improves housing and health outcomes. However, as our study is based on cross-sectional data, we cannot adjust for levels of health prior to entering federal rental assistance programs and so cannot make any causal claims about the impact of rental assistance receipt on these outcomes. Future research that takes a more longitudinal approach in following people as they move onto these programs can delve more deeply into understanding these issues.

The interaction effects suggest that the association of housing assistance with poor health is moderated among households with disabilities, but these households still report the highest probability of poor/fair health. The interactions for housing costs were more pronounced, underscoring that housing assistance is most effective in fulfilling its primary affordability mission, even as health and quality concerns persist. This finding is distinct from previous research by Fenelon et al.,[38] which found reduced odds of fair or poor health for households in publicly assisted housing, albeit in a longitudinal setup with a limited geographic scope, unlike our cross-sectional analysis using national data. This apparent difference may be explained by several factors. First, our study specifically examined rental households with disabilities, a population that may face additional barriers and have more complex needs than the general low-income population studied in earlier research. Second, the findings of Boch et al.[2] that each additional poor housing characteristic was associated with poorer health status, higher medical utilization, and a higher likelihood of hospitalization suggest that housing quality effects may be cumulative and particularly pronounced for vulnerable populations, especially for households with members with disabilities. While we controlled for key sociodemographic characteristics, the cross-sectional design precludes causal interpretation of the observed associations. For example, the smaller disability-related disparities observed among households receiving housing assistance could reflect the protective effects of assistance, program targeting criteria, or residual confounding by unmeasured variables, but could equally reflect selection processes.

The findings regarding housing assistance may reflect selection effects inherent in program targeting and allocation. Federal rental housing assistance programs prioritize the most vulnerable households, including those with the highest needs and lowest incomes.[17,18] Importantly, selection effects operate across both disability and non-disability households as evident in Table 4. Among households with disabilities, those who receive housing assistance may represent the most disadvantaged subset, experiencing multiple, compounding vulnerabilities, including worse levels of self-reported health that extend beyond what housing assistance alone can address. On the other hand, households that include a person with a disability who is unable to navigate the administrative tasks associated with applying for rental assistance may be less likely to be included in federal rental housing assistance programs. Two additional selection-effect concerns are that not all low-income households choose to apply for rental housing assistance, and not all households that apply receive it in a timely manner, as multiple-year wait lists are common across the country. Taking these limitations into account means we can only affirm our findings for households that included a person with a disability who chose to obtain rental assistance and were successful in doing so. Our design does not allow us to isolate the causal effect of rental assistance among households with members with disabilities, as we cannot identify individuals with disabilities who qualify for but do not receive assistance. Future research using administrative data that links eligibility determinations with assistance receipt would be needed to make stronger causal inferences about assistance effectiveness.

The elevated rates of water leakage, mold presence, and pest problems among disability households directly correspond to the environmental health risks documented by Hoffen et al.[25] and Rauh et al.[24] These elevated rates are of concern as these conditions have been shown to be associated with poor health outcomes. [20]The persistence of these housing quality problems even among households receiving housing assistance suggests that current housing quality standards and inspection protocols may be insufficient to ensure healthy living conditions. Recent research by Denary et al.[3] found that households facing limited affordable housing options may be forced to settle for poor housing conditions.

Despite the complex nature of our health and housing quality findings, housing assistance was clearly associated with lower affordability concerns. The lower concerns about high housing costs among disability households receiving assistance may confirm the program's effectiveness in its primary mission. This finding is consistent with research showing that rental assistance makes housing more affordable for households with members with disabilities, as evident through special measures taken during the COVID-19 crisis.[8] The affordability benefits are particularly important given the economic challenges faced by households with disabilities.

This study's cross-sectional design precludes causal inferences about the relationships between housing assistance, disability status, and health outcomes. The findings regarding housing assistance effects may reflect unmeasured confounding variables or selection effects that could be better addressed through longitudinal research designs. Future research should investigate the long-term trajectories of households with disabilities as they transition into and remain in assisted housing.

Additionally, research should examine the differential effects of various types of housing assistance programs (public housing, vouchers, multifamily housing) on households with different types and severities of disabilities. The heterogeneity within the disability population may require more targeted and differentiated approaches to housing assistance.

6. Conclusion

The results suggest that while housing assistance is associated with lower affordability challenges, it is not fully associated with the multifaceted health and housing quality needs of households with disabilities. The persistence of health disparities among assisted households indicates the need for more comprehensive, person-centered approaches

that address not only housing affordability but also housing quality, accessibility, and the broader social determinants of health.

The availability of housing assistance programs does not meet the demand, resulting in long waiting lists for many applicants.[39] By some estimates, about 18 million people with disabilities qualify for federal rental assistance but are not receiving it.[40] Only a quarter of all eligible households overall get any federal housing,[41] and people with disabilities are heavily represented among those unassisted. This assistance gap, combined with low incomes, means that people with disabilities are over-represented among those with severe housing affordability problems. This ultimately results in 1.26 million very low-income renter households headed by non-elderly people with disabilities with "worst case" housing needs.[42] Our findings indicate that rental assistance is not only relevant to housing in isolation, but also relevant to the health of household members. Policymakers should ensure housing assistance programs are designed and implemented to address the full spectrum of needs of households with disabilities. Only then can housing assistance effectively improve health equity for this vulnerable population.

CRediT authorship contribution statement

Kartik Trivedi: Writing – review & editing, Writing – original draft, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Debra L. Brucker:** Writing – review & editing, Writing – original draft, Validation, Methodology, Formal analysis, Conceptualization.

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Conflict of interest statement

The authors declare that there is no conflict of interest regarding the publication of this research paper. The authors have no financial or personal interests that could influence the research, analysis, or outcomes.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.dhjo.2026.102083.

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