

Cityscape

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Development and Research*

THE HOUSING-HEALTH CONNECTION
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U.S. Department of Housing and Urban Development
Office of Policy Development and Research

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Symposium

The Housing-Health Connection

Guest Editors: Veronica Helms Garrison and Craig Evan Pollack

Guest Editors' Introduction

The Health-Housing Nexus: New Answers to Key Questions

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The views expressed in this introduction are those of the guest editors and do not represent the official positions or policies of the Office of Policy Development and Research, the U.S. Department of Housing and Urban Development, or the U.S. government.

The link between housing and health is far reaching and complex. Historically, the housing-health nexus has been primarily associated with physical exposures and dilapidated housing; however, recent studies suggest that adverse health outcomes are also linked to housing rental assistance status, housing insecurity, a lack of affordable housing, and neighborhood quality.

Substandard, unaffordable housing and stalled community development represent important public health challenges facing millions of American families, and disentangling the complex relationships between housing and health is crucial for policymakers. This Cityscape symposium adds to the current body of evidence highlighting the relationship between health and housing. Throughout this issue, the authors examine innovative approaches to addressing cross-sector policies and programs that promote the utilization of housing as a platform to improve quality of life.

The following 10 articles begin to answer key questions pertinent to housing and health. The first three articles examine the health impact of interventions targeting specific aspects of housing. The next three articles highlight state and local efforts designed to bridge the divide between housing and health. The last four articles provide new qualitative and quantitative evidence exploring the link between housing and health. Specifically, the articles explore the following topics and questions.

Evaluations of the Health Impact of Housing-Based Interventions

1. **Does providing supportive services in housing developments reduce Medicare spending?** Kandilov et al. (2018) used Medicare claims data and a difference-in-difference study design to investigate Vermont's Supportive and Services at Home program. They found that, although the program was not associated with lower healthcare spending overall, Medicare expenditures declined in a subset of developments.
2. **Does the placement of community health workers in assisted housing developments promote positive health outcomes?** By studying the implementation of community health workers in two subsidized housing developments, Freeman et al. (2018) found that a large majority of residents reported meeting their goals, expressed improved overall well-being, and stated satisfaction with the program.
3. **Can work requirements promote self-sufficiency? What are the health consequences of these requirements?** Using a mixed-methods approach, Frescoln et al. (2018) explored the use of work requirements in public housing and its impact on residents' overall well-being. The authors suggest that, when work requirements are implemented alongside case management, these initiatives can increase residents' employment, albeit with potential negative impacts on receipt of food assistance and Medicaid enrollment.

State and Local Efforts To Bridge the Divide Between Housing and Health

4. **How do state and local housing programs address the relationship between housing assistance and health?** Bailey, Bailey, and Rice (2018) provided an indepth analysis regarding the development of 19 state- and locally funded rental assistance programs in two cities and eight states, showing how these programs promote housing affordability and address the complex housing and health relationship.
5. **How can housing developers incorporate public health throughout the design process?** De Scisciolo, Egger, and Ayala (2018) detailed a pilot study in which five community development corporations partnered with public health professionals to create Health Action Plans. Results indicate the potential for these plans to help prioritize health in the development process.
6. **To what extent are public housing authorities currently partnering to support the health and well-being of U.S. Department of Housing and Urban Development-assisted individuals and families?** Through a survey of housing authorities, Lucas (2018) explored how large public housing authorities promote resident and community health for assisted tenants. Housing authorities reported high engagement with public health entities and community-based social and human service providers, but housing authorities also reported limitations in funding, staffing, and data sharing.

New Qualitative and Quantitative Evidence Examining the Link Between Housing and Health

7. **What are the mechanisms through which subsidized housing might impact chronic disease management?** Using qualitative interview data to examine the transition into assisted housing, Keene et al. (2018) found that receipt of rental assistance was accompanied by improvements in diabetes self-management.
8. **How does homelessness during infancy impact maternal and child health?** Cutts et al. (2018) found that homelessness during infancy is a risk for adverse infant and maternal health and hardship. The authors identified that homelessness during infancy was significantly associated with higher developmental risk and, for mothers, worse overall health and depressive symptoms.
9. **Does receipt of housing assistance impact health behaviors?** Through the analysis of panel survey data, Antonakos and Colabianchi (2018) found that moving to assisted housing was linked with higher rates of smoking initially but not at long-term followup. No association was observed for several other health behaviors.
10. **How does housing vacancy impact population health?** Wang and Immergluck (2018) observed that higher numbers of vacant homes is significantly associated with adverse health outcomes in the neighborhood. This link between housing vacancy and neighborhood health varied according to whether the metropolitan area was experiencing strong or weak growth.

We hope that the research presented in this symposium will stimulate innovative ideas about how the housing and health sectors can partner at the national, state, and local levels to promote secure housing and foster individual and population health.

Guest Editors

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The Impact of the Vermont Support and Services at Home Program on Healthcare Expenditures

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Abstract

- *Objective:* The Support and Services at Home (SASH) program in Vermont aims to coordinate care and assist participants in accessing the health care and support services they need to maintain their health and age comfortably and safely in their homes. Most program participants are residents of U.S. Department of Housing and Urban Development (HUD)-assisted properties or Low-Income Housing Tax Credit (LIHTC) properties. Our objective is to estimate the impact of the first 5 1/2 years of the SASH program on the Medicare expenditures of these participants.
- *Methods:* We use a difference-in-differences model, comparing the change in the expenditures among the SASH participants with the change in the expenditures for a comparison group of Medicare beneficiaries in HUD-assisted or LIHTC properties that did not host the SASH program.

Abstract (continued)

- *Results: Our findings indicate that participants—particularly dual-eligible participants—in SASH panels that are overseen by the Cathedral Square Corporation, and in the subset of those panels that are in an urban county, experience slower growth in total Medicare expenditures and expenditures for hospital care, emergency department visits, and specialist physician visits relative to the comparison group.*
- *Conclusions: Although we do not find that the SASH program has a significant impact on Medicare expenditures for all participants in our sample, the favorable results among a subset of panels, containing nearly one-half of the SASH participants in HUD-assisted or LIHTC properties, provides evidence that a housing-plus-services model has the potential to slow the growth of healthcare costs.*

Introduction

Older adults prefer to live independently in their own homes for as long as possible (Oswald et al., 2010). Advancing age, however, increases the likelihood of chronic illness, frailty, and disability and consequently places some older adults in greater need of health and long-term services and supports (LTSS; see AARP, 2009; Redford and Cook, 2001). To continue to live independently, older adults may need access to in-home support services and housing that can be adapted to their growing needs (Lawton, 1976).

Living independently as they age may be particularly difficult for lower-income older adults, with fewer resources for support and greater healthcare needs. A recent analysis has shown that tenants assisted by U.S. Department of Housing and Urban Development (HUD) programs have more health problems than unassisted low-income adults, including significantly greater odds of poor general health, disability, and several chronic conditions (Helms, Sperling, and Steffen, 2017).

Taking advantage of the colocation of large numbers of older adults in publicly assisted, multiunit rental properties could help these low-income adults better address their health and functional challenges. Organizing a system of health and LTSS around this type of housing has many potential benefits. Economies of scale can be achieved in organizing, delivering, and purchasing services. Publicly assisted, service-enriched housing also enables onsite staff to observe and respond to residents' health and supportive services needs as they arise. Recent research shows that older residents living in housing with onsite service coordinators had significantly lower odds of being hospitalized than residents in housing without service coordinators (Sanders et al., 2014). Incorporating the surrounding community into service-enriched housing strategies may result in improved health and lower healthcare and LTSS costs among residents.

The Support and Services at Home (SASH) program in Vermont is designed to promote greater care coordination for a high-cost population of older adults and individuals with disabilities living in affordable housing properties. The program's unique contribution is its use of teams embedded in properties as a platform to connect residents to health services and social supports in the community. A full-time SASH coordinator and a quarter-time SASH wellness nurse together serve each panel of approximately 100 participants. The SASH program launched in July 2011 and by December 2016 had expanded into 54 panels in nonprofit affordable housing properties throughout Vermont.

When a participant first enrolls in SASH, the SASH coordinator and wellness nurse complete a comprehensive assessment of health conditions, medications, and support services currently used or needed. This assessment, updated annually, helps the SASH coordinator to identify the health and service needs of the individual and to target group programming toward common needs across the panel. To connect participants to resources in the community, the SASH coordinator and wellness nurse partner with local service provider organizations, such as home health agencies, councils on aging, and community mental health organizations. SASH participants consent to share their healthcare information with the SASH staff, community partners, and healthcare providers, which allows the SASH staff to work with the participants' healthcare providers to ensure proper medication usage, successful hospital discharges, and overall coordination and continuity of care.

The SASH program is a statewide initiative coordinated at the state, regional, and local levels. The nonprofit housing provider Cathedral Square Corporation (CSC) developed the SASH program and oversees the program at the state level, coordinating program expansion and training. At the regional level, six Designated Regional Housing Organizations (DRHOs) are responsible for overseeing the SASH program in their geographic regions. The program is delivered at the community level through the SASH panels, which are operated by more than 20 affordable housing organizations in their properties, called *SASH sites*.¹ HUD, the Low-Income Housing Tax Credit (LIHTC) program, the U.S. Department of Agriculture Rural Development, the State of Vermont, or a combination of agencies fund the participating housing properties.

The SASH program is available to all residents in the SASH sites—we refer to residents who enroll as *site-based participants*. SASH is also available to any Medicare beneficiary living in the surrounding community; participants who are not living in a SASH site are called *community participants*. Most SASH panels have both site-based and community participants. Panels with more site-based participants are called *site-based panels*. Those with more community participants are referred to as *mixed panels*. Our analysis includes only the site-based participants from site-based or mixed panels, who constitute 55 percent of all SASH participants. Using a comparison group of similar Medicare beneficiaries, we estimate the impact of the SASH program on multiple categories of Medicare expenditures.

¹ A complete list of housing organizations participating in SASH is available at <http://sashvt.org/admin/>.

Data and Methodology

As of December 2016, 5,386 individuals had at least one quarter of participation in SASH. We linked the CSC list of SASH participants to the housing assistance databases from HUD to identify the participants who were living in the SASH sites. The housing records come from three separate HUD databases and cover the years from 2012 to 2016. The Tenant Rental Assistance Certification System is the database for all properties in programs run by HUD's Office of Multifamily Housing (Section 202, Section 236, Section 8, and so on); the Public and Indian Housing Information Center (PIC) is the database for public housing and Housing Choice Vouchers; and LIHTC is the database for low-income housing developed through tax credits. We further linked the participant data with Medicare fee-for-service (FFS) enrollment data. The 2,986 SASH participants found in both Medicare FFS enrollment and HUD housing databases are included in this analysis.

For the comparison group, we identified Medicare beneficiaries who were not participating in the SASH program and cross-referenced them with HUD housing records to identify beneficiaries who were living in HUD-assisted or LIHTC housing properties that did not host the SASH program. Only nonprofit properties could host the SASH program; also, non-SASH properties had fewer senior residents than the SASH properties (Kandilov et al., 2017). Those who met the comparison group criteria were 3,437 beneficiaries.

Exhibit 1 shows the demographic and health characteristics of the SASH participants and the comparison group, as well as their average monthly Medicare expenditures. Some significant differences in characteristics emerge between the SASH participants and the comparison group. The SASH participants are, on average, 8.5 years older than the comparison group and have smaller households and lower household incomes. A larger proportion of comparison group beneficiaries originally qualified for Medicare due to disability, and a larger proportion are living in LIHTC properties. Because these characteristics may be correlated with healthcare expenditures, we use propensity score matching techniques to balance these covariates between the SASH participants and the comparison group and to increase the comparability of the two groups.

We estimate a propensity score using a logistic regression model to predict the probability of participating in the SASH program, where SASH participation is the dependent variable and beneficiary characteristics prior to SASH enrollment—age, race, gender, income, household size, property type, qualified for Medicare due to disability, Medicaid enrollment (dual eligible), hierarchical condition categories (HCC) risk score, and Charlson index—are the independent variables. The HCC risk score is interpreted as the predicted healthcare costs relative to the average Medicare FFS beneficiary. The Charlson comorbidity index is a mortality predictor that sums across a list of 18 chronic conditions; a higher Charlson score indicates the presence of more chronic conditions. Both the HCC risk score and the Charlson score are created using diagnosis codes on claims in the year before the start of the SASH program. Each SASH participant is matched to up to five comparison beneficiaries with the closest propensity scores. We match with replacement and adjust the weights for comparison

Exhibit 1

Characteristics of SASH Participants and Comparison Group

Demographic and Health Status Characteristics	SASH Participants	Comparison Group
Total beneficiaries (n)	2,986	3,437
Demographics		
Mean age (years)	69.2	60.7
Age ≤ 64 (%)	32.9	54.4
Age 65–74 (%)	29.8	20.6
Age ≥ 75 (%)	37.3	24.9
White (%)	97	95
Female (%)	68	65
Originally qualified for Medicare due to disability (%)	42	57
Mean household income (\$)	16,435	17,369
Mean household size (n)	1.14	1.43
Medicaid eligible (%)	53	53
Property type		
LIHTC only (%)	19.02	52.17
PIC or TRACS	73.04	47.83
Unknown	7.94	0.00
Mean monthly Medicare expenditures (\$)		
Total Medicare	812.60	766.75
Acute care	285.15	254.32
Postacute care	92.32	78.92
Emergency room	41.14	38.16
Hospital outpatient department	143.40	156.32
Primary care physician	25.35	28.68
Specialty physician	51.24	55.12
Hospice	8.19	7.22

LIHTC = Low-Income Housing Tax Credit. PIC = Public and Indian Housing Information Center. SASH = Support and Services at Home. TRACS = Tenant Rental Assistance Certification System.

Notes: Beneficiary characteristics determined in the year prior to the start of the SASH program (June 2010 through July 2011). Monthly Medicare expenditures averaged across all data used in the analysis, January 2006 through December 2016.

beneficiaries who are matched to multiple SASH participants. Further, the weights for both the comparison group and the SASH participants (who start with a weight of 1) are adjusted to account for their Medicare eligibility within the quarter.

SASH enrollment took place on a rolling basis, with most participants joining the program months or even years after the official start of SASH in July of 2011. To account for this rolling entry, we separated SASH participants into cohorts based on the calendar quarter when they started receiving services. To mimic this rolling entry among the comparison group, control beneficiaries were assigned to a quarter's cohort only if they were alive and Medicare eligible at that point in time. Unlike in the treatment group, in which cohorts are based on enrollment and are mutually exclusive, comparison beneficiaries can be assigned to multiple cohorts based on their longevity and continued Medicare eligibility. This difference is necessary to mimic the trajectory of the treatment group, whose staggered enrollment guarantees a certain longevity after the official start of the program and prevents us from comparing the costs of SASH participants who joined the program in 2014 with those comparison group beneficiaries who died in 2012 or 2013.

This analysis uses a differences-in-differences model to estimate the impact of the SASH program on per-beneficiary-per-month (PBPM) Medicare expenditures. PBPM expenditures

are calculated by dividing quarterly expenditures for each beneficiary by 3, which reduces the proportion of the observations that are zeros compared with actual PBP expenditures. The calculated monthly amount is therefore preferable to actual monthly expenditures for a linear regression analysis. We estimate the following equation using ordinary least squares (OLS)—

$$Y_{it} = \alpha_0 + \alpha_t + \alpha_p + \beta_1 X_{it} + \beta_2 \text{Blueprint}_i + \beta_3 \text{MAPCP}_i + \beta_4 \text{Att}_{it} + \gamma_1 \text{Cohort}_{i1} + \gamma_2 \text{Cohort}_{i2} \dots + \gamma_C \text{Cohort}_{iC} + \beta_5 \text{SASH}_i + \beta_6 \text{Demo}_{it} + \varepsilon_{it} \quad (1)$$

In the previous equation, the subscript i identifies each beneficiary and the subscript t identifies the time period (quarter). The dependent variable, Y_{it} , denotes the outcome for the i th beneficiary in quarter t . The intercept is α_0 . We include two sets of fixed effects; α_t ($t = 1, 2, \dots, T$) are quarterly fixed effects that control for average trends in outcomes across time for all beneficiaries, and α_p ($p = 1, 2, \dots, P$) are property fixed effects that control for property characteristics that do not change across time but could be correlated to healthcare expenditures (such as distance to the nearest hospital). Beneficiary-level demographic characteristics prior to SASH enrollment—age, race, gender, income, household size, and property type—and beneficiary-level healthcare characteristics prior to SASH enrollment—qualified for Medicare due to disability, Medicaid eligibility (dual eligible), HCC risk score, and Charlson comorbidity score—are included in X_{it} . The error term is denoted ε_{it} .

The state of Vermont initiated a medical home program for primary care practices, called Blueprint for Health, which later expanded as part of the Multi-Payer Advanced Primary Care Practice (MAPCP) Demonstration. Primary care practice participation in these initiatives could affect healthcare expenditures, and so we include time-invariant indicator variables Blueprint_i and MAPCP_i to denote beneficiaries whose recent primary care practice (based on frequency of visits) participated in these programs. The variable Att_{it} ($= 0, 1$) is an indicator that equals 1 starting in the quarter that a beneficiary was first assigned to a MAPCP practice. MAPCP_i , Blueprint_i , and Att_{it} are independent of SASH participation (and often unknown to the participant). Indicators for the cohorts (described previously) are represented by the variables Cohort_{i1} , Cohort_{i2} , ... Cohort_{iC} , where C equals the total number of cohorts in the analysis to date.

The variable SASH_i is equal to 1 in all time periods for SASH participants and is equal to 0 in all time periods for the comparison beneficiaries. The variable Demo_{it} denotes quarters after SASH participants joined the program and its coefficient (β_6) is the outcome of interest, the estimate of the impact of the SASH program on Medicare expenditures. This coefficient is interpreted as the difference between SASH and comparison beneficiaries with respect to their average change in outcomes between before and after periods. A *negative* value corresponds to a *slower rate of change* in expenditures among SASH participants relative to comparison beneficiaries. Among this population of older and disabled adults, healthcare costs generally are increasing over time, so a negative coefficient typically indicates that the average outcomes increased among both groups but at a slower rate among SASH participants. Conversely, a *positive* value corresponds to a *faster rate of change* in expenditures among SASH participants relative to comparison beneficiaries, which typically indicates that average outcomes increased among both groups but at a slower rate among comparison beneficiaries. A negative coefficient indicates that the SASH program had a favorable impact on Medicare expenditures.

Results

The results reported in exhibit 2 are denominated at the PBPM level. In the first column, we see that the SASH program does not have a significant impact on the entire sample of site-based SASH participants. The ability of the SASH program to have a significant impact on Medicare expenditure growth, however, may be enhanced or hindered by certain characteristics of the individual SASH panels. For example, panels with a larger proportion of community participants may be less effective at slowing the growth of Medicare expenditures because the coordinator and wellness nurse may not have the same level of interaction with participants who are not living in the SASH site, and the need to travel to many community participants may further reduce the limited number of wellness nurse hours (10 hours per week). We hypothesized that certain types of SASH panels would have participants who demonstrated more favorable or less favorable outcomes. The panel characteristics we tested were as follows—

1. Site-based panels versus mixed panels—for site-based panels, more than 50 percent of SASH participants are living in a HUD-assisted or LIHTC housing property that is hosting the SASH program, whereas for the mixed panels more than 50 percent of participants are living in the community. Site-based panels may perform better because most of the participants have easy and more regular in-person access to the SASH staff in the host property. Note, even in the mixed panels, the SASH participants included in the analysis are the ones living in the HUD-assisted or LIHTC host property, not the participants living in the community.
2. CSC DRHO panels versus other DRHO panels—the statewide administrator for the SASH program, CSC, also serves as one of the six DRHOs that oversee the SASH program. A substantial portion (48 percent) of SASH participants in our sample are in panels in the CSC DRHO. Most CSC DRHO panels were established in the first year of the SASH program and thus have more experience. These panels have fewer community participants, and most are in urban areas where travel time is less of a constraint on the SASH staff. CSC panels also benefited earlier than other panels from an additional level of support provided by SASH team leaders.
3. Urban panels versus rural panels—the urban panels are those in Chittenden County, whereas rural panels are in all other counties. Urban areas tend to have more community resources that can be tapped to aid the SASH participants. Also, rural panels require that SASH staff travel long distances to reach their participants. Note that the urban panels are a subset of the CSC DRHO panels.

Our results in exhibit 2 indicate that the SASH program has no significant impact, on site-based panels or on mixed panels, for total Medicare expenditures or for any of the seven subcategories of Medicare expenditures. Despite our hypothesis that a larger proportion of community participants in a panel could reduce the impact of the SASH program, we find no significant impact of the SASH program on the site-based participants in the site-based panels.

In the fourth and fifth columns of exhibit 2, we consider separately the impact of the SASH program among site-based participants in CSC DRHO panels and in other DRHO panels. Among CSC DRHO panels, the SASH program is associated with \$91.59 PBPM lower cost

Exhibit 2

Difference-in-Differences Per-Beneficiary-Per-Month Estimates for Eight Categories of Medicare Expenditures, Comparing SASH Program Participants to Non-SASH Comparison Beneficiaries

	All SASH Partici- pants (n = 2,845)	Site- Based Panels (n = 2,166)	Mixed Panels (n = 679)	CSC DRHO Panels (n = 1,374)	Other DRHO Panels (n = 1,471)	Urban Panels (n = 1,122)	Rural Panels (n = 1,723)
Total Medicare	12.72 (42.56)	- 17.32 (46.61)	22.31 (75.16)	- 91.59* (46.37)	59.95 (50.49)	- 122.24* (48.74)	63.35 (47.51)
Acute care	- 2.82 (22.06)	- 23.01 (23.56)	15.08 (47.89)	- 56.63* (23.60)	21.82 (28.20)	- 70.64** (24.91)	21.40 (26.27)
Postacute care	16.79 (12.34)	12.07 (13.78)	17.43 (20.54)	- 8.78 (13.29)	31.71* (14.88)	- 16.81 (13.81)	32.10* (13.92)
Emergency room	- 3.67 (3.70)	- 5.04 (4.04)	- 3.93 (5.14)	- 9.84* (4.32)	- 0.87 (4.39)	- 12.48** (4.37)	0.03 (4.22)
Hospital outpatient department	- 8.68 (7.85)	- 5.77 (8.45)	- 20.90 (13.30)	- 8.51 (10.09)	- 9.97 (9.71)	- 7.71 (11.43)	- 9.96 (8.94)
Primary care physician	2.29 (1.48)	2.10 (1.73)	1.75 (2.38)	1.65 (1.36)	2.14 (2.41)	1.54 (1.51)	2.27 (2.14)
Specialist physician	- 3.34 (2.24)	- 4.48 (2.48)	- 3.66 (3.69)	- 6.83* (2.79)	- 1.92 (2.67)	- 6.70* (2.99)	- 2.55 (2.60)
Hospice care	- 0.25 (3.61)	- 0.90 (3.75)	- 2.24 (6.21)	4.19 (4.56)	- 6.50 (4.37)	4.29 (4.64)	- 4.84 (4.23)

* $p < .05$. ** $p < .01$.

CSC = Cathedral Square Corporation. DRHO = Designated Regional Housing Organization. SASH = Support and Services at Home.

Notes: Standard errors are in parentheses. Medicare Part A and Part B claims data from January 2006 through December 2016. The SASH program began in July 2011. Baseline data for each beneficiary looks back to January 2006, if available.

growth. Most of this lower cost growth is driven by the \$56.63 PBPM in lower acute care cost growth. The SASH program also has statistically significant favorable impacts on Medicare expenditures for emergency departments (-\$9.84 PBPM) and specialist physicians (-\$6.83 PBPM). No significant favorable impacts are on the Medicare expenditures of participants in the other DRHO panels.

In the sixth and seventh columns of exhibit 2, we divide the panels into urban and rural panels and consider the impact of SASH on those two types of panels separately. Among urban panels, the SASH program is associated with \$122.24 PBPM lower growth in total Medicare expenditures. Most of this lower cost growth is driven by the \$70.64 PBPM lower growth in acute care costs. The SASH program also has statistically significant favorable impacts on Medicare expenditures for emergency departments (-\$12.48 PBPM) and specialist physicians (-\$6.70 PBPM). No significant favorable impacts were found on the Medicare expenditures of participants in the rural panels.

In addition to our primary analysis presented in exhibit 2, we also conducted two robustness checks and two subgroup analyses to better highlight the populations where the SASH program has a favorable impact. In the first row of exhibit 3, we estimate the impact of the SASH program as in exhibit 2, but we topcode expenditures (that is, reassign the highest expenditure values) at the 99th percentile, to reduce the impact of outliers on the results. We

Exhibit 3

Difference-in-Differences Per-Beneficiary-Per-Month Estimates for Total Medicare Expenditures, Comparing SASH Program Participants to Non-SASH Comparison Beneficiaries, Robustness Checks and Subpopulations

	All SASH Partici- pants (n = 2,845)	Site-Based Panels (n = 2,166)	Mixed Panels (n = 679)	CSC DRHO Panels (n = 1,374)	Other DRHO Panels (n = 1,471)	Urban Panels (n = 1,122)	Rural Panels (n = 1,723)
Outliers trimmed at 99th percentile	9.76 (37.32)	- 11.35 (41.81)	8.12 (55.45)	- 88.47** (38.66)	61.95 (43.72)	- 110.88 *** (40.83)	60.20 (41.19)
General linearized model estimation	39.09 (48.20)	- 0.38 (52.53)	76.70 (83.84)	- 60.33 (47.71)	106.67 (60.32)	- 82.80 (48.59)	108.38 (57.41)
	(n = 1,345)	(n = 1,053)	(n = 292)	(n = 747)	(n = 598)	(n = 621)	(n = 724)
Medicare-only beneficiaries	12.20 (56.74)	- 8.57 (61.27)	- 11.89 (87.86)	- 69.63 (65.25)	63.90 (71.51)	- 108.19 (68.95)	80.15 (65.14)
	(n = 1,500)	(n = 1,1613)	(n = 387)	(n = 627)	(n = 873)	(n = 501)	(n = 999)
Dually eligible Medicare/ Medicaid beneficiaries	17.83 (50.06)	- 22.56 (51.83)	50.81 (104.65)	- 105.66* (54.76)	60.92 (61.53)	- 127.65 ** (56.67)	55.15 (58.91)

* p < .05. ** p < .01. *** p < .001.

CSC = Cathedral Square Corporation. DRHO = Designated Regional Housing Organization. SASH = Support and Services at Home.

Notes: Standard errors are in parentheses. Medicare Part A and Part B claims data from January 2006 through December 2016. The SASH program began in July 2011. Baseline data for each beneficiary looks back to January 2006, if available.

continue to find that the SASH program has a significant favorable impact on total Medicare expenditures for CSC DRHO panels and for urban panels. Another way to reduce the impact of outlier expenditure values is to estimate a general linearized model (GLM) instead of the OLS model employed elsewhere. In this specification (second row of exhibit 3), we find no significant impact of the SASH program. In the third row of exhibit 3, we consider the SASH participants who have only Medicare, whereas in the fourth row of exhibit 3, we report the results for dual-eligible SASH participants. We do not find a significant impact of the SASH program on the Medicare-only participants, but we do see significantly slower Medicare cost growth among the dual eligible in CSC DRHO and urban panels.

Limitations

Our methodological approach sought to limit the impact of selection bias by focusing on participants who lived in the housing properties where the SASH program was implemented and removing from the sample the community participants who enrolled in SASH on their own or were referred by their healthcare providers due to their healthcare needs. Some selection bias may remain, however, because not all residents of the SASH sites chose to participate in the program, and those who did sign up were older and had more comorbidities than those who did not participate (Kandilov et al., 2017).

We were unable to include Medicaid claims data; also, Medicare claims data for substance abuse disorders were redacted from research-identifiable files during the analysis period. To

the extent that SASH participants and the comparison group had similar levels of Medicaid expenditures, or similar levels of substance abuse disorder claims, these omissions should have little impact on our results. If the SASH program had a favorable effect on Medicaid expenditures or on expenditures for substance abuse disorder claims, then our results will understate the true effect of SASH of healthcare expenditures.

Finally, our analysis is limited to beneficiaries enrolled in Medicare FFS, excluding those with Medicare Advantage. Only 8 percent of Vermont's Medicare beneficiaries have Medicare Advantage (Jacobson et al., 2017).

Discussion

When we examine all SASH panels, and when we examine site-based panels and mixed panels separately, we find no evidence that the SASH program has a significant impact on any of the eight Medicare expenditure outcomes that we considered. Note that more than one-half of the SASH participants in the mixed panels are community participants excluded from the analysis.

We do find favorable impacts of the SASH program among CSC DRHO panels and among urban panels, which make up 48 and 39 percent of the sample, respectively. Note that all the urban panels, which are the panels in Chittenden County, are panels in the CSC DRHO but not all these CSC DRHO panels are in Chittenden County, which makes it difficult for us to separate the influence of these two characteristics. These results are robust to trimming the outliers, suggesting that the effectiveness estimates are not driven by only SASH participants with the highest expenditures. The results from the GLM do not provide evidence that the SASH program was able to reduce growth in Medicare expenditures, although the estimates do have the same sign and are of similar magnitude to the OLS estimates, but with larger standard errors. A possible reason for this lack of precision is that the gamma distribution used in the GLM specification might not fit the healthcare expenditures in our sample particularly well.

Why might CSC DRHO panels, and particularly those in Chittenden County, be more successful in reining in Medicare costs? In the site visits that our evaluation team conducted, we identified a few possible differences that could help to explain these results. The CSC panels benefited earlier from having an additional level of support and management, called SASH team leaders. The SASH team leader role was created to support the SASH coordinators and remove some of their administrative burden, enabling them to focus more time on SASH participants' care coordination and healthcare needs. SASH team leaders help organize events and programs, assist with resident issues, and aid with documentation. Although this team leader role has now been implemented throughout the SASH program, during much of the analysis period only the CSC panels benefited from this additional support-management role. Also, our site-visit interviews revealed that the urban panels in Vermont tended to have access to more healthcare and social support services in their communities than those in rural areas. Chittenden County had multiple initiatives to coordinate and integrate care across service providers, which could contribute to the favorable impact of SASH found among these panels.

Finally, the significant impact of the SASH program on expenditures among dual-eligible participants but not among Medicare-only participants suggests that additional research on the program impact for the Medicaid population is warranted.

Conclusion

In the evaluation of the SASH program, our team explored whether coordinated services provided in an affordable housing setting affected healthcare costs for older adults and individuals with disabilities by examining total Medicare costs and many subcategories of Medicare costs to determine any shifts in healthcare utilization. In addition to these analyses, our evaluation incorporated a survey of SASH participants and interviews with SASH staff, stakeholders, and community partners.

When we compared all SASH participants living in properties hosting the SASH program to a comparison group of similar Medicare beneficiaries living in other HUD-assisted or LIHTC housing, we found no evidence that the SASH program had an impact on the growth in Medicare costs. However, for a subset of the SASH panels, namely those under the direction of CSC and those in Chittenden County, Medicare cost growth was significantly slower relative to the comparison group. Favorable impacts of the SASH program were particularly pronounced for dual-eligible participants.

Although slowed growth in Medicare costs is an important goal of the SASH program, the program also has other potential benefits. For example, SASH participants surveyed had higher self-reported physical function scores and less difficulty with medication management (Kandilov et al., 2017). Future work will examine the impact of the SASH program on Medicaid expenditures, because Medicare expenditures do not capture total health care costs for the dual eligible.

We have identified promising features of the SASH program that could provide baseline knowledge for establishing future housing-plus-services programs; we have also identified populations that experience favorable outcomes from this type of program. Using multidisciplinary teams embedded in affordable housing properties to link residents to healthcare and social service supports available in the community has the potential to help control expanding medical costs. Continuing research efforts should delve further into identifying the characteristics of care coordination initiatives in an affordable housing setting that are associated with achieving favorable outcomes for participants.

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A Pilot Community Health Worker Program in Subsidized Housing: The Health + Housing Project

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Abstract

- *Objectives:* We examine the implementation of a community health worker (CHW) program in subsidized housing, describe needs identified and priorities set by residents, and summarize participant-reported outcomes.
- *Methods:* Partnering with a local community-based organization, four bilingual CHWs recruited adult residents in one public housing building and one Section 8 building to participate in a 15-month intervention. Residents set health-related and life-improvement goals and developed an action plan for achieving them. CHWs used a motivational interviewing framework to help residents achieve their goals and connect them to case management, healthcare services, and other community resources. Prior to the intervention, surveyors approached every unit in both buildings for a baseline survey; 390 of an estimated 819 residents responded (47.6 percent). Of the 226 who completed an intake assessment with a CHW, 149 completed the program assessment questionnaire (65.9 percent).
- *Results:* Residents reported high levels of chronic disease, mental health issues, and low satisfaction with social relationships. 226 residents (61.3 percent female,

Abstract (continued)

29.7 percent age 65 years or older, and 68.6 percent Hispanic or Latino) completed an intake assessment with a CHW and received an average of 11 in-person visits. Most program assessment respondents reported partially or completely achieving their most important goal (82.0 percent). They also reported high levels of satisfaction with the CHW program (96.6 percent) and improved overall well-being (78.6 percent).

- *Conclusions: CHWs based in subsidized housing buildings encountered high levels of medical and social needs among residents. Improvements in self-reported well-being and high levels of satisfaction with the program suggest that such place-based initiatives may be effective in addressing health and its determinants.*

Introduction

More than 4 million people live in public housing or project-based Section 8 housing subsidized by the U.S. Department of Housing and Urban Development (HUD). Residents of these buildings are disproportionately racial or ethnic minorities, and more than 70 percent are extremely low income (HUD, 2016).¹ These factors are associated with significant health disparities and needs (Bor, Cohen, and Galea, 2017; Liao et al., 2011). Although recent research demonstrates that housing subsidies deliver health and economic benefits to low-income adults in the United States (Andersson et al., 2016; Fenelon et al., 2017; Simon et al., 2017), subsidized housing residents represent a relatively vulnerable group that experiences high rates of chronic disease (Digenis-Bury et al., 2008; Feinberg et al., 2015; Helms, Sperling, and Steffen, 2017). Some evidence shows that many residents are already sick when they enter subsidized housing (Ruel et al., 2010), and the environmental conditions in aging public housing buildings have been shown to increase the risk of illness, such as pediatric asthma (Northridge et al., 2010). The clustering of significant need in subsidized housing presents a potential opportunity to provide efficient place-based interventions to improve health, as having a high volume of concentrated need can facilitate targeted interventions.

