

Unstable Housing and Caregiver and Child Health in Renter Families

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abstract

OBJECTIVES: To evaluate how 3 forms of housing instability relate to caregiver and child health among low-income renter households.

METHODS: Caregivers of children 0 to 48 months of age were interviewed in 5 urban medical centers from May 2009 to December 2015. Caregivers reported on the following: caregiver health, maternal depressive symptoms, child's health, lifetime hospitalizations, developmental risk, and 3 housing circumstances, which were categorized as being behind on rent in the past 12 months, multiple moves (≥ 2 in past 12 months), and child's lifetime history of homelessness. Associations with caregiver and child health outcomes were examined through multivariable logistic regression.

RESULTS: Of 22 324 families, 34% had at least 1 of the following adverse housing circumstances: 27% had been behind on rent, 8% had made multiple moves, and 12% had a history of being homeless. Overlap between these was limited; 86% experienced only 1 adverse housing circumstance. Each circumstance was individually associated with increased adjusted odds of adverse health and material hardship compared with stable housing. Households behind on rent had increased adjusted odds of fair and/or poor caregiver health (adjusted odds ratio [aOR]: 1.91; 95% confidence interval [CI]: 1.77–2.05), maternal depressive symptoms (aOR: 2.71; 95% CI: 2.51–2.93), child lifetime hospitalizations (aOR: 1.19; 95% CI: 1.10–1.27), fair and/or poor child health (aOR: 1.41; 95% CI: 1.28–1.56), and household material hardships. Families with multiple moves and history of homelessness had similar adverse caregiver, child, health, and hardship outcomes.

CONCLUSIONS: Three forms of housing instability were associated with adverse caregiver and child health among low-income renter households. The American Academy of Pediatrics recommends social screening within health care; providers could consider assessing for behind on rent, multiple moves, and homelessness in high-risk practices.

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Drs Cutts and Sandel supervised data collection at their respective research sites, conceptualized and designed the study, interpreted the analyses, and reviewed and revised the manuscript; Mr Sheward helped conceptualize and design the study and drafted and revised the manuscript; Ms Ettinger de Cuba and Drs Frank, Chilton, Black, Casey, and Ochoa supervised data collection in their sites, helped conceptualize and design the study, and reviewed and revised the manuscript; Ms Coleman conducted the analysis, provided statistical expertise, and critically reviewed the

WHAT'S KNOWN ON THIS SUBJECT: Unstable housing circumstances, including homelessness, are critical social determinants of adult and child health. However, many housing instability definitions are limited to only homelessness or multiple moves and do not include rent strain.

WHAT THIS STUDY ADDS: Rent strain, defined as “behind on rent,” is the most prevalent form of housing instability with little overlap with multiple moves or homelessness. All 3 forms were associated with adverse health outcomes for caregivers and young children.

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No universally accepted definition of housing instability exists, although housing circumstances are widely acknowledged as a key social determinant of health. Some authorities define housing instability by high housing costs relative to income (more than 30% of a household's gross monthly income), poor housing quality, unstable neighborhoods, overcrowding, and homelessness.^{1,2} Others have used different metrics for housing instability, including multiple moves, eviction, and difficulty paying rent, mortgage, or utilities.³⁻⁹ We have previously examined health, developmental, and anthropometric correlates of housing insecurity among children younger than 3 years of age, using crowding (> 2 people per bedroom or > 1 family per residence) and multiple moves (≥ 2 moves within the previous year) as forms of housing insecurity.⁷ Examining the association between different aspects of housing instability and health outcomes among at-risk populations simultaneously rather than in isolation will assist in understanding the contribution of each circumstance separately and concomitantly.

On the basis of our previous research and a review of the literature, we identified distinct forms of housing instability associated with inadequate access to care and adverse health outcomes.^{5,7,10,11} Multiple moves have been associated with adverse mental health, educational, and behavioral outcomes in children, and diminished physical and mental health in adulthood.¹²⁻²⁰ Homelessness has been linked with multiple adverse health outcomes for children, including fair and/or poor health and developmental risk.^{21,22} Difficulty paying rent, mortgage, or utilities (ie, housing costs > 30% of a household's gross monthly income), or anxiety about other financial obligations also serve as markers of housing instability.^{5,7,23-26} Inability to

pay rent or mortgage and associated financial hardship may lead to homelessness. Given the evidence that racial and ethnic subgroups, specifically African Americans and Hispanics, have higher housing hardship at all income levels and are shown to have worse outcomes for many health outcomes and statuses, housing instability could contribute to racial and ethnic disparities in health outcomes.²⁷⁻³⁰ Adults in households behind on rent are also at risk for depression.³¹ However, associations between being behind on rent as a form of financial strain afflicting parents of young children and correlations with children's health and development and other household material hardships have not been previously assessed.

