

Physical and Mental Health, Cognitive Development, and Health Care Use by Housing Status of Low-Income Young Children in 20 American Cities: A Prospective Cohort Study

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Approximately 2 million Americans experience homelessness each year.¹ Families with children are estimated to make up 34% of the homeless population (i.e., 23% children and 11% adults) on any given night.² A substantial portion of homeless children have physical, developmental, behavioral, and emotional problems. Homeless children commonly experience acute and chronic health problems such as asthma,³⁻⁶ ear infections,⁶ lead toxicity,^{7,8} immunization delays,⁹ nutritional deficits including overweight and obesity,^{4,10,11} developmental or growth delays,^{12,13} and problems in cognitive functioning.¹⁴ Children in homeless families also have a high current prevalence of mental health problems, ranging from 12% to 47% depending on the age of the children, assessment measures, and geographic area.^{4,15-19} The literature has provided solid evidence that the extent of health and mental health problems among homeless children is greater than that among the general population of children.

However, the evidence is mixed as to whether homeless children differ from housed low-income children on health, developmental, and mental health outcomes. Some studies have found that homeless children are more likely than low-income stably housed children to have fair or poor health status,⁶ severe health problems,³ delayed developmental status,¹² disruptive behavior disorders,¹⁸ and, among boys, internalizing and externalizing behavior problems.¹⁷ A review of the studies on the cognitive functioning of homeless children and adolescents concluded that homeless children tend to have lower intellectual functioning than those who are domiciled.²⁰ Other studies have reported that both groups of children have high rates of developmental, behavioral, and emotional problems, and they do not differ significantly from each other.^{15,21-23} A review of published studies between 1987 and 2004 stated that the detrimental impact of

Objectives. We assessed the independent effect of homeless and doubled-up episodes on physical and mental health, cognitive development, and health care use among children.

Methods. We used data from 4 waves of the Fragile Families and Child Wellbeing Study, involving a sample of 2631 low-income children in 20 large US cities who have been followed since birth. Multivariate analyses involved logistic regression using the hybrid method to include both fixed and random effects.

Results. Of the sample, 9.8% experienced homelessness and an additional 23.6% had a doubled-up episode. Housing status had little significant adverse effect on child physical or mental health, cognitive development, or health care use.

Conclusions. Family and environmental stressors common to many children in poverty, rather than just homeless and doubled-up episodes, were associated with young children's poor health and cognitive development and high health care use. Practitioners need to identify and respond to parental and family needs for support services in addition to housing assistance to effectively improve the health and development of young children who experience residential instability, particularly those in homeless families. (*Am J Public Health.* 2011;101:S255-S261. doi:10.2105/AJPH.2010.300098)

homelessness measured as a stay in a family shelter on children's health tends to be in the mild to moderate range.²⁴

Although previous studies of the health status of homeless children and families have added greatly to knowledge of this population's needs, they have had several limitations. With a few exceptions,^{25,26} most studies in this area have relied on cross-sectional designs, which makes determining the causal relationships between homelessness and health outcomes difficult. Little is known about whether homeless families differ from housed low-income families before homeless episodes. Studies have typically been based on a sample from a single geographic area and have often used a small convenience sample. In addition, variations in the age of the sample, settings from which the study participants were recruited (e.g., shelters, clinics, schools), and assessment measures make it difficult to compare and generalize the findings. Last, many studies currently available relied on decade-old or even older data, which

do not reflect the recent trends in homelessness and health.^{25,27}

We built on previous studies using public-release data from the Fragile Families and Child Wellbeing Study (FFS). First, the sample was recruited in 20 large US cities and included children in families who have experienced homelessness and others who were at risk. Second, unlike in studies based on families staying in shelter settings, we counted as homeless a family living in temporary housing, in a shelter, or in a place not meant for human habitation (e.g., the streets, abandoned buildings, and automobiles). In addition to measures of homelessness, the data include information on doubling-up episodes, an additional important measure of precarious housing status. Third, the data include a wide range of health-related measures and control variables, including individual and household characteristics. Finally, the use of longitudinal data enabled us to compare children's health status over time by homeless and doubled-up

episodes, adjusting for many potential confounders.

We examined the extent of homelessness and doubling up and health and health care use by housing status among low-income children in 20 large US cities. We also investigated the extent to which homelessness and doubling up explain differences in health and mental health, cognitive development, and health care use of children, controlling for a wide variety of individual and familial characteristics.