A growing body of literature suggests the effectiveness of community health worker (CHW) models in improving health outcomes among vulnerable populations (Cosgrove et al., 2014; Islam et al., 2014a; Kangovi et al., 2017a; Margellos-Anast, Gutierrez, and Whitman, 2012). CHWs share cultural, linguistic, or other key characteristics with the communities they serve (Love, Gardner, and Legion, 1997). Interventions using CHWs or other lay health workers, such as community health advocates and peer navigators, have been successfully implemented in community and clinic settings alike (Islam et al., 2017; Kangovi et al., 2017a; Kim et al., 2016). However, few CHW programs have been implemented in subsidized housing, and those that exist have focused primarily on specific medical conditions or health behaviors (Brooks et al. 2017; Gutierrez Kapheim et al.,

¹ Defined as families whose incomes do not exceed the higher of the federal poverty level or 30 percent of Area Median Income (AMI).

2015; Levy et al., 2006; Lopez et al., 2017; Quintiliani et al., 2014; Rorie et al., 2011; Scammell et al., 2011; Sikkema et al., 2000; Slater et al., 1998; Zhu et al., 2002). Community-based CHWs are well positioned to help residents with a broader range of issues, especially given that social and economic factors, outside the healthcare system or a narrow disease-focused framework, drive a large share of overall health outcomes (Woolf and Braveman, 2011). For vulnerable low-income populations who experience cultural and communication barriers in accessing healthcare and social services, trusted community-based CHWs can act as a crucial bridge to these resources (Islam et al., 2017) and provide a better understanding of their clients' residential environments, including aspects that might shape health.

To our knowledge, no studies to date have examined a CHW intervention that is co-located in subsidized housing, is open to all residents regardless of health status, and addresses broadly defined resident health-related needs rather than specific diseases or behaviors. The Health + Housing Project was a pilot CHW program in subsidized housing that aimed to improve resident health by providing access to and information about medical care, addressing social determinants of health, and connecting residents to needed community resources. In this article, we answer the following research questions: (1) What were the health-related needs and priorities of subsidized housing residents? (2) Were residents willing to engage with a CHW and set health-related goals? (3) Did residents find the CHW intervention acceptable and helpful for meeting their health-related goals and improving their well-being? (4) What lessons learned can inform implementation of other CHW programs in subsidized housing?

Methods

The Health + Housing CHW intervention was conducted in two subsidized apartment buildings in the Lower East Side neighborhood of Manhattan, New York City (NYC). Community and governmental stakeholders and local housing providers assisted in selecting the buildings. One building is owned and operated by the city public housing authority and the other is a privately owned Section 8 building.² Together, the buildings comprise 450 apartment units (200 units in one building; 250 in the other) with an estimated 819 adult residents. All residents 18 years and older were eligible to participate in the CHW program and invited to complete baseline and postprogram surveys if they spoke English, Spanish, or Chinese (Mandarin or Cantonese). The Institutional Review Board at the New York University (NYU) School of Medicine approved the study.

Baseline Survey

Eight bilingual surveyors conducted baseline surveys between December 2015 and March 2016. Surveys were completed in person during daytime, evening, and weekend hours, and residents were offered a \$5 incentive. Surveyors made multiple attempts to recruit residents in each apartment and kept tracking logs of recruitment attempts to ensure that each apartment was approached

² Eligibility requirements (household earnings less than 80 percent of AMI) are generally the same for both types of building; therefore the residents are similar in terms of income and demographics. However, Section 8 buildings often receive larger operating subsidies from the government, especially in high-cost areas. They also are privately managed and, unlike public housing, have the ability to leverage private capital. For this reason, Section 8 buildings may be better maintained than public housing, although it depends on the quality of the management company.

at least six times at varying hours and days. Additionally, fliers describing the study and inviting residents to call the project director were placed under every apartment door and posted next to elevator banks. Surveyors also recruited residents in front of the intervention buildings and held survey workshops, providing food, to encourage residents to participate. All adults living in each unit were eligible to participate. Surveyors used secure cellular-enabled tablets, entering responses directly into REDCap (Harris et al., 2009) to minimize data entry errors.

The baseline survey consisted of 149 questions on demographics, general health status, chronic disease, healthcare access and utilization, housing conditions, social service needs, social support, and food security. Questions were drawn from commonly used and validated questionnaires when possible, including PROMIS-10 (general health, satisfaction with social activities, pain rating; Cella et al., 2010); NHANES (chronic disease, insurance coverage, visits to primary care, overall diet; CDC, 2014); PHQ-2 and GAD-2 (depression and anxiety screening; Kroenke, Spitzer, and Williams, 2003; Skapinakis, 2007); and U.S. Department of Agriculture (food security; Gundersen et al., 2017). Surveys were translated into Spanish and Chinese and back translated to check for accuracy.

Health + Housing CHW Program Description

Health + Housing partnered with a local community-based organization—Henry Street Settlement (HSS)—to assist with the hiring and supervision of field staff and to serve as a primary referral site for case management, health enrollment, and parent support services. Prior to program launch, the study team solicited input about program design and outreach strategies from stakeholders, including local community-based organizations, building residents and management, city agencies, and other academic colleagues.

The program attempted to hire bilingual (Spanish/English and Chinese/English) CHWs from the same neighborhood as the intervention buildings. Although only one of the four that were hired was a local resident, all CHWs shared linguistic and cultural characteristics with building residents. CHWs completed a 35-hour training that focused on core competencies that included CHW identity and roles, social determinants of health, models of behavioral change, and communication skills. CHWs subsequently received additional training on study protocol, chronic disease management, motivational interviewing, mental health first aid, and smoking cessation.

CHWs attempted to recruit residents from all apartments, and each CHW was initially assigned 90 to 100 individuals who had completed the baseline survey prior to the start of the program. Residents who were “frequent users” of health care (defined as three or more self-reported emergency department visits, or one or more hospitalizations, in the past year) were prioritized for recruitment. Subsequent waves of recruitment were conducted for residents who had not completed the baseline survey, until all 450 apartments had been attempted. Residents were not offered an incentive to participate in the program beyond the services offered by the CHW.

Once a building resident agreed to participate in the program, the CHW worked with him or her in sequential visits to complete a baseline survey (if not already done), an intake assessment, a goal-setting exercise, and an action plan that outlined steps for working on each goal (Islam et al., 2014b; Kangovi et al., 2017b). The intake assessment included demographic information, history of physical and mental health issues, medications, and primary health-related concerns. For the

goal-setting activity, residents selected up to 5 goals from a pre-established list of 23 suggested goals (residents could also write in their own goals). The list was developed by reviewing goal-setting forms used by other programs and anticipating a range of social determinants of health that might be important to residents' well-being. After ranking their goals in order of importance, participants rated their motivation level for completing each goal and then, with CHW guidance, developed an action plan for reaching their goals.

Following completion of this process, CHWs met with residents as frequently as needed and used motivational interviewing³ to help residents achieve their goals. Activities included connecting residents to case management at HSS (for example, benefits screening and enrollment), assisting with care coordination, and linking residents to services in the community. CHWs also offered health education related to chronic disease management, nutrition, physical activity, smoking cessation, and stress reduction (NYU CSAAH and NYU-CUNY Prevention Research Center, 2015). CHWs met weekly with the supervisor at HSS, a licensed clinical social worker, and the study project director to troubleshoot cases; and weekly with the project director and data manager to review progress and complete data entry. The CHW intervention period ran for 15 months (April 2016 through June 2017).

Program Assessment

After the program ended, residents who reported working with a CHW were asked to complete a 20-item program assessment questionnaire to assess change in overall wellness, connection to community resources, their experience working with the CHW, satisfaction with the program, and whether they felt they had achieved their primary goal. Only respondents who reported their most important goal in a prior question were asked if they felt they had achieved that goal. The questionnaire was translated into Spanish and Chinese and administered by six bilingual surveyors using the same protocol that was used for the baseline survey. New surveyors were hired (instead of using CHWs) to avoid desirability bias in participants' responses. After one month of data collection, the financial incentive to participate was increased from \$5 to \$20 in an effort to improve response rates.

Data Analysis

Univariate analyses of baseline survey variables were performed to describe characteristics of CHW program participants and nonparticipants. For analytical purposes, participants were defined as residents who completed an intake assessment with a CHW. Differences between participants and nonparticipants were examined using *t*-tests for continuous variables and χ^2 or Fisher's exact tests for categorical variables. Post-hoc pairwise comparisons were performed and Bonferroni's correction used to adjust for multiple comparisons. The program assessment questionnaire was analyzed using descriptive statistics.

³ "Motivational interviewing is a directive, client-centred counselling style for eliciting behaviour change by helping clients to explore and resolve ambivalence. Compared with nondirective counselling, it is more focused and goal-directed" (Rollnick and Miller, 1995: 326).

Results

In this study, we looked at data collected prior to and as part of the CHW intervention to assess the acceptability and potential impact of the Health + Housing Project. We analyzed results of the baseline survey, intake assessments, participant goal setting data, and the program assessment questionnaire.

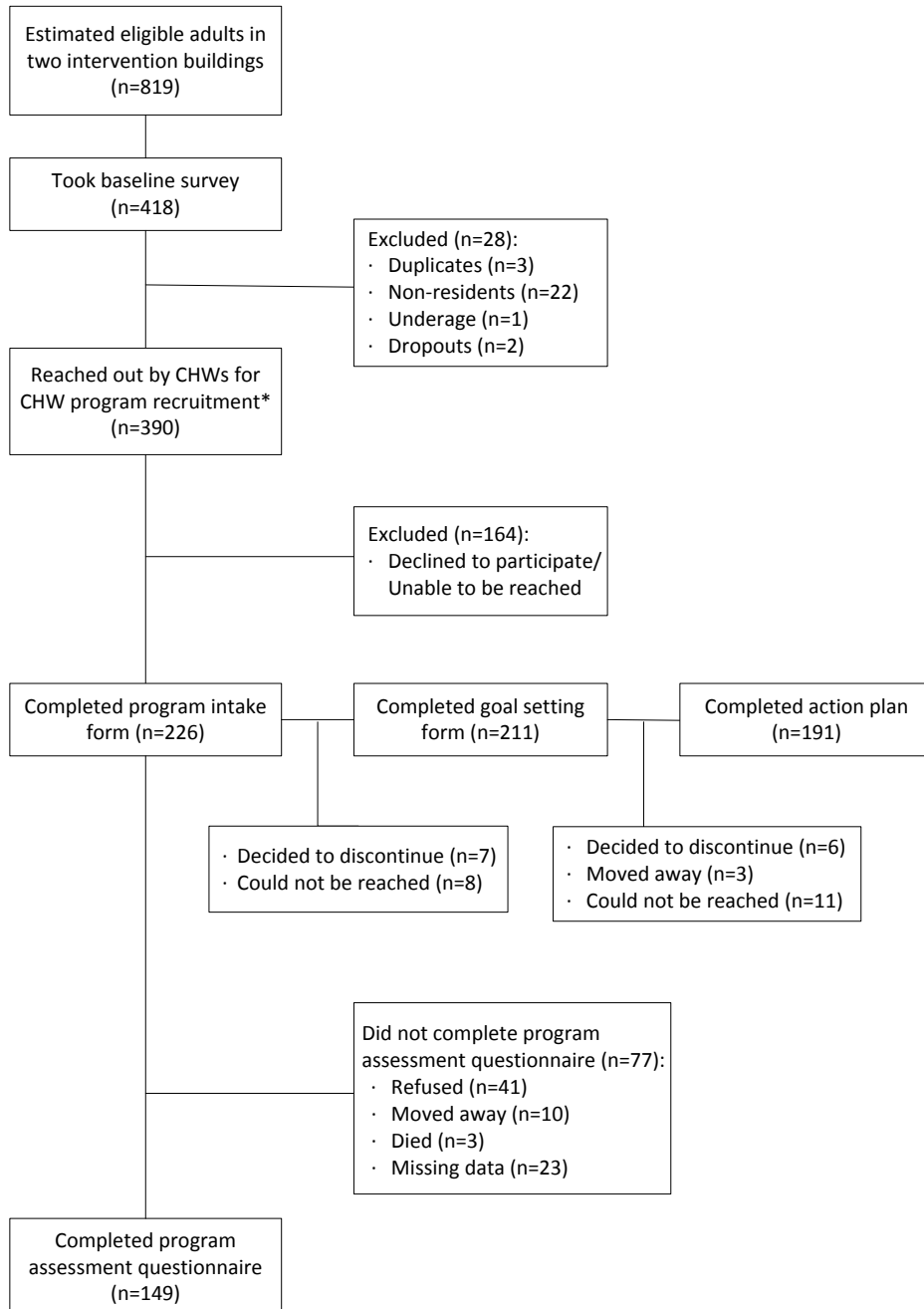
Health Needs of Residents

Of the 819 adults estimated to be living in the two intervention buildings, valid baseline surveys were conducted with 390 residents (47.6 percent response rate; see exhibit 1). At least one resident completed the baseline survey in 266 of the 450 apartment units (59.1 percent unit response rate). Based on available data provided by building management, survey respondents appeared similar to building residents overall in age, gender, and race/ethnicity. Exhibit 2 shows that most respondents were female (62.5 percent) and born in the United States (59.9 percent). Nearly 57 percent had a household income of less than \$20,000 per year. Nearly all (94.6 percent) said they had health insurance, and 86.0 percent had seen a primary care physician in the past 6 months. In terms of health in the past 12 months, 9.0 percent reported that they had visited an emergency department three or more times and 14.9 percent reported one or more hospitalizations. Slightly more than 40 percent reported their general health status as fair or poor. Chronic diseases, anxiety, and depression were common. More than one-third (37.7 percent) rated their diet as fair or poor, and 47.4 percent reported food insecurity. Nearly a one-fourth (22.5 percent) rated their satisfaction with social activities as fair or poor.

A total of 226 residents of the 390 baseline survey takers (57.9 percent) completed an intake assessment with a CHW. Compared with nonparticipants (n = 164), CHW program participants were significantly older and had higher levels of social disadvantage and health-related needs (exhibit 2). Participants were more likely than nonparticipants to have a household income less than \$20,000 (62.7 versus 47.2 percent) and to be unemployed or unable to work (32.0 versus 17.6 percent). A higher percentage of participants had three or more visits to the emergency department (13.3 versus 3.1 percent), and one or more hospitalizations (18.7 versus 9.8 percent) in the past year. Participants were more likely to report their general health as fair or poor (44.9 versus 34.2 percent), and to screen positive for depression (22.5 versus 8.3 percent) and anxiety (21.1 versus 7.0 percent). They were also more likely to report their diet as fair or poor (44.3 versus 28.7 percent) and to suffer from food insecurity (52.4 versus 40.3 percent). A larger percentage reported their satisfaction with social activities and relationships as fair or poor (27.7 versus 15.4 percent).

Exhibit 1

Health + Housing Project Flow Diagram



CHW = community health worker.

* Although most baseline surveys were completed prior to CHW recruitment attempts, some were completed by CHWs for residents who agreed to participate in the CHW program but had not completed a baseline survey in the preprogram period.

Exhibit 2

Baseline Characteristics of Health + Housing Project Program Participants Versus Nonparticipants (1 of 2)

Characteristic	Total (N = 390) n (%)	Participants ^a (n = 226) n (%)	Nonparticipants (n = 164) n (%)	p
Demographics				
Female	243 (62.5)	138 (61.3)	105 (64.0)	0.59
Age, years				< 0.001
18–44	159 (41.3)	72 (32.4)	87 (53.4)	
45–64	126 (32.7)	84 (37.8)	42 (25.8)	
65+	100 (26.0)	66 (29.7)	34 (20.9)	
Country of birth				< 0.05
United States—50 states	182 (46.8)	98 (43.4)	84 (51.5)	
United States—Puerto Rico	51 (13.1)	39 (17.3)	12 (7.4)	
Dominican Republic	75 (19.3)	41 (18.1)	34 (20.9)	
China	56 (14.4)	35 (15.5)	21 (12.9)	
Race/ethnicity				0.42
Hispanic or Latino	252 (64.8)	155 (68.6)	97 (59.5)	
Asian	84 (21.6)	45 (19.9)	39 (23.9)	
Black or African-American	35 (9.0)	17 (7.5)	18 (11.0)	
White	9 (2.3)	4 (1.8)	5 (3.1)	
Education				0.94
Less than HS degree	164 (42.4)	97 (43.3)	67 (41.1)	
HS degree or equivalent	81 (20.9)	47 (21.0)	34 (20.9)	
Some college education	94 (24.3)	54 (24.1)	40 (24.5)	
College degree or higher	48 (12.4)	26 (11.6)	22 (13.5)	
Annual household income				< 0.05
< \$20,000	155 (56.6)	104 (62.7)	51 (47.2)	
\$20,000–\$39,999	65 (23.7)	33 (19.9)	32 (29.6)	
\$40,000+	54 (19.7)	29 (17.5)	25 (23.2)	
Current work situation				< 0.001
Employed	154 (40.0)	69 (30.7)	85 (53.1)	
Unemployed	53 (13.8)	39 (17.3)	14 (8.8)	
Homemaker, student	38 (9.9)	17 (7.6)	21 (13.1)	
Retired	93 (24.2)	67 (29.8)	26 (16.3)	
Unable to work	47 (12.2)	33 (14.7)	14 (8.8)	
Physical and mental health				
Hypertension	131 (33.7)	84 (37.3)	47 (28.7)	0.07
Diabetes	60 (15.4)	40 (17.7)	20 (12.2)	0.14
Asthma	82 (21.2)	55 (24.4)	27 (16.7)	0.06
Positive depression screening	63 (16.6)	50 (22.5)	13 (8.3)	< 0.001
Positive anxiety screening	57 (15.2)	46 (21.1)	11 (7.0)	< 0.001
Severe pain ^b	79 (20.6)	54 (24.2)	25 (15.5)	< 0.05
General health (fair or poor)	157 (40.4)	101 (44.9)	56 (34.2)	< 0.05
Poor health self-efficacy ^c	61 (15.6)	40 (17.7)	21 (12.8)	0.19
Overall diet (fair or poor)	147 (37.7)	100 (44.3)	47 (28.7)	< 0.01
Insurance and healthcare utilization				
Currently insured	366 (94.6)	211 (94.2)	155 (95.1)	0.70
Time without insurance ^d	42 (11.5)	24 (11.4)	18 (11.7)	0.93
Visited primary care provider ^d	270 (86.0)	168 (89.4)	102 (81.0)	< 0.05
Needed medical care but didn't get it ^d	32 (8.3)	26 (11.6)	6 (3.7)	< 0.01
3+ ED visits in past 12 months	35 (9.0)	30 (13.3)	5 (3.1)	< 0.001
1+ hospitalization in past 12 months	58 (14.9)	42 (18.7)	16 (9.8)	< 0.05

Exhibit 2

Baseline Characteristics of Health + Housing Project Program Participants Versus Nonparticipants (2 of 2)

Characteristic	Total (N = 390) n (%)	Participants ^a (n = 226) n (%)	Nonparticipants (n = 164) n (%)	p
Social needs and social satisfaction				
Food insecurity ^d	182 (47.4)	118 (52.4)	64 (40.3)	< 0.05
Unmet social service needs ^e	200 (52.4)	127 (57.0)	73 (45.9)	< 0.05
Unable to pay rent on time ^d	69 (18.2)	47 (21.4)	22 (13.8)	0.06
Satisfaction w/ social activities (fair/poor)	87 (22.5)	62 (27.7)	25 (15.4)	< 0.01

ED = emergency department. HS = high school.

^a Participant defined as a resident who completed an intake assessment with a community health worker.

^b Defined as rating of ≥ 7 on scale of 0–10 to question, “How would you rate your pain on average (where 0 is no pain and 10 is the worst pain imaginable)?”

^c Defined as “a little” or “not at all” confident in ability to take good care of health.

^d Within past 6 months.

^e Defined as responding yes to 1 or more out of 10 social, financial, or other services needed but not received during the past 6 months.

Resident Engagement and Goal Setting

During the course of the 15-month intervention, CHWs recorded more than 2,400 in-person visits with participants, averaging 11 visits per participant (median = 8, range = 1–81). Residents 65 years and older had a higher mean number of visits than residents 18 to 64 years (16 versus 9). CHWs managed a caseload at any given time of 40 to 53 residents. Residents worked with CHWs for 8 months on average and left the caseload when they decided they no longer wanted to receive visits or when the overall intervention period ended.

CHWs engaged in a wide range of activities with residents depending on their needs and goals. Of the 226 residents who completed a CHW program intake assessment, 211 (93.4 percent) completed the goal-setting activity, and 191 (84.5 percent) completed an action plan (see exhibit 1). Exhibit 3 shows the goals on which residents chose to focus by frequency and self-rated order of importance. “Be physically active” or “exercise regularly” were the most frequent goals set, and “get my illness under control” or “take my medicine” were the goals most frequently ranked as most important. CHW activities included communicating with healthcare providers and family members; making and attending medical appointments; assisting with transportation; completing benefits applications; enrolling in Health Homes, Meals-on-Wheels, and low-cost fitness classes; and contacting or following up with housing management for repairs or complaints. In addition, CHWs referred residents to HSS for case management services (for example, assistance with Medicaid or food stamp applications), legal assistance for eviction or rent arrears, and workforce development or English as a Second Language classes. CHWs recorded 428 referrals for participants, nearly one-half of which were to HSS (48.0 percent). The remaining referrals were made to services such as medical, eye, or dentist visits; senior centers; exercise classes or gyms; and food pantries.

Exhibit 3

Health + Housing Project Participant Goals

Goals Set by Participants^a	Count	%	Goal Ranked #1 in Importance by Participants	Count	%
Be physically active/exercise regularly	130	17	Get my illness under control/take my medicine	46	22
Find or change job/job readiness skills	96	12	Find/change job/job readiness skills	38	18
Eat a healthy diet	87	11	Access to healthcare/mental healthcare	17	8
Get my illness under control/take my medicine	83	11	Access—other (benefits, financial services, other)	16	8
Lose weight	47	6	Housing	16	8
Housing	45	6	Eat a healthy diet	14	7
Access to healthcare/mental healthcare	45	6	Family goal/get help for family member	12	6
Family goal/get help for family member	44	6	Be physically active/exercise regularly	10	5
Access—other (benefits, financial services, other)	41	5	Resolve legal problem	9	4
Cope with stress	39	5	Cope with stress	8	4
Cut down/quit alcohol/smoking	38	5	Access to food	6	3
Access to food	27	3	Cut down/quit alcohol/smoking	5	2
Resolve legal problem	21	3	Lose weight	5	2
Minor/major apartment repairs	18	2	Minor/major apartment repairs	4	2
Education goal (not job related)	14	2	Other	3	1
Other	11	1	Education goal (not job related)	2	1
Total goals set	786	100	Total	211	100

Note: n = 211, because 15 people who completed an intake assessment (n = 226) chose not to set goals.

^a Participants could select up to five goals. Goals are clustered into similar categories for the exhibit (see appendix A for full list of goals). Percentages on the left panel represent the number of goals selected by participants in each category divided by the total number of all goals set (N = 786).

Participant Assessment of the CHW Program and Self-Reported Outcomes

At the conclusion of the intervention, 149 residents out of 226 who completed an intake assessment with a CHW (65.9 percent) completed the program assessment questionnaire (exhibit 4). Residents reported high levels of satisfaction with the CHW program. More than three-fourths said they were “very comfortable” or “extremely comfortable” speaking with their CHW about their issues (76.5 percent), and nearly all were “satisfied” or “very satisfied” with their individual CHW (96.6 percent) and the CHW program overall (96.6 percent).

As a result of their participation in the CHW program, participants reported improvement in their overall well-being and achievement of their most important goal. When asked to what degree things had gotten better for them since working with their CHW, 78.6 percent responded “moderate,” “high,” or “very high” degree. Most said the program met their needs “quite a bit” or “completely” (59.6 percent). Most (80.6 percent) reported that they would “definitely” or “probably” take part in the program again if given the opportunity. In terms of goal achievement, 82.0 percent responded that they either “partially” or “completely” achieved their most important goal, and 91.5 percent said that setting goals and creating an action plan was “somewhat” or “extremely” helpful. Of the 77 respondents who said that they had been referred to HSS to see a case manager, 46 (60.5 percent) said they had followed up and met with a case manager there. Most (70.5 percent) said they felt more connected to services in the community because of the work they did with their CHW.

Exhibit 4

Health + Housing Project Program Assessment Questionnaire Results

Questions	n (%)
How comfortable felt speaking with CHW about issues	
Very/extremely comfortable	114 (76.5)
Somewhat comfortable	31 (20.8)
Not very/not at all comfortable	4 (2.7)
Overall was satisfied or very satisfied with CHW	142 (96.6)
Overall was satisfied or very satisfied with CHW program as a whole	142 (96.6)
To what degree have things gotten better since started working with CHW	
Moderate/high/very high degree	114 (78.6)
Small degree/not at all	31 (21.4)
To what degree did program meet needs	
Quite a bit/completely	87 (59.6)
Somewhat	27 (18.5)
A little/not at all	32 (21.9)
Would choose to participate in program again	
Probably/definitely	120 (80.6)
Maybe	20 (13.4)
Probably not/definitely not	9 (6.0)
If set goals, success in completing most important one	
Partially/completely achieved the goal	105 (82.0)
Made no progress on the goal	16 (12.5)
Did not try to achieve the goal	7 (5.5)
Setting goals and making an action plan was somewhat or extremely helpful to improving overall wellness	118 (91.5)
Was referred by CHW to case manager at Henry Street Settlement	77 (55.0)
Met with case manager at Henry Street Settlement	46 (60.5)
Experience working with the case manager at Henry Street Settlement was good, very good, or excellent	40 (87.0)
Felt more connected to services in community because of work with CHW	105 (70.5)
Frequency of CHW meetings was about right	125 (84.5)
CHW explained what program was about clearly or very clearly	128 (86.5)
How well CHW helped with issues	
Very/extremely well	104 (70.8)
Somewhat well	35 (23.8)
Not very well/not at all well	8 (5.4)

CHW = community health worker.

Notes: N = 149, because 77 people who completed an intake assessment (n = 226) did not complete the program assessment. The denominator is less than 149 for some questions because of branching logic and/or missing data.

Discussion

The Health + Housing Project was a place-based pilot project aimed at testing the feasibility, acceptability, and potential impact of a CHW intervention co-located in subsidized housing. Prior housing-based CHW or CHW-like interventions have focused on breast cancer screening (Slater et al., 1998; Zhu et al., 2002); pediatric asthma (Gutierrez Kapheim et al., 2015; Levy et al., 2006; Scammell et al., 2011); diabetes, hypertension, and asthma (Lopez et al., 2017); chronic disease screening and follow-up (Rorie et al., 2011); HIV prevention (Sikkema et al., 2000); smoking cessation (Brooks et al., 2017); and obesity (Quintiliani et al., 2014). This study differed in its emphasis on enabling residents to determine on which aspects of their broadly defined health to focus for improvement.

Similar to residents living in subsidized buildings elsewhere in the United States, the program found that residents living in the two intervention buildings had a high prevalence of physical and mental illness (Feinberg et al., 2015; Helms, Sperling, and Steffen, 2017) and also expressed high rates of food insecurity and other needs. For example, residents had higher rates of diabetes, hypertension, asthma, depression, and self-reported fair or poor general health than the overall population in NYC (NYC DOHMH, 2017). This high concentration of multiple health needs among building residents suggests that subsidized low-income buildings may indeed be good targets for CHW programs. This finding may be all the more relevant in contexts such as NYC, where rapid development of market-rate housing is juxtaposed with pockets of concentrated need (such as those found in subsidized housing) that may be lost within apparent improvements in overall neighborhood health when using data aggregated at the neighborhood level or higher. CHW programs targeted at a building level may be one way to respond to increased income and health disparities in local communities.

Across several measures, the Health + Housing program found that residents who participated in the CHW program were at higher risk and had greater needs than residents who did not. Program participants were not only less well-off financially and more likely to be unemployed than nonparticipants, but they also reported significantly greater mental health problems and healthcare utilization, greater food insecurity, and less satisfaction with their social activities. This finding, particularly regarding the higher healthcare use of participants, can be partially explained by the fact that CHWs made additional attempts to recruit residents identified as “frequent users” of acute healthcare services. The differences observed between participants and nonparticipants, however, may also have illustrated some degree of “self-selection” into the CHW program by residents who needed it most. In sum, our findings indicate that a place-based CHW program in subsidized housing will find a population in significant need and willing to engage.

The protocol developed for the Health + Housing Project pilot was designed to be participant led; participants identified and prioritized their health-related goals with support and motivation from the CHWs. CHWs were able to encourage most participants to set goals and establish a related action plan to accomplish them. This type of client-centered protocol has been effective in helping patients make behavior changes (MacGregor et al., 2005) and has been successfully used in other CHW studies (Islam et al., 2014b; Kangovi et al., 2017b). Of the respondents who reported setting goals, most said they partially or completely achieved their most important goal. CHWs were also successful at making appropriate referrals as needed, especially to the program partner’s case management services (at HSS). It appears that residents, with guidance from a CHW, will follow through on referrals to neighborhood resources and make progress in achieving health-related goals.

Lessons Learned

Although subsidized housing buildings present unique opportunities for CHW programs, they also pose specific challenges. For example, compared with conducting CHW programs in health clinics with a “captive audience,” Health + Housing surveyors and CHWs attempted to engage people as they went about their daily lives. Having surveyors and CHWs available at varied hours and days of the week was important. The program also found that word of mouth became a useful

recruitment tool. When residents worked with CHWs and found them helpful, they often told their neighbors, who subsequently engaged with the program. Partnering with a community-based organization that offers a range of services in the languages spoken by residents was also crucial. In addition to the high percentage of referrals that CHWs made to HSS, the partnership provided additional legitimacy to the project, licensed clinical supervision of CHWs, and a space for team meetings.

The experience working in the two intervention buildings challenged the assumption that all subsidized housing residents are stably housed. A surprising number of residents set goals related to housing, as many adult children struggled to find independent housing in NYC's tight housing market. Although Health + Housing CHWs were adept at assisting with housing applications, because more than 400,000 families are on waiting lists for public or Section 8 housing in NYC (NYCHA, 2017), the prospects of securing affordable housing are low. As a result, CHWs assisted a handful of residents experiencing acute family conflict with placement in homeless shelters. Subsidized housing-based CHW programs in high-cost cities should anticipate such requests and consider incorporating a housing specialist into the project.

Finally, the high rates of mental health issues reported among residents point to an area in particular need of further attention in subsidized housing. Although the program anticipated significant mental health needs among residents, and CHWs attended an 8-hour mental health first aid training course offered by the NYC Health Department, the shortage of high-quality mental health resources with open availability limited the ability of CHWs to successfully navigate participants to care. Future programs would benefit from establishing direct relationships with mental health providers to facilitate access to treatment. Additionally, the high percentage of program participants who rated their satisfaction with social activities and relationships as fair or poor may be connected to their poor physical and mental health (Thoits, 2011) and points to the potential for CHWs to have a positive impact on residents' lives by providing meaningful social interaction.

Limitations

Although participant-reported outcomes were overwhelmingly positive, this pilot study had limitations. First, the program was conducted in only two subsidized housing buildings on the Lower East Side of NYC and may not be generalizable to other communities. Second, the baseline survey sample size of 390 and program assessment questionnaire sample size of 149 are relatively small and limit our ability to show statistical significance for some outcomes or to perform subgroup analyses. The baseline survey response rate was lower than anticipated (47.6 percent of individuals, 59.1 percent of apartment units), but slightly higher than response rates from other surveys conducted in NYC public housing (Feinberg et al., 2015). We do not know how survey respondents differed from nonrespondents; however, based on available data, respondents appeared similar to building residents overall in age, gender, and race/ethnicity. Third, selection bias may have been present specifically for the residents who agreed to complete the program assessment questionnaire, limiting the ability to fully evaluate the effectiveness of the CHW program. Fourth, the program analyzed only self-reported outcomes, which may have been affected by reporting bias. Lastly, although the program monitored CHW performance regularly and attempted to address noticeable differences in resident engagement, the relatively open-ended nature of the

intervention protocol made it difficult to standardize CHW activities, leading to variability among the four CHWs. Program participants may, therefore, have had variable experiences depending on the CHW with whom they worked, which is likely true for CHW programs in general; the sample size did not allow for results to be stratified by individual CHW.

Conclusion

Our article contributes to the literature on place-based CHW programs by demonstrating that subsidized housing buildings are promising sites for CHW interventions. We found that building residents in general and program participants in particular had very high levels of medical, mental health, and health-related social needs. Further, residents responded positively to a program that enabled them to determine what types of health-related goals to set, expressing a high rate of satisfaction with the CHW program and reporting improvements in overall well-being.

Appendix A: List of 23 Goals From Which Participants Chose

Choose up to five goals from the list below that you would like to work on (ST = short-term; LT = long-term).