Our goal in this study was to examine associations between 3 unstable housing circumstances and adverse caregiver and child health outcomes and to examine if there was overlap among these 3 housing circumstances. We hypothesized that each one of the 3 housing circumstances would be strongly associated with adverse health outcomes and other health-related household hardships among this at-risk population of low-income renter households with young children.³²

METHODS

Study Sample and Procedures

Children's HealthWatch conducted household-level surveys and medical record audits from May 1, 2009 to December 31, 2015 in primary care clinics (Baltimore, MD and Minneapolis, MN) and pediatric emergency departments (Baltimore, MD; Boston, MA; Little Rock, AR; and Philadelphia, PA). Institutional review board approval was obtained at each site and renewed yearly. Caregivers were approached to be screened for participation; 31 250 (93%) agreed to be screened, and

26 845 (80%) were eligible and completed the interview. Eligibility criteria for the current analysis included public or no health insurance (as proxy for low income); child's age ≤ 48 months; research site state residency; caregiver's ability to speak English, Spanish, or Somali (in Minneapolis only); respondent living in the child's household; and consent to be interviewed. For this study, only renter households were included to better represent families most vulnerable to housing instability. This resulted in a final sample size for the current analysis of 22 324 caregiver and child dyads.

Demographic Measures

Caregivers provided information on their age, self-identified race and/or ethnicity, country of origin, marital and employment status, highest level of education attained, and children's health insurance and breastfeeding history. Children's age and sex were obtained from medical records.

Dependent Variables

Caregiver Health Outcome Measures

Caregiver health outcomes were self-reported current health statuses and maternal depressive symptoms. Caregivers characterized their health as excellent, good, fair, or poor using a question from the 1988 to 1994 National Health and Nutrition Examination Survey. Depressive symptoms were measured only in mothers via a 3-item screening test developed for maternal depression, with sensitivity of 100%, specificity of 88%, and positive predictive value of 66% in comparison with the 8-item Rand screening instrument.³³ As recommended by the author, the 3-item instrument was considered positive if a respondent had a positive response to any 2 of the 3 items.

Child Health Outcome Measures

Caregivers reported their perception of their child's health as fair, poor, good, or excellent, adapted from the single, validated question from the Third National Health and Nutrition Examination Survey, and their child's lifetime history of hospitalizations, excluding at birth.^{34,35} Developmental risk was measured with the Parents' Evaluation of Developmental Status (PEDS), which meets standards set by the American Academy of Pediatrics for developmental screening tests for children from birth through age 7.³⁶⁻³⁸ We limited our sample to children \geq 4 months of age ($n = 18\,754$) for the developmental outcome because of better sensitivity and specificity of PEDS for children \geq 4 months of age and used recommended scoring to determine those at developmental risk (2 or more concerns).³⁶

Children's weight and length on the day of the interview were recorded by interviewers or obtained through medical record review. At risk of being underweight was defined as weight-for-age less than fifth percentile or weight-for-height $<$ 10th percentile, according to Centers for Disease Control and Prevention growth standards.³⁹

Material Hardship Measures

We measured other household material hardships associated with poor health and development outcomes, including household food insecurity and child food insecurity, as defined by the 18-item US Food Security Survey Module and categorized households as "food secure" or "insecure" in accordance with established procedures.⁴⁰ Energy insecurity was measured by 4 questions as defined in previous Children's HealthWatch research and was shown to be associated with adverse maternal and child health outcomes.⁴¹⁻⁴⁶ When a respondent affirmed none of these 4 questions, her or his household was categorized as "energy secure." Health care

hardships were defined by questions that were used to explore both unmet needs for health care services and/or prescriptions for the index child or other household members because of household inability to afford care ("foregone care") and, conversely, paying for medical care, thus being unable to afford other basic needs such as food, housing, or utilities ("health cost sacrifices").