METHODS

The FFS follows a cohort of nearly 5000 parents with children born between 1998 and 2000 in 20 large US cities. It includes an oversample of unmarried parents. The 20 cities are Austin, Texas; Oakland, California; Baltimore, Maryland; Detroit, Michigan; Newark, New Jersey; Philadelphia, Pennsylvania; Richmond, Virginia; Corpus Christi, Texas; Indianapolis, Indiana; Milwaukee, Wisconsin; New York, New York; San Jose, California; Boston, Massachusetts; Nashville, Tennessee; Chicago, Illinois; Jacksonville, Florida; Toledo, Ohio; San Antonio, Texas; Pittsburgh, Pennsylvania; and Norfolk, Virginia. A stratified random sampling strategy was used to select among large US cities grouped according to their policy environments and labor market conditions. The baseline survey was conducted with the mother and father separately after the birth of their child. The follow-up surveys took place approximately 1 year, 3 years, and 5 years after the birth. Of the baseline sample, 90% responded to the 1-year follow-up, 88% to the 3-year follow-up, and 87% to the 5-year follow-up.

Sample

We ascertained homeless and doubled-up episodes via responses to multiple survey items that were asked at each follow-up interview. We considered a family to be homeless in the period leading up to the interview if the mother indicated that she lived in temporary housing, in a group shelter, or on the street at the time of the interview or that, in the 12 months before the interview, she stayed in a shelter, an abandoned building, an automobile, or any other place not meant for regular housing, even

for 1 night. A family was considered doubled up if the mother indicated that she lived with family or friends or was living in a house owned by family but was not paying rent or that, in the past 12 months, she had moved in with other people because of financial problems. We restricted the doubled-up families to only those with household incomes below the federal poverty level. Because our main focus was children, we included only the families who reported that the child lived with them all or most of the time. Among fathers who live with children but do not live with the child's mother, very few were homeless, so we excluded these families from the analyses. The analyses included homeless families in which the mother and father lived together.

The homeless sample included those households that reported being homeless in at least 1 of the 3 follow-up interviews ($n=259$). The doubled-up sample included households that reported being doubled up in at least 1 of the 3 follow-up interviews ($n=621$). Finally, the comparison group included those households that reported having income at or below the federal poverty threshold at 1 or more of the 3 follow-up waves but did not experience homelessness or doubling up in any of the 3 waves ($n=1751$). The final sample included 2631 children.

If an individual reported being homeless and doubled up in the same wave, we categorized them only as homeless in that wave. Approximately 86% of the 259 ever-homeless children were homeless in only 1 wave. Of the ever-doubled-up children, 73% were doubled up in only 1 wave. Of those in the stably housed low-income group, 41% were poor in only 1 wave, 33% were poor in 2 waves, and 27% were poor in all 3 waves.

We compared characteristics of the families who were lost to attrition in any follow-up wave with characteristics of those who responded to every wave. Although we found no significant differences in the rates of homeless or doubled-up episodes by attrition status, those who were lost to attrition at some wave were more likely to be Hispanic, to be an immigrant, to be a high school dropout, to have lower income at birth, to lack family support at birth, and to not live with the father at birth. Possibly, the families at greater risk of

homelessness were less likely to be followed up and not included in the sample.

Measures

We grouped the main outcomes of interest into 4 categories: physical health, mental health, cognitive development, and health care use. We obtained data on these outcomes in 3 ways: through the main FFS mother survey data, through medical records data from the child's birth, and through the In-Home Longitudinal Study, a collaborative project following up the FFS sample.

The child's physical health measures included the mother's rating of the child's overall health status as fair or poor, any physical disability reported, and whether the child had been diagnosed with asthma. The measures of mental health, probable emotional and behavioral disorders, were based on Child Behavior Checklist (CBCL) scores in the clinical range ($T \geq 64$) on the Internalizing and Externalizing scales. Cognitive development was measured using the Peabody Picture Vocabulary Test (PPVT). We calculated percentages of children below average, average, and above average in cognitive development from standardized PPVT scores. Measures of health care use included any emergency department (ED) visit in the past 12 months, number of well doctor visits and doctor visits for illness or injury, and any inpatient hospitalizations.