Disease Management Goals		Diet/Exercise Goals		Smoking/Alcohol Goals		Access Goals	
<input type="checkbox"/>	Take my medicine (ST)	<input type="checkbox"/>	Eat a healthy diet (LT)	<input type="checkbox"/>	Cut down on smoking (ST)	<input type="checkbox"/>	Access to health care (ST)
<input type="checkbox"/>	Get my illness under control (LT)	<input type="checkbox"/>	Lose weight (LT)	<input type="checkbox"/>	Cut down on alcohol (ST)	<input type="checkbox"/>	Access to food (ST)
		<input type="checkbox"/>	Be physically active (ST)	<input type="checkbox"/>	Quit smoking (LT)	<input type="checkbox"/>	Access—other (ST)
		<input type="checkbox"/>	Exercise regularly (LT)	<input type="checkbox"/>	Quit drinking alcohol (LT)		
Family Goals		Employment Goals		Apartment Goals		Other Goals	
<input type="checkbox"/>	Get help for a family member (ST/LT)	<input type="checkbox"/>	Job readiness skills (ST)	<input type="checkbox"/>	Minor apartment repairs (ST)	<input type="checkbox"/>	Cope with stress (ST)
<input type="checkbox"/>	Family goal—other (ST/LT)	<input type="checkbox"/>	Find/change job (LT)	<input type="checkbox"/>	Major apartment repairs (LT)	<input type="checkbox"/>	Resolve legal problem (LT)
				<input type="checkbox"/>	Apartment goal—other (ST/LT)	<input type="checkbox"/>	Other (ST/LT)

If any checked are “Other,” specify here: _____

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Work Requirements and Well-Being in Public Housing

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Abstract

- *Objectives:* Work requirements in public housing are highly controversial, and little is known about their impacts. We examined how implementation of a work requirement paired with supportive services by Charlotte Housing Authority has impacted residents' overall well-being. Although the policy might improve well-being by increasing household income, it might also engender stress through greater housing precarity.
- *Methods:* This mixed-methods study analyzes data from 126 resident surveys conducted before and after work requirement implementation, interviews with 48 residents, and household-level administrative data. Survey and administrative data capture changes in income and health between 2010 and 2014. Interviews provide qualitative insights on changes in health, household income, and overall well-being.
- *Results:* We find that residents want to work and report both positive and negative effects associated with the work requirement. Resident interviews suggest increases in household income led to a reduction in overall stressors. Negative impacts include cuts in or elimination of Medicaid and Supplemental Nutrition Assistance Program benefits (more commonly known as food stamps). Self-rated health did not improve.
- *Conclusions:* We find work requirements—when implemented with case management and opportunities to complete work-related activities in lieu of employment—are associated with both positive and negative impacts. We urge public housing agencies implementing similar policies to carefully monitor and evaluate not only changes in household income and evictions but also welfare supports and the health and well-being of all residents in households affected by the policy.

Introduction

Poverty and minority status can exacerbate individuals' risk for physical and mental disabilities (Adler and Rehkopf, 2008). Public housing residents, therefore, 64 percent of whom are classified as very low-income and 45 percent of whom are African-American, are at especially high risk for poor health. Furthermore, many public housing residents live in negative social environments (for example, high crime and socially isolated) that can further lower well-being (Bennett, Smith, and Wright, 2006). One study found that public housing residents were three times more likely to report fair or poor health and twice as likely to be diagnosed with chronic health conditions compared with Black women nationally.¹ In addition, 29 percent of public housing residents reported poor mental health (Manjarrez, Popkin, and Guernsey, 2007).

This article addresses the question: What are the impacts on the well-being of residents when public housing agencies (PHAs) require work-able (that is, nonelderly² and nondisabled) residents to have a job in order to remain in their housing? In theory, a work requirement could improve well-being by increasing household income (Danna and Griffin, 1999; Stronks et al., 1997). However, work requirements could also reduce well-being by increasing stress and housing precarity (Bowie and Dopwell, 2013; Hasenfeld, Ghose, and Larson, 2004; Starkey et al., 2012).

Currently, only eight PHAs—all participants in the U.S. Department of Housing and Urban Development (HUD) Moving to Work (MTW) demonstration program—have implemented work requirements for some or all of their work-able residents (Webb, Frescoln, and Rohe, 2014). As of March 2018, requirements range from 20 hours per week of work for a single household member to 30 hours for all work-able adults in the household (HUD, 2017). Although all policies have been implemented with case management supports and protections for residents who find compliance difficult, failure to comply results in eventual eviction in all but one agency (HUD, 2017).

The MTW demonstration encourages participating PHAs to implement innovative policies and programs to help residents achieve self-sufficiency, among other statutory goals.³ To do so, MTW agencies can seek waivers from standard HUD regulations and to combine various funding streams into a single, flexible account. MTW agencies have the funding and regulatory flexibility to implement not only policies to structure resident behaviors, such as work requirements, but also policies to support those behaviors, including case management, transportation, childcare assistance, and tuition reimbursement. Together, these supports could increase well-being by connecting public housing residents to employment, education, healthcare, and other resources.

Well-being is a multidimensional concept that encompasses physical, mental, emotional and social functioning (ODPHP, n.d.). To achieve a state of well-being, one must be sufficiently healthy and resourced to meet the basic needs of the family, while also being able to engage with family, friends, and community. This article seeks to expand our understanding of public housing work requirements by examining how well-being, examined through changes in household income and

¹ The Manjarrez, Popkin, and Guernsey (2007) study compares outcomes of African-American women, as 88 percent of adults in the HOPE VI Panel Study sample were women and 90 percent were Black.

² The U.S. Department of Housing and Urban Development defines *elderly* as people age 62 and older.

³ These other goals include increasing housing options and achieving cost efficiencies.

self-rated health, is affected by Charlotte Housing Authority's (CHA's) work policy. To date, work requirements in public housing have attracted little research attention; these studies have primarily focused on the economic impacts on public housing residents and have not addressed the impacts on broader indicators of well-being. For example, an evaluation of CHA's work requirement found a statistically significant and positive impact on residents' employment status without a corresponding increase in evictions (Rohe, Webb, and Frescoln, 2016). Placing these findings in the broader context of resident well-being is crucial to understand the impact of work requirements.

Background

This article examines the effects of a work requirement implemented by CHA on the well-being of affected residents. CHA manages roughly 3,300 public housing units and 8,500 housing choice vouchers. Admitted to MTW in 2007, their program comprises several major initiatives including rent reforms, expanding its housing portfolio, and a work requirement, which only applies to work-able residents in 5 of its 15 public housing developments.

CHA's work requirement mandates that all work-able households—those households with at least one nondisabled adult age 18 to 61—maintain 15 hours per week of employment. In lieu of employment, residents may complete preapproved work-related activities for up to 12 months. Beginning in fall 2011, CHA has provided voluntary case management to residents at all 5 work-requirement sites. CHA notified affected residents in fall 2013 that work requirement enforcement would begin in January 2014.⁴

Case managers work with property managers to monitor compliance. Sanctions for noncompliance include—

- Initially, noncompliant residents are placed on a 2-month improvement plan that requires them to meet with case managers and either obtain employment or complete “work-related activities.” Approved work-related activities include documented job searches, training or licensure programs, and some educational activities.
- Continued noncompliance results in loss of one-half the household's subsidy. In most cases, this loss means that rent would be reassessed from the minimum \$75 to between \$360 and \$450 per month for a two- to three-bedroom unit.
- If noncompliance continues for more than 6 months, the household loses its entire subsidy.
- Households are evicted if they cannot pay the higher rents or if they remain noncompliant for 1 year.

Prior evaluations of CHA's work requirement indicate broad resident support for, and compliance with, the policy (Rohe et al., 2013; Rohe, Webb, and Frescoln, 2016). Most residents believe the work requirement is fair. Among work-able respondents to a 2012 survey, 87 percent of those in the work requirement sites and 80 percent of those in the non-work-requirement sites thought so

⁴ Enforcement of the policy was delayed due to high unemployment resulting from the 2010 recession.

(Rohe et al., 2013).⁵ Administrative data suggest that the policy has not increased evictions; since enforcement began in May 2014 and September 2016, only two households have been evicted (Rohe, Webb, and Frescoln, 2017).

Although case management alone was not successful at increasing employment, when paired with a work requirement, residents' employment increased significantly (Rohe, Webb, and Frescoln, 2016). Analysis of administrative data in December 2012 (15 months after case management began) indicated 51 percent of residents were employed. One year later, slightly prior to enforcement of the work requirement, 58 percent were employed, and a year after enforcement began, wage employment rose to 88 percent. After another year, the number of residents employed was 93.9 percent (Rohe, Webb, and Frescoln, 2016).

Methods

CHA implemented the work requirement in 5 of its 15 family public housing sites, thereby allowing for a natural quasi-experimental design. Residents living in the 5 work requirement sites are the treatment group, and the comparison group is composed of work-able residents living in the other 10 family public-housing sites.

Given how little we know about public housing work requirements, we used mixed-methods and convergent analysis (Creswell, 2015)—which involves separate analysis of each type of data, then comparison of the results to seek areas of convergence or divergence in the findings—to investigate the impacts of the policy on well-being. This approach improves our understanding by leveraging the advantages of both quantitative and qualitative methods (Caracelli and Greene, 1997; London, Schwartz, and Scott, 2007).

Data for this study include survey responses, CHA administrative data, and longitudinal interviews with residents. Surveys were mailed to all heads of household in CHA's 15 nonelderly public housing sites in July 2010 (response rate 75 percent) and September 2014 (response rate 53 percent). Survey data include responses to questions about physical and mental health and food security. Quantitative analysis is limited to those work-able respondents who responded to both the 2010 and 2014 surveys (25 treatment and 101 comparison cases). Administrative data for each household include the head of household's age, the number of children, disability and elderly status, and household income.⁶

Semi-structured interviews were conducted with work-able residents subject to the work requirement in January 2014, September 2014, and November 2015 and with residents in the non-work-requirement (comparison) sites in September 2016. Interviewees in the treatment group were randomly selected from residents living in the five work requirement sites in January 2014 ($n = 15$). The interview

⁵ Mail-out/mail-back surveys were sent to the head of household in all CHA public housing units. Among those living in the work-requirement sites, the response rate was 57.5 percent, and it was 52.8 percent among residents in the comparison sites.

⁶ The income variable used is the Total Household Income in HUD's Multifamily Tenant Characteristics System. Work-able households living in CHA housing have their incomes verified biennially, unless they are a minimum renter, in which case the household is required to report an increase in income within 30 days. Due to these policies, the Total Household Income may not be the household's actual income at the time the variable was taken in June 2011 and December 2014.

samples for September 2014 (n = 14) and November 2015 (n = 15) include this original sample, as well as additional randomly selected individuals. Fifteen heads of household were interviewed more than once across the three periods. Residents placed on improvement plans or a subsidy sanction were oversampled to ensure that we heard their perspectives.

The comparison interviews were drawn from work-able residents who had been living in the comparison family public housing sites in December 2013 and who were still living in CHA public housing in September 2016. The sample was matched with work-able residents living in the work-requirement sites in December 2013 based on age, whether dependent children were living in the home, household income, and whether the head of household had a high school diploma or general educational development (GED) certificate.

We asked all interviewees about their household composition; health; employment experiences; educational background; participation in education, job training, or life skills programs; and receipt of welfare benefits such as Medicaid and the Supplemental Nutrition Assistance Program, or SNAP (hereafter, food stamps). We also asked how working outside the home affects their families, their views on the work requirement and, if applicable, experiences with case managers and sanctions. Interviews were recorded, transcribed, and analyzed using deductive coding.

Results

Due to limitations related to sample size, results are suggestive of trends rather than causal inferences. Summary statistics are presented for all work-able survey respondents living in public housing without the work requirement (comparison) and in the five work requirement sites (treatment). As exhibit 1 shows, the sample is largely composed of African-American females. Work requirement respondents were slightly younger (average 42 versus 47 years), were more likely to have children (80 versus 61 percent), and were better resourced—56 percent had reliable access to a car, and 84 percent had a high school diploma or GED.

Median household income increased between 2010 and 2014 for both groups (exhibit 2). Median income among comparison group members was lower than that of the treatment group in 2011 (\$1,812 versus \$7,540) and in 2014 after the work requirements were implemented (\$3,204 versus \$10,826). The resulting change in median income from 2011 to 2014 was \$1,392 for the comparison group versus \$3,286 for the treatment group.

The 2014 survey of households living in the work requirement sites asked what, if anything, the head of household had done in response to the work requirement. Of respondents, 52 percent indicated they had looked for a new job, 37 percent said they had found a new job, and 22 percent said they were working more hours. The Total Household Income data within the Multifamily Tenant Characteristics System data are reflective of these survey results. Reported wage employment increased from 48 to 60 percent among residents in the work requirement sites between 2011 and 2014.

Although household income increased, food insecurity rose among households subject to the work requirement from 60 percent in 2010 to 76 percent in 2014. The increase is consistent with what heads of household said during interviews—that their food stamps were cut as household income rose.

Exhibit 1

Demographic Characteristics of Treatment and Comparison Groups

2014	Public Housing Comparison (N = 101)		Work Requirement Treatment (N = 25)	
	Mean	Std. Dev.	Mean	Std. Dev.
% Female ^a	98	—	96	—
% Black or African-American ^a	98	—	100	—
Age head of household ^a	46.99	9.89	42.04	9.18
% Dependent child in home ^a	61	—	80	—
Total number children in home ^a	1.38	1.50	1.84	1.68
% Reliable access to car ^b	42	—	56	—
% High school diploma or GED ^b	52	—	84	—

GED = general educational development certificate.

Sources: ^aCharlotte Housing Authority (CHA) Tenant Directories (December 2014); ^b2014 survey of CHA public housing residents

Exhibit 2

Income Characteristics of Treatment and Comparison Groups

	Public Housing—Comparison (N = 101)					Work Requirement—Treatment (N = 25)				
	2011		2014		Change	2011		2014		Change
	Median	Std. Dev.	Median	Std. Dev.		Median	Std. Dev.	Median	Std. Dev.	
Median household income ^a	\$1,812	\$5,183	\$3,204	\$6,011	\$1,392	\$7,540	\$6,187	\$10,826	\$8,016	\$3,286
	%		%		Change	%		%		Change
Households with wage any income ^a	20		36		16	48		60		12
Households with total income ≥ \$1,000/month ^a	9		17		8	28		40		12
Households minimum renter ^a	69		50		-19	36		24		-12
Food ran out sometimes or often ^b	67		65		-2	60		76		16

Sources: ^aJune 2011 and December 2014 Multifamily Tenant Characteristics System reports; ^b2010 and 2014 surveys of Charlotte Housing Authority public housing residents

Low-income and minority populations have worse health outcomes than the general population, as our survey results confirm (exhibit 3). On average, our respondents estimated their health to be “good” (1 is poor, 3 is good, and 5 is excellent), but overall self-rated health worsened slightly within both the comparison (3.21 to 2.91) and treatment (3.84 to 3.04) groups between 2010 and 2014. In the comparison and treatment groups, 45 and 40 percent of respondents, respectively, reported having at least two chronic diseases in 2014, including asthma, hypertension, diabetes, or an autoimmune or inflammatory disease such as lupus, fibromyalgia, or arthritis.

Exhibit 3

Health Characteristics of Treatment and Comparison Groups

	Public Housing—Comparison (N = 101)					Work Requirement—Treatment (N = 25)				
	2010		2014		Change	2010		2014		Change
	Median	Std. Dev.	Median	Std. Dev.		Median	Std. Dev.	Median	Std. Dev.	
Self-rated health	3.21	1.19	2.91	1.14	-0.30	3.84	0.90	3.04	1.14	-0.80
CES-D (score ≥ 10 is depressed)	9.13	6.22	10.28	6.63	1.15	8.60	5.85	10.44	5.99	1.84
BMI (≥ 30 obese in AA women) ^a	32.78	9.01	33.99	9.35	1.21	32.95	10.09	35.18	9.67	2.23
	%		%	Change	%		%	Change		
Two or more chronic diseases	20		45	25		12		40	28	
Physical health limited accomplishments	52		54	2		40		64	24	
Physical health limited activities	46		44	-2		28		44	16	
Emotional health limited accomplishments	49		46	-3		32		48	16	
Anxiety affected activities	42		39	-3		24		40	16	

AA = African-American. BMI = body mass index. CES-D = Center for Epidemiologic Studies Depression.

^aNew studies account for different ranges of healthy and unhealthy BMI in non-White populations (Wagner and Heyward, 2000).

Source: 2010 and 2014 surveys of Charlotte Housing Authority public housing residents

Survey data indicate that respondents' poor health impacts their daily living in multiple ways and most measures of health worsened for those in both the treatment and comparison groups. Self-rated health, depression, body mass index, and the number of chronic diseases heads of household reported all increased. Although not statistically significant, reported anxiety increased more among the treatment than the comparison group between 2010 and 2014.

Work Requirements and Income Changes

Based on resident surveys and interviews, CHA work requirement impacted household income in four key ways. First, for some, the policy provided the impetus and support to secure wage employment. Although the perception that public housing residents do not want to work is

common (Falk, McCarty, and Aussenberg, 2014; Mead, 1986), nearly every resident we spoke with in the treatment and comparison groups wanted to work and believed that other work-able residents should as well. One woman living in a work requirement site shared, “[I think the work policy is fair, because] it pushes me to go out and do things I should already do, things I should’ve already done . . . job research, working on resumes, etc.” Despite this support, many also expressed fear about what would happen to them if they were unable to find work, “For the people who are looking—it’s hard. You can’t make people hire you. You can’t make people give you a chance.”

Many interviewees in the treatment sample told us that case managers provided the support needed to obtain wage employment. A mother of two who was unemployed when she moved into a work-requirement site explained, “I think it is a good stepping stone if you do what you are actually supposed to do. ‘Cause they have a lot of resources for you to accomplish the things you are trying to accomplish. . . . I would say my best experience is my case worker.” Another praised her case manager for encouraging her to complete Certified Nursing Assistant (CNA) training. She now has a job she enjoys that pays \$14 per hour.

Second, the work requirement seems to have affected education, which in turn affects income, in two very different ways. Some residents said the case management helped them return to school to obtain certifications, such as a CNA, enabling them to earn more. Others, however, stated that the policy was impeding their educations (particularly completion of GED). Although less commonly expressed, frustration with case managers was mostly related to enforcement of the policy, such as requiring parents with dependent children and inadequate childcare to work in low-wage, dead-end jobs. A mother of three without a GED who had been sanctioned for not meeting the work requirement said she did not find the case manager helpful, because “they pushing you to find any kind of job. You know what I mean? It’s not fair, because they’re not thinking about it long term. I mean working at McDonald’s is not a long-term job.”

Third, households that transitioned from unemployment or underemployment talked about having their welfare supports reduced. Many in the work requirement sites told us that their welfare benefits had been reduced as their wage incomes increased. Several expressed frustrations similar to this one: “The more you make, the more they take.” One resident explained, “I have a temp job making \$8 per hour. They cut my food stamps from \$333 down to \$65 so that’s not incentive to work.”

Reductions in welfare benefits are especially acute for most interviewees, as their jobs did not pay enough for families to live independent of welfare. An interviewee living in a work-requirement site shared a common sentiment. When asked about her ability to become economically self-sufficient, she said, “The biggest problem with me, is trying to find a decent paying, permanent job . . . because you can’t survive off of eight, nine, even ten dollars.” Another work requirement interviewee stated, “I’m doing way better than I was before but that’s just because I’m working hard to get what I want. Other than that, no, I still feel like I’m at the bottom. I’m not getting anywhere.”

Finally, parents pointed to the tradeoffs of increased employment on their family—more income but also less family time. Nearly all interviewees discussed working in the context of their parenting role. Many in the work-requirement sites told us that the increased income resulting from changes in employment had improved the overall well-being of their families, because they felt

less financial pressure and could afford to do a little bit more than meet basic needs: “I feel like it’s a stress when I’m not working, because I do not like bill collectors and then I don’t like them to turn my stuff off. Then my kids... when they [are] going on field trips, ‘Momma, we just need five dollars... OK, I can give you five dollars to go on the field trip.’ But when I’m not working, it makes me feel bad.”

All but three of our interviewees were single mothers, and each addressed the challenge of balancing work and parenting. The lack of affordable and reliable childcare directly impacted their employment. One told us, “My biggest challenge is being a single mom. I mean, I have so much on me. If... one of the kids gets sick, I’m the only one to go get them.” Another recounted turning down a fast food management position because she did not have affordable childcare.

Interviewees across all sites told us the security provided by living in public housing had a positive impact on their overall well-being. Not only did it provide shelter, but it also helped them stabilize financially. One shared, “If it wasn’t for the rent being adjustable I know I probably would have been evicted a long time ago.” Another articulated the role that public housing played in her ability to plan for self-sufficiency goals: “Being a single mother of four and just going to school, the housing authority is very beneficial to me. I need to establish a career and work on it until I’m able to move out on my own.”

Work Requirements and Health Outcomes

As both survey results and resident interviews evidenced, the baseline physical and mental health of CHA’s work-able public housing residents is very poor. Although health measures generally worsened within both groups, individuals living in the work-requirement sites reported diminished health in all measures.

Both groups reported high rates of depressive symptomatology; depression negatively impacts physical health and reduces capacity for employment (Ross and Mirowsky, 1995; Wells, Stewart, and Hays, 1989). Interviews with work-requirement residents suggest much of this condition is situational—the demands of being a single mother and struggling financially—but it was exacerbated by trauma events, poor health histories, or the inability to afford healthcare. A 35-year-old mother of three who did not have health insurance and was relocated to one of the work-requirement sites after a serious domestic violence incident, told us, “They said I got high blood-pressure. I’m anemic. I know I’m depressed, so I guess I’d just say ‘good.’ When I’m not at work I sleep a lot. I’m sad, I mean, I just feel like down, depression, sad. I don’t want to be bothered.”

The way a work requirement interacts with other welfare benefits, such as food stamps and access to Medicaid, is of significant concern given the health challenges of public housing residents. For instance, North Carolina Basic Medicaid Eligibility stipulates a mother with a single dependent cannot make more than \$434 monthly to be eligible for full Medicaid benefits. If she has two children, she cannot make more than \$569, and with three children, no more than \$667 monthly (NCDHHS, n.d.). A household of a single parent with one child who lives in a CHA work-requirement development would make *one dollar* too much to qualify for full Medicaid insurance if working only the required 15 hours per week at minimum wage ($15 \times \$7.25 \times 4 = \435). As

such, the work requirement policy of only 15 hours a week and the qualifications for Medicaid are incongruent. Complying with the requirements for one program disqualifies a household from receiving the benefits of the other, thereby creating hardships.

Without full medical insurance for routine care, interviewees described going to the emergency room to access medication and healthcare. One woman subject to the work requirement shared, “I had to go to the ER. My blood pressure was through the roof and my head was hurting so bad. They were going to admit me if it didn’t come down. I just want to be happy about something. I’m glad to be alive. I’m thankful for my health and my strength and my children and my family so I am happy about some things. But I am always depressed and sad about stuff.”

Despite the challenges of reduced benefits and balancing parenting and employment, those subject to the work requirement reported feeling less stressed as a result of increased wage income. At least part of this decrease in stress resulted from feeling that they were better able to care for their families, “Me being the only parent, it’s important for [my son] to see me going to work and working to get what we need.”

Discussion

This article seeks to understand how a public housing work requirement paired with case management affects well-being as measured by changes in household income and self-rated health. Survey and interview data suggest CHA’s public housing residents support enforcement of a 15-hour-per-week work requirement for work-able residents when implemented with case management support and opportunities for compliance through work-related activities. Despite overall support for the policy and increases in household income, interviewees reported frustrations with obtaining living wage employment, reductions in welfare benefits following marginal increases in income, a perceived PHA focus on employment over education, and deteriorations in self-reported health.

During interviews, those residents in the work-requirement sites reported that the policy had provided motivation to find work and that the case managers had offered support and encouragement. Work-requirement interviewees, who had increased their wage employment, indicated that increased wages had reduced some stressors by providing the household with a little extra money that could be used to pay down bills or purchase small “treats” such as a meal out or school pictures.

Although both employment and hours worked increased, few households reached the threshold of \$1,000 monthly that Sullivan and DeCoster (2001) found would improve mental health and depression; only 17 percent of comparison households and 40 percent of treatment households met that threshold in 2014. One reason households likely did not meet this threshold was low educational attainment; only 52 percent of comparison and 84 percent of treatment heads of household within the survey sample had either a high school diploma or a GED. Several interviewees argued that the policies would be more effective if residents without a GED or high school diplomas were given a choice between obtaining a GED or wage employment.⁷ Households were particularly frustrated that increases in income resulted in reductions in their food stamp benefits and Medicaid coverage.

⁷ The 2016 revision of CHA’s work policy requires 20 hours of work but also includes a provision for the head of household to attend educational programing and work just 15 hours.

Access to sufficient, healthy food and healthcare is of critical importance, as responses to the 2010 and 2014 surveys suggested that self-rated health worsened within both treatment and comparison groups. Reasons for this decline may include the baseline health status of the residents and the normal effects of aging.

Most of the literature suggests that wage employment improves health (Faragher, Cass, and Cooper, 2005; Ross and Mirowsky, 1995; Stronks et al., 1997), and interviewees in the work-requirement sites reported some reductions in financial stressors; however, the survey data revealed reductions rather than improvements in measures of health. The relatively brief time of the intervention and the sample size may have contributed to these results. Also, research on welfare reform indicates that low-wage employment might not be sufficient to generate health improvements (Cancian et al., 1999; Corcoran et al., 2000; Meyer and Sullivan, 2006; Scott et al., 2004).

Limitations

Our study has several limitations we hope to address in future research. First, it was dependent on a small survey sample of 126 work-able households and an interview sample of 48 individuals. Second, we would like to examine changes during a longer period following work-requirement enforcement. Finally, household income and education within the treatment and comparison groups were significantly different at baseline. Despite these limitations, this study contributes to our limited knowledge of the effects of work requirements on public housing residents.

Policy Recommendations

Only MTW agencies currently have the authority to impose work requirements. Given the limitations of this study and lack of other studies examining work requirements in public housing, we caution against expanding such policies without additional study. HUD should require any PHA proposing a work requirement to collect additional data, including changes in health and well-being for all those living in the household.

CHA's policy reflects recognition of barriers many work-able public housing residents encounter in finding and maintaining employment. Other PHAs should consider a similar policy that begins with a low employment threshold (15 to 20 hours), case management for all affected households or those that are noncompliant, and provision for engagement in "work-related activities" in lieu of wage employment. These policies have provided a safety net for residents who make good faith efforts to find employment and protection from immediate eviction for noncompliance.

One of the most significant barriers to employment was low education levels and a lack of job skills. PHAs considering implementing a work requirement should allow those subject to the policy to meet it through completion of education and job training. Partnerships with community agencies, including Workforce Investment Boards, could help residents develop employment skills and obtain marketable licensures.

PHAs should work with local public health organizations to provide additional support for improving the health of public housing residents. The health needs of this population have been

well documented, and our study provides additional evidence of the need for expanded services. Federal and state policymakers should carefully consider the way work requirements may impact access to healthcare and food.

Overall, CHA's work requirement, including case management and other services, was associated with increases in wage employment without increasing evictions. Parents described wanting to work to provide financially for their families and to serve as a role model for their children. They reported feeling less stressed when they had a little extra money to treat their families and pay their bills. Despite this, household income was not sufficient to support a move out of public housing, physical and mental health needs remained severe, and few residents made progress toward improving their educational levels. PHAs could improve the effectiveness of public housing interventions to increase family self-sufficiency and well-being by providing more job training and educational opportunities, additional health interventions, and access to case management services.

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Innovative Approaches to Providing Rental Assistance: States and Localities Seek To Support Health and Human Services Goals

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Abstract

- *Objectives: We sought to learn more about how state- and locally funded rental assistance programs were created, how they are structured, whom they serve, and how they are funded.*
- *Methods: We conducted qualitative research about 19 state- and locally funded rental assistance programs in eight states and two cities using phone interviews, online surveys, and email exchanges with officials and providers familiar with the programs, and we conducted online research to gather additional information about the programs.*
- *Results: Although the rental assistance programs varied, key themes emerged, including (1) most programs, recognizing the impact of housing stability on health outcomes, targeted populations served by state or local health and human services programs; (2) most programs served a growing number of households over time; (3) funding generally increased over time and most of it came from general revenue; and (4) programs involved collaboration between the housing and health and human services agencies to ensure clients' needs were comprehensively met.*
- *Conclusions: Although state and local rental assistance alone cannot fill the gap between the need for and supply of affordable housing, it can play a critical role in helping states and localities achieve better outcomes for special populations in which states and localities are deeply invested.*

Background

State and local policymakers increasingly recognize that a lack of stable, affordable housing not only causes homelessness but can worsen people's health and raise state and local costs (Hostetter and Klein, 2014). High housing costs affect people's access to doctors, healthy food, and medications and can increase their risk of being forced into institutional care such as nursing homes or mental health facilities (Braveman et al., 2011). People with significant health challenges who struggle to pay for housing often use costly health and social services that can strain government budgets, including emergency shelters, mental health and substance use treatment, and institutional health care (Bodurtha et al., 2017). Insufficient affordable housing also constrains policymakers' ability to implement community-based best practices. For example, states and localities have a legal obligation under the Supreme Court's *Olmstead* decision to provide services that help people with disabilities live independently in the community.¹ Adhering to this obligation is difficult when the available affordable housing is inadequate.

Federal affordable housing resources are scarce. Federal programs such as the Housing Choice Voucher (HCV), public housing, and Section 8 Project-Based Rental Assistance programs provide the vast majority of rental aid, but three in four eligible households receive no aid because of funding limitations (CBPP, 2017a, 2017b). Most state and local housing agencies that administer federal rental assistance have closed their waiting lists due to high demand, and those on waiting lists often wait years for assistance (Mazzara, 2017; PAHRC, 2017). Only a small fraction of agencies prioritize households facing homelessness, families with young children, or people with disabilities (HUD, 2017).

Some states and localities have filled part of the gap by funding their own rental aid programs (Bergquist et al., 2014; NLIHC, 2017). This article reviews findings from our qualitative study about how 19 such state- or locally funded programs across eight states (Connecticut, Illinois, Iowa, Maryland, Minnesota, Nebraska, New Jersey, and Oregon) and two cities (District of Columbia and San Francisco) were created and funded, how they operate, and whom they serve. It also discusses key observations for other states and localities interested in initiating or expanding rental assistance.

Methods

The National Low Income Housing Coalition (NLIHC) created and periodically updates a database of state- and locally funded affordable housing programs (NLIHC, 2017).² Using the NLIHC database as a starting point, a 2014 Technical Assistance Collaborative (TAC) report created summary profiles of more than 70 such programs (Bergquist et al., 2014). TAC's review found that these programs tend to target specific populations, are often intended as a bridge to federal assistance, do not require engagement in services, and use tenant-based models.

¹ In 1999, the Supreme Court ruled in *Olmstead v. L.C.* that the Americans with Disabilities Act requires states to serve people with disabilities in the least restrictive environment possible, which has led the U.S. Department of Justice to investigate, and sometimes sue, states suspected of noncompliance. See <http://www.bazelon.org/the-olmstead-case/>.

² Note that we first referenced NLIHC's database in 2016, and the database may have been updated since then.

Building on these resources, we sought to learn more about these programs to identify lessons that states and communities might find useful. Excluding one-time or very short-term aid programs, our review of the NLIHC and TAC surveys identified 66 active state- or locally funded rental assistance programs, most of which are state programs, in 32 states serving about 120,000 households. Out of this universe, we explored programs in a small number of states and cities.

We were particularly interested in programs that target people with health challenges and link housing aid to health and social service supports. For example, we selected Iowa and Maryland because their housing subsidies targeted people served by Medicaid programs that help people with disabilities live in the community instead of institutions. To learn from a cross-section of communities and programs, however, we also considered other criteria to ensure diversity in program location, age, and size. We included a mix of states and cities because both levels of government likely have meaningful lessons to share. We also included a mix of tenant-based and project-based approaches. We excluded some states, including New York, because the amount of resources invested could be difficult to replicate. Ultimately, we interviewed agency officials and advocates about 19 programs in 10 locations (8 states and 2 cities).

We began by emailing and speaking with a subset of state and local officials and advocates from selected communities (chiefly in New Jersey and Illinois). We interviewed officials managing the programs and advocates familiar with the programs' history—people we either already knew or identified through contact information available online or referrals. These strategies enabled us to speak with people about every program we targeted. We used the preliminary conversations to verify the accuracy of the NLIHC and TAC survey information, test potential survey questions, and identify people with more detailed information to offer, such as the programs' creation, structure, changes over time, and funding.

Based on those conversations, we developed a simple online survey—with questions about a program's size, eligibility criteria, and funding—to use with the remaining locations (see appendix B). We followed up with semi-structured phone interviews with officials and advocates who completed surveys to learn more about each program, including its origin and changes over time. We asked them roughly the same questions as the preliminary group but grouped the more straightforward questions into the survey and reserved more complex questions for phone conversations. We received survey responses for each program for which we requested them, although one survey was completed after the phone conversation. In some cases, we asked follow-up questions or sought clarification via email. We also used information published on local and state government websites to supplement what we learned from surveys, emails, and phone conversations.³

Limitations

Our results reflect a relatively small share of programs that do not constitute a strictly representative sample. Also, we gathered information during the period 2016 to 2017, and some information

³ See appendix A for an overview of key characteristics of each program, including the kind of agency that oversees it, the populations served, the services offered, whether subsidies are tenant or project based, and the approximate size of each program. Much of the information in appendix A was derived from the survey (see appendix B for substantive survey questions), although some was also obtained from phone conversations with advocates and officials.

could now be outdated. Although we received answers to most of our questions for each program, not all the officials and advocates we contacted could answer all our questions. For some programs, we were unable to delineate the program's origins, the reasoning behind certain policy decisions (such as shifting program management to a different agency), or initial program funding levels.

Results

We identified several common features among the 19 programs that may be of interest to policy-makers and stakeholders—

- To further the state's or locality's health and human services goals in addition to affordable housing goals, most of the programs target special populations, particularly people with significant physical or mental health needs, and connect them to a set of services.
- Programs use a mixture of tenant- and project-based rental assistance, with many using both.
- Programs are often designed as a bridge to federal rental assistance.
- Coordination between housing agencies and health and human services agencies is common for programs that serve special populations.
- Program funding tends to grow over time to serve more households.
- Most programs rely on general revenue, not dedicated sources such as special taxes or fees.

Program Features

States and localities have many options in designing rental assistance. Although the programs we analyzed had a variety of designs, many shared common features (see appendix A for details on each program).

Policy Goals

Providing affordable housing resources is a central purpose of the rental assistance programs. For instance, New Jersey's State Rental Assistance Program was created in part as a temporary stopgap at a time when funding for federal vouchers had stalled.⁴ Similarly, advocates in Washington, D.C., stated that sequestration's effect on federal rental assistance funding contributed to the growth of the Local Rent Supplement Program. However, many programs target goals beyond housing affordability. In addition, although many programs were created or expanded to meet state or local policy needs, federal mandates or initiatives sometimes played a role.