Independent Variables

Housing Instability Measures Regarding Housing Circumstances

Measures of housing instability were as follows:

1. Being behind on rent, as defined by endorsing the following question, "During the last 12 months, was there a time when you were not able to pay the mortgage or rent on time?" As described above, the sample was restricted to only renters;
2. Multiple moves as defined by the following question, "In the past 12 months, how many places has the child lived?" A child who has lived in 3 or more places in the past year is equivalent to 2 or more or "multiple moves;" and
3. Current homelessness, as defined by the following question, "What type of housing does the child live in?" and endorsing currently living in a shelter, motel, temporary or transitional living situation, scattered site housing, or no steady place to sleep at night. We also assessed history of homelessness in the child's lifetime, as defined by the following question, "Since the child was born, has she or he ever been homeless or lived in a shelter?" and endorsing lived in a shelter, motel, temporary or transitional living situation, scattered site housing, or no steady place to sleep at night. These 2 groups (current homelessness and history of

homelessness) were combined into a single "homeless" group.

Each measure was compared with stable housing, which was defined as the absence of all 3 measures.

Caregiver and Child Health Associations With Each Housing Circumstance

We tested for significant associations between the 3 housing circumstances noted, caregiver and child health outcomes, and household material hardships. First, the 3 circumstances of housing instability were tested individually for their associations with poor health and household outcomes compared with those not experiencing the following conditions: behind on rent in the past year, multiple moves in the past year, and current or previous homelessness. We measured these circumstances as binary measures, which have significant individual associations with children's health outcomes in adjusted analyses previously published or presented but that have not previously been tested together (results available on request).^{7,44-46}

Second, a "stable housing" comparison group was created, which consisted of no endorsement on any of the 3 housing circumstances (not behind on rent in past 12 months, fewer than 2 moves in past 12 months, and no homelessness in child's lifetime). We then performed separate multivariable logistic regression analyses for each of the 3 housing circumstances compared with stable housing. Adjusted odds ratios (aORs) for outcomes among the 3 circumstances were examined for their associations with adverse caregiver or child health and household material hardships compared with stable housing.

Lastly, we examined the potential cumulative impact of the 3 housing circumstances. One categorical variable with 4 mutually exclusive levels was created: stable housing (none of the 3 adverse housing

circumstances), only 1 adverse housing condition, 2 adverse housing circumstances, and all 3 adverse housing circumstances. We tested whether experiencing 1, 2, or all 3 forms of housing instability was associated with greater adjusted odds of adverse health outcomes for caregivers and children and other household material hardships. Because there is no gold standard measure or even a professional consensus on the definition of housing instability, we were not able to assess the study questions' formal sensitivity and specificity in identifying housing instability.

Statistical Methods

Descriptive statistics were used to characterize the study sample overall and to stratify by each of the 3 housing circumstances. χ^2 and Student's *t* tests were used to assess differences between groups. Separate multivariable logistic regression models were fit to determine associations between each housing instability circumstance, caregiver and child health and development, and household material hardships. To examine the cumulative effect of multiple adverse housing circumstances, we fit multivariable logistic regression models comparing families with 1, 2, or 3 adverse housing circumstances to families with stable housing for each of the outcomes noted above. All models were adjusted for site; caregiver's race and/or ethnicity, age, education, employment, marital status, and if he or she was US-born or an immigrant; child's breastfeeding history; child's age; and survey year. Child's age was not included in caregiver health outcome models because it was not statistically significant in bivariate analyses. aORs and 95% confidence intervals (CIs) are reported for all models. Two-tailed tests and a significance level of 0.05 were used for all hypothesis testing. We used

SAS version 9.3 (SAS Institute, Inc, Cary, NC) for all analyses.