Control variables were sociodemographic and family characteristics and children's health conditions at birth. Sociodemographic and family characteristics included race/ethnicity, mother's age, marital status, cohabiting status, number of children in the household, immigrant status, educational level, household income, receipt of Temporary Assistance for Needy Families (TANF) or food stamps, receipt of Supplemental Security Income, Medicaid enrollment, level of family support, mother's overall health status, exposure to domestic violence, prenatal substance use, prenatal smoking, mother's mental health history, and timing of first prenatal care visit. Children's health conditions at birth included low birth weight (<2500 g), preterm birth (<37 wk), any abnormal infant health conditions, and any serious abnormal infant health conditions.

Statistical Analysis

We performed all data analyses using Stata statistical software, release 11.1 (StataCorp, College Station, TX).²⁸ Most control variables were missing for fewer than 5% of the sample; the exceptions were child's gender, preterm birth, timing of first prenatal care visit, and the variables from the medical records data (e.g., prenatal behavior, abnormalities at birth), which were missing in 20%, 21%, 35%, and 21% of observations, respectively. We used multiple imputation (with Stata's MI commands) to handle missing data with 5 imputed data sets.

We first compared sociodemographic and family characteristics and child's health conditions among homeless, doubled-up, and housed low-income children, using a χ^2 analysis for categorical variables and a *t* test for continuous variables. Next, we used the logistic regression model with the hybrid method that allows for the estimation of fixed effects coefficients for time-varying variables while estimating the random effects coefficients for time-invariant variables²⁹ to estimate the effect of homeless and doubled-up episodes on health outcomes (i.e., overall health as fair or poor, physical disability, asthma, probable emotional and behavioral disorders, below-average PPVT scores, any ED visit, and any hospitalization). The regression model with the hybrid method not only adjusts for dependence resulting from the use of repeated measures but also controls for any time-invariant, unobserved covariates.²⁹ In the multivariate analysis, time-varying variables included homeless and doubled-up status, marital status, cohabiting status, number of children in the household, household income, receipt of public assistance, level of family support, maternal health and mental health status, and exposure to domestic violence. The coefficients for time-varying variables depend only on variation over time within persons.

RESULTS

Of 2631 low-income children followed up to 5 years old, 9.8% had experienced homelessness and an additional 23.6% had a doubled-up episode (Table 1). The homeless group included a greater proportion of children who were Black or Hispanic, who had a low birth weight, who had a mother with a prepregnancy

TABLE 1—Sample Characteristics of Homeless, Doubled-Up, and Housed Low-Income Children: The Fragile Families and Child Wellbeing Study, 1998–2006

Variable	Homeless (n = 259), % or Mean	Doubled Up (n = 621), % or Mean	Housed Low Income (n = 1751), % or Mean
Sociodemographic characteristics			
Race/ethnicity			
White ^{b,c}	9	15	10
Black ^{a,c}	64	52	54
Hispanic ^{a,c}	22	30	33
Other race	4	3	3
Mother's mean age, y ^{b,c}	24.1	22.8	24.4
Mother married ^{a,b}	7	7	13
Mother lives with father ^{a,b}	43	46	56
Number of children ^a	1.3	1.5	1.6
Mother is immigrant ^{a,b}	8	12	20
Education (mother)			
< High school ^b	50	53	46
High school ^b	33	29	35
> High school	17	18	19
Household income (\$)	18 948	20 172	19 313
TANF or food stamps in past 12 mo	55	49	49
Disability or SSI in past 12 mo	3	5	4
Birth paid for by Medicaid	84	82	79
Mother could ask family for babysitting	87	91	90
Mother could ask family for loan ^{a,c}	79	85	87
Mother's health and health behavior			
Mother's self-reported health is fair or poor	13	10	10
Experience of domestic violence ^{a,b}	18	14	7
Used drug during pregnancy ^{a,b,c}	25	15	10
Smoked cigarettes during pregnancy ^{a,b,c}	40	27	20
Drank alcohol during pregnancy ^{a,b,c}	16	10	7
Prepregnancy diagnosis of mental illness ^{a,c}	25	16	13
Prenatal care begun in 2nd or 3rd trimester	59	57	57
Depression at 12-mo interview ^{a,b,c}	29	20	15
Child's health at birth			
Born low birth weight (<2500 g) ^a	18	14	11
Born preterm (<37 wk) ^b	12	14	10
Any abnormal infant health condition	66	65	61
Any serious abnormal infant health conditions	5	3	3

Note. SSI = Supplemental Security Income; TANF = Temporary Assistance for Needy Families. Comparison group includes children from households with incomes at or below the federal poverty threshold in at least 1 of the 3 follow-up interviews but stably housed in all 3 follow-up interviews.