Deinstitutionalization—the movement away from institutionalizing people with disabilities and toward integrating them into the community—is one of the most common policy goals, often tied to compliance with the Supreme Court's *Olmstead* decision. Studies routinely show that lack of

⁴ To learn more information about sequestration's impact on federal rental assistance, see <https://www.cbpp.org/research/housing/sequestrations-rising-toll-100000-fewer-low-income-families-have-housing-vouchers>.

affordable housing is a significant barrier to moving people out of nursing homes or other health facilities (Irvin et al., 2017); targeted rental assistance can remove this barrier for people who could otherwise live in the community with the right supports. Before the *Olmstead* decision, Minnesota's Bridges Program was created to assist deinstitutionalization. U.S. Department of Justice (DOJ) enforcement of *Olmstead* directly led to the creation of Illinois' Bridges Program through a 2011 settlement agreement, whereas Nebraska officials said that DOJ's *Olmstead* enforcement contributed to the creation of the Rental Assistance Program for People with Mental Illness in 2006, although no lawsuit or investigation was pending. States also often cite *Olmstead* as a reason for expanding programs.

Another common program goal is addressing homelessness, including stabilizing or improving the health of people with serious physical or mental health conditions who are experiencing homelessness. Homelessness can destabilize people's health by exacerbating mental illness, exposing people to the elements or unsanitary conditions, or contributing to or exacerbating substance use disorders. In addition, homelessness can make it more difficult for people to obtain healthcare and social support services. Officials and advocates noted the hope that targeting rental assistance to people who might otherwise rely on costly shelters or frequently utilize expensive emergency services like hospital emergency departments may also reduce state and local costs in these areas.

Several programs were created specifically to address homelessness. Advocates in Washington, D.C., noted that the Permanent Supportive Housing Program was created after the closing of a local homeless shelter made homelessness more visible. San Francisco created the Local Operating Subsidy Program in 2004 as part of a 10-year plan to end homelessness, only a year after the federal government started promoting such plans.⁵ Similar plans to end homelessness, including in Minnesota and Connecticut, contributed to the growth of other rental assistance programs.

Target Populations

Every program we analyzed limits eligibility to people with incomes of less than the Area Median Income (AMI).⁶ About one-half of them explicitly require participants to have incomes at or below 30 percent of AMI; a few serve higher-income people, including 50 or 60 percent of AMI. Several programs lack income eligibility requirements but have population-specific eligibility criteria—such as homelessness or participation in particular services—that likely mean they serve people with incomes well below AMI.

Primarily for the reasons cited previously, every program we studied targets aid to people who have mental illness, experience homelessness, or have other qualifying characteristics (for example, families with children). Even the programs that do not *exclusively* serve special populations set aside some rental assistance for such groups or prioritize them in practice.

⁵ To learn more about the federal government's role in encouraging states to adopt 10-year plans to end homelessness, see http://nlihc.org/sites/default/files/Sec7.08_Ten-Year-Plan_2015.pdf.

⁶ The U.S. Department of Housing and Urban Development (HUD) uses AMI as a benchmark to determine eligibility for federal rental assistance programs, and 11 of the 19 state and local rental assistance programs we analyzed also use AMI in their eligibility criteria. Of the 11 rental assistance programs that use AMI, 8 are currently operated at least in part by a housing agency.

Leaders in Creating New Programs

Each program we studied had champions who were instrumental in creating it. In some cases, advocates cultivated champions within agencies or legislatures; in others, agency officials appear to have proposed new programs without major outside advocacy. Regardless, legislative advocacy has been key to increasing funding and protecting programs from cuts.

Agency-Led Efforts

Health and human services officials, rather than legislators or housing advocates, were often the primary champions for creating new programs. Indeed, in some cases, housing advocates were unaware of rental assistance programs long after their creation. In these cases, the health agencies determined that lack of affordable housing interfered with their ability to effectively serve their clients and achieve the policy goals discussed previously.

Advocate-Led Efforts

Several programs were enacted after advocates—typically housing and homelessness advocates—organized legislative advocacy campaigns for more rental assistance resources. For instance, homelessness advocates were key to creating Minnesota’s Transitional Housing Program in the 1980s; they later joined affordable housing advocates to push for the Minnesota Housing Trust Fund, which eventually became an additional funding source for rental assistance. On the whole, successful campaigns to create, expand, or protect rental assistance programs have received cross-partisan support.

Services

Nearly all of the programs we studied are connected to a package of services, largely state- or locally funded health services. These programs include community-based mental health services such as case management and outpatient therapy and medication management, which help people manage symptoms while living in the community, and are typically broadly available to members of the community—not only people receiving rental assistance. The most commonly offered services are supportive housing services, which help people maintain stable housing after exiting homelessness, such as by helping them pay rent on time, understand their rights as tenants, and manage their health to prevent hospitalization or institutionalization (Dohler et al., 2016).

Most of the services offered alongside rental assistance are optional for participants (Bergquist et al., 2014; NLIHC, 2017). However, a small number of programs require participants to receive certain basic services, such as monthly case management visits, as long as they receive rental assistance. Also, some only serve people who already receive specific services; for example, Iowa’s Home and Community Based Services (HCBS) Rental Assistance Program provides rental assistance only to people who receive home- and community-based services.⁷

⁷ Home- and community-based services are Medicaid services that help seniors or people with disabilities receive services in their homes and communities rather than in nursing homes or other healthcare facilities. See <https://www.cms.gov/Outreach-and-Education/American-Indian-Alaska-Native/AIAN/LTSS-TA-Center/info/hcbs.html> for a list of the types of services states can provide through their HCBS programs.

Subsidy Structure

More than one-half of the programs we studied cover the difference between rent and 30 percent of the tenant's income, with the subsidy often capped at Fair Market Rent (FMR) or a similar measure, similar to federal rental assistance (CBPP, 2017a).⁸ However, two programs have additional subsidy caps: Oregon Health Authority's State Rental Assistance program's monthly \$500 cap and the Nebraska Rental Assistance Program's \$6,000 annual cap (with some exceptions).

Two other programs provide less generous income-based subsidies: Connecticut's Rental Assistance Program requires most tenants to contribute 40 percent of their income (30 percent for elderly tenants and tenants with disabilities), and San Francisco's Direct Access to Housing requires a 50-percent contribution. Washington, D.C.'s Housing First Subsidy Program uses a flat rent not based on income, and Illinois' Rental Housing Support uses two flat rents, one for people with incomes of less than 15 percent of AMI and one for those with incomes between 15 and 30 percent of AMI.

Size

Most of the programs we studied grew significantly over time. They now serve an average of 1,600 households (ranging from fewer than 100 to more than 5,400); only two serve fewer than 700. The two smallest programs were the most narrowly targeted, serving recipients of specific Medicaid services: Iowa's HCBS Rental Assistance Program and Maryland's Money Follows the Person subsidy. The two largest programs were among the least targeted: Connecticut's Rental Assistance Program and New Jersey's State Rental Assistance Program, both of which set aside some rental assistance for special populations but otherwise base eligibility on income.

Tenant- and Project-Based Subsidies

Rental assistance can be either tenant based (meaning the household uses the subsidy to rent a home of its choice on the private market) or project based (meaning the subsidy is tied to a specific building or unit). Some of the programs we analyzed are strictly project based, some are strictly tenant based, and about one-half use both models. For instance, Connecticut's Rental Assistance Program largely uses a tenant-based model but also funds permanent supportive housing units with project-based subsidies. Programs serving special populations are just as likely to use tenant-based as project-based rental assistance, and many—like Washington, D.C.'s Permanent Supportive Housing Program—use both.

Bridge to Federal Rental Assistance

Nearly one-half of the programs we analyzed help households afford rent while waiting for federal rental assistance. They either (1) were explicitly intended to function as a bridge to federal rental assistance or (2) required participants to apply for federal rental assistance as a condition of eligibility. Once participants obtain federal assistance, the state or local funds are redirected to serve other households waiting for federal assistance.

⁸ Subsidies in HUD's HCV program are based on a HUD-determined FMR, which typically reflects the cost of rent (including utilities) of units at the 40th percentile in a metropolitan area or county. The goal is to ensure that the subsidy can help low-income people afford adequate yet modest housing while enabling the program to assist as many households as possible. See huduser.gov/portal/datasets/fmr.html.

Most of these bridge or bridge-like programs either have no time limits or have exceptions to time limits, allowing people to keep receiving aid while waiting for federal subsidies. This aid helps vulnerable individuals such as those experiencing homelessness or at risk of institutionalization get safe, stable housing more quickly, potentially preventing further decline in their health while they wait for federal assistance.

Generally, households may receive state or local rental assistance for several years before federal assistance becomes available. To ensure a timely transition into federal assistance, Maryland's Money Follows the Person Bridge Subsidy Demonstration enters into memoranda of understanding with public housing agencies (PHAs), under which the PHAs prioritize bridge subsidy recipients to receive federal housing choice vouchers within 3 years of receiving the state subsidy.

Cross-Agency Coordination

The programs we examined are chiefly administered by state or local housing agencies or the health and human services agencies. Four are jointly administered by the housing *and* the health and human services agencies, typically with the former administering the rental assistance and the latter managing services. The rest are nearly evenly split between those administered by a housing agency and those administered by a health and human services agency.

In some cases, particularly programs created by a health and human services agency, the agency that originally administered the program no longer does so. Four such programs moved from a health and human services agency to the corresponding housing agency or are now jointly administered in collaboration with the housing agency. For instance, the Minnesota Bridges Program, which serves people with mental illness, was created within the state human services agency but later moved to the state housing agency.

Administering agencies sometimes contract with nonprofit organizations, PHAs, or local Continuums of Care (the planning bodies that coordinate federal homelessness resources) to implement the rental subsidy or services. For example, both of Connecticut's programs contract with PHAs to manage the rental subsidies, including managing a waitlist alongside the HCV program waitlist. Some programs in Minnesota (the Transitional Housing Program and Housing Trust Fund) and New Jersey (the supportive housing portion of the State Rental Assistance Program) utilize their local Continuums of Care to organize and prioritize referrals. Several programs that serve people with mental illness or other health needs rely heavily on healthcare providers for referrals.

Funding Trends

Generally, funding for the programs we examined have grown significantly over time (along with growth in the number of households), and funding doubled for at least one-half of them.⁹ For instance, New Jersey's State Rental Assistance Program started with \$10 million annually in the early

⁹ Figures on funding levels do not take inflation into account. Also, we were unable to obtain information on initial program funding for about one-half of the programs we examined.

2000s and now receives more than \$40 million annually.¹⁰ Iowa's HCBS Rent Subsidy program started with about \$70,000 in the mid-1990s and now receives more than \$650,000 in general revenue funds.

States and localities typically fund rental assistance in one of two ways: (1) general revenue appropriated each legislative session, or (2) dedicated revenue sources (typically fees, taxes, or interest). Of the 19 programs we studied, 13 rely solely on appropriations, 1 relies on dedicated funds, and the remaining 5 have used both. Nearly all the programs that rely solely on appropriated funds grew substantially over time, despite some occasional dips. The 5 programs that have used both kinds of funding also saw growth. In contrast, the only program relying solely on dedicated funding (Illinois' Rental Housing Support program) saw about a 20-percent decline in funding since its creation a decade ago.

Discussion

States and localities used at least portions of their rental assistance programs to address homelessness, physical and mental health problems, and other social problems, with most programs explicitly targeting people experiencing such problems. States and localities facing similar challenges could use lessons from existing programs to think creatively about how to use rental assistance to help address them. The programs we analyzed largely lack meaningful outcome measurements, meaning judgment about which models are best must be reserved for future research. Although no single way exists to advocate for or structure rental assistance programs, our research suggests that the following can guide stakeholders engaged in early conversations, strategic planning, and program implementation.

Target Rental Assistance to Special Populations

Targeting rental assistance to people with particular needs can help programs gain and maintain support—and use scarce resources effectively. Agency officials, legislators, and advocates all view rental assistance as an important tool for addressing other state or local priorities. Given the wide range of goals that rental assistance can support, such as ending homelessness and improving health care, champions for creating rental assistance can be found in many places: in legislatures, government agencies, and community organizations invested in serving vulnerable populations.

Moreover, because rental assistance would likely remain scarce even with robust state and local efforts, states and localities should focus their modest resources on the groups facing the direst circumstances. People who are experiencing homelessness or have mental health conditions were the most common target populations of the programs we analyzed. Another potential target is high-cost users of the health care system, such as people with frequent emergency room or inpatient

¹⁰ The New Jersey State Rental Assistance Program was originally—and for most of its duration—funded by general revenues. New Jersey shifted the program onto the state's housing trust fund during the Great Recession. The trust fund typically funds affordable housing development, and many hope that the rental assistance will be transferred back to general revenue funding in the near future, allowing the trust fund to return to funding development.

hospital visits; often they are unstably housed, and programs that couple affordable housing with services (like supportive housing) have been shown to reduce state and local costs (Dohler et al., 2016).

Some populations not included in our sample might also be worth targeting. Two examples are youth aging out of the foster care system and people who were formerly incarcerated. Both groups often struggle to afford housing, and the resulting instability can contribute to homelessness, involvement in the justice system, and other adverse outcomes (Annie E. Casey Foundation, 2014; Metraux, Roman, and Cho, 2007; NHCHC, 2013).

Engage Cross-Agency Partners Early and Often

Cross-sector partnerships are key to effectively serving special populations with both housing and service needs. Partnering with housing experts can reduce administrative duplication, improve efficiency, and avoid challenges and missteps. Of the programs we studied, 12 were formed in a health and human services agency, with little or no help from the housing agency; 4 of them later had at least the rental assistance part of the program moved to housing agencies, presumably because of difficulties administering rental assistance.

Although health and human services officials understand how rental assistance benefits the people they serve, housing agencies typically have much deeper expertise and capacity to design and manage rental assistance. To administer rental assistance effectively, agencies require financial and practical mechanisms to help people locate housing that meets their needs, perform property inspections, and make timely rent payments. Agencies also need to recruit and retain landlords willing to work with the agency, accept housing subsidies for payment, and rent to people with poor rental and credit histories. In addition, programs that require recipients to be on the waiting list for federal housing assistance should connect with the housing agency to ensure participants eventually receive federal assistance. Finally, division of labor between housing and health and human service agencies enables the latter to focus on addressing peoples' needs *beyond* housing unaffordability.

Think Carefully and Creatively About Funding Opportunities

Rental assistance programs can grow over time, enabling them to serve more households, particularly when legislators understand how rental assistance supports other health and human service goals. The *kind* of program funding used is an important design consideration. Although our investigation did not find that one funding source (general revenue versus dedicated funding) is best, the following factors can help when weighing funding options.

The choice of funding source depends greatly on the local political climate. If the strongest support for creating new rental assistance comes from within a government agency, it might be easier for the agency to request a modest amount of general funds to start a new program than to convince legislators to create a new dedicated funding source or divert funds from an existing one. Dedicated funding sources can also face significant opposition from stakeholders with an interest in maintaining access to an existing fee or tax or who oppose the creation of a new one. Among

advocacy campaigns that sought a dedicated funding source, like the trust fund in Minnesota, non-profit housing developers were important stakeholders because trust funds often fund affordable housing construction or rehabilitation.

The funding source's sustainability is another key consideration. Without sustainable funding, a program may not keep up with rising rents and may have to terminate rental assistance for some households. Funding that keeps up with rising rents is particularly important for rental assistance with no time limits (as in the vast majority of programs we analyzed).

Dedicated funding may seem more sustainable because the revenue is systematically collected from a fee or tax. In contrast, appropriated funds require legislators to allocate funds for the program, meaning the rental assistance competes directly with other legislative priorities every year. However, the only program we examined that relies exclusively on dedicated funds—Illinois' Rental Housing Support program—was also the only program to see a significant funding *decline* since its creation.¹¹ Dedicated funds can be vulnerable during periods of budget shortfalls and can also see fluctuation or stagnation in the fees or taxes that fund them. For instance, dedicated funding sources often include part of the mortgage recording fees paid on the purchase or sale of real estate; if fewer people buy homes, this revenue falls. Moreover, most of the programs relying on appropriated funds have experienced significant growth. That said, 5 of the programs we examined have at some point relied on both kinds of funding, and advocates indicated they have been able to convince legislators to use general revenues to offset declining funding or scale up programs if a dedicated funding source becomes insufficient. Thus, although stakeholders attempting to create a new program should think creatively about funding structures, sustaining and growing programs depends largely on building a strong base of political support for the program's goals.

Track and Share Meaningful Outcomes

Most of the programs we analyzed track basic output measures, like how many households they serve and for how long. More outcome monitoring and formal evaluations are needed, however, to determine how the programs affect longer-term housing outcomes and impact other systems, such as by reducing health spending, improving health outcomes, reducing the use of emergency homeless shelters, improving recovery from substance abuse, and reducing recidivism among people involved in the criminal justice system. Data in these areas would bolster arguments for creating or expanding programs while identifying areas needing improvement. Philanthropic organizations could invest in building government and provider capacity to measure client outcomes and implement new initiatives when outcome goals are not met.

Additional Considerations

States, localities, and other stakeholders should consider other issues in designing rental assistance. For instance, a growing body of research finds that growing up in low-poverty neighborhoods with quality schools can significantly improve low-income children's educational achievement and later economic success (Chetty, Hendren, and Katz, 2016). Rental assistance can be designed

¹¹ Note that Illinois faced serious state budget challenges between 2015 and 2017 that may have affected its rental assistance program. See <https://www.nytimes.com/2017/07/06/us/illinois-budget-shutdown-states-rauner.html>.

to expand families' access to such neighborhoods. More broadly, programs should always protect tenants' basic rights, including their rights under the Fair Housing Act. Other considerations can be critical for particular populations; for example, programs that connect people to services should track outcomes to ensure the services offered are sufficient to help participants stay stably housed, avoiding evictions or institutionalization.

Conclusion

State and local rental assistance programs appear to benefit from enduring support from policy-makers and advocates, particularly when the rental subsidy helps the government achieve health or other social welfare goals. The many lessons learned from existing programs could inform states or localities seeking to build new programs or improve existing ones, particularly during a time when funding for federal rental assistance has been stagnant. We also hope this research opens the door for more comprehensive and systematic study of state and local rental assistance.

Appendix A

Exhibit A-1, on the following pages, lists key features of state and local rental assistance programs based on information collected during the period 2016 to 2017.

Exhibit A-1

Key Program Features (1 of 4)

Program Name	Current Agency: ^a Housing or Health and Human Services	Target Populations	Services	Tenant or Project Based	Funding Amount and Type (Appropriations and/or Dedicated Funds)	Number of Units
<i>States</i>						
<i>Connecticut</i>						
Elderly Rental Assistance Program	State housing agency	Elderly and people with disabilities	None	Project based	\$2,300,000 Annual appropriations	1,344
Rental Assistance Program	State housing agency	General; mental illness and homeless setasides	None for general population; setasides include permanent supportive housing	Tenant based; project based for setasides	\$52,300,000 Annual appropriations	5,473
<i>Illinois</i>						
Rental Housing Support	State housing agency	General (local preferences allowed including homeless)	None	Project based	\$18,000,000 Dedicated	2,500
Permanent Supportive Housing Bridge Subsidy Program	State human services agency	Mental illness	Required basic mental health case management, optional other services	Both	\$13,354,200 Dedicated and annual appropriations	1,400
<i>Iowa</i>						
HCBS Rent Subsidy Program	State housing agency	People with disabilities (on HCBS waiver)	Required participation in HCBS services	Tenant based	\$658,000 Annual appropriations	360

Exhibit A-1

Key Program Features (2 of 4)

Program Name	Current Agency:^a Housing or Health and Human Services	Target Populations	Services	Tenant or Project Based	Funding Amount and Type (Appropriations and/or Dedicated Funds)	Number of Units
Maryland						
MFP Bridge Subsidy Demonstration	State health agency	People with disabilities (including mental illness)	Must participate in MFP home and community-based services program	Tenant based	\$2,500,000 one-time appropriations drawn down over 5 years	89 (estimated over 5 years)
Minnesota						
Bridges Program	State housing agency	Mental illness	Optional community mental health services	Tenant based	\$4,300,000 annual appropriations and dedicated	770
Transitional Housing Program	State human services agency	Homeless or at risk of homelessness	Required case management	Both	\$3,184,000 annual appropriations	1,200
Minnesota Housing Trust Fund	State housing agency	General with strong preference for homeless	Some voluntary services	Both; mostly tenant based	\$10,276,000 annual appropriations and dedicated	1,993
Nebraska						
Rental Assistance Program for Adults with SMI and Substance Dependence	State health and human services agency	Mental illness or substance dependence	Required behavioral health services	Project based	\$2,600,000 dedicated and annual appropriations	875

Exhibit A-1

Key Program Features (3 of 4)

Program Name	Current Agency: ^a Housing or Health and Human Services	Target Populations	Services	Tenant or Project Based	Funding Amount and Type (Appropriations and/or Dedicated Funds)	Number of Units
New Jersey						
State Rental Assistance Program	State housing agency	General with homeless, disabilities, children set aside	Some optional services, including permanent supportive housing	Both; mostly tenant based	\$41,300,000 dedicated (recently shifted from annual appropriations)	3,883
Supportive Housing	Both	Mental illness or substance use disorder	Optional supportive housing services	Both	\$18,600,000 annual appropriations	2,500
Oregon						
Oregon Health Authority State Rental Assistance	State health agency	Mental illness and substance use disorder	Tenancy supports and peer support available	Both	\$20,000,000 biennium appropriations	1,700
Cities						
District of Columbia						
Local Rent Supplement Program	Both	General with preferences for homeless	Some permanent supportive housing services available	Both	\$52,000,000 annual appropriations	3,400 ^b
Home First Subsidy Program	Both	Mental illness and homeless or leaving institution	Required monthly mental health services home visit and optional tenancy support services	Tenant based	\$9,200,000 annual appropriations	950
DC Permanent Supportive Housing Program	Both	Mental illness, substance use, or other health problem and homeless or leaving institution	Voluntary permanent supportive housing services	Both	\$45,400,000 annual appropriations	1,355

Exhibit A-1

Key Program Features (4 of 4)

Program Name	Current Agency: ^a Housing or Health and Human Services	Target Populations	Services	Tenant or Project Based	Funding Amount and Type (Appropriations and/or Dedicated Funds)	Number of Units
San Francisco						
San Francisco Direct Access to Housing	Specialized homelessness agency ^c	Homeless with serious physical or behavioral health condition	Supportive housing and onsite health care services available	Project based	\$23,426,608 annual appropriations	1,638
San Francisco LOSP	Both (housing agency and specialized homeless agency)	Homeless (families, youth, single adults, seniors)	Supportive housing services available for some	Project based	\$12,359,887 annual appropriations	1,459 ^d
San Francisco Housing First Program	Specialized homelessness agency	Homeless	Supportive housing services available	Project based	\$23,321,866 annual appropriations	2,449 ^e

HCBS = Home and Community Based Services. LOSP = Local Operating Subsidy Program. MFP = Money Follows the Person. SMI = serious mental illness.

^a "Current Agency" refers to the state or local agency or agencies that are currently responsible for managing the program rather than the agency in which the program was created. Some programs were created in one agency but later transferred to another agency.

^b This total includes about 1,600 project-based units that overlap significantly with supportive housing and 540 units for the new targeted affordable housing subcategory of the Local Rent Supplement Program.

^c San Francisco recently created a Department of Homelessness and Supportive Housing to manage programs that serve people experiencing homelessness, which used to be managed by the health and human services agency. See <http://hsh.sfgov.org/>.

^d Some overlap with Direct Access to Housing and other supportive housing exists.

^e Some overlap with LOSP exists.

Appendix B: Key Survey Questions

1. How many households are served by the program?
2. How many households were served when the program began?
3. Who is eligible for the program?
4. Are there preferences or set-asides within the program for certain groups?
5. Do tenants have to be on a federal rental assistance waitlist to receive assistance through this program?
6. How much do tenants pay toward rent?
7. Is there a maximum benefit tenants can receive?
8. Is there a time limit? If so how long?
9. Is the program project-based or tenant-based?
10. If you chose “other,” how would you describe the program?
11. How much funding does the program receive annually?
12. What is the funding source for the program?
13. What agencies administer the program on the ground?
14. Does the program track any outcomes? Please list any outcomes you track.
15. Are tenants offered any services through the program? Please indicate whether these services are required.

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Embedding Health in Affordable Housing Development: Results of the Health Action Plan Pilot Project

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Abstract

- *Objectives: Although affordable housing holds great potential for improving the health of its residents, the optimal way to incorporate health into the affordable housing planning and design process remains unknown. Working with five community development corporations (CDCs), we performed a pilot study of their approach to developing Health Action Plans, a structured process that formalizes collaboration between CDCs and public health professionals.*
- *Methods: Five CDCs were selected through a competitive process to receive financial and technical assistance to develop Health Action Plans. The evaluation used a mixed-methods approach. Data were collected through monthly Community of Practice calls, structured interviews conducted twice during the project, and prepilot and postpilot surveys to assess the CDCs' ability to implement the Health Action Plan framework in the future.*
- *Results: Four CDCs developed Health Action Plans specific to their projects. The plans varied in the health issues addressed and the health-promoting strategies considered. A fifth CDC developed generic guidelines. All CDCs gained a deeper understanding of how the built environment can impact health and found that engaging residents and understanding local health needs improved the development process. They were likely to engage public health professionals in the future and consider how their development decisions affect resident health.*
- *Conclusions: The Health Action Plan may be an important framework to guide CDCs to look at development as a mechanism to promote resident health outcomes. Work remains to be done before the creation of a Health Action Plan becomes routine, including the incorporation of additional tools and resources that bolster cross-sector collaboration.*

Background

Place matters. This simple statement reflects our growing understanding of how the social and physical environment in which people live can influence both individual and population health outcomes. Housing is one of the most important places we inhabit and has the potential to significantly impact resident health in numerous ways—from site selection to the building materials used to operations and maintenance procedures.

Architects, planners, and developers play roles in ensuring that the built environment is health promoting. Factors such as walkability, access to services, healthy food, transportation, and safety all translate to better health (Berke and Vernez-Moudon, 2014). Similarly, quality design and construction, coupled with regular building maintenance, can help to prevent illness and contribute to improved physical and mental wellbeing (Robert Wood Johnson Foundation, 2011).

Enterprise Green Communities Criteria

Enterprise Community Partners (hereafter, Enterprise) launched its Green Communities Initiative in 2004. The central element of the initiative is the Green Communities Criteria (hereafter, the Criteria), which is the nation's leading green building standard for affordable housing. The Criteria have been used to certify properties in 43 states, ensuring healthy design and building practices across the affordable housing field. Protecting human health by reducing greenhouse gas emissions and by promoting proven healthy housing design and operations practices has been an imperative of the Criteria since its inception. During its most recent update, Enterprise sought to amplify this emphasis on health, and the current version of the Criteria includes best practices in active design, health-related criteria inspired by the Health Impact Assessment (HIA) process and new standards for indoor air quality. More specifically, the 2015 update includes two process-based criteria that interweave the integrative design process from the green building sector with the HIA process from the public health sector. By so doing, the Criteria provide affordable housing developers an actionable path to considering and prioritizing resident health-promoting outcomes through design. One of these criteria is mandatory for all projects pursuing Enterprise Green Communities certification (Criterion 1.2a, *Resident Health and Well-Being: Design for Health*) and one is optional (Criterion 1.2b, *Resident Health and Well-Being: Health Action Plans*; Enterprise, 2015). Although both these criteria ask developers to consider resident health in their project designs, Criterion 1.2b requires a more rigorous association with a public health professional and community stakeholders, as well as more robust followup action. These criteria were developed through a partnership involving Enterprise, the Health Impact Project (a collaboration between the Robert Wood Johnson Foundation and The Pew Charitable Trusts), and the U.S. Green Building Council—all organizations poised to promote the comprehensive and systematic consideration of health in housing through green building certification programs.

The Health Action Plan Process

Although many affordable housing developers include health-promoting design features in their buildings, these design decisions are often made without regard to the specific health needs of a building's current or future residents. Development of a Health Action Plan (through Criterion 1.2b) calls for housing developers to collaborate with public health professionals to assess, identify,

implement, and monitor achievable actions to enhance the health-promoting features of their project and to minimize features that could present health risks. The Health Action Plan framework identifies five Resident Health Campaigns that encompass many of the health issues that disproportionately affect low-income communities—injury and accessibility, asthma and respiratory health, cardiovascular diseases, Type 2 diabetes and obesity, cancer and health outcomes related to toxin exposure, and mental health.

Based on a review of local public health data and input from residents and other community stakeholders, community development corporations (CDCs) and their public health partners create a Health Action Plan that focuses on one or more of the Resident Health Campaigns or identifies additional community concerns. Developers then work with their public health partners to design changes to the built environment that will address these concerns. Exhibit 1, taken from the Criteria, offers an example of a Health Action Plan.

Exhibit 1

Example of a Health Action Plan

Key Health Issue and Population Group	Potential Intervention	Examples of Strategies	Was This Strategy Elected? (Yes or No)	If Selected, Indicate How This Strategy Will Be Implemented	Rationale for Selecting or Rejecting This Example Strategy
High incidence of childhood asthma	Eliminate or reduce use of potential asthmagens	Prioritize the specification of hard surface flooring	Yes	Specification of linoleum for kitchens; cork flooring for bedrooms	High-impact strategy in terms of addressing health issue; also a flooring choice that reduces ongoing maintenance and replacement costs. Given the disparities in asthma rates by race, ethnicity and income in our community, this strategy will also help to address health equity.
Above-average prevalence of childhood obesity	Prioritize features that promote physical activity	Street infrastructure improvements to safely accommodate users of all ages, abilities and transportation modes	No	NA	Our project team does not have the capacity to affect local transportation infrastructure.
Above-average prevalence of childhood obesity	Prioritize features that promote physical activity	Playground	Yes	We will be including a 100-square-foot playground as part of the project.	This feature will provide a local, safe space for the families living in our development to play and socialize. Otherwise, closest playground is 2 miles from project, not easily accessible. Given the disparities in childhood obesity rates by race, ethnicity and income in our community, this strategy will also help to address health equity.

NA = not applicable.

Developing the Health Action Plan is only one step of the process. The accompanying Implementation and Monitoring Plan ensures that the strategies adopted during the design phase perform as expected and positively contribute to resident health. The Implementation and Monitoring Plan identifies design, operations, and health metrics for each strategy adopted in the Health Action Plan.

The Health Action Plan Pilot Project

Enterprise and the Health Impact Project were interested in evaluating the ways in which CDCs implemented the Health Action Plan framework and the capacities needed to achieve a development perspective anchored by promoting resident health outcomes. Funded by the Health Impact Project, Enterprise conducted a pilot project, along with a formative evaluation, involving five CDCs between July and December 2016. The purpose of the pilot was to observe and support the ways in which the affordable housing developers used public health data and forged the key partnerships necessary to create a Health Action Plan and a Monitoring and Implementation Plan. A secondary goal of the pilot was to build the organizational capacity of these developers to ensure their ability to implement the Health Action Plan framework in future projects.

Participating organizations were selected through a competitive process, with a request for proposal issued in June 2016. Twelve organizations applied and were ranked based on the following factors.

- Development project schedule.
- Thoroughness and comprehensive nature of the proposal.
- Demonstrated experience in developing affordable housing.
- Commitment to addressing resident health outcomes through housing solutions.

The five organizations selected were Grant Housing and Economic Development Corporation (California), Gulf Coast Housing Partnership (Louisiana), LUCHA (Illinois), Mercy Housing Southeast (Georgia), and SKA Marin (New York).

In addition to their geographic diversity, the development projects represented a mix of construction types (single-family, multifamily lowrise, and multifamily highrise) and resident populations (families and seniors). Projects were in various stages of the predevelopment process, with construction beginning after the end of the pilot. Each CDC received a \$10,000 grant to facilitate their partnership with a local public health professional, technical assistance from national experts, and connection to a Community of Practice peer network. Participants were expected to benefit from deep technical support on a single housing project and apply the knowledge they gained going forward.

Methods

The formative evaluation took a mixed-methods approach to understand how implementing the Health Action Plan framework influenced decision making and the kinds of assistance necessary to scale adoption of the framework across the industry. More specifically, the evaluation was designed to answer the following questions.

- How did the developers identify and use local health data and resources? What evidence informed the creation of their Health Action Plans?
- To what extent did the developers partner with local health providers and public health professionals?
- Did the developers engage community stakeholders? Who were the most relevant voices at the table?
- How did the developers staff this activity and delegate roles and responsibilities?
- What amount of resources did the developers use?
- What factors in the process influenced decision making?

The pilot project also sought to increase the developers' capacity in four key areas: (1) organizational commitment to embedding health in future site design and operations decisions; (2) development of partnerships with public health professionals; (3) data collection, analysis, and interpretation; and (4) stakeholder engagement around resident and community health issues.

Data were collected throughout the pilot using both formal and informal methods. Monthly Community of Practice calls were a rich source of information on the challenges the developers faced in locating and contracting with a public health professional, engaging with community stakeholders, and interpreting the requirements of the Health Action Plan process. The open-ended agendas for these calls enabled each group to share their successes and challenges and to learn from the experiences of their colleagues. The calls, which were recorded, were well attended by the pilot participants, and staff from Enterprise and the Health Impact Project joined to provide technical assistance.

The monthly calls enabled the evaluators to stay abreast of changes in the development process and gauge their impact on completing the steps of the Health Action Plan. For example, one developer had to delay their search for a public health professional to secure project funding when a planned-for source fell through. Real-world circumstances such as this offered important insights into how developers might implement the Health Action Plan process while responding to the inherent uncertainties of affordable housing construction.

Individual structured interviews were also held with each CDC at the midpoint and end of the pilot project. Each hour-long interview involved all members of the developer team, as well as the primary evaluator and Enterprise project director. A set of common questions were used, with time allowed at the end of each interview for unstructured discussion. Interview notes were transcribed and coded to discern cross-cutting themes.

To determine the influence of the pilot project on developer capacity, a brief assessment survey was administered via an online survey at project start and, with some modifications, re-administered at project end. The evaluator created the survey and other members of the Enterprise team and staff from the Health Impact Project reviewed it. A convenience sample was used to pilot test the survey instrument. A link to the survey was sent via email to each organization. This procedure was used for both the prepilot and postpilot surveys.

One person from each CDC completed the survey on behalf of their organization; in all but one case, the same person completed both surveys. Using the Organizational Capacity Matrix (exhibit 2), which was developed for the purposes of this evaluation as a guide, the prepilot and postpilot survey responses were evaluated to determine the organizations’ movement along the awareness continuum for each dimension. Data on resource expenditures, including staff and consultant time spent on the Health Action Plan process, were also collected.