RESULTS

Sample Characteristics

Among the sample ($N = 22\,324$), the mean age of caregivers was 26.6 years (SD 5.8); 52.6% were African American, non-Hispanic; 31.9% were Hispanic; 12.1% were white, non-Hispanic; 3.4% were other racial and/or ethnic categories. Ninety-three percent of caregivers were biological mothers; 5% were biological fathers; and 2% were other (ie, adoptive mother or father, foster mother or father, grandmother or grandfather, aunt or uncle, other relative). Seventy-six percent of caregivers were US born, 32.7% were married, 40.2% were employed, and 72.7% had a high school education or more. The mean age of children was 18.6 months (SD 13.3), 46.2% were female, and 95.9% were publicly insured. Most of the children's households participated in the Supplemental Nutrition Assistance Program (67.2%) and the Special Supplemental Nutrition Program for Women, Infants and Children (76.7%), whereas only approximately one-fourth currently received subsidized housing (22.0%), Low Income Home Energy Assistance Program (22.5%), or Temporary Assistance for Needy Families (26.2%). Thirty-four percent of participants reported at least 1 adverse housing circumstance. Twenty-seven percent of participants reported being behind on rent, 8.0% reported multiple moves within the past year, and 12.0% reported current or previous homelessness within the child's lifetime (Table 1).

Adjusted Analyses

In comparing adverse housing circumstances to the composite referent group of stable housing, and after controlling for potential confounders, we found an association

between each housing instability circumstance and adverse caregiver health outcomes, child health and development outcomes, and household hardships (Table 2).

Compared with caregivers in stable housing, caregivers who were behind on rent had increased adjusted odds of fair and/or poor health (aOR: 1.91; 95% CI: 1.77–2.05) and maternal depressive symptoms (aOR: 2.71; 95% CI: 2.51–2.93). Compared with children in stable housing, children in households behind on rent had increased adjusted odds of lifetime hospitalizations (aOR: 1.19; 95% CI: 1.10–1.27) and fair and/or poor child health (aOR: 1.41; 95% CI: 1.28–1.56). There were no statistically significant associations with developmental risk or underweight status. Households behind on rent also experienced increased adjusted odds of other household hardships, including the following: household food insecurity (aOR: 4.93; 95% CI: 4.58–5.30), child food insecurity (aOR: 4.14; 95% CI: 3.78–4.54), energy insecurity (aOR: 4.28; 95% CI: 3.98–4.60), household foregone care (aOR: 3.06; 95% CI: 2.83–3.31), child foregone care, (aOR: 3.08; 95% CI: 2.69–3.52), and health cost sacrifices (aOR: 4.24; 95% CI: 3.83–4.70).

Compared with caregivers in stable housing, caregivers with multiple moves had increased adjusted odds of fair and/or poor health (aOR: 2.23; 95% CI: 1.96–2.53) and maternal depressive symptoms (aOR: 3.67; 95% CI: 3.22–4.17). Among children in households with multiple moves compared with those in stable housing, we identified a nonsignificant association with lifetime hospitalizations (aOR: 1.11; 95% CI: 0.97–1.26), increased adjusted odds of fair and/or poor health (aOR: 1.41; 95% CI: 1.19–1.68), and of developmental risk (aOR: 1.28; 95% CI: 1.08–1.53). There were no statistically significant associations with underweight status. Households with multiple moves also

TABLE 1 Descriptive Characteristics of Individual Adverse Housing Conditions Compared With Stable Housing