^aTest of association significant at $\alpha = .05$ between homeless and housed low-income groups (by *t* test and χ^2 test).

^bTest of association significant at $\alpha = .05$ between doubled-up and housed low-income groups (by *t* test and χ^2 test).

^cTest of association significant at $\alpha = .05$ between homeless and doubled-up groups (by *t* test and χ^2 test).

mental health diagnosis, and who had a lower level of family support than the stably housed low-income group. Mothers in the doubled-up group were younger and had a lower level

of education than the housed low-income group. A smaller proportion of homeless and doubled-up children came from married or cohabiting families and had immigrant mothers

than from the housed low-income group, and a greater proportion of unstably housed mothers experienced domestic violence than in the housed low-income group. Mothers in the homeless group had the highest prevalence rates of prenatal drug use, prenatal smoking, prenatal alcohol use, and mental health problems, followed by the doubled-up group and then by the housed low-income group.

Children’s Health and Developmental Status

Between 2% and 5% of the children in the sample had fair or poor health, and we observed no significant differences by housing status (Table 2). Children who experienced homelessness had a higher rate of physical disability than others: For example, at 1 and 3 years old, 7% to 8% of the children in the homeless group had a physical disability, compared with 2% to 3% of the housed

low-income group ($P < .01$ at 1 year old). The rate of asthma was notably high across all 3 groups of children, with a range of between 20% and 28% at 5 years old. Children who experienced homeless or doubled-up episodes were more likely than housed low-income children to have a probable emotional or behavioral problem: At 5 years old, 12% of the homeless group had CBCL internalizing scores in the clinical range, which was significantly higher than those of 6% of housed low-income children ($P < .05$); 23% of the doubled-up group had CBCL externalizing scores in the clinical range, compared with 18% for the housed low-income group. As children aged, the extent of externalizing problems became much more prevalent than that of internalizing problems for all groups. Cognitive development for the children in the sample was largely similar, with standardized PPVT scores at around the 20th percentile at 3 years old and

the 30th percentile at 5 years old. At 5 years old, between 44% and 47% of the children had below-average standardized PPVT scores. The average number of doctor visits was very similar across the 3 groups, with the exception of doctor visits for illness or injury at 1 year old. A greater proportion of unstably housed children than stably housed children used the ED at 1 year old, but the difference across the groups became negligible in later years.

Influence of Housing Instability on Health, Development, and Health Care

Homeless and doubled-up episodes did not have a significant effect on young children’s physical and mental health, cognitive development, or health care use (Table 3). The results were unchanged if a conventional random effects model was used instead of the hybrid method.

The control data revealed some important associations with health, development, and

TABLE 2—Children’s Health, Development, and Health Care Use by Homeless and Doubled-Up Episodes: The Fragile Families and Child Wellbeing Study, 1998–2006

Variable	Aged 1 Year			Aged 3 Years			Aged 5 Years		
	Homeless in Past Year (n = 129), % or Mean	Doubled Up in Past Year (n = 353), % or Mean	Housed Low Income (n = 1666), % or Mean	Homeless in Past Year (n = 95), % or Mean	Doubled Up in Past Year (n = 287), % or Mean	Housed Low Income (n = 1619), % or Mean	Homeless in Past Year (n = 76), % or Mean	Doubled Up in Past Year (n = 252), % or Mean	Housed Low Income (n = 1566), % or Mean
Physical health									
Child health as fair or poor	4	5	4	4	3	3	4	2	3
Physical disability mother reported	8**	3	2	7	5	3			
Asthma diagnosed	21	17	17	23	20	22	23	28**	20
Mental health (CBCL scores in clinical range)									
Internalizing				28	28**	19	12*	5	6
Externalizing				14	12*	8	22	23*	18
Total				6	6	3	15*	11	8
Cognitive Development									
PPVT score, percentile				16.5	21.9	20.8	28.0	29.8	31.7
PPVT score, below average				71	64	67	47	44	45
PPVT score, average				27	31	30	51	51	48
PPVT score, above average				2	6	3	2	6	7
Health care use									
No. well doctor visits	1.9	1.9	1.9	1.3	1.2	1.2	1.1	1.1	1.0
No. doctor visits for illness or injury	4.9*	4.9**	3.6	1.3	1.4	1.6	1.0*	1.1	1.1
Any ED visit	75**	68*	62	38	45**	34	23	29	26
Any hospitalizations	19	18	18	11	7	6	9	2	3