Exhibit 2

Organizational Capacity Matrix

Outcome	Organizational Capacity	Partnerships	Data Collection and Analysis	Stakeholder Engagement
Consistently apply	Deep organizational commitment to health outcomes as evidenced by a formal policy and dedicated staff and other resources at organization level.	Ongoing partnership with public health professionals. Partnership resulted in health-enhancing design features or programming in at least one project.	Consistently uses health-related data to inform decision making.	Consistently engages with stakeholders around health issues.
Act	Demonstrated organizational commitment to health outcomes as evidenced by dedicated staff or project resources at project level.	Partnered with a public health professional on at least one project. Partnership resulted in health-enhancing design features or programming in at least one project.	Has used health-related data but does not do so consistently.	Engages with stakeholders on issues, but lacks experience engaging around health issues.
Intention or willingness to act	Interested in increasing health focus in future.	Interested in partnering with a public health professional.	Interested in using health-related data but is unsure how to do so.	Interested in engaging stakeholders around health issues.
Awareness	Somewhat aware of connection between health and housing.	Does not intend to partner with a public health professional.	Identified barriers to using health-related data.	Does not regularly engage stakeholders.

Results

The experiences of the five participating CDCs provided a candid look at the process by which affordable housing developers implement the Health Action Plan framework. Each organization approached the key implementation steps differently, and all but one successfully created a Health Action Plan as outlined in the Criteria. The Implementation and Monitoring Plan proved problematic for several groups, in part because of their lack of experience in monitoring resident outcomes related to building design. Despite these challenges, four of the five developers either had fully developed monitoring plans or had the basics of a plan that could be solidified by the time final building design decisions were made. The products these four developers created would qualify for the full points available in the Green Communities certification process. One developer

began the Health Action Plan process after final construction drawings were complete and missed the opportunity to create a project-specific Health Action Plan. However, their participation in the pilot resulted in design guidelines that will be valuable in the future.

Enterprise and the Health Impact Project were also interested in whether participating in the pilot had increased the CDCs' ability to implement the Health Action Plan framework in the future. As a result of participating in the pilot, each group saw an increase in their organizational capacity in at least one dimension (exhibit 2). Every group gained a deeper appreciation of how the built environment can influence resident health outcomes. Most gained the ability to partner with a health professional in the future, and several expected to continue the partnership they had formed during the pilot. The types of partners they selected varied and included healthcare providers, nonprofit public health institutes, private consultants, and in one case, a public-health-oriented architect.

Those groups that engaged community members found the experience to be a critical complement to published health data and believed that they had gained the skills necessary to conduct community meetings in the future. One developer conducted key stakeholder interviews, while another held two community focus groups. A third sought to leverage a local health fair as a way to engage the community, although this plan did not happen within the timeframe of the pilot project.

The one dimension along which most groups did not substantially increase their capacity was data collection and analysis. The developers relied on their public health partners for data collection and analysis, and most expressed that they would continue to rely on these partners for data analysis. Data used in the development of the Health Action Plans were drawn from publicly available, secondary data sources, including the American Community Survey, local health atlases, and neighborhood plans. Some groups committed to conducting an annual resident survey as part of their Implementation and Monitoring Plans but expected to engage a third party to analyze their results.

Exhibits 3 and 4 provide the results of the evaluation. Exhibit 3 offers information about each CDC, including details about their projects, the public health professionals they partnered with, the data sources used, and the ways in which they engaged key stakeholders. Exhibit 4 summarizes the findings in terms of the evaluation questions posed at the start of the pilot.

In addition to these results, several key lessons emerged that have broader implications for scaling this work. For each of these lessons, a participant quote provides additional context and meaning.

- **Participating in the pilot broadened the developers' understanding of the relationships between health and housing.** "As developers, we are not service providers, so we don't think about what kind of a room could be best for delivering services or how a space can welcome people. Before this pilot, we didn't realize that place and design can intersect to increase the health and wellness of our residents."
- **Community engagement is an essential part of the process and revealed unexpected insights.** "The community members provided a lot of input on mental health issues, perspectives on safety issues, and knowledge of who in the community was providing health assets. The residents are the experts on what they're experiencing."

Exhibit 3**Findings by Participating Community Development Corporations**

Developer	Development Type	Public Health Partner	Data Sources	Community Engagement
Grant HED (Los Angeles, CA)	76 units (multifamily); 13,000 square feet commercial retail; supportive services for formerly incarcerated residents	Raimi + Associates	LA City Health Atlas; Plan for a Healthy Los Angeles; California Health Interview Survey	Community health fair (planned to occur after pilot)
Gulf Coast Housing Partnership (New Orleans, LA)	40 units (single-family detached homes)	Andrew Ryan, MPH	Local hospitals and state health officials; local crime data	Neighborhood stakeholder interviews
LUCHA (Chicago, IL)	40 units (single-family detached homes)	Illinois Public Health Institute	U.S. Census; American Community Survey; Chicago Health Atlas; Illinois Hospital Association COMP data; Illinois Department of Public Health, Mortality Files	Community focus groups
Mercy Housing Southeast (Atlanta, GA)	77 units (housing for seniors) paired with 40,000-square- foot healthcare facility	Matt Finn, American Institute of Architects, National Council of Architectural Registration Boards, Leadership in Energy & Environmental Design Accredited Professional Cognitive Design, LLC	Annual Resident Survey	Resident and other stakeholder interviews
SKA Marin (New York, NY)	152 units (multifamily)	New York City Health + Hospitals Corporation; New York Academy of Medicine	2015 East Harlem Health Profile	Community leaders, local elected officials, local established institutions, public health professionals (completed prior to pilot)

- **Partnering with a public health professional is important, but it takes time to find the right fit.** “Our organization realized that we needed somebody who knew more about health, so we reached out to the NY Academy of Medicine who had just released a report about the health of the community in East Harlem. They were happy to work with us.”

Exhibit 4

Findings by Evaluation Questions

Evaluation Question	Result
How did developers identify and use existing local health data and resources? What evidence informed the creation of their Health Action Plans?	In all but one case, the public health professionals reviewed and interpreted public health data for the developers. Two developers sought community feedback to ground truth these data and to prioritize the health issues identified.
Did the developers partner with local health providers and public health professionals?	Each developer team did partner with a public health professional; in one case, this individual was a health-focused architect. The process of locating a public health professional and negotiating a scope of work took more time than anticipated.
Did the developers engage community stakeholders? Who were the most relevant voices at the table?	Three of the five developer teams met with community stakeholders, including residents, service providers, and health experts. The others had either engaged stakeholders prior to the pilot project or had a scheduled event delayed beyond the timeframe of the pilot.
How did the developers staff this activity and delegate the roles and responsibilities required?	The lead staff person for the pilot project varied among the developer teams and included an executive director, project manager, and regional director. The responsibility for drafting the Health Action Plan and Implementation and Monitoring Plans fell to the public health professional engaged by the community development corporation.
What amount of resources did developers use?	Total costs incurred by the organizations ranged from \$10,000 to \$15,000. These costs were mainly attributed to staff time and partnering with the public health professional. The costs associated with partnering with a public health professional ranged from \$5,100 to \$9,500.
What factors in the process most influenced decision making?	Two factors were most important in influencing decision making—working with public health professionals and engaging community stakeholders.

- **Health data can inform design decisions and should be considered early in the process.** “We will use health data to make design decisions when planning for a particular type of community, such as senior housing or permanent supporting housing.”
- **Development of the Monitoring and Implementation Plan and the need for continued monitoring posed the greatest challenge for the pilot participants.** “How can we give ourselves some indication down the road of how this went? Thinking about design impacts has an implication for monitoring—how can we get a sense that what we did had a meaningful impact, particularly as we think about what to include in future projects.”
- **To ensure success, implementing the criterion should be a seamless addition to the typical development process, rather than another requirement.** “Success is tied to the development cycle of particular projects. This effort must be institutionalized as part of the organization’s mission so that this process is part of all projects from the beginning.”

Limitations

This formative evaluation had several limitations. The projects selected for the pilot were all new construction projects; thus, we were unable to observe how the Health Action Plan framework might be implemented by developers rehabilitating an existing property. The timeframe for the pilot did not reflect the affordable housing development cycle. The pilot project ran for 5 months; the predevelopment stage of an affordable housing project can run much longer and is subject to changes in financing, staffing, and so on. This artificially compressed timeframe did not enable the CDCs to implement the framework fully. Lastly, the \$10,000 grant provided each organization the funds necessary to engage a public health professional, which alleviated the burden on the developer of finding the necessary resources within their project budget.

Qualitative data collection and analysis are subject to additional limitations. The small sample size limits the generalizability of the evaluation results. Although extensive notes were taken at each individual interview, these sessions were not recorded, and important observations could have been omitted from the analysis. The evaluator chose to manually code interview notes and, by doing so, may have introduced bias in assessing common themes and lessons learned. In addition, the unstructured agenda of the Community of Practice calls could have prevented key issues from being surfaced. To address these threats to validity, both quantitative and qualitative data collection methods and sources were used to increase confidence in the evaluation results.

Discussion

Four of the five participating CDCs successfully completed the pilot and developed a Health Action Plan (online appendix 1, available at huduser.gov/portal/periodicals/cityscpe/vol20num2/appendix1.html). In lieu of creating a Health Action Plan, one CDC developed common space design guidelines, which they plan to implement in all future housing projects for seniors. Each plan was uniquely tailored to the specific needs of the local community and varied in the number of health issues addressed and health-promoting strategies considered. Ultimately, the strategies selected depended on the project resources available. In one case, the developer noted that creating the Health Action Plan had allowed them to seek additional funding from local philanthropy to build a rock-climbing wall requested by the youth living within their affordable housing communities.

Considering public health data was an important part of the process, ground-truthing that data with local stakeholders proved equally important. Community members may prioritize health issues differently than the data would suggest. In Louisiana, the CDC found that the greatest health concern to the community was the potential for children to drown in a canal that was near the property. That concern was not captured by any publicly available data source and was only uncovered by talking with people living near the site. In response, the developer proposed a natural barrier consistent with the site design to make it difficult for children to access the water. In Chicago, community members were most concerned about depression and anxiety and identified a lack of fellowship with neighbors as a contributing cause. This finding led the developer to consider strategies to increase opportunities for neighbors to interact, including enhancing common areas and installing bulletin boards to advertise community events.

A review of public health data may also raise issues about which residents are unaware or unconcerned. For example, the Louisiana CDC found that local data indicated high crime rates near their project site. The developer team expected to hear from the community their concerns about safety. Instead, community members did not identify crime as a problem in the area. This apparent disconnect between the data and resident perception led the developer team to interview the local police chief who better explained the data and provided additional context. Working with the police department, the developer chose to install security cameras and lights to enhance resident safety.

As these examples indicate, an essential component of the Health Action Plan framework is the need to supplement public health data with the lived experiences of community stakeholders. Doing so provides a deeper and more holistic understanding of the needs and priorities of the community. This knowledge will enable a developer to select those health-promoting strategies that will lead to the greatest gains in resident health outcomes.

Conclusions

As part of their final interviews, each CDC was asked how the Health Action Plan framework could be scaled across the industry. Responses fell into three broad categories: (1) create additional tools (for example, list of public health professionals or a reference library of approved Health Action Plans and Monitoring and Implementation Plans); (2) consider changes to the criterion to provide flexibility in creating and implementing Health Action Plans encompassing both the built environment and programs aimed at improving resident outcomes (for example, exercise classes, computer labs, and so on); and (3) drive systems change to embed health considerations in the regulatory framework governing affordable housing. Regarding this latter suggestion, one key means of changing industry practice is through the Qualified Allocation Plan (QAP) process, which awards low-income housing tax credits to development projects meeting specific selection criteria within each state. Since 1986, most of the affordable housing in this country has been developed and maintained using these credits, and 22 states currently include the Criteria in their QAPs. To increase the competitiveness of their housing tax credit applications, developers are incentivized to follow the Criteria, which now includes the Health Action Plan framework. Consequently, QAPs are an important element of the Health Action Plan scaling strategy.

Enterprise continues to look for opportunities to partner in this work and has recently launched a project involving two CDCs in the Boston area that will implement the Health Action Plan framework within the context of a property retrofit. Additional tools and templates are being created to accelerate adoption of the Health Action Plan framework, including a list of public health professionals to assist developers in finding a suitable partner and a set of standardized health outcome metrics to relieve the need for developers to create their own. This latter effort responds directly to the challenges that the CDCs experienced in developing the Implementation and Monitoring Plan. Planning for the next version of the Criteria (to be issued in 2019) will consider additional strategies to expand adoption. Although implementing the Health Action Plan framework is relatively inexpensive (especially when considered relative to an overall project budget), developers often operate on razor-thin margins, and each additional cost must have demonstrated value.

The Health Action Plan Pilot Project was successful in demonstrating the ability of CDCs to approach development in ways that promote resident health outcomes. The need for widespread adoption of health as a design consideration in affordable housing was reiterated through the findings of this pilot. Creating a Health Action Plan provides developers with a keen understanding of the health needs of their residents and enables them to address those needs through thoughtful and intentional design and development practices. Improving resident health outcomes through the built environment is a relatively new priority for the affordable housing industry. The Criteria, and particularly the Health Action Plan framework, offers developers the tools necessary to achieve this goal.

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Connecting Fragmented Systems: Public Housing Authority Partnerships With the Health Sector

Stephen Lucas

Council of Large Public Housing Authorities

Abstract

- *Objectives:* The primary objective was to learn about the types of health partnerships and priorities large public housing authorities (PHAs) have developed to improve resident and community health.
- *Methods:* The Council for Large Public Housing Authorities (CLPHA) developed a survey that catalogued PHAs' partnerships with the health sector to gain insight into health-related initiatives for residents. CLPHA conducted 15 in-depth interviews to develop a survey instrument that was administered online in 2017. Participants included 39 PHAs (57-percent response rate) that collectively serve 24 percent of the 3.5 million U.S. Department of Housing and Urban Development-assisted public housing and housing choice voucher households nationally (n = 847,908).
- *Results:* Large PHAs report high engagement with public health entities and community-based social service providers. Respondents also report working with healthcare service providers, including behavioral health providers and federally qualified health centers. The most common health-related activities in which PHAs are engaged include healthcare service coordination (87 percent) and improving healthy community resources (67 percent). Perceived barriers to establishing health-housing partnerships and health-related programming or alignment include concerns about privacy or liability and lack of resources or capacity.
- *Conclusions:* Large PHAs' level of engagement with the health sector vary widely by agency as does the depth and breadth of established health partnerships.

Background

Stakeholders across sectors serving low-income Americans increasingly recognize that breaking down silos can produce more positive life outcomes and promote effective service delivery. Specifically, intersections between housing and health have recently gained attention as the housing sector has embraced “health in all policies,” and the health sector has increasingly sought to address social determinants of health like housing (Bostic et al., 2012; HHS, 2010; HUD, 2014). Underscoring the impetus for these initiatives is the high medical need of the population served by housing assistance programs. National estimates suggest that, although low-income adults receiving U.S. Department of Housing and Urban Development (HUD) rental assistance are far more likely to have health insurance coverage and report higher rates of healthcare service utilization compared with those who do not receive housing assistance, they do not necessarily have better health outcomes and often report lower health status (Fenelon et al., 2017; Helms, Sperling, and Steffen, 2017; Simon et al., 2017).

The extent to which existing systems-level partnerships and alignment efforts encourage collaboration between public housing and healthcare institutions that serve this population remains largely unknown. A survey by the Council of Large Public Housing Authorities (CLPHA) sought to learn about the prevalence and types of health partnerships that have been developed to improve resident and community health, including with which health entities public housing authorities (PHAs) most often partner. Secondly, CLPHA sought to understand what health-related priorities PHAs set, either alone or in concert with partners, and any target subpopulations of public housing residents.

The study focused on PHAs as they act as the chief provider of housing to low-income Americans at the state and local level. In this context, PHAs may play a critical role in multisector solutions to address complex challenges associated with poverty and health for millions of low-income Americans. CLPHA focuses on “large” PHAs as defined by HUD as managing 1,250 units or more. As of March 2018, CLPHA’s large PHA membership manages 40 percent of the nation’s public housing program, administer 26 percent of the Housing Choice Voucher (HCV) program, and operate a wide array of other housing programs. Large PHAs like these may have greater resources, scale, or both to effectively create partnerships around resident health.

Methods

CLPHA developed the health and housing partnership survey, spanning a wide range of topics, primarily through key informant interviews with public housing authorities.

Overview

This project represents a survey of members of CLPHA that was administered from August 2017 to November 2017. CLPHA is “a national non-profit organization that works to preserve and improve public and affordable housing through advocacy, research, policy analysis, and public education” (CLPHA, 2018).

Survey Development

CLPHA developed a draft survey instrument designed to collect information on a wide range of PHA partnerships with the health sector, including type of common health partners, health priorities, type of health-related initiatives, extent to which health partnerships were formalized, source or sources of funding for health programming, engagement with data sharing with health partners, and incorporation of resident health into strategic planning efforts.

The survey instrument was modified based on key informant interviews with 15 PHAs conducted from April 2017 to July 2017. Each PHA executive director contacted for these interviews was asked to invite all staff (for example, directors or coordinators) knowledgeable about the agency's current activities and future planning of health-related initiatives, and each call consisted of between one and five PHA staff members and one CLPHA staff member who acted as the interviewer. Interviews ranged in length from 30 to 90 minutes, and each agency was asked to share their organization's health-related activities and priorities, with standard followup questions to elicit greater detail. Agencies described existing partnership activities, services, or referrals, examples of their strongest health partnerships, and short- and long-term goals. Some PHAs were asked to review items from the survey instrument for clarity and comprehensiveness. The final survey instrument included 21 core survey questions, including affirmative "choose all that apply" statements, about respondents' health partnerships. Appendix A reproduces the survey questions.

Survey Distribution

The survey was distributed online to all 68 CLPHA members. One email announcement of the survey was sent to PHA executive directors. Information about the survey was subsequently included in three editions of the CLPHA e-newsletter and followed up with individual emails to PHA executive directors from nonrespondent PHAs on two occasions, 1 month prior to closing the survey and 1 week prior to closing. PHA executives, senior-level staff, or both were encouraged to complete the survey on behalf of each agency, drawing on other staff or external partners as needed to accurately answer all survey questions. No incentives were offered to respondents to complete the survey. Duplicative survey responses from the same housing authority were clarified with followup emails or phone calls.

Results

The survey elicited responses from 39 PHAs (57 percent of all CLPHA members) that collectively serve 24 percent (847,908) of the 3.5 million HUD-assisted public housing and HCV households nationally. The study sample includes PHAs from 20 different states and represents 80 percent of the 1.1 million public housing and HCV units managed by CLPHA members. When compared with nonrespondents, survey respondents represented larger portfolios on average, with the mean number of HUD-assisted, occupied units among respondents at 8,737 compared with 2,499 among nonrespondents. Slightly more representation was from states in the West (33.3 percent of respondents versus 18.5 percent of nonrespondents) and slightly less from states in the South (28.2 versus 40.7 percent). For a more detailed comparison of survey respondents and nonrespondents see exhibit 1.

Exhibit 1

Characteristics of Public Housing Authority Respondents

Characteristic	Respondents	Nonrespondents
	(n = 39)	(n = 27)
	Mean (Median)	
Number of assisted, occupied units	8,737 (1,511)	2,499 (1,922)
Percent elderly	13.5 (11.9)	12.9 (12.1)
Percent disabled age 62 or less	15.1 (13.7)	14.4 (15.4)
Percent below 80% AMI	96.9 (98.4)	96.8 (98.6)
Number of children	15,443 (7,049)	8,210 (8,170)
Region	n (%)	
Northeast	7 (18.0)	6 (22.2)
Midwest	7 (18.0)	4 (14.8)
South	11 (28.2)	11 (40.7)
West	13 (33.3)	5 (18.5)
U.S. Virgin Islands or Puerto Rico	1 (2.56)	1 (3.70)

AMI = Area Median Income.

Internal Planning, Goal-Setting, and Staff Responsibilities

A key objective of the survey was to gain a sense of motivation by large PHAs to expand health-related programming and systems alignment efforts and to better understand the nature of their goals. For example, in response to the following multiple-choice question, “In general, our housing authority would like to _____ our work at the intersection of health and housing,” 69 percent of respondents answered “expand,” 31 percent answered “maintain/improve,” and no respondents said “reduce.” Despite interest in expanding or maintaining current efforts, PHAs are often without resources dedicated to health initiatives, and they draw on a variety of funding sources to support their health programming and alignment efforts. Most respondents indicate that they appropriate internal PHA funds (62 percent) and resources provided by nonprofit partners (56 percent). One-third or fewer PHAs report drawing funding from other sources such as foundations, hospitals and other healthcare service providers, private-sector partners, and community development corporations or organizations. One-half of Moving to Work (MTW) demonstration program agencies that responded (6 of 12) report using funding flexibility under the MTW program to fund health-related programming and alignment efforts. Five agencies (13 percent) report using the Rental Assistance Demonstration (RAD) program to enhance the built environment to encourage healthier behaviors and improve accessibility. Fewer than 10 percent report using local and federal government grants and social impact, or “pay for success,” bonds to help fund health-related initiatives.

Dedicated Health Staff

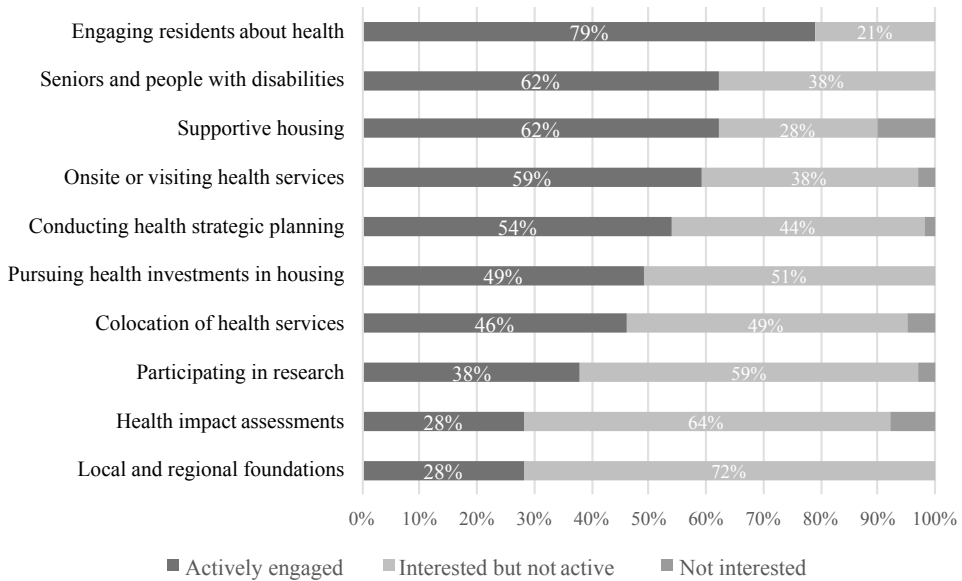
Only 5 PHAs (13 percent) report having dedicated housing-health staff members. The staff most commonly involved with health-housing initiatives are resident services directors and staff (74 percent), service coordinators (67 percent), Family Self-Sufficiency Program coordinators (51 percent), property management personnel (41 percent), and executive leadership members (33 percent). Fewer than one-fourth of respondents (21 percent) report having staff hired in temporary, grant-funded capacities related to health activities.

Types of Services

PHAs' current health-related initiatives and interests in future activities varied. Respondents were asked to indicate in which of 10 activities they were engaged and those that interest their institutions (exhibit 2). Most PHAs report working with residents around health priorities (79 percent), providing or contracting for supportive housing and other wraparound services (62 percent), implementing health interventions for seniors and people with disabilities (62 percent), facilitating onsite or visiting health service delivery (59 percent), and conducting strategic planning focused on setting health-related goals (54 percent).

Exhibit 2

Current Public Housing Authority Health Activities and Interests in Future Activities



Note: N = 39.

Health Impact Assessments

Despite high rates of engagement with residents and health-related strategic planning, only 28 percent of PHAs report having conducted more formalized, comprehensive health impact assessments (HIAs), which “[use] an array of data sources and analytic methods and [consider] input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of those effects within the population” (NRC, 2011: 5). PHAs are interested in these efforts; 64 percent say they are interested in conducting HIAs to address new projects’ impacts on resident health (exhibit 2). Other health activities PHAs are included in but not currently pursuing include raising funds from local or regional foundations to support health programs (72 percent), participating in health-housing research projects and interventions (59 percent), and securing investments in affordable housing from health sector partners (51 percent). Few PHAs indicate a lack of interest in any of the 10 activity options.

Priority Health Conditions

PHAs were asked whether or not they had internal programs, work with external health partners, or both, that specifically address 22 health condition or behavior categories spanning medical and behavioral health (exhibit 3). PHAs are most commonly engaged with substance use disorders (SUDs), with 72 percent of respondents indicating they work with SUDs and addiction broadly or alcohol dependence and tobacco use or addiction specifically. About two-thirds (64 percent) work on at least one specific medical health condition, such as diabetes (46 percent), heart disease (46 percent), and asthma (38 percent), and nearly one-half of all PHAs (44 percent) report working on two or more of the conditions in this category.

One-half of PHAs (51 percent) work on preventive health efforts, such as prenatal care (36 percent) and sexually transmitted infections and diseases (31 percent) and dental care (28 percent), with 36 percent working on two or more. Slightly less than one-half (46 percent) report focusing on behavioral health conditions. A third of respondents (33 percent) have efforts directed at physical disabilities. An identical number of PHAs (33 percent) report focusing on general wellness (for example, stress reduction, physical activity, and nutritious food preparation and eating) rather than

Exhibit 3

Health Conditions of Interest for PHAs

Health Conditions	n	%
Behavioral health conditions ^a	18	46
Anxiety and stress	16	41
Bipolar Disorder	13	33
Depression	15	38
Post-traumatic stress disorder	12	31
Schizophrenia	10	26
Medical health conditions ^b	25	64
Asthma	15	38
Chronic obstructive pulmonary disease	8	21
Diabetes	18	46
Dementia	9	23
Heart disease	18	46
Obesity	13	33
Physical disabilities	13	33
Preventive health ^c	20	51
Dental care	11	28
Infant mortality	9	23
Prenatal care and pregnancy	14	36
Sexually transmitted infections and diseases	12	31
Vision care	10	26
Substance use disorders ^d	28	72
Addiction, general	22	56
Alcohol dependence	21	54
Substance use disorders	18	46
Tobacco use	25	64
Wellness, no specific condition	13	33

PHA = public housing authority.

^a Twelve PHAs (31 percent) have initiatives addressing two or more conditions in this category.

^b Seventeen PHAs (44 percent) have initiatives addressing two or more conditions in this category.

^c Fourteen PHAs (36 percent) have initiatives addressing two or more conditions in this category.

^d Twenty PHAs (51 percent) have initiatives addressing two or more conditions in this category.

Note: N = 39.

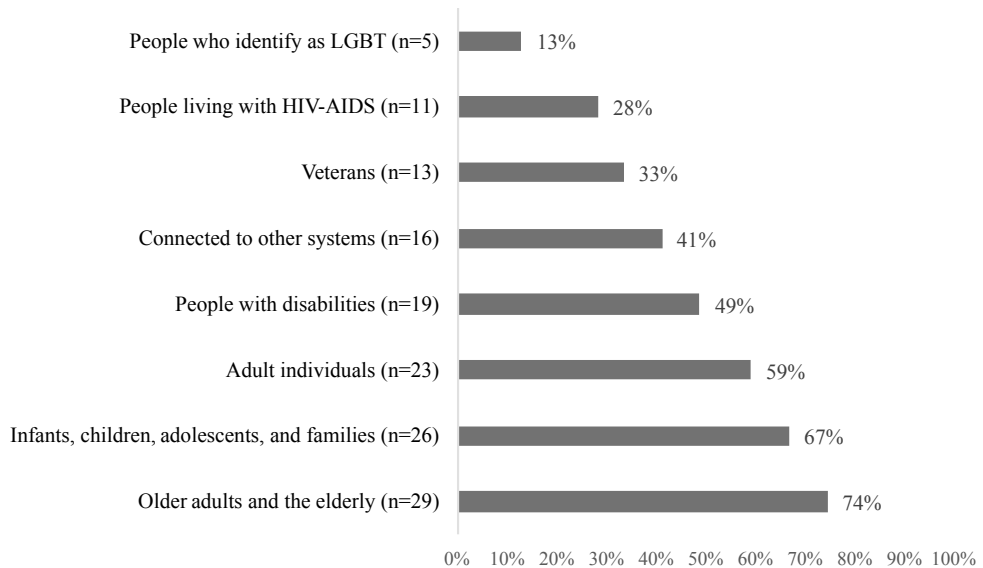
or in addition to programming or services addressing specific conditions. It should be noted that 8 of the 13 PHAs choosing “wellness” as an option in this category also indicate they also work on at least one specific health condition.

Subpopulations of Interest

Although PHAs may focus on certain priority health conditions and behaviors, they may also focus their programming and partnership efforts on specific segments of their resident population. The leading subpopulations of interest (exhibit 4) are older adults and elderly people (74 percent); infants, toddlers, children, and families (67 percent); adult individuals (59 percent); and people with disabilities (49 percent). A smaller proportion of PHAs report a focus on people connected to other systems, such as the criminal justice system or Medicare-Medicaid dual eligibles (41 percent); veterans (33 percent); people living with HIV/AIDS (28 percent); and people identifying as lesbian, gay, bisexual, or transgender (13 percent).

Exhibit 4

Resident Subpopulations Targeted With Public Housing Authority Initiatives



HIV/AIDS = human immunodeficiency virus and acquired immune deficiency syndrome. LGBT = lesbian, gay, bisexual, or transgender.

General Direction of Health Initiatives

Most PHAs (87 percent) report supporting healthcare service coordination activities. Other common focuses of programming include increasing healthy community resources like community gardens, healthy retail options, and bike-sharing services (67 percent), improving the built environment (46 percent), and varied offerings dictated by funders or partners (36 percent). Slightly fewer than one-third of PHAs help provide preventive health for children and adolescents

(30 percent), offer harm reduction resources like prevention and treatment of sexually transmitted infections and diseases or drug use (30 percent), and support medication management support (20 percent).

Location of Programming and Service Provision

When asked to identify the location of their programming, most PHAs indicate that their health programming focused on residents in specific buildings (72 percent). Slightly more than one-half of respondents (51 percent) report having initiatives that bring health services or education to residents' doorsteps (including visiting services), and slightly less than one-half of respondents (44 percent) take a community "hub"-based approach with institutions like schools, hospitals, community centers, libraries, and churches. Slightly less than one-fourth of respondents (23 percent) report having other forms of decentralized health programming (not focused on specific buildings) that serve voucher families.

Types of Health Partners

The survey asked PHAs to indicate which of 34 types of organizations they work with across public health, healthcare service providers, community-based health and social service providers, community resources and development, and advocacy/funding/research. PHAs most commonly work with community-based social and human service providers and public health entities, with 85 percent of respondents (n = 33) working with at least one health partner in each of those categories (exhibit 5). PHAs report often working with multiple organizations within these categories: 56 percent work with three or more community-based social or human service providers such as Aging and Disability Resource Centers and Area Agencies on Aging (56 percent) and homeless continuums of care (51 percent), and 36 percent report working with three or more public health entities such as local and state health departments (64 percent and 62 percent respectively), violence prevention organizations (33 percent), and organizations serving veterans (33 percent).

In addition to community-based service providers and public health, most PHAs also work with healthcare service providers (79 percent); advocacy, funding, and research entities (72 percent); and community resources and development organizations (54 percent). One-half of respondents (49 percent) work with three or more types of healthcare service providers. Some of the most common partners in this category include behavioral health providers (51 percent), fitness facilities and providers (41 percent), federally qualified health centers (38 percent), hospitals (33 percent), and dental providers (33 percent). Within the advocacy, funding, and research category, PHAs most commonly work with universities and research centers (46 percent) and advocacy organizations (44 percent). The most prevalent community resource or development partners for PHAs are parks and recreation (36 percent), community development corporations (31 percent), and law enforcement (31 percent).

Exhibit 5

Most Common Health Partners for PHAs

Health Partners	n	%
Community resources and development ^a	21	54
Affinity groups (for example, walking, running, weight loss, etc.)	7	18
Community development corporations	12	31
Environmental health	4	10
Law enforcement	12	31
Parks and recreation agencies and organizations	14	36
Urban planners	3	8
Healthcare service providers ^b	31	79
Behavioral health providers	20	51
Dental	13	33
Emergency departments	5	13
Family planning and sexual health providers	5	13
Federally Qualified Health Centers	15	38
Fitness providers/facilities	16	41
Hospitals	13	33
State Medicaid agencies	4	10
Medicaid Managed Care Organizations	6	15
Pharmacists	6	15
Public health ^c	33	85
Local health departments	25	64
Nutrition organizations	24	62
Schools and school-based providers	8	21
State health departments	5	13
Veterans organizations	13	33
Violence prevention organizations	13	33
Community-based human and social service providers ^d	33	85
Aging & Disability Resource Centers and Area Agencies on Aging	22	56
Assisted living	11	28
Child and adolescent health and welfare	13	33
Home health agencies	11	28
Homeless continuums of care	20	51
Social service providers and charities, general	23	59
Supportive housing services	14	36
Advocacy, funding & research ^e	28	72
Advocacy organizations	17	44
Data sharing entities	5	13
Foundations/funders	9	23
Think tanks	2	5
University/research centers	18	46

PHA = public housing authorities.

^a Seven PHAs (18 percent) work with three or more types of organizations in this category.

^b Nineteen PHAs (49 percent) work with three or more types of organizations in this category.

^c Fourteen PHAs (36 percent) work with three or more types of organizations in this category.

^d Twenty-two PHAs (56 percent) work with three or more types of organizations in this category.

^e Six PHAs (15 percent) work with three or more types of organizations in this category.

Note: N = 39.

Information Sharing

Most respondents have formal memoranda of understanding (MOUs) with health partners (69 percent) and refer residents to healthcare service providers (64 percent), one-half of respondents report sharing data with health partners (49 percent), and slightly under one-fourth of PHAs share or exchange financial resources with health partners (23 percent) and share staffing resources (21 percent).