	Stable Housing	Behind on Rent	<i>P</i>	Multiple Moves	<i>P</i>	Homelessness	
	<i>n</i> (%)	<i>n</i> (%)		<i>n</i> (%)		<i>n</i> (%)	<i>P</i>
<i>n</i> (%)	14 710	5544 (27)		1294 (8)		1967 (12)	
Site			< .001		< .001		< .001
Baltimore, Maryland	3113 (21)	1099 (20)		205 (16)		241 (12)	
Boston, Massachusetts	2418 (16)	1420 (26)		398 (31)		1106 (56)	
Little Rock, Arkansas	3028 (21)	1029 (19)		232 (18)		104 (5)	
Minneapolis, Minnesota	2836 (19)	640 (12)		239 (19)		304 (16)	
Philadelphia, Pennsylvania	3315 (23)	1356 (25)		220 (17)		212 (11)	
Caregiver's place of birth			.01		.10		< .001
Born in United States	11 144 (76)	4100 (74)		1009 (78)		1580 (81)	
Immigrant	3535 (24)	1432 (26)		283 (22)		381 (19)	
Child's sex			.75		.95		.21
Male	7880 (54)	2984 (54)		692 (54)		1083 (55)	
Female	6830 (46)	2560 (46)		602 (47)		884 (45)	
Child's age (mean ± SD), mo	18 (13)	19 (13)	< .001	23 (12)	< .001	18 (13)	< .001
Child breastfed			< .001		.001		< .001
Yes	8853 (60)	3539 (64)		837 (65)		1265 (65)	
No	5839 (40)	1992 (36)		452 (35)		692 (35)	
Child's insurance			.27		.12		.01
Public	14 047 (96)	5317 (96)		1222 (95)		1903 (97)	
No insurance	627 (4)	217 (4)		67 (5)		59 (3)	
Caregiver's race and/or ethnicity			.40		< .001		.01
Hispanic	4662 (32)	1724 (31)		445 (35)		552 (28)	
African American	7727 (53)	2902 (53)		572 (45)		1070 (55)	
White	1728 (12)	684 (12)		202 (16)		216 (11)	
Other	457 (3)	190 (4)		64 (5)		105 (5)	
Caregiver's marital status			.001		.001		< .001
Married	4842 (33)	1956 (35)		365 (28)		397 (20)	
Not married	9845 (67)	3579 (65)		929 (72)		1567 (80)	
Caregiver's education			< .001		.001		.001
Some high school	4034 (28)	1399 (25)		414 (32)		597 (30)	
High school graduate	6055 (41)	2043 (37)		474 (37)		725 (37)	
College graduate	4590 (31)	2089 (38)		403 (31)		640 (33)	
Caregiver's age (mean ± SD), y	26 (6)	28 (6)	< .001	26 (6)	< .001	27 (6)	.04
Caregiver employed			< .001		< .001		< .001
Yes	5929 (40)	2452 (44)		397 (31)		538 (27)	
No	8762 (60)	3083 (56)		897 (69)		1426 (73)	
SNAP			< .001		< .001		< .001
Yes	9333 (64)	3901 (71)		958 (75)		1625 (84)	
No	5254 (36)	1595 (29)		327 (25)		322 (17)	
WIC			.01		< .001		< .001
Yes	11 363 (78)	4152 (76)		893 (70)		11 363 (78)	
No	3248 (22)	1344 (25)		391 (31)		3248 (22)	
Current subsidized housing			.48		< .001		.01
Yes	3193 (22)	1188 (22)		225 (18)		487 (25)	
No	11 203 (78)	4284 (78)		1043 (82)		1462 (75)	
LIHEAP			< .001		.01		< .001
Yes	2608 (21)	1394 (29)		185 (18)		280 (17)	
No	9783 (79)	3406 (71)		862 (82)		1381 (83)	
TANF			< .001		< .001		< .001
Yes	3381 (23)	1416 (26)		520 (40)		1043 (53)	
No	11 213 (77)	4110 (74)		768 (60)		910 (47)	
Eviction in past 5 y (start in 2011)			< .001		< .001		< .001
Yes	274 (3)	397 (10)		134 (15)		227 (14)	
No	10 784 (98)	3621 (90)		792 (85)		1347 (86)	
Formal eviction			.19		.55		.06
Yes	113 (54)	187 (59)		60 (57)		113 (54)	
No	98 (46)	128 (41)		45 (43)		69 (37)	