Note. CBCL = Child Behavior Checklist; ED = emergency department; PPVT = Peabody Picture Vocabulary Test. For homeless and doubled-up groups, we excluded children experiencing such an episode in other years but not in the target year. Comparison group included children from households with incomes at or below the federal poverty threshold in at least 1 of the 3 follow-up interviews but stably housed in all 3 follow-up interviews.

*Significantly different from the housed low-income group at $P < .05$; **Significantly different from the housed low-income at $P < .01$

TABLE 3—Results of Logistic Regression Analyses With the Hybrid Method: The Fragile Families and Child Wellbeing Study, 1998–2006

Variable	Fair or Poor Health, OR (95% CI)	Physical Disability, OR (95% CI)	Asthma, OR (95% CI)	CBCL Externalizing Score ≥64, OR (95% CI)	CBCL Internalizing Score ≥64, OR (95% CI)	PPVT Below Average, OR (95% CI)	ED visit, OR (95% CI)	Hospitalization, OR (95% CI)
Homeless episode in past year	0.99 (0.34, 2.90)	1.37 (0.32, 5.80)	1.01 (0.46, 2.23)	1.21 (0.50, 2.94)	1.46 (0.56, 3.80)	1.06 (0.47, 2.36)	1.17 (0.76, 1.81)	1.38 (0.71, 2.68)
Doubled-up episode in past year	0.68 (0.32, 1.46)	1.42 (0.48, 4.21)	1.25 (0.75, 2.06)	0.96 (0.55, 1.71)	1.05 (0.56, 1.97)	1.04 (0.62, 1.75)	1.11 (0.84, 1.48)	1.08 (0.69, 1.67)
Child is female	0.68 (0.41, 1.12)	0.69 (0.33, 1.44)	0.46* (0.24, 0.88)	1.14 (0.82, 1.59)	0.64** (0.46, 0.90)	0.79 (0.59, 1.05)	0.73** (0.63, 0.86)	0.68* (0.49, 0.94)
Mother's age, y	1.00 (0.95, 1.04)	1.02 (0.96, 1.08)	0.97 (0.93, 1.02)	0.98 (0.95, 1.01)	1.01 (0.98, 1.04)	0.98 (0.95, 1.01)	0.98* (0.97, 1.00)	0.98* (0.95, 1.00)
Out-of-wedlock birth	1.49 (0.58, 3.82)	0.62 (0.13, 2.86)	0.88 (0.36, 2.16)	0.81 (0.40, 1.65)	0.77 (0.40, 1.49)	1.53 (0.85, 2.74)	0.79 (0.58, 1.07)	1.21 (0.77, 1.90)
Mother married	0.87 (0.28, 2.70)	2.51 (0.37, 17.19)	0.91 (0.41, 2.02)	0.60 (0.25, 1.46)	0.63 (0.25, 1.54)	1.33 (0.64, 2.75)	0.91 (0.61, 1.36)	0.66 (0.34, 1.29)
Mother lives with father	1.56 (0.72, 3.39)	0.80 (0.26, 2.45)	1.32 (0.81, 2.17)	0.98 (0.55, 1.74)	1.17 (0.62, 2.20)	0.70 (0.43, 1.16)	0.95 (0.72, 1.25)	0.72 (0.46, 1.12)
No. children	1.16 (0.90, 1.50)	1.06 (0.71, 1.58)	0.93 (0.78, 1.11)	1.24* (1.03, 1.49)	1.33** (1.08, 1.65)	1.14 (0.96, 1.36)	1.00 (0.91, 1.11)	1.02 (0.87, 1.19)
Black (ref. White)	1.68 (0.66, 4.26)	1.01 (0.34, 2.96)	3.33** (1.59, 6.97)	0.98 (0.58, 1.65)	0.99 (0.57, 1.73)	3.06** (1.90, 4.92)	1.09 (0.85, 1.40)	0.82 (0.57, 1.19)
Hispanic (ref. White)	2.20 (0.80, 6.04)	1.12 (0.33, 3.78)	4.15** (1.83, 9.42)	1.19 (0.66, 2.15)	1.89* (1.03, 3.50)	3.12** (1.84, 5.31)	1.00 (0.76, 1.32)	1.07 (0.71, 1.61)
Other race (ref. White)	3.20 (0.73, 13.94)	3.18 (0.44, 22.75)	2.71 (0.59, 12.36)	1.58 (0.56, 4.52)	1.96 (0.69, 5.59)	2.04 (0.81, 5.10)	1.06 (0.63, 1.77)	1.25 (0.61, 2.56)
Mother is immigrant	4.60** (2.18, 9.70)	0.91 (0.27, 3.05)	0.20** (0.09, 0.45)	0.51* (0.27, 0.94)	1.01 (0.59, 1.73)	2.97** (1.72, 5.14)	0.69** (0.53, 0.90)	0.97 (0.65, 1.44)
Mother graduated high school (ref. <high school)	0.47** (0.27, 0.82)	1.29 (0.64, 2.63)	0.82 (0.51, 1.33)	0.87 (0.62, 1.23)	0.65* (0.45, 0.94)	1.14 (0.84, 1.55)	1.01 (0.85, 1.20)	0.97 (0.75, 1.26)