To characterize the reciprocal nature of data sharing activities for health initiatives, respondents could indicate the following, choosing all that applied—11 percent characterize the data sharing as unidirectional (share data with partners or partners share data with the agency without reciprocity), 11 percent as multidirectional (share data with and receive data from health partners), 39 percent as both or depending on the partner (engaged in both unidirectional and multidirectional data sharing), 6 percent as supported by centralized or third-party data system or repository, or 17 percent as conducted without a formal process (data shared on informal basis). One-third of respondents (33 percent) report not currently sharing or receiving data from health partners.

Limitations

This survey received responses from 39 of the 125 large PHAs (managing 1,250 or more units) across the country. Although the 39 survey respondents represent 24 percent of all public housing and HCV households served nationally, this sample is self-selected (that is, those who chose to complete the survey) rather than a representative sample of large PHAs or PHAs of any size. Although the demographics of nonrespondents are comparable with those of respondents (see exhibit 2), it is unknown whether the PHAs that did not complete the survey have a higher, similar, or lower level of engagement with health partners.

Additionally, the survey only includes data from PHAs that were members of CLPHA as of August 2017. The capacity, activity level, and interest in health-housing partnerships among smaller housing authorities (fewer than 1,250 available units) cannot necessarily be inferred based on the results of this survey. CLPHA is currently fielding a brief survey to more than 3,000 PHAs of various sizes, with the support of the Public and Affordable Housing Research Corporation (PAHRC).

Lastly, the survey did not provide detailed data about PHAs' individual partnerships and programs, instead providing a more high-level summary snapshot. Additional surveys of and interviews with PHAs could explore the specific elements of successful, fully reciprocal partnerships, as well as barriers to cross-sector collaboration.

Discussion

This survey of large PHAs presents findings relevant to the future of housing and health partnerships involving PHAs. First, all PHAs want to either expand or improve on their work at the intersection of housing and public health, with 92 percent already engaged in at least some health partnerships. Second, despite engaging in a variety of program and systems alignment efforts (targeting specific subpopulations and conditions), partnership opportunities between PHAs and certain health entities that have clear overlap in populations and needs served are seemingly underexplored. Third, PHAs must overcome challenges like limited funding and regulatory hurdles (for example, Health Insurance Portability and Accountability Act¹ [HIPAA] privacy concerns) to expand internal capacity and deepen cross-sector engagement—challenges that health partners can

¹ Pub. L. 104–191, 110 Stat. 1936. August 21, 1996.

help PHAs resolve. The findings of this survey form an important baseline regarding PHA health system partnerships and underscore the desirability of PHAs as key housing partners for all facets of the health sector serving vulnerable populations.

Engaging Underutilized Health Entities

The survey suggests that PHAs are engaged with a wide and varying array of health partners across components of health systems, but certain types of health partners could partner with PHAs given demographic information about resident or patient populations and utilization patterns. For example, the following two emerged as key areas of opportunity.

1. Medicaid entities: Although 85 percent of PHAs work with at least one type of healthcare service provider, most PHAs do not work with large Medicaid partners, such as state Medicaid agencies (10 percent) or Medicaid managed care organizations, or MCOs (15 percent). An estimated 75 percent of adults in HUD-assisted households have public health insurance (for example, Medicaid, Medicare), suggesting more opportunities for better alignment between PHAs and Medicaid systems exist (Fenelon et al., 2017; Helms, Sperling, and Steffen, 2017; Simon et al., 2017). Many Medicaid MCOs have started to invest more resources in social determinants of health such as housing, with promising opportunities to serve residents' often-complex health needs (Sally, Waxman, and Gourevitch, 2017; SAHF, 2017).
2. Acute or emergency care: Fewer than one-half of PHAs work with key safety-net healthcare service providers like hospitals (33 percent) and emergency rooms (13 percent). Residents in HUD-assisted households use emergency services at a higher rate than the general population. According to a recent report, "Nearly one-fourth (22.9 percent) of HUD-assisted adults reported two or more ER visits during the past 12 months. This rate is greater than the 17.8 percent rate among unassisted low-income renters, and more than twice the 8.6 percent rate among adults in the general population" (HUD, 2017: 13). Many PHAs indicate having standard operating procedures for staff to connect residents with emergency health services (38 percent) and nonemergency health services (49 percent), but only 18 percent report systematically tracking these referrals. Interventions seeking to decrease nonurgent emergency department visits such as case management, care planning, information sharing, and diversion strategies have been shown to be effective at reducing unneeded visits (Moe et al., 2017; Raven et al., 2016).

Formalizing Partnerships

Most CLPHA members report establishing formal MOUs with health partners and referring residents to healthcare service providers. More than one-half of respondents report sharing data with health partners, although it is unclear from this survey how much of PHAs' data-sharing informs decision making and the sophistication level of the data being collected, tracked, and analyzed. PHAs express concern about violating HIPAA requirements, with several PHAs identifying this as a barrier to confidently engage health partners around health data. The level of formality with which PHAs and their partners conduct business is less critical to evaluate than the degree to which PHAs and their partners engage in collaborative goal setting, decisionmaking, and accountability tracking. Formalized agreements can help facilitate such partnerships, as well as help PHAs manage

long-term partnerships based on stated, shared commitments. Separate from this survey, CLPHA works with membership to identify examples of MOUs with health sector partners that have effectively established or strengthened partnerships, or both.

Funding Partnerships and Capacity Building

Currently, large PHAs are primarily funding their health-related activities with limited internal resources and nonprofit partners, often adding health partnership activities to resident service leadership and staff without resources for dedicated staff. Smaller numbers of PHAs—around one-fourth or fewer—fund these efforts with the support of foundations, healthcare service providers, private-sector partners, and community development corporations or organizations. Even fewer are leveraging alternative financing mechanisms for health-related services such as social impact bonds, despite large PHAs' general familiarity with innovative, mixed-finance deals from affordable housing development. To increase capacity, PHAs could explore innovative financing mechanisms for health-related activities and prioritize financial arrangements and health partnerships that provide financial resources long-term and as needed.

Partnership Quality and Effectiveness

Although the survey provides greater insight into PHAs' existing health partnerships—with whom they work and in what capacity—it did not collect enough data to assess how far-reaching these partnerships are or the quality of these partnerships more generally. To foster better collaboration between PHAs and the health sector, more information about these health-related activities and priorities is needed, as well as the partnerships that make them possible and sustainable. Future surveys should seek to identify success factors and barriers specific to PHAs and health sector partners to eventually assess the quality of these partnerships in their interconnectedness, impact on outcomes, and cost-effectiveness.

Future Research

Results suggest merit in this survey and support expanding administration to a larger, nationally representative sample of PHAs to provide greater insight into these critical partnerships. The CLPHA released another version of this survey in February 2018 to more than 3,000 PHAs of various sizes, with the support of the PAHRC.

Conclusion

CLPHA's survey results provide a compelling snapshot and baseline concerning the number and breadth of PHA partnerships with the health sector, including types of partners, health conditions of interest, subpopulations targeted, types of collaborative activities, and service or educational offerings for residents of HUD-assisted housing, which all constitute key ingredients in successful cross-sector collaborations or partnerships aimed at improving health (Towe et al., 2016). Additionally, this project identified gaps in the existing partnership and health intervention landscapes pertinent to housing agencies. Large PHAs' level of engagement with the health sector and health-related priorities vary widely by agency, as do the goals of their established health partnerships.

Future inquiry could explore other ingredients of successful cross-sector collaboration, such as the quality of these PHA health partnerships individually and collectively, the depth and impact of cross-sector investments related to these partnerships, and the effectiveness of policies developed and implemented to support collaboration across sectors.

Housing providers pursue a wide range of health partnerships and nearly uniformly seek to expand and refine cross-sector efforts to improve resident health. This desire should be paired with resources to help PHAs build greater capacity to partner with the health sector and, in the process, learn more about what successful partnerships can achieve for individuals and families in assisted housing.

Appendix A: Survey Instrument (40 total questions, 21 survey questions)

Introductory Text:

The Council of Large Public Housing Authorities (CLPHA) is committed to working with public housing authorities (PHAs) and health sector partners to develop resources, trainings, and convenings that promote housing as a critical social determinant of health and wellbeing.

This survey will help establish a baseline of cross-system partnerships between housing and health providers. Results from this survey will provide a clear sense of how larger PHAs are working with health system partners, what lessons can be learned from successes to date, and what needs PHAs have as they work to improve resident/community health and wellbeing.

General Information Questions (4 total)

- Housing Authority Name
- State/Province
- Who is Completing the Survey on Behalf of the Agency?
- Point of Contact for Health-Related Activities

Core Survey Questions (16 total)

1. In general, our housing authority would like to _____ our work at the intersection of health and housing.
 - Expand
 - Maintain/Improve
 - Reduce

2. We are interested in or currently engaged in the following activities (not interested, interested but not active, active)
 - Conducting strategic planning focused on setting health-related goals
 - Engaging resident to guide efforts to improve community health
 - Health impact assessments to assess new projects' impacts on resident health
 - Securing investments in affordable housing from health sector partners
 - Raising funds from local or regional foundations to support health programs
 - Colocation of affordable housing and health service providers
 - On-site and/or visiting health service delivery for residents
 - Participating in health-housing research projects and interventions
 - Implementing health interventions for seniors and/or people with disabilities
 - Providing and/or contracting for supportive housing services and/or other wraparound health and human services

3. We have internal programs and/or work with external partners to specifically address the following conditions in our resident population. (Check all that apply.)
 - Addiction
 - Alcohol dependence
 - Asthma
 - Anxiety/stress
 - Bipolar Disorder
 - COPD
 - Dental
 - Depression
 - Diabetes
 - Dementia
 - Disabilities (physical)
 - Heart disease / high blood pressure
 - Infant mortality
 - Post-traumatic stress disorder (PTSD)

- Prenatal care and pregnancy
 - Obesity
 - Schizophrenia
 - Sexually-transmitted infections and diseases (STI/D)
 - Substance use disorders
 - Tobacco use
 - Vision
 - We do not focus on specific conditions. Instead, we focus on general wellness and healthier behaviors (e.g. stress reduction, physical activity, nutritious food preparation and eating, etc.).
 - We do not currently have targeted health-related programming.
4. We have specific health programs, interventions, and/or partnerships targeting the following groups of residents:
- Families (“whole family” interventions)
 - Adult individuals
 - Adolescents
 - Children
 - Infants/toddlers
 - Expectant and new mothers/parents
 - Seniors
 - People living with physical disabilities
 - People living with psychiatric disabilities
 - People living with HIV/AIDS
 - Formerly incarcerated (or other "justice-involved") individuals/families
 - People who identify as lesbian, gay, bisexual, and/or transgender (LGBT)
 - Those receiving other forms of public assistance besides HUD assistance (e.g. Medicaid, TANF, SSI/SSDI)
 - Dual-eligibles (i.e. people enrolled in both Medicare and Medicaid)
 - Veterans
 - N/A or None of the Above

5. Our health-housing programming and alignment efforts can best be characterized as: (Check all that apply)
- Centralized (i.e. focused on residents in specific buildings)
 - Decentralized (i.e. focused on voucher families)
 - Visiting (i.e. bringing health interventions to residents' doorsteps)
 - "Hub"-based (e.g. schools, hospitals, community centers, libraries, churches)
6. Our health-housing programming and alignment efforts include: (Check all that apply)
- Built environment (e.g. building rehabilitation, removing environmental health hazards, improving walkability of neighborhoods, increasing use of stairs)
 - Increasing healthy community resources (e.g. urban gardens, farmers markets, bike sharing services, "healthy" retail options)
 - Healthcare service coordination (i.e. working with health service providers to make referrals, provide on-site or visiting services, etc.)
 - Medication management and other compliance-related interventions
 - Preventative health for children and adolescents (e.g. vaccinations)
 - Harm reduction (e.g. STI/D prevention and treatment, drug use)
 - Focused on groups dictated by funders/partners (i.e. those funding/supporting the intervention decide who to target within our resident population)
 - None of the Above
 - Other (please specify)
7. Our health and housing interventions are targeted at residents with the following forms of HUD assistance. (Check all that apply)
- Public housing
 - Project-based vouchers
 - Tenant-based vouchers
 - Special-purpose vouchers (e.g. HUD-VASH, FUP, NED)
8. Our health and housing work leverages the following programs supported by HUD: (Check all that apply)
- LIHTC-financed or RAD developments
 - Continuums of Care (CoCs)
 - Choice Neighborhoods

- Hope IV Revitalization
 - Lead Safe Housing
 - Section 202 – Supportive Housing for Elderly
 - Section 811 – Supportive Housing for Persons with Disabilities
 - Self-Sufficiency Program
 - Smoke-Free Initiative
 - None of the Above
 - N/A
 - Other (please specify)
9. Which of the following partners directly support or provide health-related programming and/or help guide your efforts to improve resident and community health? (Check all that apply)
- Advocacy organizations
 - Aging and Disability Resource Centers (ADRCs) / Area Agencies on Aging (AAAs)
 - Affinity-based community groups (e.g. walking/running/weight loss support groups)
 - Assisted living providers
 - Behavioral health providers
 - Bike-share programs
 - Child and adolescent health and welfare
 - Community development corporations/organizations
 - Continuums of Care (CoC)
 - Data sharing organizations (warehouses, repositories, nonprofit conveners, etc.)
 - Dental care providers
 - Environmental health organizations
 - Emergency/urgent care departments
 - Family planning and sexual health providers
 - Federally-Qualified Health Centers (FQHCs)
 - Fitness providers or facilities (i.e. gyms, YMCA/YWCAs)
 - Funders for health programming
 - Home health agencies / home care

- Hospitals – nonprofit
 - Hospitals – private
 - Law enforcement
 - Local health department
 - Medicaid – Managed Care Organizations (MCOs)
 - Medicaid – State Agencies
 - Medicare – Special Needs Plans (including Dual-Eligible SNPs)
 - Nutrition (including food shopping/preparation)
 - Parks and recreation agencies/organizations/foundations
 - Pharmacists
 - Physician practices (separate from physicians affiliated with health systems)
 - Private-sector health clinics
 - Schools and school-based providers and clinics
 - Social service providers / charities (e.g. Catholic Charities)
 - State health department
 - Supportive housing service providers
 - Think tanks
 - Transitional care providers
 - Universities/research centers
 - Urban planners
 - Veterans organizations and/or Veterans Administration
 - Violence prevention organizations
10. Choose “yes” if at least one health partnership satisfies each statement. (Check all that apply)
- We have Memorandums of Understanding (MOUs) with our health partners.
 - We share data with our partners for health-related goals.
 - We refer patients/residents to each other when appropriate.
 - We share/exchange financial resources when appropriate.
 - We share staffing resources (e.g. co-hire FTEs, loan/receive staffing support) when appropriate.

11. Sources of funding for health-related initiatives: (Check all that apply)

- PHA Funds (e.g. Section 8 admin fees, MTW-related savings, ROSS Program)
- Foundations
- Private-sector partners (e.g. Medicaid managed care)
- Nonprofit partners
- Community development corporations/organizations
- Hospitals and other healthcare service providers
- Social impact bonds or other non-traditional financing
- N/A
- Other (please specify)

12. Which of the following statements are true for your agency, if any? (Check all that apply)

- We leverage funding flexibility from the Moving to Work (MTW) program to fund health-related programming and alignment efforts.
- We have used RAD conversions as a vehicle for public health-informed changes (e.g. making buildings more accessible and tailored to residents' health and human service needs) to residents' built environments.
- We do NOT use MTW flexibility or RAD specifically for health-related programming or systems alignment.

13. We have (or have ready access to) data about resident health in the following areas: (Check all that apply)

- Chronic health conditions (e.g. diabetes, asthma, depression, COPD, HIV/AIDS)
- History of emergency healthcare referrals (i.e. PHA staff referrals to services)
- Health-related behaviors (e.g. physical activity, tobacco use)
- Attendance at and/or satisfaction with health education programming
- Health insurance coverage status
- Healthcare service utilization (e.g. visits to primary care)
- Other (please specify)

14. Our data sharing with healthcare partners is: (Check all that apply)

- Unidirectional (i.e. we share data with them or they share data with us without reciprocation)
- Multi-directional (i.e. we share data with and receive data from health sector partners)

- Depends on the partner; we are engaged in both unidirectional and multidirectional data sharing
- Supported by centralized and/or third-party data systems or repositories
- Conducted without a formal process (i.e. on an informal basis)
- Not Sure
- We do not currently share data with healthcare partners

15. Which of the following are true for your agency?

- We have an established process for staff to follow to connect residents with emergency health services.
- We have an established process for staff to follow to connect residents with non-emergency healthcare services.
- We track referrals to health services by resident/household.

16. Which of the following staff members are involved with your health-housing initiatives? (Check all that apply; there might be overlap since specific titles vary by PHA)

- Service coordinators
- Resident services
- Family Self-Sufficiency coordinators
- Dedicated health-housing staff
- Executive leadership (e.g. ED/CEO, COO, etc.)
- Property management
- Temporary/grant-funded staff
- Other (please specify)

Partnership Inventory Questions (5 total)

Please complete the following fields to provide an inventory of your health-housing partners.

1. Partner 1 (name of partner, nature of partnership and any relevant notes)
2. Partner 2 (name of partner, nature of partnership and any relevant notes)
3. Partner 3 (name of partner, nature of partnership and any relevant notes)
4. Partner 4 (name of partner, nature of partnership and any relevant notes)
5. Partner 5 (name of partner, nature of partnership and any relevant notes)

CLPHA Programming-Specific Questions (5 total)

- What would you hope to learn more about from other housing authorities and experts focused on the intersection of health and housing? (open-ended)
- What resources would you like to see come from peer PHAs and generally from CLPHA's *Housing Is Initiative*? (open-ended)
- What activities would you and your staff like to participate in to improve your organization's health and housing planning and programming? (open-ended)
- Would you be interested in attending an online health-housing strategic planning training in early 2018? (yes, no, maybe)
- Would you be willing to participate in a Health-Housing workgroup or webinar series?

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‘Then I Found Housing and Everything Changed’: Transitions to Rent-Assisted Housing and Diabetes Self-Management

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Abstract

- *Objective:* This study draws on qualitative interview data to examine transitions into rent-assisted housing as they relate to diabetes self-management behaviors.
- *Methods:* We conducted qualitative interviews with low-income residents of New Haven, Connecticut, who had a diagnosis of type 2 diabetes. To examine experiences of transition into rent-assisted housing, we drew on interviews with those participants who were living in rent-assisted housing at the baseline interview ($n = 18$) and participants ($n = 5$) who transitioned into rent-assisted housing between baseline and a 9-month followup. Interviews probed participants’ housing and diabetes experiences. Analysis followed an inductive grounded theory approach.
- *Results:* Our data suggest that improvements in diabetes self-management accompanied the receipt of rental assistance. By providing housing access to those participants who previously had no place of their own, rental assistance facilitated environmental control that supported diabetes routines. By making housing more affordable, rental assistance also improved some participants’ ability to afford diabetes-related expenses and mitigated health-demoting financial stress. Additionally, for some participants, rental assistance provided residential stability that facilitated access to health-promoting local social support.
- *Conclusions:* Although more research is needed, these data suggest that expanded access to rental assistance could both improve population health and reduce healthcare spending associated with preventable diabetes-related complications.

Introduction

The demand for rental assistance in the United States—in the form of rental vouchers, public housing units, and other project-based subsidies—continues to outpace supply (Fischer and Sard, 2017). The U.S. Department of Housing and Urban Development (HUD) currently provides rental assistance to approximately 5 million low-income households (HUD, 2016), representing less than one-fourth of households eligible to receive a subsidy (Alexander et al., 2014). These rental subsidies are a primary source of affordable housing for low-income Americans given an increasingly unaffordable rental market in which most poor renting households spend more than one-half of their income on housing costs (Aurand et al., 2018; Desmond, 2016).

Emerging research suggests that the existing shortage of rental assistance may have health consequences. In particular, using a unique data linkage that combines HUD data with nationally representative health surveys, Fenelon et al. (2017) found that adults living in public housing report better self-rated health and less psychological distress than those who moved into public housing up to 2 years later—the average length of HUD waiting lists for rental assistance. In other work using the same linked data, Simon et al. (2017) found that, relative to future recipients, current recipients of rental assistance are less likely to report unmet needs for health care due to cost. These studies suggest potential health benefits of rental assistance and also health consequences of unmet need for this resource. More research is needed, however, to examine both the causal relationship between rental assistance and health and the processes through which these effects may operate. Additionally, research is needed to examine how rental assistance may affect self-management behaviors and disease trajectories among those living with chronic health conditions.

Type 2 diabetes is one prevalent and costly chronic condition that housing access may affect. In 2015, approximately 22 million American adults had received a diagnosis of type 2 diabetes, representing approximately 9 percent of the adult population (CDC, 2017). Low-income individuals, who are more likely to be struggling with affordable housing problems, experience both a higher prevalence of type 2 diabetes and also disproportionately higher rates of morbidity and mortality associated with diabetes-related complications (CDC, 2017; Lutfey and Freese, 2005; Stevens et al., 2014). To minimize the risk of complications such as kidney, eye, and vascular disease, individuals living with diabetes must carefully manage their blood glucose levels through medication, diet, exercise, glucose monitoring, and healthcare visits (Glasgow, Toobert, and Gillette, 2001). Given these complex and resource-intensive behavioral demands, social conditions play an important role in facilitating or constraining adherence to recommended diabetes self-management routines (Chaufan, Constantino, and Davis, 2012; Lutfey and Freese, 2005; Weaver et al., 2014). Furthermore, given the strong association between daily glucose control and diabetes complications, social conditions that affect self-management behaviors are likely to affect long-term outcomes (Lutfey and Freese, 2005). As such, investments in social resources, such as housing that can improve self-management capacity, may ultimately reduce disease burdens and narrow disparities.

As an important source of affordable housing for low-income households, rental assistance may represent an opportunity to improve both housing access and chronic disease self-management. Rental assistance may affect diabetes management through several mechanisms. First, this assistance can provide a “home” (Dupuis and Thorns, 1998) to individuals who do not have one

because they are homeless or are living in places that they cannot call home. Access to a home can provide autonomy and control over one's environment, which, as prior research indicates, can enable the establishment and maintenance of consistent health routines (Aidala et al., 2005; Padgett, 2007). Second, by making housing affordable, rental assistance may enable individuals to invest more in their diabetes care. Indeed, existing research finds that individuals living in more affordable housing are less likely to miss medications and appointments (Pollack, Griffin, and Lynch, 2010) and that housing cost burdens can make it difficult for individuals to prioritize their health needs (Keene, Guo, and Murrillo, 2018). Finally, by making housing affordable, rental assistance may prevent forced moves that can have negative consequences for health (Desmond and Kimbro, 2015), and enable residential stability that fosters health-promoting social support (Keene, Bader, and Ailshire, 2013).

Despite some research demonstrating the potential importance of housing for individuals with diabetes (Berkowitz et al., 2018; Keene, Guo, and Murrillo, 2018; Ludwig et al., 2011; Vijayaraghavan et al., 2011), little is known about the processes through which rental assistance may affect diabetes self-management. In this article, we draw on qualitative interviews to examine how individuals experience transitions from waiting lists into rent-assisted housing and how these experiences may shape participants' diabetes-related behaviors.

Methods

The interviews presented here are part of a qualitative study designed to examine the intersection of housing and diabetes management among low-income individuals. This study took place in New Haven, Connecticut, a city with approximately 130,000 residents that, like many U.S. cities, faces a shortage of both affordable market-rate and rent-assisted units (McDonald and Pething, 2014). In New Haven, 55 percent of renters spend more than 30 percent of their income on rent, and 80 percent of renters in the lowest income quintile are severely cost burdened, spending more than 50 percent of their income on rent (JCHS, 2017). Given these high rents, rental assistance is an important component of New Haven's affordable housing landscape. In 2016, 9,153 New Haven households and 19,221 individuals received HUD-funded rental assistance in the form of Housing Choice Vouchers (HCVs; 5,737 units), traditional public housing (1,840 units), and project-based Section 8 (2,536 units) (HUD, 2016). In 2016, 692 New Haven households also received state-funded long-term rental vouchers through Connecticut's Rental Assistance Program (RAP). The demand for this assistance exceeds supply. Nearly 7,000 households are on waiting lists for public housing in New Haven, and 2,500 households are on waiting lists for vouchers that are currently closed to new applicants (Elm City Communities, 2017).

After obtaining approval from the Yale University Institutional Review Board, we used flyers and snowball sampling to recruit 40 participants who were over age 24, diagnosed with type 2 diabetes, and income eligible for rental assistance. All participants who were either screened or enrolled in the study earned less than 50 percent of the Area Median Income. We selected interview participants following established purposive sampling procedures that aim to diversify the sample according to theoretically relevant factors. Specifically, we constructed our interview sample to include a range of housing experiences (subsidized, unsubsidized, homeless) and treatment regimes.

The interviews followed a semistructured format, relying on an interview guide that included broad and open-ended questions with followup probes. This format ensured that certain topics of interest were covered, but also enabled the interviewer to probe unanticipated themes and to adapt the interview throughout the research process (Corbin and Strauss, 2014; Weiss, 1994). Exhibit 1 describes the primary questions in our interview guide. Approximately 9 months after the baseline interview, 26 members of the sample participated in followup interviews. All data were collected between July 2016 and August 2017. Interviews were audio recorded and transcribed verbatim. They each lasted 45 to 120 minutes, and participants were compensated \$50.00 per interview.

To examine experiences of transition into rent-assisted housing, this article draws on interviews with participants who were living in rent-assisted housing at baseline (n = 18) and participants who transitioned into rent-assisted housing between baseline and followup (n = 5). Exhibit 2 provides demographic information for these 23 participants.

Following a grounded theory approach (Corbin and Strauss, 2014), our analysis was an ongoing, iterative process that co-occurred with data collection. We wrote thematic summaries after each interview and memos about developing concepts. We used memos, summaries, and group discussion to iteratively and collaboratively develop a codebook. Using Dedoose software, two coders independently applied the codebook to one-half of the transcripts and resolved inconsistencies through discussion. A single coder then coded the remaining transcripts. For this article, we extracted and reviewed coded data related to (1) moving into subsidized housing, (2) housing affordability, and (3) place-related barriers and place-related facilitators of diabetes self-management. We also reviewed full transcripts to contextualize these excerpts within participants' broader narratives.

Exhibit 1

Semistructured Interview Guide: Primary Questions

Topic	Question
Diabetes care	Can you tell me about when you were first diagnosed with diabetes? What are the things that you do to manage your diabetes? Are there things that make it harder for you to manage your diabetes? Or things that make it easier? Can you tell me a little bit about the people who are involved in your diabetes care?
Diabetes and place	Are there places where it is harder for you to manage your diabetes? Or places where it is easier? Tell me a little bit about where you live. (We follow this with a series of probes that capture affordability, stability and quality of current housing and prior housing experiences.) What is/was it like to manage your diabetes while living (insert each housing situation)? While living (insert housing situation) was there ever a time that it was hard to keep your blood sugar under control? Can you tell me about that time?

Exhibit 2

Participant Baseline Characteristics

Characteristic	n
Age (years, mean)	53
Race	
Black and/or African American	17
White and/or Caucasian	2
Hispanic and/or Latino(a)	1
Multiracial and/or other	3
Gender	
Male	12
Female	11
Ever homeless	
Yes	15
No	8
Rental assistance at baseline	
Yes	18
No ^a	5
Type of rental assistance	
Public housing	12
Housing Choice Voucher	5
Rental Assistance Program voucher	5
Permanent Supportive Housing	1
Using insulin	
Yes	12
No	11

^a At baseline, two of these participants were living in subsidized transitional housing programs that provided shared living arrangements. Both moved into long-term and independent rent-assisted housing between baseline and followup.

Note: N = 23 total participants.

Results

The following sections draw on interview data to describe how transitions to rent-assisted housing may support diabetes self-management in a number of ways, including providing participants with improved control over their housing environment, reducing financial strain, and facilitating housing stability. In presenting these data we use pseudonyms to protect participants' anonymity.

A Home of My Own

The receipt of rental assistance enabled some participants to secure a home of their own, often after years of living with friends, with family members, on the streets, or in homeless shelters. When Regina (age 46) moved into a public housing unit a year before the baseline interview, she received her first set of house keys to a place she could finally call her own. She described her new apartment as a dream come true and as a change that dramatically affected her diabetes self-management. She explained, "Then I found housing. I got housing, everything, my numbers, as far as my health, got back on track. I'm insulin-dependent. I have many medications that I take on a daily basis, but since I've had housing, my diabetes changed. It went from up here to being down here in the right place."

Regina described her new apartment as providing autonomy and control over her environment that helped her to establish and maintain a diabetes routine. In her new apartment, she could keep

her medications in the same place next to her bed and could sit the same chair when she took them each morning. Having her own place also provided her with better control over her diet. She explained, “Not being in my own place, it was hard to try to fight my diabetes and stay healthy and stuff because when you’re living with somebody else, it’s almost like you have to eat whatever’s being made.” This changed when she moved into her own apartment. As she noted, “But it’s a whole lot different ‘cause now, when you in your own place, you can cook that healthy food now, you can have that healthy stuff.”

When Monte (age 59) obtained his own public housing unit between baseline and followup, improved control over his environment enabled him to better manage his diabetes. At baseline, Monte lived in a transitional housing building, where he had his own room but shared common spaces. He described how his eating habits changed in his new apartment where he had his own kitchen, noting, “I had better access to a kitchen to prepare my own meals so I wasn’t eating meals prepared by other people. So I was a lot more aware of what was going into my meals and how I was preparing them. So that made a big difference.”

Monte also described how his new apartment gave him better control over his sleep schedule, enabling him to focus on his diabetes management. He explained, “Being able to sleep and not be stressed is a definite mind-changer. Changes the outlook and attitude. Gives me the opportunity to reflect in my own way and my own time to get things done the way I wanna get them done, the way I feel comfortable doing things. Makes a big difference, makes a big difference.” After Monte moved into his own apartment, his Hemoglobin A1C, a measure of average blood glucose, fell so dramatically that his doctor, not believing the result, repeated the blood test.

Homeless participants, whose receipt of rental assistance enabled them to move off the streets or out of emergency shelters, described particularly dramatic improvements in their diabetes management associated with these moves. For example, Tory (age 39) lived in shelters and on the streets before receiving an RAP voucher from the state of Connecticut and moving into his own apartment 4 months before the baseline interview. He noted, “It was harder when I was homeless because like I said kitchens, the shelters, they feed you pasta. And if you out there all day and didn’t eat nothing, you eat whatever they give you. . . . Like I said, once I got the apartment I was like, ‘Okay.’”

In addition to dietary improvements, formerly homeless participants noted that the receipt of rental assistance improved their medication adherence. Participants described many challenges of storing and taking medication in emergency homeless shelters. For example, Myron (age 57), who spent many months on the street and in homeless shelters, explained, “I had a problem with my medicine. I kept it in storage because I didn’t trust the shelter. People steal stuff all the time in there.” While living in a homeless shelter, Mike (age 60) often stored his medications with shelter staff but could not always retrieve them as needed. He also recounted an instance where staff lost his medications and another time when his medications were confiscated on entering the shelter. Mike’s control over his medication improved dramatically when he moved to his own subsidized permanent supportive housing unit. He explained, “But now it’s nice I’ve got all my [medications] now on my dresser drawer, everything that I need and I just take with me what I need for the day.”

Not all participants associated the receipt of rental assistance with improvements in their diabetes management. Some, who moved from other stable housing arrangements, did not perceive a change.

One participant even noted a loss of social support associated with her move from her mother's apartment to her own public housing unit. Participants whose prior housing did not provide autonomy, however, nearly universally described positive health impacts of rental assistance receipt.

An Affordable Place To Live

Participants also described how rental assistance improved housing affordability with positive implications for their diabetes self-management. For example, prior to receiving a state-funded rental assistance voucher, Melvin struggled to pay the rent, sometimes at the expense of eating well. Melvin explained, "It was hard because, number one, we wanted to make sure the rent was paid. Now it don't make no difference having all this food and all this stuff when you ain't got a place to stay." In his new rent-assisted apartment, Melvin was very careful about his diet, prepared his own meals, and ate recommended proteins such as salmon. When asked about his diet before receiving the rental assistance voucher, he explained, "Oh no, ain't eat no salmon. Tuna fish in a can... Oodles of noodles, chop hot dogs up in them, or something like that." In addition to providing more room in his budget for nutritious food, Melvin described a reduction in financial stress that he perceived to positively affect his diabetes. He noted, "Shoot, I think it [the voucher] made my diabetes better... Less stress."

Janet (age 57) also described a reduction in financial stress associated with the HCV that she had been receiving for 8 years. She explained, "But I'm not stressed on finances because of my Section 8, my rent is like really—this apartment is \$1,300 a month. My portion is like maybe 260 which is a blessing." Janet, who was a student at a local community college, also discussed how financial stress could interfere with her medication adherence. For example, the day before the interview she missed her medication dose amidst stress related to her financial aid. She explained, "then I find out that I don't got no books because I don't got financial aid, so my stress level went here. And everything that I needed to do for Janet went out the door. I got so overwhelmed."

Although participants like Janet and Melvin experienced rent decreases when they received rent assistance, for others rent was a new expense. For example, prior to moving into her subsidized unit, Jamie was living with her daughter, where she did not pay rent. Although Myron also did not pay rent in the shelter where he previously lived, he nonetheless attributed budgetary improvements to his public housing unit. When he was homeless, he paid for a monthly storage locker, a car, and frequent meals out. In his new apartment, he prepared his own meals, dramatically reducing his food budget, and gave the car to his ex-wife, who took over the payments. His downtown public housing building enabled him to walk or take the bus everywhere. He also described better control over his finances in general, noting, "Since I moved in, it's just a little better organized in my head so I can budget better."

Although Myron still struggled to make ends meet, occasionally running out of food at the end of the month or owing the pharmacy for his medication copayment, he was able to invest more in his diabetes care. For example, he shopped for protein-rich foods and bought a used bicycle that he rode for exercise. In general, Myron noted the importance of housing that is both stable and affordable, stating, "Again, it's the affordable part of affordable housing that's a blessing. Not being able to afford where you live is a nightmare, without having that stable place where you know you can get rest and get yourself together."