TABLE 1 Continued

	Stable Housing	Behind on Rent	<i>P</i>	Multiple Moves	<i>P</i>	Homelessness	<i>P</i>
	<i>n</i> (%)	<i>n</i> (%)		<i>n</i> (%)		<i>n</i> (%)	
Low birth wt, < 2500 g			.78		.62		.74
Yes	2076 (14)	769 (14)		175 (14)		279 (15)	
No	12346 (86)	4633 (86)		1086 (86)		1633 (85)	
Child hospitalizations			< .001		< .001		< .001
Yes	3883 (27)	1679 (31)		411 (32)		608 (31)	
No	10711 (73)	3831 (70)		865 (68)		1336 (69)	
Child fair and/or poor health			< .001		< .001		< .001
Yes	1415 (10)	740 (13)		180 (14)		265 (13)	
No	13282 (90)	4795 (87)		1106 (86)		1699 (87)	
At risk for underweight			.40		.18		.68
Yes	1990 (14)	729 (14)		160 (13)		263 (14)	
No	12176 (86)	4640 (86)		1102 (87)		1657 (86)	
Developmental risk			< .001		< .001		< .001
Yes	2108 (18)	1072 (22)		295 (24)		473 (27)	
No	9958 (83)	3737 (78)		959 (77)		1293 (73)	
Well child			< .001		< .001		< .001
Yes	4769 (41)	1715 (37)		420 (35)		566 (33)	
No	6770 (59)	2904 (63)		784 (65)		1128 (67)	
Admission from the ED			.53		< .001		< .001
Yes	1412 (14)	576 (13)		72 (7)		123 (8)	
No	8927 (86)	3766 (87)		896 (93)		1461 (92)	
Maternal health fair and/or poor			< .001		< .001		< .001
Yes	2957 (21)	1780 (33)		448 (36)		625 (33)	
No	11373 (79)	3586 (67)		805 (64)		1301 (68)	
Maternal depressive symptoms			< .001		< .001		< .001
Yes	2344 (17)	1888 (36)		533 (43)		839 (44)	
No	11651 (83)	3375 (64)		706 (57)		1060 (56)	
Household food insecurity			< .001		< .001		< .001
Yes	2727 (19)	2725 (49)		663 (51)		976 (50)	
No	11979 (81)	2817 (51)		631 (49)		990 (50)	
Child food insecurity			< .001		< .001		< .001
Yes	1208 (8)	1395 (25)		357 (28)		527 (27)	
No	13499 (92)	4147 (75)		937 (72)		1439 (73)	
Energy insecurity			< .001		< .0001		< .001
No	12224 (84)	2926 (53)		944 (74)		1491 (76)	
Moderate	1413 (10)	1311 (24)		121 (9)		174 (9)	
Severe	977 (7)	1288 (23)		217 (17)		291 (15)	
Household foregone care			< .001		< .001		< .001
Yes	2041 (14)	1836 (33)		373 (29)		515 (26)	
No	12633 (86)	3686 (67)		912 (71)		1446 (74)	
Child foregone care			< .001		< .001		< .001
Yes	456 (3)	524 (10)		131 (10)		193 (10)	
No	14211 (97)	4996 (90)		1154 (90)		1769 (90)	
Health cost sacrifices			< .001		< .001		< .001
Yes	852 (6)	1140 (21)		184 (15)		241 (13)	
No	13510 (94)	4309 (79)		1087 (86)		1692 (87)	

χ^2 testing was used for categorical variables, and *t* test was used for continuous variables. Homeowners and those with private insurance are excluded from this analysis. LIHEAP, Low-Income Home Energy Assistance Program; SNAP, Supplemental Nutrition Assistance Program; TANF, Temporary Assistance for Needy Families; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children.

experienced increased adjusted odds of household hardships, including the following: household food insecurity (aOR: 4.86; 95% CI: 4.28–5.51), child food insecurity (aOR: 4.07; 95% CI: 3.51–4.72), energy insecurity (aOR: 1.80; 95% CI: 1.56–2.08), household foregone care (aOR: 2.73; 95% CI:

2.37–3.15), child foregone care (aOR: 3.16; 95% CI: 2.55–3.92), and health cost sacrifices (aOR: 3.11; 95% CI: 2.58–3.75).

Compared with caregivers in stable housing, caregivers with current or recent history of homelessness

had increased adjusted odds of fair and/or poor health (aOR: 1.96; 95% CI: 1.75–2.20) and maternal depressive symptoms (aOR: 3.60; 95% CI: 3.21–4.04). Compared with children in stable housing, children in households with current or previous history of homelessness