Mother has >high school (ref. <high school)	0.26** (0.12, 0.59)	0.75 (0.29, 1.98)	0.72 (0.39, 1.34)	0.49** (0.30, 0.80)	0.32** (0.19, 0.53)	0.49** (0.33, 0.72)	0.73** (0.59, 0.91)	1.02 (0.73, 1.42)
Household income (Log)	0.96 (0.82, 1.13)	0.86 (0.64, 1.16)	0.99 (0.87, 1.12)	0.99 (0.88, 1.12)	1.13 (0.98, 1.29)	1.02 (0.90, 1.15)	0.95 (0.89, 1.01)	1.03 (0.92, 1.14)
TANF or food stamps	2.25* (1.14, 4.46)	0.70 (0.26, 1.86)	1.19 (0.78, 1.82)	1.43 (0.88, 2.33)	1.00 (0.60, 1.69)	1.11 (0.73, 1.68)	1.07 (0.85, 1.34)	0.86 (0.60, 1.25)
Disability or SSI	0.98 (0.13, 7.23)	0.32 (0.02, 5.10)	0.82 (0.21, 3.23)	1.29 (0.29, 5.66)	0.54 (0.10, 2.84)	1.41 (0.36, 5.57)	0.82 (0.38, 1.80)	1.29 (0.42, 3.96)
Medicaid enrollment	0.91 (0.45, 1.85)	6.09** (1.69, 21.96)	1.21 (0.76, 1.91)	0.79 (0.47, 1.35)	0.97 (0.56, 1.68)	1.15 (0.74, 1.79)	1.30* (1.01, 1.66)	1.45 (0.97, 2.18)
Family to ask for babysitting	1.16 (0.59, 2.28)	1.45 (0.52, 4.07)	1.11 (0.68, 1.82)	0.91 (0.54, 1.52)	0.85 (0.49, 1.47)	1.05 (0.65, 1.69)	1.53** (1.16, 2.01)	1.22 (0.78, 1.90)
Family to ask for loan	1.48 (0.78, 2.83)	0.98 (0.38, 2.50)	0.91 (0.58, 1.44)	0.86 (0.53, 1.39)	1.01 (0.62, 1.66)	0.96 (0.62, 1.48)	1.11 (0.86, 1.43)	0.93 (0.62, 1.40)
Mother's health fair or poor	1.87* (1.07, 3.29)	0.66 (0.25, 1.73)	0.91 (0.58, 1.44)	0.56* (0.34, 0.93)	0.57* (0.34, 0.96)	0.88 (0.57, 1.38)	0.99 (0.77, 1.27)	0.98 (0.67, 1.45)
Domestic violence	1.53 (0.64, 3.66)	0.27 (0.07, 1.15)	0.78 (0.43, 1.44)	1.59 (0.84, 3.01)	1.42 (0.74, 2.75)	1.88* (1.05, 3.34)	0.92 (0.66, 1.29)	1.15 (0.68, 1.94)
Drug use during pregnancy	0.74 (0.32, 1.69)	1.47 (0.55, 3.91)	1.00 (0.38, 2.64)	0.88 (0.53, 1.47)	0.82 (0.46, 1.46)	0.85 (0.51, 1.43)	0.74 (0.51, 1.09)	1.00 (0.67, 1.50)
Smoked during pregnancy	1.13 (0.57, 2.22)	1.10 (0.45, 2.64)	1.11 (0.62, 1.97)	0.96 (0.62, 1.49)	0.89 (0.54, 1.46)	1.03 (0.71, 1.49)	0.97 (0.80, 1.18)	1.01 (0.73, 1.40)
Drank during pregnancy	1.38 (0.54, 3.56)	0.89 (0.23, 3.39)	0.85 (0.36, 2.02)	0.89 (0.45, 1.75)	1.12 (0.59, 2.10)	1.01 (0.52, 1.98)	1.30 (0.96, 1.77)	1.27 (0.80, 2.02)
Prenatal care begun in 2nd or 3rd trimester	1.00 (0.40, 2.52)	0.50 (0.18, 1.39)	1.61 (0.89, 2.91)	1.37 (0.83, 2.26)	1.01 (0.60, 1.71)	1.24 (0.82, 1.90)	1.13 (0.90, 1.43)	1.08 (0.73, 1.61)
Mental illness before pregnancy	1.07 (0.97, 1.18)	1.05 (0.91, 1.22)	0.96 (0.89, 1.03)	1.06 (0.99, 1.15)	1.07 (0.99, 1.16)	1.00 (0.93, 1.07)	0.99 (0.96, 1.03)	1.06 (1.00, 1.13)
Mother's depression	1.08 (0.58, 2.02)	1.08 (0.51, 2.30)	0.86 (0.57, 1.28)	0.95 (0.67, 1.36)	0.85 (0.57, 1.26)	1.01 (0.76, 1.33)	0.88 (0.75, 1.02)	0.78 (0.56, 1.10)
Low birth weight	4.20** (1.92, 9.22)	2.18 (0.74, 6.44)	3.05** (1.34, 6.94)	1.46 (0.82, 2.59)	0.99 (0.52, 1.90)	1.61 (0.96, 2.68)	1.18 (0.88, 1.58)	2.21** (1.48, 3.30)
Any abnormal infant health	0.76 (0.33, 1.78)	1.57 (0.46, 5.36)	1.70 (0.59, 4.92)	0.98 (0.53, 1.82)	0.91 (0.45, 1.84)	1.03 (0.61, 1.72)	1.21 (0.88, 1.68)	0.80 (0.51, 1.23)
Serious abnormal infant health condition	1.31 (0.73, 2.37)	3.34 (0.94, 11.85)	1.13 (0.66, 1.94)	1.20 (0.88, 1.65)	0.95 (0.65, 1.38)	1.24 (0.89, 1.73)	0.86 (0.73, 1.01)	1.18 (0.83, 1.68)
No. children	2515	2342	2331	2140	2140	1625	2445	2445
No. observation	6079	3702	4891	3459	3459	2495	5211	5216