A Stable Place To Live

Increased affordability can prevent evictions as well as stress related to the threat of a forced move, both of which can be disruptive to diabetes routines. Indeed, some participants described feeling safe from eviction in their rent-assisted housing. For example, Bella (age 55) noted that she was “totally secure” in her HCV-supported unit, in which she had lived for 5 years. Regina also described this sense of security and rootedness in her public housing unit. She explained, “This is my last stop home. This is my retirement home. This is gonna be the last place. I’m not going anywhere else because why would I move and give up the luxury of having to pay only \$59 and everything is included?... I feel safe here. I don’t wanna move anywhere else. So for the next 5 years, if we stay in contact, this is where you’ll be coming to see me ’cause this is where I’ll be.”

In addition to supporting consistent diabetes routines, this residential stability may also enable individuals to establish local social support networks that are health promoting. For example, Marcus (age 62), who had lived in his public housing unit for 1 year, described drawing on support from Myron, who lived in the same building. This support became particularly valuable after Marcus had a heart attack between the first and second interview. He explained, “between my brother and Myron, they took care of everything that had to be done.... Like if I needed something to eat, they wouldn’t let me eat nothing out of the way. I had to eat salads... and I just considered myself really blessed that I had people around me that took care of me.” Marcus described Myron as a source of support for other residents as well, noting, “...he looks out for everybody. He’s a real good guy.”

Although rental assistance could provide health-promoting stability, the initial receipt of assistance was nearly always associated with a move. For some participants, this move temporarily disrupted self-management routines. For example, Michelle (age 47) moved to a public housing unit between baseline and followup, from a room that she was renting from a friend. Directly after moving to her new unit, Michelle was admitted to the hospital with very high blood sugar. She described being tired from the move, not taking her medications, and turning away the visiting nurse who helped her daily. When Michelle moved to her new place, she also no longer had support from family members living nearby. By the second interview, however, Michelle seemed to have adjusted to her new apartment and had developed sources of support in her new building, including from a neighbor who drove her to the interview. She also described an overall improvement in her diabetes self-management. Although she had been in and out of the hospital prior to moving, during the 8 months spent in her new apartment, her only admission was the one directly following her move.

Discussion

Participants’ narratives suggest that the receipt of rental assistance can support improvements in diabetes self-management. In some cases, rental assistance provided housing access to those participants who previously had no place of their own, in turn providing autonomy and environmental control that facilitated dietary and medication regimes. It also improved some participants’ finances, enabling them to invest more in their diabetes-related expenses and mitigating financial

stress. Finally, although moves associated with the receipt of rental assistance could temporarily disrupt diabetes routines, participants' narratives suggest that, in the long run, this assistance may facilitate residential stability and associated access to health-promoting social support.

Our data also point to important variation in participants' experiences of rental assistance receipt. In particular, this experience, and its implications for diabetes self-management, seemed to be shaped by participants' previous housing situation. Not surprisingly, individuals whose rent assistance enabled them to move off the streets or out of emergency homeless shelters described particularly dramatic changes in dietary and medication regimes. Many participants, however, who were not previously homeless but were struggling with inadequate or unaffordable housing, also described significant benefits of rental assistance for their diabetes management. A few participants described a loss of social support or experienced disruptions in their routine in the period immediately following a move into rent-assisted housing. In this sense, our data suggest the potential utility of developing programs that can provide extra support to new recipients of rental assistance, particularly those who have chronic health conditions, during the potentially vulnerable period surrounding a move.

The implications of rental assistance for diabetes self-management may also vary depending on individuals' access to affordable medical care. Many participants in our study had virtually no healthcare expenses as a result of their Medicaid coverage, which was accessible to many because of Connecticut's expansion of Medicaid through the Affordable Care Act. For individuals living in states with more limited access to Medicaid coverage, the challenges of managing diabetes without rental assistance may be greater. Access to stable and affordable housing may also better position individuals to benefit from the medical care that they receive, and more research is needed to better understand this intersection.

Although our findings suggest benefits of rental assistance for type 2 diabetes management, our qualitative study was designed to examine processes rather than to estimate causal effects. As with most qualitative studies, our sample size and design limits our ability to make population level generalizations. Furthermore, our small sample limits our ability to fully examine variations in the experience of rental assistance receipt across personal characteristics. It is also unclear to what extent the experiences of this sample of New Haven residents would be transferable to other settings or to other low-income renters within New Haven who may not be represented in our study. Additionally, our study is limited by drawing primarily on retrospective accounts of transition from waiting lists to rent-assisted housing. Although many of these retrospective accounts provided rich detail about this transition, future longitudinal studies that can prospectively observe the receipt of rental assistance will be an important addition to the literature. Finally, future research that moves beyond self-report to assess objective measures of diabetes self-management and control is needed to estimate and quantify the potential population health impact of rental assistance for individuals living with type 2 diabetes and other behaviorally managed chronic conditions.

Nonetheless, the qualitative data presented here illustrate numerous plausible pathways through which rental assistance may operate to improve diabetes self-management and ultimately long-term diabetes outcomes. Although more research is needed, these data suggest that expanded access to rental assistance could both improve population health and reduce the large existing costs

preventable diabetes-related complications (Yang et al., 2013). The cost savings associated with preventing large and unnecessary downstream healthcare costs may offset costs associated with expanding rental assistance programs (Sandel and Desmond, 2017).

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Homelessness During Infancy: Associations With Infant and Maternal Health and Hardship Outcomes

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Abstract

- *Objective: Homelessness among children is correlated with developmental delays, fair or poor health, and high healthcare utilization (AAP, 2013). Associations of homelessness specifically among infants younger than 12 months, however, are unknown. This study evaluates homelessness during infancy as a risk for adverse infant and maternal health and hardship.*
- *Methods: From May 2009 to December 2015, 9,980 mothers of infants younger than 12 months were surveyed at emergency departments and primary care clinics in five U.S. cities. Infants were classified as having a history of homelessness if they were homeless at any point versus being consistently housed during their first year. Infant health outcomes included caregiver report of fair or poor health, developmental risk, and hospitalizations. Maternal health outcomes included self-report of fair or poor health and positive screen for depressive symptoms. Hardships included household and child food insecurity and foregone medical care or prescriptions due to cost.*
- *Results: After adjusting for potential confounders, homelessness during infancy was associated with higher adjusted odds of fair or poor infant health (adjusted odds ratio [AOR] 1.71; 95-percent confidence interval [CI] 1.18, 2.47; $p < 0.01$) and developmental risk (AOR 1.62; 95-percent CI 1.04, 2.53; $p = 0.03$), but not hospitalizations. Compared with consistently housed mothers, mothers with a history of homelessness had higher adjusted odds of fair or poor health and depressive symptoms. History of homelessness was associated with higher adjusted odds of household and child food insecurity and foregone health care for family members other than the infant.*
- *Conclusions: Homelessness in infancy is associated with adverse outcomes for infants and mothers. Interventions providing housing and other health-related resources to homeless families with infants may improve health and family hardship.*

Introduction

In the United States, approximately 1.27 million children younger than 6 are homeless in a given year. (HHS Administration for Children and Families, 2016). In 2015, the U.S. Department of Housing and Urban Development found nearly one-half of families experiencing homelessness had a child under the age of 6, and 10.4 percent of homeless families had an infant under 12 months of age (HUD, 2015). According to HHS Administration for Children and Families (2016), infancy is the period of life when a person is most likely to live in a homeless shelter.

Stable housing is a foundation for children's healthy growth and development (Sandel et al., 2018), particularly from conception through the first 3 years of life, when the brain and body are growing and developing most rapidly. Prenatal homelessness is associated with higher adjusted odds of low

birth weight and preterm delivery (Cutts et al., 2015; Little et al., 2005). Deprivation during the most rapid period of brain development can fundamentally impact the architecture of the brain leading to long-term impacts on cognitive, socioemotional, and motor ability (Berkman, 2009; Shonkoff and Garner, 2012; Shonkoff and Phillips, 2000).

It is well-documented that children under age 18 who experience homelessness, as compared with stably housed children, manifest increased risk for multiple adverse health conditions, including a greater likelihood of chronic and acute illness, developmental delay, behavioral problems, early substance use, high-risk sexual behaviors, and poor school performance, in addition to more limited access to health care (Bassuk, 1991; Noell et al., 2001; Rubin et al., 1996; Weinreb et al., 1998). Throughout early childhood, not specifically during infancy, homelessness is associated with developmental delays and psychiatric disorders (Grant et al., 2007).

Maternal well-being is also necessary for optimal infant development (Casey et al., 2004; Cummings and Davies, 1994). Previous research indicates that maternal mental health, particularly depression, is a mediating factor for child health outcomes (Ashiabi and O'Neal, 2007). Homeless mothers are more likely to suffer worse physical and mental health than the general population and have higher incidence of acute and chronic conditions including asthma, chronic anemia, chronic ulcers, and unmet dental needs (Rog and Buckner, 2007; Weinreb et al., 2006; Zima, Wells, and Benjamin, 1996).

For most families, homelessness is a consequence of limited financial resources to afford stable housing (Grant et al., 2013). Families with children who are homeless may also concurrently experience other economic hardships, including food insecurity and lack of access to affordable health care (Gundersen et al., 2003; Miller and Lin, 1988). Each hardship alone is associated with poor health outcomes in children and adults (Ayanian, Weissman, and Schneider, 2000). Even after a family is no longer homeless, economic hardships associated with limited financial resources persist (Gubits et al., 2016). Cumulatively, these hardships exert additive short- and long-term negative effects on family health and well-being (Frank et al., 2010; Grant et al., 2013).

To our knowledge, no information can be found about the association of homelessness with health outcomes of infants and their mothers and the risk of other concurrent economic hardships. The goal of the current study is to assess whether homelessness in infancy was associated with adverse health and hardship outcomes for mothers and infants during this particularly vulnerable year of life.

Methods

Children's HealthWatch (<http://www.childrenshealthwatch.org>) is an ongoing collaborative research study monitoring the health and well-being of young children and their families in the United States since 1998. Children's HealthWatch collects data in Baltimore, Boston, Little Rock, Minneapolis, and Philadelphia. This network of researchers examines associations of family economic hardships and participation in public assistance programs on young child and caregiver health.

This analysis used data from the cross-sectional Children's HealthWatch study. As described previously (Rose-Jacobs et al., 2016), trained research assistants elicited caregivers' verbal responses to a 20-to-30 minute survey of household demographics, maternal and child health, and household

housing status and economic hardships. Participants were caregivers seeking medical care for their child younger than 48 months of age in emergency departments or primary care clinics in hospitals in the five cities. Eligibility included English, Spanish, and (in Minneapolis only) Somali speakers, state residency, and knowledge of the child's health and household. For this analysis, the sample was restricted to families of children less than 12 months old. Caregivers of critically ill or injured children were not approached. Each site obtained institutional review board approval prior to data collection, which was renewed annually. All research was conducted in accord with prevailing ethical principles.

Of the 32,610 caregivers of children younger than 4 approached between May 1, 2009, and December 31, 2015, 3,607 (11.1 percent) were ineligible for the study and 2,158 (7.4 percent) refused or were unable to complete the interview. Children younger than 12 months comprised 12,989 (48.4 percent) of the completed interviews. To better ensure that participants had relatively similar economic backgrounds, exclusion criteria included private insurance and homeownership, which excluded 2,267 (17.4 percent) of families with children younger than 12 months. Additionally, given previously published associations between prenatal homelessness and health outcomes, 742 infants (2.3 percent) whose mothers were homeless during pregnancy were also excluded. The final analytic sample was 9,980.

Measures

Demographics. Variables collected included study site and clinical setting, mother's country of birth (United States or other); age; race and/or ethnicity; marital status; education and employment; infant's sex, age, insurance status, birth weight, and breastfeeding history; and number of children in household.

Homeless during the infant's lifetime. Participants were asked "Since your child was born has s/he ever been homeless or lived in a shelter?" Homelessness was defined as living in a shelter, motel, and other transitional living situations or not having a consistent place to sleep at night. Those participants who reported currently living in a shelter, motel, car, or no consistent place to sleep at night were included in the homeless group. Participants were classified into two categories: (1) "consistently housed"—no history of homelessness since the infant's birth, and (2) "history of homelessness"—homeless for any period of time since the infant's birth.

Child health. Infant health status was measured using the RAND Corporation health status question asking caregivers to rate their infant's overall health at the point in time of the interview as excellent, good, fair, or poor (National Center for Health Statistics, 1998). The outcome variable for this study combined response options into two categories: fair or poor compared with excellent or good child health. Fair or poor reported health status is highly predictive of increased health services utilization and higher healthcare costs (O'Hara and Caswell, 2013). Caregivers were also asked if the infant had been hospitalized other than at birth ("lifetime hospitalizations").

Developmental risk. Caregiver concerns about the infant's developmental status for infants four months or older ($n = 5,336$, 53.5 percent of the sample) were ascertained using the Parents' Evaluation of Developmental Status (PEDS), a validated screening tool (Glascoe, 2000). Parents described concerns about their child's development at the time of the interview. Developmental risk was defined by endorsement of two or more concerns on the PEDS.

Maternal health. Maternal health status was measured by self-report of health status as excellent, good, fair, or poor (CDC, 1994). The outcome variable for this study combined response options into two categories: fair or poor compared with excellent or good caregiver health. Maternal depressive symptoms were detected using the Kemper scale (Kemper and Babonis, 1992). This scale consists of three validated questions: (1) “How many times in the past week has this statement been true for you? I felt depressed (affirmed feeling depressed for one or more days in the past week)”; (2) “In the past year, have you had 2 weeks or more during which you felt sad, blue or lost pleasure in things that you usually cared about or enjoyed?”; and (3) “Have you had 2 or more years in your life when you felt sad most days, even if you felt okay sometimes?” Caregivers who responded affirmatively to two or more questions were categorized as positive for depressive symptoms.

Food insecurity. The U.S. Food Security Survey Module, or FSSM, is an 18-question scale developed by the U.S. Department of Agriculture and is considered the “gold standard” in assessment of household food security (Bickel et al., 2000; USDA Economic Research Service, 2017). The assessment reflects the previous 12 months for each question. Households categorized as household food insecure (HFI) had at least three affirmative responses to nonchild-specific questions. Households categorized as child food insecure (CFI) gave affirmative responses to at least two of the eight child-specific questions in addition to at least three affirmative responses on nonchild-specific questions.

Foregone care. Participants were asked whether at any time (1) the index infant or (2) another family member had foregone needed health care (prescriptions and/or medical care) due to the family’s inability to afford care.

Statistical Techniques

Multiple logistic regression analyses were performed, controlling for confounders including study site, mother’s race or ethnicity, educational attainment, employment, marital status, breastfeeding history, child’s age, and number of children in the household. All analyses were conducted using two-sided tests and a significance level of $\alpha = 0.05$. Statistical analyses were performed using SAS software (version 9.3; SAS Institute, Cary, NC).

Results

Between May 2009 and December 2015, 9,980 caregivers with infants were interviewed. Of those interviewed, 300 (3.0 percent) families had experienced homelessness since the birth of their infant, and 9,680 families (97.0 percent) were consistently housed. The mean age of homeless infants was slightly older than those consistently housed, 5.9 months (standard deviation [sd] = 3.6) compared with 4.8 months (sd = 3.6; $p < 0.01$). No significant difference was found in maternal age; overall mean age was 25.7 years (sd = 5.7). Also, no significant difference resulted for low birth weight status; overall, 13.7 percent of infants were born with low birth weights. Compared with consistently housed caregivers, those with a history of homelessness had higher rates of unemployment and of not having a partner (67.0 versus 81.0 percent and 62.8 versus 76.2 percent, respectively). Those with a history of homelessness had lower rates of high school or higher education completion (69.9 versus 58.3 percent). Consistently housed families on average had more children than those who experienced homelessness (2.4 versus 2.0; exhibit 1).

Exhibit 1

Sample Description According to Homelessness Status of Infants Younger Than 12 Months

Variable	Overall n (%)	Consistently Housed n (%)	Homelessness During Infancy n (%)	p-Value
Total participants	9,980 (100)	9,680 (97)	300 (3)	
Site				< 0.01
Baltimore	2,010 (20)	1,983 (21)	27 (9)	
Boston	1,752 (18)	1,615 (17)	137 (46)	
Little Rock	1,903 (19)	1,884 (20)	19 (6)	
Minneapolis	2,342 (23)	2,266 (23)	76 (25)	
Philadelphia	1,973 (20)	1,932 (20)	41 (14)	
Caregiver's place of birth				0.38
U.S. born (vs. foreign born)	7,248 (73)	7,037 (73)	211 (71)	
Child gender				0.66
Female	4,615 (46)	4,480 (46)	135 (45)	
Age of child (months)				< 0.01
Mean (std. dev.)	4.9 (3.6)	4.8 (3.6)	5.9 (3.6)	
Child breastfed				0.08
Yes	6,533 (66)	6,323 (65)	210 (70)	
Child's health insurance				0.23
Public (vs. none)	9,360 (94)	9,073 (94)	287 (96)	
Caregiver's ethnicity				< 0.01
Hispanic	3,330 (34)	3,197 (33)	133 (45)	
Black non-Hispanic	5,007 (51)	4,888 (51)	119 (40)	
White non-Hispanic	1,246 (13)	1,211 (13)	35 (12)	
Other	314 (3)	304 (3)	10 (3)	
Marital status				< 0.01
Married/partnered	3,663 (37)	3,592 (37)	71 (24)	
Caregiver's education attainment				< 0.01
Less than high school diploma	3,037(31)	2,913 (30)	124 (42)	
High school	4,035 (40)	3,924 (41)	111 (37)	
More than high school	2,879 (29)	2,816 (29)	63 (21)	
Caregiver's age				0.50
Mean (std. dev.)	25.7 (5.7)	25.7 (5.7)	25.5 (5.8)	
Caregiver's employment				< 0.01
Employed	3,249 (33)	3,192 (33)	57 (19)	
WIC				0.54
Yes	9,005 (91)	8,738 (91)	267 (90)	
SNAP				< 0.01
Yes	6,023 (61)	5,805 (61)	218 (73)	
Subsidized housing				< 0.01
Yes	1,883 (19)	1,865 (20)	18 (6)	
Low birthweight				0.26
Less than 2,500g	1,357 (14)	1,323(14)	34 (12)	
Number of children in household				< 0.01
Mean (std. dev.)	2.3 (1.3)	2.4 (1.3)	2.0 (1.4)	

SNAP = Supplemental Nutrition Assistance Program. std. dev. = standard deviation. WIC = Special Supplemental Program for Women, Infants, and Children program.

Notes: Chi-square testing was utilized for categorical variables, and a t-test was utilized for continuous variables. Exclusion criteria included private health insurance, homeownership, index child >12 months of age, and prenatal homelessness.

Unadjusted Outcomes

Infants with a history of homelessness had higher unadjusted rates of hospitalizations, fair or poor health, and developmental concerns than consistently housed infants (22 versus 18 percent, 12 versus 8 percent, and 14 versus 7 percent, respectively). Caregivers who experienced homelessness in the first 12 months of their infant's life were more frequently reported fair or poor health and depressive symptoms than caregivers who were consistently housed (31 versus 20 percent and 39 versus 18 percent, respectively). Of families who experienced homelessness, 44 percent reported household food insecurity compared with 25 percent of consistently housed families. Child food insecurity rates were also higher among those with a history of homelessness compared with consistently housed families (19 versus 11 percent). Families with a history of homelessness were more likely to forego needed medical care for any household member other than the index child than consistently housed families (21 versus 16 percent). Rates of foregone care for the index child did not differ between groups (exhibit 2).

Exhibit 2

Unadjusted Outcomes by Homelessness: Infant Health, Maternal Health, and Household-Level Hardships Among Infants Younger Than 12 Months

Variable	Overall n (%)	Consistently Housed n (%)	Homelessness During Infancy n (%)	p-Value
Total participants	9,980 (100)	9,680 (97)	300 (3)	
Child health				
Lifetime hospitalizations	1,808 (18)	1,742 (18)	66 (22)	0.08
Child health fair or poor	777 (8)	740 (8)	37 (12)	< 0.01
Developmental risk (PEDS two or more concerns)	368 (7)	340 (7)	28 (14)	< 0.01
Maternal health				
Maternal health fair or poor	1,979 (20)	1,887 (20)	92 (31)	< 0.01
Depression screen	1,770 (19)	1,656 (18)	114 (39)	< 0.01
Household-level hardships				
Household food insecurity	2,513 (25)	2,380 (25)	133 (44)	< 0.01
Child food insecurity	1,124 (11)	1,066 (11)	58 (19)	< 0.01
Household foregone care	1,634 (17)	1,570 (16)	64 (21)	0.02
Child foregone care	331 (3)	319 (3)	12 (4)	0.51

PEDS = Parents' Evaluation of Developmental Status.

Notes: Chi-square testing was utilized for categorical variables, and a t-test was utilized for continuous variables. Exclusion criteria included private health insurance, homeownership, index child >12 months of age, and prenatal homelessness.

Infant Health Outcomes

Compared with infants who were consistently housed, a history of homelessness during infancy was associated with higher adjusted odds of fair or poor child health (adjusted odds ratio [AOR] 1.71; 95-percent confidence interval [CI] 1.18, 2.47; $p < 0.01$) and developmental risk (AOR 1.62; 95-percent CI 1.04, 2.53; $p = 0.03$). Risk of lifetime hospitalizations (exhibit 3) did not differ between the two groups (AOR 1.17; 95-percent CI 0.87, 1.58; $p = 0.30$).

Exhibit 3

Adjusted Outcomes by Homelessness: Infant Health, Maternal Health, and Household-Level Hardships Among Infants Younger Than 12 Months

Variable	Consistently Housed	Homelessness During Infancy AOR (95% CI)	p-Value
Lifetime hospitalizations	1.00	1.17 (0.87, 1.58)	0.30
Child health			
Child health fair or poor	1.00	1.71(1.18, 2.47)	< 0.01
Developmental risk (PEDS two or more concerns)	1.00	1.62 (1.04, 2.53)	0.03
Maternal health			
Maternal health fair or poor	1.00	1.87 (1.44, 2.43)	< 0.01
Depression screen	1.00	2.98 (2.30, 3.86)	< 0.01
Household-level hardships			
Household food insecurity	1.00	2.07 (1.62, 2.65)	< 0.01
Child food insecurity	1.00	1.59 (1.16, 2.17)	< 0.01
Household foregone care	1.00	1.74 (1.29, 2.35)	< 0.01
Child foregone care	1.00	0.78 (0.41, 1.46)	0.44

AOR = adjusted odds ratio. CI = confidence interval. PEDS = Parents' Evaluation of Developmental Status.

Notes: Adjusted for site, mother's race/ethnicity, educational attainment, employment status, marital status, child's age, breastfeeding history, and number of children in the household. Child's age not in maternal health outcome models.

Maternal Health Outcomes

Compared with mothers of infants who had been consistently housed since the birth of their child, mothers in the history of homelessness group had higher adjusted odds of being in fair or poor health (AOR 1.87; 95-percent CI 1.44, 2.43; $p < 0.01$) and screening positive for depressive symptoms (AOR 2.98; 95-percent CI 2.30, 3.86; $p < 0.01$; exhibit 3).

Household-Level Hardships

Compared with those consistently housed, families who had been homeless since the child's birth had higher adjusted odds of HFI (AOR 2.07; 95-percent CI 1.62, 2.65; $p < 0.01$), CFI (AOR 1.59; 95-percent CI 1.16, 2.17; $p < 0.01$), and foregone health care for family members other than the index child (AOR 1.74; 95-percent CI 1.29, 2.35; $p < 0.01$). Adjusted odds of foregone health care for the index child did not differ between the two groups (AOR 0.78; 95-percent CI 0.41, 1.46; $p = 0.44$; exhibit 3).

Limitations

This study has several limitations. First, significant findings in this cross-sectional study design reflect associations, not causation. Second, the study did not consider duration, whether the family was homeless once or over multiple periods of time, type or quality of alternative living arrangements for homeless families, or the housing quality for those who reported they were consistently housed. Quality of living arrangements may vary greatly within each group. Third, we did not collect information on other known risk factors of poor health outcomes that are more prevalent among homeless families compared with consistently housed families, including history of physical, emotional, or sexual abuse; exposure to interpersonal violence and community violence; substance use history; or mental health diagnoses (Bassuk and Rosenberg, 1988; Rog

and Buckner, 2007). These and other unmeasured covariates may contribute to adverse health outcomes described in this research. Finally, although other researchers independently validated the questions used in this study, respondents may have overreported or underreported negative child or maternal health outcomes. Previous research on the health status questions utilized in this study, however, show significant associations between reports of fair or poor health and higher healthcare utilization and costs (O'Hara and Caswell, 2013). Despite these limitations, the findings of this study provide evidence of the association between homelessness during infancy and adverse infant and maternal health outcomes as well as family material hardships, which have potential public policy implications.

Discussion

After controlling for confounders, we found significantly increased adjusted odds of poor infant and maternal health outcomes in families with infants who had experienced homelessness. These infants were at increased risk for fair or poor health and developmental risk, but not hospitalizations. Furthermore, their mothers were more likely to report their own health as fair or poor and more likely to report maternal depressive symptoms.

Families who experienced homelessness since the birth of the infant were more likely than consistently housed families to report an inability to afford enough food. Caregivers will often forego basic needs, including food, to buffer their children from the lack of family resources (Edin et al., 2013). In extreme instances, however, families are forced to decrease the quality or quantity of food for children, known as child food insecurity.

Families of infants who experienced homelessness were also more likely to report foregoing needed health care for other family members other than the index child due to family inability to afford the care.

Given previous research on the associations between homelessness during the prenatal period on birth outcomes, the findings of this article, and the prevalence of infants with histories of homelessness both prenatally and postnatally, more research is needed to address the potential cumulative impact of prenatal and postnatal homelessness on infant and early childhood health outcomes. Additionally, research on specific diagnoses and health indicators, such as those documented by health providers in medical records, beyond the reported outcomes of overall general health and development discussed in this article are necessary to understand the severity of health impacts homelessness during infancy has on child health.

The findings of this study demonstrate the potential toxicity of homelessness in the first twelve months of life as well as its potential effect on the health of caregivers. These data suggest that children who experience homelessness early in life may be at greater disadvantage than their peers as they grow and learn, but more research is necessary to identify the longitudinal impacts of homelessness during infancy on health and educational outcomes. Early exposures to adverse conditions and poor health are linked to negative health outcomes over the life course, especially when hardships persist (Shonkoff and Garner, 2012). Family homelessness also impacts parental physical and mental health, both of which are linked to negative health and developmental outcomes in children (Casey et al., 2004). Further, the impacts of homelessness may be compounded

by other material hardships. Inability to afford food and access health care are independently associated with poor health outcomes, but, as our previous work has shown, hardships experienced simultaneously increase risks of adverse child and maternal health outcomes (Frank et al., 2010).

This study adds to the extensive body of research on the negative child and family outcomes associated with lack of stable housing (Gubits et al., 2016). Previous Children's HealthWatch research demonstrates that more subtle housing instability short of homelessness significantly increases the risk of poor caregiver and child health as well as economic hardships (Sandel et al., 2018). Policies and programs that prevent homelessness and provide services that respond holistically to the combined needs of parents and children, also known two-generation strategies, for alleviating family hardships may improve health and child development. Evidence-based policies that help move families toward stable housing and increase the availability of affordable housing (Bailey et al., 2015) should be implemented widely, robustly funded, and expanded.

Conclusion

Homelessness during infancy is associated with early harm to children's health and development, poor caregiver health and maternal mental health, and additional material hardships for families. Each of these outcomes has long-term impacts on health, educational attainment, and workforce participation later in life. Together, the cumulative force of these impacts may exert lifelong negative effects on a child's future. Efforts to prevent homelessness and coordinate services for families experiencing homelessness, especially for families with young children, are urgently needed. Partnerships between healthcare systems, housing providers, early education providers, and social service agencies offer promising results for coordinating solutions that respond to family needs holistically. Adequate and stable federal, state, and local funding across sectors is critical for maximizing the impact of these innovative strategies. Additionally, increasing federal funding for programs that support the housing, health, early education and care, and nutrition needs for families can improve our national health and well-being and strengthen our country's future.

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Impact of Rental Assistance on Modifiable Health Risk Factors and Behaviors in Adults

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Abstract

- *Objectives:* Housing may influence health through various mechanisms and is recognized as a social determinant of health. This study investigated the influence of rental assistance on modifiable health risk factors and behaviors using data from the Panel Study of Income Dynamics. Participants receiving rental assistance were compared with participants not receiving rental assistance on body mass index (BMI), obesity, smoking, alcohol use, and physical activity.
- *Methods:* Participants (N = 1,374) were ages 18 to 62, heads of household, and had not received rental assistance for 4 years prior to baseline. Treatment group participants (n = 116) received rental assistance between baseline and the 2-year followup. Control group participants (n = 1,258) were eligible for rental assistance 2 years after baseline but did not receive assistance. Models estimated the average treatment effect on the treated for each health indicator in each followup year. Participants were matched on age, race and ethnicity, gender, education, disability status, employment, household income, and number of children in the family unit.
- *Results:* At the 2-year followup, smoking was significantly higher among treatment-group participants. A sensitivity analysis excluding permanently disabled participants showed significantly higher obesity in the treatment group 2 years after baseline. No significant differences were found 4 or 6 years after baseline on any outcome.
- *Conclusions:* Rental assistance was associated with increased smoking and obesity 2 years after baseline but did not influence BMI, alcohol consumption, or physical activity. Interventions to reduce smoking and obesity may improve the health of individuals who receive rental assistance.

Introduction

Rental assistance has been recognized as a mechanism for improving the lives of individuals through the provision of better-quality and more-affordable housing (Shaw, 2004). However, few studies have examined the influence of rental assistance on physical health risk factors and behaviors, and findings have shown both positive and negative influences of various forms of rental assistance on health (Fauth, Leventhal, and Brooks-Gunn, 2004; Fenelon et al., 2017; Fertig and Reingold, 2007).

Fauth, Leventhal, and Brooks-Gunn (2004) studied Black and Latino adults in high-poverty areas in Yonkers, New York, using data from the Yonkers Project. Adults randomly assigned by lottery to move to newly built public housing facilities were compared with other adults, who stayed in high-poverty areas, on measures of well-being, including physical health and alcohol abuse symptoms. Adults who moved to new public housing facilities were found to have fewer reported health problems, such as diabetes and asthma, and were less likely to report alcohol abuse symptoms approximately 2 years after moving. Fenelon et al. (2017) linked National Health Interview Survey data and U.S. Department of Housing and Urban Development (HUD) data to study the influence of rental assistance on adults' physical and mental health. Study participants living in public housing, and those in multifamily housing, had lower odds of fair or poor reported health status as compared with future public housing residents, controlling for demographic characteristics and neighborhood factors. Fertig and Reingold (2007) investigated the effect of living in a public housing project (self-reported data) on health among mothers in the Fragile Families and Child Wellbeing Study, using a baseline measure from survey data obtained after the birth of a child and followup data 1 and 3 years later. By contrast with Fenelon et al. (2017), the study found overall health status to be worse among mothers who reported moving into a public housing project between baseline and the 1-year interview, and mothers in public housing projects were more likely to be overweight at the 3-year interview.

These studies differ in design, definition of rental assistance, method for assigning residents to treatment or control group, measured outcomes, and analytic methods. Two of the studies used samples from nationally representative databases (Fenelon et al., 2017; Fertig and Reingold, 2007) and one studied residents in a local rental assistance program (Fauth, Leventhal, and Brooks-Gunn, 2004). Although all the studies were longitudinal, the study by Fauth, Leventhal, and Brooks-Gunn (2004) lacked baseline data. However, all the studies tested associations between rental assistance and one or more physical health indicators, and they all compared residents who received rental assistance with similar residents who did not receive assistance.

This study focuses on the effects of rental assistance on modifiable health risk factors and behaviors among adult participants in the Panel Study of Income Dynamics (PSID), which is a nationally representative panel study of individuals in the United States. The aim of the study was to determine whether rental assistance influenced health as evidenced by changes in body mass index (BMI), obesity, alcohol consumption, smoking, and physical activity from baseline to a subsequent wave 2, 4, or 6 years following baseline.

Methods

Several data sources were used to construct a pooled analysis dataset. This dataset included three baseline years (1999, 2001, and 2003) and 2-, 4- and 6-year followup waves for each baseline year. Data sources included PSID survey data, geospatial data, data on rental assistance, and HUD income limit data. The PSID survey data, geospatial data, and data on rental assistance were merged with HUD income limit data to determine study eligibility. We used a pooled cross-sectional design with propensity score matching to estimate the influence of rental assistance on each health indicator 2, 4, and 6 years after baseline. The study was approved by our institutional review board.

Sample

PSID participants included in this study (N = 1,374) were between 18 and 62 years of age at baseline and were identified as the same head of household from 2 years prior to baseline through the 2-year followup point. The baseline age limit of 62 years was used to exclude participants who might become eligible for housing for seniors at age 62. PSID participants included in the treatment group were receiving rental assistance 2 years after baseline but did not receive rental assistance from 4 years prior to baseline through the baseline year. The control group included PSID participants who were eligible for rental assistance 2 years after baseline but did not receive rental assistance from 4 years prior to baseline through 6 years after baseline.

The PSID Assisted Housing Database (AHD) was used in part to determine whether a participant met criteria for inclusion in the treatment or control group (PSID, 2014). The PSID AHD was originally constructed by matching the addresses of PSID families with the street addresses of subsidized housing units, including Section 8 and voucher programs. The AHD includes the PSID family identifier and study year as well as the type of rental assistance, using HUD classifications. The AHD data for 1995 and later years classify four categories of rental assistance: public housing; other project-based housing, including low-income housing tax credits; tenant-based housing (primarily vouchers); and Farmers Home, state-assisted housing (HUD, 2017, 2002). We combined all four of the assisted housing categories to create a rental assistance indicator, coded 1 if a participant was receiving any type of rental assistance in a given year and 0 if the participant was not receiving rental assistance. We used PSID family identifiers and study year in the AHD to link the rental assistance indicator to other PSID data on families and individuals (McGonagle and Sastry, 2016; Newman and Schnare, 1997). Each year of PSID data was linked to each year of AHD data from the first prebaseline year through the final 6-year followup. The match was restricted to participants identified as the same head of household from prebaseline through 2 years after baseline for participants in the treatment group and from prebaseline through the 6-year followup for participants in the control group. These constraints enabled us to match family data on receipt of rental assistance to the head of household across multiple years, as appropriate for each group. To maintain an adequate sample, data on rental assistance at 4 and 6 years after baseline were not used to define the treatment group.