TABLE 2 Individual Adverse Housing Conditions Compared With Stable Housing

Outcomes	Behind on Rent	Multiple Moves	Homelessness
	aOR (CI)	aOR (CI)	aOR (CI)
Child health outcomes			
Lifetime hospitalizations	1.19 (1.10–1.27)	1.11 (0.97–1.26)	1.25 (1.12–1.41)
Child health fair and/or poor	1.41 (1.28–1.56)	1.15 (1.19–1.68)	1.59 (1.36–1.86)
At risk for being underweight	0.96 (0.87–1.06)	0.86 (0.72–1.04)	0.89 (0.77–1.04)
Developmental risk (PEDS 2 or more concerns)	1.08 (0.97–1.20)	1.28 (1.08–1.53)	1.26 (1.08–1.47)
Caregiver health outcomes			
Caregiver health fair and/or poor	1.91 (1.77–2.05)	2.23 (1.96–2.53)	1.96 (1.75–2.20)
Depression screen	2.71 (2.51–2.93)	3.67 (3.22–4.17)	3.60 (3.21–4.04)
Hardship outcomes			
Household food insecurity	4.93 (4.58–5.30)	4.86 (4.28–5.51)	4.43 (3.96–4.96)
Child food insecurity	4.14 (3.78–4.54)	4.07 (3.51–4.72)	4.12 (3.59–4.71)
Energy insecurity	4.28 (3.98–4.60)	1.80 (1.56–2.08)	1.27 (1.12–1.44)
Household forgone care	3.06 (2.83–3.31)	2.73 (2.37–3.15)	2.82 (2.48–3.21)
Child foregone care	3.08 (2.69–3.52)	3.16 (2.55–3.92)	2.63 (2.15–3.22)
Health cost sacrifices	4.24 (3.83–4.70)	3.11 (2.58–3.75)	3.31 (2.76–3.96)

Analyses are adjusted for site, US-born mother versus immigrant, mother's race and/or ethnicity, caregiver education, caregiver employment, marital status, breastfeeding history, mother's age, child's age (child's age not in maternal health outcome models), and survey year. Private insurance and homeownership have been excluded from the analyses.

had increased adjusted odds of lifetime hospitalizations (aOR: 1.25; 95% CI: 1.12–1.41), fair and/or poor child health (aOR: 1.59; 95% CI: 1.36–1.86), and developmental risk (aOR: 1.26; 95% CI: 1.08–1.47). There were no statistically significant associations with underweight status. Households with homelessness also experienced increased adjusted odds of household hardships, including the following: household food insecurity (aOR: 4.43; 95% CI: 3.96–4.96), child food insecurity (aOR: 4.12; 95% CI: 3.59–4.71), energy insecurity (aOR: 1.27; 95% CI: 1.12–1.44), household foregone care (aOR: 2.82; 95% CI: 2.48–3.21), child foregone care, (aOR: 2.63; 95% CI: 2.15–3.22), and health cost sacrifices (aOR: 3.31; 95% CI: 2.76–3.96).

As summarized in Fig 1, there was limited overlap between the 3 adverse housing circumstances. In our study, 6529 households (86.0%) experienced only 1 adverse housing circumstance, 979 (13.0%) experienced 2 adverse housing circumstances, and 106 (1.0%) experienced all 3 adverse housing circumstances. As the number of adverse housing circumstances increased, adjusted odds of caregiver and child health risks and material hardships increased as well (Table 3).

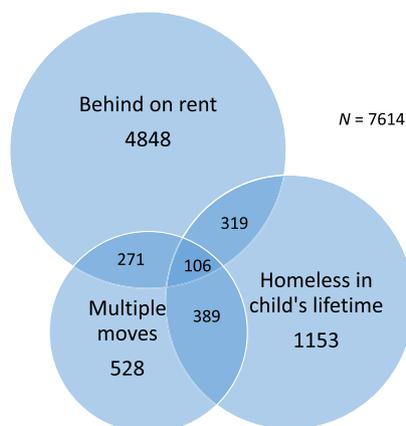


FIGURE 1 Number of adverse housing conditions.

If only homelessness and multiple moves were used to identify at-risk families, 64% (4848) of at-risk families (7614) would not be identified, as shown in Fig 1.

DISCUSSION

There are 3 important aspects of this study. First, 1 out of every 3 low-income renter households experienced at least 1 form of housing instability. Each of the 3 forms tested were individually associated with increased risk of adverse caregiver and child health status and household material hardship. Second, we demonstrate

that the 3 examined adverse housing circumstances have little overlap and each is important to identifying risk for adverse health status and material hardships among families in rental housing with young children. Of note, 2 out of 3 families were at risk because of being behind on rent, underscoring this circumstance as a previously unrecognized form of unstable housing that is meaningful for caregiver and child health. Third, families identified as housing unstable had dramatically increased odds of household and child food insecurity.