Note. CBCL = Child Behavior Checklist; CI = confidence interval; ED = emergency department; OR = odds ratio; PPVT = Peabody Picture Vocabulary Test; SSI = Supplemental Security Income; TANF = Temporary Aid for Needy Children. For the time-varying variables, odds ratios on the deviations from the mean are presented. Specifications also include controls for means of time-varying variables and variables indicating interview wave.

* $P < .05$; ** $P < .01$.

health care use. Black and Hispanic children were much more likely than White children to have asthma and a below-average PPVT score. Female children were in better health than male children; they were less likely to have asthma, emotional distress as measured by the CBCL Internalizing scale, and an ED visit or hospitalization. Children of immigrant mothers

were less likely to have asthma, behavioral problems, and an ED visit but more likely to have worse mother-rated health and a below-average PPVT score.

Higher mother's education was associated with decreased odds of having worse mother-rated health, CBCL scores in the clinical range, below-average PPVT scores, and an ED visit.

Receipt of TANF or food stamps was associated with increased odds of worse mother-rated health, and Medicaid enrollment was associated with increased odds of reported physical disabilities and an ED visit. A greater level of family support was associated with increased odds of an ED visit. Mother's self-rated fair or poor health status significantly increased the

odds that she rated the child's health as fair or poor but reduced the odds of behavioral problems. Mother's experience of domestic violence was associated with increased odds of below-average PPVT scores. Finally, children who had a low birth weight were more likely to have fair or poor health, asthma, and a hospitalization.

DISCUSSION

This study was the first prospective cohort study providing estimates of homelessness and doubled-up episodes for young children on the basis of a large, multicity sample and examining the impact of housing status on child health, mental health, cognitive development, and health care use.

Of young, low-income children, 9.8% experienced homelessness and an additional 23.6% had a doubled-up episode. Prior research based on municipal shelter data estimated that over a 3-year period in the early 1990s, 13.6% of poor children younger than 18 years stayed in shelters in Philadelphia; in New York City, 11.2% of such children did.³⁰ Given that children younger than 6 years old are overrepresented among homeless children, the rate of homelessness we report appears to be low. Although, unlike previous studies that focused on families staying in shelter settings, the FFS identified homeless episodes by asking whether a family lived in temporary housing, in a shelter, or in a place not meant for human habitation (e.g., the streets, abandoned buildings, and automobiles), respondents' self-reported homelessness experiences might be underreported. We should also note that although the denominator of the prevalence rate in previous research (i.e., poverty population) was based on a single-point-in-time measure and did not capture the number of people experiencing poverty over time, the rate in our study is based on those in poverty at any of the 3 follow-up waves in 20 large cities.

Both homelessness and doubled-up episodes did not have a significant adverse effect on young children's physical and mental health or cognitive development. A set of stressors common to many children in poverty, rather than housing status, contributed to poor child health and development. The findings highlight the importance of family environment with

regard to children's health and development, as shown by associations of child health, mental health, and cognitive development with mother's education level and immigrant status, child's poor health with mother's poor health, and children's lagged cognitive development and exposure to domestic violence. These findings suggest that health and social service professionals need to identify and respond to parental and family needs for support services in addition to housing assistance to effectively improve the health and development of children who experience residential instability, particularly children in homeless families.

Homelessness is often considered a more aggravated type of residential instability than doubling up with relatives and friends. Homeless families are more likely than doubled-up families to be Black and have a lower level of family support. Mothers in the homeless group had distinctively worse health and health behaviors than those in the doubled-up group, who were in turn worse off than counterparts in the housed low-income group. This discrepancy may be partly explained by the likelihood that homeless mothers have more exposure to residential instability and stressful life events than others, resulting in greater effects on their health and health behaviors. These findings suggest the great need for health and social services for household heads of homeless families. However, the differences between children in the homeless and doubled-up groups with regard to health, mental health, cognitive development, and health care use were negligible or moderate.

We also demonstrated the lingering effects of low birth weight on children's subsequent health and development. In particular, low birth weight made a significant contribution to poor health status, asthma, and a greater likelihood of hospitalization. These findings indicate that pregnant women who are homeless or at risk of becoming homeless and their children need to be targeted for screening and assessment of health risks.

This study has several limitations. First, although the sample included a cohort of children born in 20 jurisdictions, the data do not include rural areas in which families and children might have different sociodemographic characteristics, health care needs, and access to care. Second, we did not examine the

roles of the length of homeless and doubled-up episodes on children's health because we lacked such information. Third, although we used the hybrid method to control for stable, unobserved characteristics, the model did not control for time-varying, unmeasured characteristics that might be associated with homelessness and health outcomes. Last, following up on a cohort of children from birth to 5 years old, we focused on the relationship of housing status to child health and development for young children. Future research is warranted to clarify the relationship for older children and youths.

Because the number of homeless families with children has climbed continuously in many areas of the country in recent years,^{31,32} a clear understanding of homeless-specific and other poverty-related effects on children's health outcomes is important. We demonstrated that although homelessness per se has limited direct effect on young children's health outcomes, the family environment common among low-income families and infant health conditions were associated with poor health and cognitive development and high health care use by young children, thus contributing to guiding the direction of interventions to effectively and efficiently identify and address the health care needs of low-income children experiencing housing instability. ■

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Contributors

J.M. Park conceptualized the study, developed the study design, and led the writing of the article. A.R. Fertig conducted the analysis and contributed to the writing of the article. P.D. Allison consulted on data analysis and contributed to revisions.

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Human Participant Protection

This study was approved by the institutional review boards at the University of Illinois at Urbana–Champaign and the University of Georgia.

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