There are several limitations in this study. First, as previously stated, because there is no formalized definition of housing instability, there is no gold standard housing instability assessment against which these housing circumstances can be compared. For this reason, standard evaluation of a diagnostic tool testing sensitivity and specificity cannot be conducted. Second, data used in these analyses included a large, multisite, clinical sample of predominantly urban, low-income families of young children. Although there is a strong link between poverty and housing instability, these housing circumstances have not yet been tested in a population of varying socioeconomic status,

TABLE 3 Number of Adverse Housing Conditions Compared With Stable Housing (*N* = 22 324)

Outcomes	1 Adverse Housing Condition (<i>n</i> = 6529)	2 Adverse Housing Conditions (<i>n</i> = 979)	3 Adverse Housing Conditions (<i>n</i> = 106)
	aOR (CI)	aOR (CI)	aOR (CI)
Child health outcomes			
Lifetime hospitalizations	1.14 (1.07–1.22)	1.31 (1.14–1.52)	1.27 (0.83–1.92)
Child health fair and/or poor	1.33 (1.21–1.47)	1.68 (1.39–2.03)	2.59 (1.62–4.16)
At risk for being underweight	0.95 (0.87–1.04)	0.91 (0.75–1.11)	0.73 (0.40–1.34)
Developmental risk (PEDS 2 or more concerns)	1.12 (1.01–1.24)	1.26 (1.04–1.53)	1.21 (0.71–2.07)
Caregiver health outcomes			
Caregiver health fair and/or poor	1.69 (1.58–1.82)	2.73 (2.37–3.14)	4.24 (2.85–6.31)
Depression screen	2.50 (2.33–2.69)	4.72 (4.08–5.44)	7.45 (4.92–11.29)
Hardship outcomes			
Household food insecurity	3.91 (3.65–4.19)	7.98 (6.91–9.22)	17.91 (11.25–28.52)
Child food insecurity	3.36 (3.08–3.68)	5.82 (4.98–6.80)	18.01 (12.04–26.95)
Energy insecurity	3.23 (3.01–3.47)	2.78 (2.40–3.22)	3.29 (2.20–4.93)
Household forgone care	2.69 (2.49–2.90)	3.69 (3.17–4.30)	5.63 (3.75–8.43)
Child foregone care	2.63 (2.30–3.00)	3.83 (3.07–4.77)	5.32 (3.18–8.91)
Health cost sacrifices	3.53 (3.19–3.90)	4.82 (3.99–5.83)	8.36 (5.35–13.07)

Analyses are adjusted for site, US-born mother versus immigrant, mother's race and/or ethnicity, caregiver education, caregiver employment, marital status, breastfeeding history, mother's age, child's age (child's age not in maternal health outcome models), and survey year. Private insurance and homeownership have been excluded from the analyses.

homeowners, rural populations, or families without young children. Third, demonstrated in the cross-sectional design of this study is association, not causation, and we acknowledge that the associations (eg, housing instability and maternal caregiver depression) may be bi- or multidirectional. Finally, as with any self-report measure, these housing circumstances and some of the outcomes are subject to reporting bias and shared method variance.⁷

Despite these limitations, these 3 forms of housing instability have important clinical implications for all practitioners who work with young children and families. Together, they represent an effective way to identify families at risk for adverse health circumstances and hardships

associated with unstable housing. These questions can be administered in pediatric offices, by clinicians or practitioners working with young families in social service settings (departments of social services, school systems, housing assistance programs, etc), or by housing and community groups to assess individual and community-level needs.

CONCLUSIONS

The inclusion of questions that are used to identify housing instability in social determinants of health screening can potentially assist in targeting services to individual families and better understanding community needs. With the following 3 unstable housing circumstances:

behind on rent in the past 12 months, 2 or more moves in the past 12 months, and history of homelessness in the child's lifetime, we have demonstrated associations with adverse caregiver and child health status and other household hardships. Given the minimal overlap between these 3 housing circumstances, each may need to be assessed to identify families most at risk for adverse caregiver and child health among low-income renter households.

ABBREVIATIONS

aOR: adjusted odds ratio
 CI: confidence interval
 PEDS: Parents' Evaluation of Developmental Status

manuscript; Dr Heeren led the analysis providing statistical expertise and critically reviewed the manuscript; Mr Pasquariello provided policy expertise and critically reviewed the manuscript; and all authors approved the final manuscript as submitted.

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