Control group participants were determined to be eligible for rental assistance at the 2-year followup wave based on PSID total household income, number of people in the family unit, and

HUD income limit data.¹ We used the 80 percent of Area Median Income limit to determine eligibility for rental assistance (HUD, 2001). About one-half of the participants in the control group met criteria for inclusion in more than one of the samples (baseline years 1999, 2001, and 2003). These participants were the same head of household during multiple years and were eligible for rental assistance in more than one baseline year but did not receive rental assistance during any prebaseline or followup year. These participants were randomly assigned to one of the three subsamples to balance the number of observations across time prior to merging (exhibit 1).

The resulting sample included 1,405 adult PSID participants eligible for the treatment or control group. The 1,374 PSID participants included in the analysis sample had complete data on all baseline covariates, with 116 participants in the treatment group and 1,258 participants in the control group.

Exhibit 1

Longitudinal Samples

Sample	Prebaseline	Baseline	2-Year Followup	4-Year Followup	6-Year Followup	Treatment n	Control n
1	1995–1997	1999	2001	2003	2005	22	431
2	1997–1999	2001	2003	2005	2007	34	413
3	1999–2001	2003	2005	2007	2009	60	414

Measures

Data on participants' demographic characteristics and health status were obtained from PSID. Demographic variables measured at baseline included age, sex, race and ethnicity, education, permanent disability, employment status, hours worked in the previous year, total household income, and number of children in the family unit (exhibit 2). Race/ethnicity was determined from two separate questionnaire items indicating race and ethnicity and was coded as non-Hispanic Black, non-Hispanic White, Hispanic, or non-Hispanic other. The questionnaire item on ethnicity was asked for the first time in 2005; thus it was extrapolated to earlier baseline years and combined with data on race to create the race/ethnicity variable.

Data on modifiable health risk factors and behaviors were obtained from PSID for baseline and the followup waves. These health-related variables, used as outcomes in separate models, included BMI, obesity, smoking (any number of cigarettes), alcohol consumption (any alcohol and number of drinks per day), light physical activity (frequency per week), and heavy physical activity (frequency per week). BMI was calculated from self-reported height and weight measured in pounds and inches using the Centers for Disease Control and Prevention formula for adults: $\text{weight (pounds)} / [\text{height (inches)}]^2 \times 703$ (CDC, 2017). Obesity was defined as a BMI of 30 or higher (CDC, 2017). Smoking and alcohol consumption were determined from the PSID survey questions—

¹ PSID 2010 geospatial data and PSID public data (PSID, 2017a, 2017b) obtained for this study were matched with HUD income limit data (HUD, 2005, 2003, 2001) for assisted housing programs for years 2001, 2003, and 2005 separately using state, county, and metropolitan statistical area geocodes. Nearly all the PSID locations were matched with HUD data (2001, 97.8 percent; 2003, 98.4 percent; 2005, 99.0 percent). These data were then merged with PSID AHD data using a family identifier for each year individually.

Exhibit 2

Demographic Characteristics at Baseline

	Treatment n = 116	Control n = 1,258	t / χ^2
Age (years)	39.6 (10.7)	43.1 (10.7)	3.4***
Male gender (%)	44.8	67.3	22.8***
Race/ethnicity (%)			33.7***
Non-Hispanic Black	61.2	39.3	
Non-Hispanic White	25.9	53.7	
Hispanic	7.8	4.5	
Non-Hispanic other	5.2	2.5	
Education (%)			22.7***
Less than high school	37.9	21.4	
High school diploma	38.8	37.3	
Some college	19.0	37.1	
Missing	4.3	4.2	
Permanently disabled (%)	12.1	5.9	6.8**
Employed (%)	66.4	76.8	6.3*
Hours worked previous year	1,474 (969)	1,772 (943)	3.2**
Household income (\$)	27,360 (22,785)	41,553 (42,986)	3.5***
Number of children in family unit	1.6 (1.6)	1.0 (1.2)	- 4.8***

* p < .05. **p < .01. *** p < .001.

Notes: Numbers in parentheses are standard deviations. Comparing the treatment and control groups, t is for means and χ^2 is for percentages.

- “Do you smoke cigarettes?”
- “Do you ever drink any alcoholic beverages such as beer, wine, or liquor?”
- “On average, do you have less than one drink a day, one or two drinks a day, three to four drinks a day, or five or more drinks a day?”

The number of alcoholic drinks per day was coded as none (0), less than one (1), one to two (2), three to four (3), and five or more (4). Physical activity, coded as the number of times per week, was determined from survey items on light and heavy physical activity—

- “How often do you participate in light physical activity such as walking, dancing, gardening, golfing, bowling, etc.?”
- “How often do you participate in vigorous physical activity or sports—such as heavy housework, aerobics, running, swimming, or bicycling?”

Analysis

Propensity score matching was used to estimate the effect of rental assistance on each health-related outcome in separate models predicting outcomes at 2, 4, and 6 years following baseline. Participants included in each model had complete data across all waves for the health indicator being tested and complete data on baseline covariates. The propensity score for a given model included baseline covariates and the appropriate baseline health indicator (for example, baseline BMI for the models predicting BMI following baseline). The propensity score is an estimate of the probability of treatment based on a set of observed covariates, obtained from a logit model, with scores ranging from 0 to 1. Matching is achieved by pairing similar subjects in the treatment and control

groups based on their propensity scores. The average treatment effect on the treated (ATET) is estimated by finding matches for participants in the treatment group from participants in the control group. For each matched case, and for each health indicator separately, the observed outcome for a matched participant in the control group was imputed for the treatment group participant. The ATET is estimated as the average of the differences between the observed and imputed outcomes of participants in the treatment group; it indicates the average effect of receiving rental assistance on the health of individuals in the treatment group at a given time point.² An assumption is made that matching on the propensity score, which is constructed from a set of covariates, is adequate to remove the influence of systematic differences between the nonrandomized treatment and control groups (Rosenbaum and Rubin, 1983). We used one-to-one matching for all analyses.

The ATET coefficients for the 2-, 4-, and 6-year outcomes were estimated for each of the dependent variables using Stata's `-teffects psmatch-` command (Garrido et al., 2014; Social Science Computing Cooperative, 2015; StataCorp, 2015). Participants in the control group were matched with participants in the treatment group on a set of baseline covariates including baseline health measure, age, sex, race/ethnicity, education, employment status, number of hours worked in the previous year, permanent disability status, total household income, and number of children in the family unit. Stata v. 15.0 was used for all analyses (StataCorp, 2017).

A sensitivity analysis was conducted using data for participants who were not permanently disabled ($n = 1,286$; treatment group $n = 102$ and control group $n = 1,184$), because disabled individuals may receive benefits not available to nondisabled individuals and may have restrictions on physical mobility that can influence health.

Results

The treatment and control groups differed significantly on all the demographic characteristics at baseline (exhibit 2). Participants in the treatment group were younger and were more likely to be female, Black, permanently disabled, less educated, and unemployed. They also had lower household incomes and more children on average as compared with participants in the control group.

Unadjusted descriptive statistics for the health indicators for participants included in propensity score matching are shown in exhibit 3. The ATET coefficients for each model are shown in exhibit 4. Smoking was significantly higher among participants in the treatment group at the 2-year followup as compared with matched control group participants. At the 2-year followup, BMI and obesity were moderately but not statistically significantly higher among the treatment group relative to the matched control group participants. None of the differences for smoking, BMI, or obesity were significant at the 4- or 6-year followup points. Alcohol consumption and physical activity did not differ between the treatment group and matched controls in any of the models estimated.

² ATET is estimated as $\tau = E[\bar{\mu}(1, p(X)) - \bar{\mu}(0, p(X)) | W=1]$, Where τ is the treatment effect on the treated, $p(X)$ is the propensity score, $\bar{\mu}(1, p(X))$ is the conditional mean under exposure to the treatment, $\bar{\mu}(0, p(X))$ is the conditional mean under no exposure to the treatment, and $W = 1$ indicates treatment group (Abadie and Imbens, 2016).

Exhibit 3

Average Health Measures by Treatment Group

Variable	Group	n	Baseline	2-Year	4-Year	6-Year
			M (SD)	Followup M (SD)	Followup M (SD)	Followup M (SD)
BMI	Treatment	95	29.0 (6.3)	30.4 (7.0)	30.3 (6.3)	30.3 (6.9)
	Control	1,162	28.0 (5.7)	28.2 (5.6)	28.6 (6.0)	29.0 (6.2)
Obesity (%)	Treatment	95	36.8 (4.8)	47.4 (5.0)	50.5 (5.0)	42.1 (5.0)
	Control	1,162	29.1 (4.5)	31.9 (4.7)	33.0 (4.7)	34.9 (4.8)
Smoker (%)	Treatment	101	33.7 (4.7)	35.6 (4.8)	32.7 (4.7)	31.7 (4.7)
	Control	1,212	31.9 (4.7)	30.3 (4.6)	28.5 (4.5)	27.8 (4.5)
Alcohol—any (%)	Treatment	102	58.8 (4.9)	54.9 (5.0)	50.0 (5.0)	55.9 (5.0)
	Control	1,210	60.1 (4.9)	60.6 (4.9)	59.6 (4.9)	57.9 (4.9)
Alcohol—drinks/day	Treatment	100	0.8 (0.9)	1.1 (1.2)	1.1 (1.3)	1.4 (1.4)
	Control	1,193	0.8 (0.9)	1.0 (1.1)	1.2 (1.2)	1.4 (1.3)
Light physical activity (times/week)	Treatment	99	3.7 (4.3)	4.3 (4.7)	3.5 (4.1)	3.1 (4.1)
	Control	1,170	5.1 (6.7)	4.5 (6.0)	3.9 (4.9)	4.1 (5.9)
Heavy physical activity (times/week)	Treatment	102	2.0 (6.1)	1.5 (2.2)	2.0 (3.7)	2.2 (5.5)
	Control	1,185	2.1 (4.2)	2.1 (5.2)	1.9 (3.2)	2.2 (3.2)

BMI = body mass index. M = mean. SD = standard deviation.

Note: Summary statistics are unadjusted for baseline covariates.

Exhibit 4

Average Treatment Effect on the Treated

	2-Year Followup		4-Year Followup		6-Year Followup	
	Coef. (SE)	p	Coef. (SE)	p	Coef. (SE)	p
BMI	1.03 (0.53)	.05	0.62 (0.66)	.35	0.27 (0.72)	.71
Obesity	0.11 (0.06)	.07	0.07 (0.06)	.23	0.02 (0.06)	.72
Smoking	0.11 (0.05)	.04	0.09 (0.05)	.06	0.04 (0.05)	.46
Alcohol—any	-0.05 (0.07)	.45	-0.02 (0.07)	.79	-0.01 (0.07)	.88
Alcohol—drinks/day	-0.08 (0.14)	.55	-0.07 (0.16)	.66	0.12 (0.18)	.51
Light physical activity	0.06 (1.16)	.96	-0.45 (0.58)	.43	-1.23 (0.95)	.20
Heavy physical activity	0.18 (0.33)	.59	0.45 (0.63)	.47	-0.02 (0.66)	.97

BMI = body mass index. SE = standard error.

Note: 2-year followup p-value for BMI = .051.

Results of the sensitivity analysis (not shown) estimating the ATET for the subgroup of individuals who were not permanently disabled revealed significantly higher likelihood of obesity among treatment group participants at the 2-year followup (Coef. = 0.14, SE = 0.07, $p = .04$). Differences in obesity between the groups were not statistically significant at the 4- or 6-year followup points. Results for smoking, alcohol consumption, and physical activity showed no significant differences between the treatment group and matched controls in any of the models estimated.

Discussion

Results of this study reveal significant treatment effects 2 years after baseline on smoking and on obesity in a sensitivity analysis that excluded permanently disabled individuals. In contrast to the finding of no influence on smoking behavior in Fertig and Reingold (2007) at 1 or 3 years after

receiving rental assistance, our study did find a significant increase in smoking in the treatment group. In our study, the control group differed in many ways from the treatment group at baseline. Despite matching on propensity scores, the control group in our study may represent a different segment of the population than the control group in the study by Fertig and Reingold (2007) because all participants in that sample were drawn from the Fragile Families and Child Wellbeing Study. Also, in contrast to our finding of no differences in alcohol use, Fauth, Leventhal, and Brooks-Gunn (2004) found a reduction in symptoms of alcohol abuse among participants who received rental assistance; the measures of alcohol use and alcohol abuse are dissimilar, which could explain this difference in part. However, the control sample in Fauth, Leventhal, and Brooks-Gunn (2004) was drawn entirely from a population of adults living in a high-poverty area, whereas our sample was not restricted in that way.

In the sensitivity analysis, we found that obesity increased in the treatment group. This finding is similar to the finding in Fertig and Reingold (2007) of an increase in overweight participants 3 years after receiving rental assistance. Measures of overall health status, such as the number of health symptoms in Fauth, Leventhal, and Brooks-Gunn (2004) and general reported health status in Fenelon et al. (2017), are not directly comparable with the more specific health measures in our study. Both of those studies found improved health status among adults receiving rental assistance as compared with similar adults who did not receive rental assistance.

The PSID AHD data were used to determine whether a participant received rental assistance at any time from 2 years prior to the baseline year through a 6-year followup. We did not determine whether individuals received rental assistance more than 4 years prior to the baseline year or whether treatment group participants received assistance after the 2-year followup. A more restrictive sampling method would have resulted in excessive data loss in the treatment group. Thus results may include the influence of rental assistance beyond the 2-year followup wave. Samples were combined across years in order to obtain a sufficient number of observations, but combining data across years could bias the results of the study. However, combining data across years could provide a more robust sample, as time-dependent influences on outcomes that are omitted from the model may be attenuated by this method. The number of observations in the treatment group, even after combining the samples, ranged from 95 to 102 for the models estimated, limiting the power of the tests. In addition, PSID AHD data were available only through 2009, which limited the waves of data we included in the analysis. A set of baseline covariates controlled for in the analysis included a range of measures meant to capture potential confounding influences on outcomes, but unobserved covariates may also have influenced the findings. Multiple statistical tests were conducted, increasing the possibility of a false positive finding. The use of self-reported height and weight to determine BMI may have introduced error in the analysis to the extent that participants' self-reported height and weight data were inaccurate. The use of a variable indicating any smoking, rather than frequency or number of cigarettes per day, combines individuals who smoke less with those who smoke more. This measure, however, captures the increased likelihood of smoking and provides some indication of increased exposure of smokers and nonsmokers in a housing unit to second-hand smoke, a known carcinogen.

The results of this study suggest that interventions to reduce smoking may be needed for the population of individuals receiving rental assistance, because the proportion of people smoking increased within 2 years after rental assistance began. The findings support HUD's final rule on smoke-free housing, which became effective in 2017 and will be fully implemented in 2018.³ Among individuals who receive rental assistance and who are not disabled, results of the sensitivity analysis suggest a need for targeted interventions to reduce obesity. Results of this study showed effects of rental assistance within a short time after assistance was received, but not in a longer timeframe, at 4 to 6 years after baseline. Thus, interventions might be most effective if they occur soon after individuals receive rental assistance. Environmental factors that may affect health were not examined in this study but might contribute to health risk factors and behaviors and should be investigated in further work.

Conclusion

In a sample of individuals from PSID, a propensity score analysis showed increased likelihood of smoking among individuals who received rental assistance between baseline and a 2-year followup. BMI, obesity, alcohol consumption, and light and heavy physical activity were not significantly different in this matched case analysis. A sensitivity analysis showed increased obesity among non-disabled individuals. Results of the study suggest that interventions to reduce smoking and obesity may benefit individuals who receive rental assistance.

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³ "Instituting Smoke-Free Public Housing; Final Rule," 24 CFR Parts 965–966. *Federal Register* 81 (233). December 5, 2016.

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The Geography of Vacant Housing and Neighborhood Health Disparities After the U.S. Foreclosure Crisis

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Abstract

- *Objectives:* We examined the impact of long-term (6 months or more) vacant housing and various durations of vacancy on a variety of health outcomes at the neighborhood level across three types of U.S. metropolitan areas (metros): (1) those that have experienced consistently strong growth, (2) those that have undergone weak growth, and (3) those hit hardest by the foreclosure crisis.
- *Methods:* We used hierarchical linear modeling with long-term vacant housing data derived from the U.S. Postal Service as well as data for health outcomes obtained from the Centers for Disease Control and Prevention to examine the health effects of residents who resided in 19,243 neighborhoods (census tracts) in the 50 largest metropolitan areas during the housing recovery.
- *Results:* Neighborhood long-term vacancy is significantly associated with neighborhood health problems in adults, but the association between vacant housing and neighborhood health outcomes varies based on the growth trajectory of the metropolitan area. For most health outcome measures, long-term vacancies are more strongly associated with poor outcomes in strong-growth and hard-hit metros than in weak-growth metros, but the reverse is true for asthma and mental health. Our findings also suggest that very long-term (more than 3 years) vacant housing increased significantly after the housing crisis and was significantly associated with health problems in all three types of metros.
- *Conclusions:* The differences in the relationship between neighborhood-level long-term housing vacancy and health outcomes across the three types of metros should be considered when addressing community development strategies for decreasing vacancy rates aimed at improving health outcomes.

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Introduction

The Great Recession, the most severe housing market crisis in the United States since the Great Depression, saw mortgage foreclosure of more than 5.5 million homes by the end of 2014 (Carlyle, 2015). In areas with high foreclosure rates, the resulting accumulation of vacant properties generated negative effects on neighborhoods, including decreased property values and increased crime rates (Apgar and Duda, 2005; Immergluck and Smith, 2006; Mallach, 2008; Raleigh and Galster, 2014; Schuetz, Been, and Ellen, 2008). High levels of neighborhood housing vacancies—especially lasting more than several months—have long been a concern to community developers and policymakers (Hollander, 2011; Sternlieb and Indik, 1969).

Although a number of researchers have examined the health effects of foreclosures, few have studied the relationship between vacant housing and health outcomes at the neighborhood (census tract) level within the context of metropolitan areas (metros). Studies of vacant housing and health outcomes are limited to case studies in particular cities or sets of cities (Cohen et al., 2003; Cohen et al., 2000). A need exists to study connections between vacant housing and health that allow for some generalization, yet recognize that these relationships may vary across different types of metros and housing markets. The effects of high levels of neighborhood vacancy on health outcomes may differ across types of metros. For example, vacancies created by new construction may be common in “strong-growth” metros, those induced by population loss may be common in “weak-growth” metros, and those resulting from foreclosure or eviction are prevalent in boom-bust “hard hit” metros affected by the foreclosure crisis of the late 2000s.

This study examines the trajectory of long-term vacant housing from 2011 to 2014¹ and investigates the association between long-term (6 months or more) vacant housing and neighborhood health outcomes in 2014 across three types of U.S. metros. Our definition of long-term vacancy follows Immergluck (2016), who defines it as a property vacant for 6 months or longer and so avoids most transitional vacancies for rent or sale. In this study, we sought to answer two research questions: First, is long-term vacant housing associated with neighborhood health outcomes, and if so does this association vary across different types of metropolitan areas? Second, does the length of vacancy, ranging from relatively shorter duration (6 to 12 months) to very long duration (3 years or longer) matter? That is, do vacancies of different lengths have different effects on health outcomes at the neighborhood level? An examination of the determinants of health outcomes in deteriorated physical environments such as those with boarded-up housing across different cities may help policymakers and planners design effective tools for improving neighborhood health outcomes and decreasing the health inequality associated with vacant housing.

Background

After the foreclosure crisis, the U.S. housing market exhibited disparities in market recovery and neighborhood health outcomes. The national housing market recovery, examined by trajectories of national vacancy rates and housing values, exhibited geographic disparities, with some metros

¹ We examined the trajectory of long-term vacancy after 2011 because the discontinuity in the data source was in 2011. We also selected 2014, when both vacancy and health data were publicly available across the United States, which enabled us to construct a cross-sectional design for regression analyses. Details about the data will be discussed in the data section.

recovering relatively slowly or worsening whereas others recovered quickly and improved (Immergluck, 2016; Wang, 2016). Moreover, low-income and minority groups tended to experience more stress from debt and foreclosure, which worsened health disparities (Houle, 2014; Libman, Fields, and Saegert, 2012; Saegert, Fields, and Libman, 2011).

Uneven housing recovery and health disparities can be explained partly by a process of cumulative causation. Myrdal (1957) asserted that the process of cumulative causation with capital and labor flowing from lagging regions into developed regions tends to generate unbalanced regional growth and disparities. Likewise, the rise in the number of foreclosures led to a great number of vacant properties, which depressed the construction industry and businesses dependent on local consumer spending. As a result of high concentrations of vacant homes in neighborhoods, residents may move to other neighborhoods in pursuit of higher-quality services, schools, infrastructure, and jobs. At the same time, amenities and tax bases can deteriorate, leading to further disinvestment in these areas. This vicious cycle of special polarization can lead to greater health inequalities. Given the possibilities of cumulative pressures toward distress, external intervention may be critical to addressing housing and health disparities in some cities.

Neighborhood physical and socioeconomic conditions might lead to negative health outcomes by influencing health behaviors in various ways. For example, although the availability of affordable housing and convenient transportation may improve neighborhood health outcomes, physically deteriorated neighborhoods with substandard housing may erode residential health and well-being (Cohen et al., 2003; Cohen et al., 2000; Krieger and Higgins, 2002; Miles, Coutts, and Mohamadi, 2011; Ross and Mirowsky, 2010). Substandard housing including dampness and mold, deteriorating insulation, lead paint, the presence of rodents, and toxic chemicals can increase the incidence of allergies, headaches, vomiting, asthma, and other respiratory diseases; lung cancer; and mental health problems (Dales et al., 1991; Jacobs et al., 2002; Peat, Dickerson, and Li, 1998; Phipatanakul et al., 2000). In addition, neighborhood socioeconomic conditions are also associated with health outcomes. In general, residents with lower incomes, lower levels of education, and fewer economic opportunities are more likely to live in substandard homes and deteriorated neighborhoods, which result in multiple health problems that contribute to cumulative health disparities (Houle, 2014; Rugh, Albright, and Massey, 2015; Libman, Fields, and Saegert, 2012; Saegert, Fields, and Libman, 2011).

As many foreclosed homes became vacant in the late 2000s, even in areas that had not previously experienced vacancy problems, and because studies focusing on the relationship between vacant housing and health are scarce, we reviewed studies that explored the relationship between foreclosures and health. The studies provide evidence that a rise in the number of foreclosures has negative effects on residents and neighborhood conditions, including effects on home values, social capital, neighborhood stability, and crime rates (Ellen, Lacoé, and Sharygin, 2013; Immergluck and Smith, 2006; Li and Morrow-Jones, 2010; Ross and Squires, 2011; Schuetz, Been, and Ellen, 2008). Consequently, residents who experienced defaults and foreclosures during the Great Recession also experienced serious physical and mental health degradation (Cannuscio et al., 2012; Libman, Fields, and Saegert, 2012; Pollack and Lynch, 2009), and living in neighborhoods with high levels of such properties is associated with weight gain, hospital visits, and mental health problems such as depression and suicide (Arcaya et al., 2013; Currie and Tekin, 2015; Houle and Light, 2014).

The focus of this study is to examine the relationship between long-term vacant housing and neighborhood health outcomes. Similar to foreclosures, vacant properties are associated with decreases in home values and increases in crime, and the longer a home remains vacant in a neighborhood, the stronger are such effects (Cui and Walsh, 2015; Han, 2014). Although two studies found negative effects of vacant housing on health outcomes (Cohen et al., 2003; Cohen et al., 2000), none have revealed the effects of longer durations of vacancy on health outcomes, nor have any examined the relationship between vacant housing and neighborhood health problems across the United States following the Great Recession.

Based on the literature concerning vacant and foreclosed homes, we hypothesize that the association between long-term vacant housing and health outcomes will be amplified in neighborhoods with longer durations of vacant housing. During the mortgage crisis, the accumulation of foreclosed properties varied across different types of metros: traditionally weak markets had persistently higher levels of foreclosed properties, and boom-bust markets with initially lower levels of foreclosed homes experienced large declines in home values and large increases in foreclosed properties (Immergluck, 2010). Thus, we hypothesize that, in the aftermath of the foreclosure crisis, a change of vacancy that largely stemmed from foreclosures may affect health outcomes differently across different types of metros.

Data and Methods

We used long-term vacant housing data collected by the U.S. Postal Service (USPS) and aggregated quarterly to the census tract level by the U.S. Department of Housing and Urban Development (HUD), which provide information on residential vacancies with durations from 3 to 36 months or longer (HUD, 2016).² Health data were obtained from the Centers for Disease Control and Prevention (CDC) for the 500 largest U.S. cities. The data consisted of 2014 estimates on health outcomes among adults at the census tract level: overall mental health, overall physical health, cancer, coronary heart disease (CHD), diabetes, asthma, arthritis, high blood pressure, stroke, high cholesterol, chronic obstructive pulmonary disease, chronic kidney disease, and missing all teeth. CDC released its 2014 health indicator data for the 500 largest cities, containing about 28,000 census tracts, in December 2016 through the CDC Chronic Data Portal. The primary data source was the CDC 2014 Behavioral Risk Factor Surveillance System, which surveyed adults older than 18 years (CDC, 2017). We pooled the health estimations only for the year 2014.³ The CDC 500-city health indicator datasets and HUD-USPS periodic vacancy datasets enabled us to carry out comparative analyses across the United States. To examine associations between long-term

² The USPS identifies a vacant address as one to which mail has not been delivered for more than 3 months (GAO, 2011). HUD-USPS data, so named throughout the article, provide counts of “no stat” addresses that are viewed as long-term vacancies but not classified as vacant because they are not habitable. As HUD staff recommended, we excluded no-stat addresses because they could generate significant measurement error.

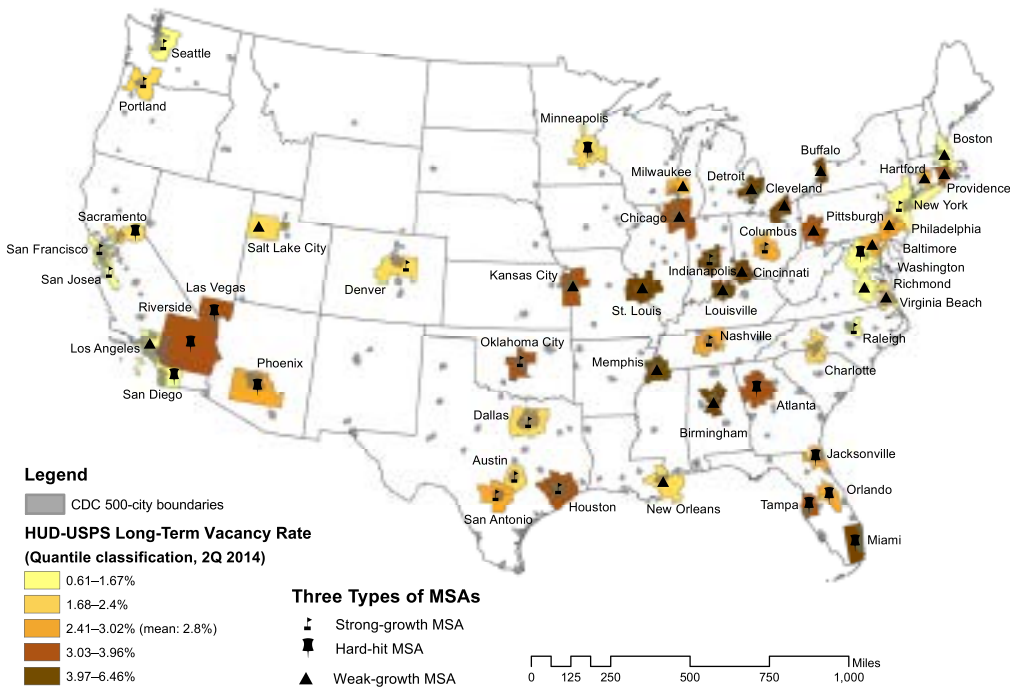
³ The dataset includes 2013 and 2014 model-based small area estimates for 27 measures that are categorized as 5 unhealthy behaviors, 13 health outcomes, and 9 prevention practices. Data sources used in measurements of adults older than 18 include the Behavioral Risk Surveillance System data, U.S. Census Bureau 2010 data, and the American Community Survey (ACS) 2009–2013 and 2010–2014 5-year data (CDC, 2017).

vacant housing and neighborhood health outcomes in regression analyses, we used the data from the CDC and the HUD-USPS for the year 2014, when both vacancy and health data were available across the United States.

Exhibit 1 illustrates long-term vacancy rates in the second quarter of 2014 for the 50 largest metros and the geographical locations of the CDC 500-city boundaries. We merged the two datasets at the tract level: 2014 HUD-USPS vacancy data for the 50 largest U.S. metros and 2014 CDC health data for 500 cities. As a result, we were able to construct a dataset consisting of 19,243 tracts in 295 U.S. cities in the 50 largest metropolitan areas. Tracts for 205 U.S. cities were excluded from the dataset because they were not in the 50 largest metropolitan areas.

Exhibit 1

The Long-Term Vacancy Rate, 500-City Boundaries, and Three Types of MSAs in the 50 Largest MSAs



CDC = Centers for Disease Control and Prevention. HUD-USPS = data from U.S. Department of Housing and Urban Development and the U.S. Postal Service. MSA = metropolitan statistical area.

Note: As of the second quarter of 2014.

A Simple Typology of the 50 Largest Metropolitan Areas

To measure the relationship between vacant homes and health outcomes across the different types of metros, we constructed a simple typology of large metropolitan areas. We used cluster analysis to categorize the three types of metros representing metropolitan growth and economic development during the recent housing crisis. The four clustering variables included changes in

population, Gross Domestic Product (GDP), and home values from 2005 to 2014. The fourth variable was changes in the population for the short term, from 2011 to 2014, to assign more weight to population growth because shrinking cities are generally defined as those experiencing population decline over a relatively short term.⁴ Using this approach, we classified the 50 largest metros into “strong-growth,” “hard-hit,” or “weak-growth” metros. Then we classified tracts according to the type of metro and found 7,552 tracts in strong-growth metros, 4,017 tracts in hard-hit metros, and 7,405 tracts in weak-growth metros.

Exhibit 1 presents three types of metropolitan areas. Strong-growth metros exhibit high population growth (a mean of 21 percent), strong economic growth (a mean of 9.85 percent in GDP per capita), and moderate levels of home appreciation (a mean of 6.5 percent) from 2005 to 2014, and high short-term population growth (a mean of 6.5 percent) from 2011 to 2014. These metros had lower neighborhood long-term vacancy rates (about 2.3 percent) in the second quarter of 2014. They are in the West (including San Francisco, California; Seattle, Washington; and Portland, Oregon); in the South (including Houston, Austin, and Dallas, Texas); and in the East (including New York City; Columbus, Ohio; Nashville, Tennessee; and Raleigh, North Carolina). Hard-hit metros include metros with moderate growth in population (16 percent), a decline in GDP per capita (9 percent), and a large deflation of home values (18 percent) from 2005 to 2014, and a moderate short-term growth of population (4.6 percent) from 2011 to 2014. These metros were the hardest hit by the most recent economic shock and had higher vacancy rates (about 2.8 percent) in 2014. They include most California and Florida metros, including Riverside, Sacramento, and San Diego, California, and Miami and Jacksonville, Florida. These hard-hit metros experienced relatively high levels of foreclosures during the mortgage crisis. Weak-growth metros typically experienced low levels of long-term population growth (5.4 percent), modest growth in GDP per capita (2.1 percent), and moderate home value increases (10.3 percent) from 2005 to 2014. They either saw no short-term population growth or lost population. These metros had the highest vacancy rates (about 3.4 percent) in the second quarter of 2014. Weak-growth metros are generally traditional Rust Belt metros, including Baltimore, Maryland; Buffalo, New York; Chicago, Illinois; Cleveland, Ohio; Detroit, Michigan; St. Louis, Missouri; and Philadelphia and Pittsburgh, Pennsylvania.

Long-Term Vacancy in 295 Cities Within the 50 Metropolitan Areas

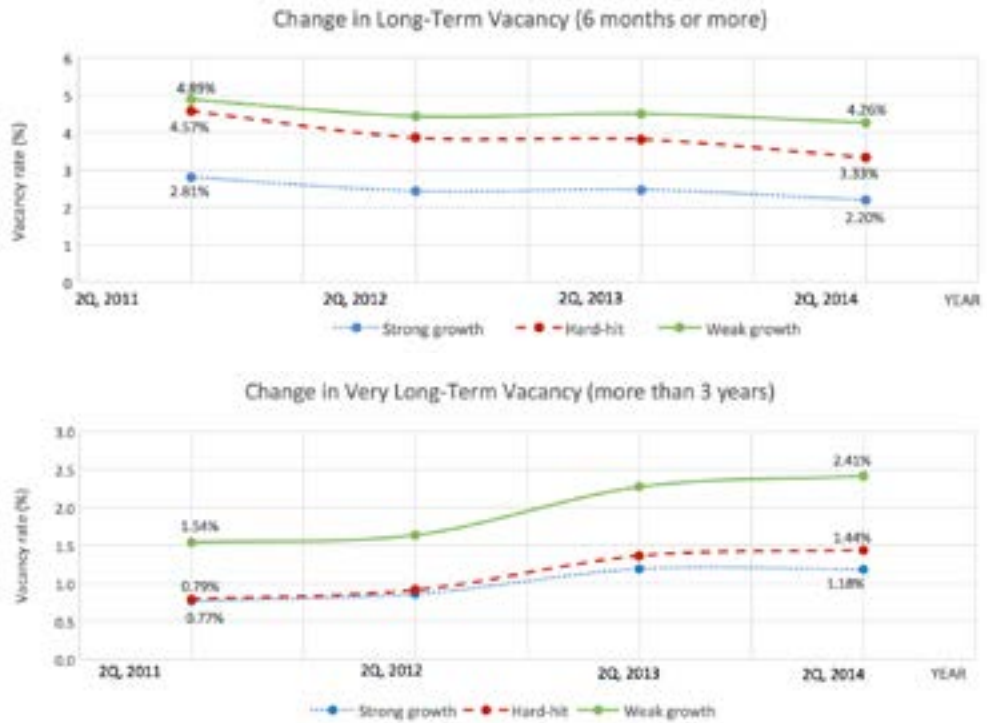
We constructed variables measuring the number of long-term vacant residential units by various durations of vacancy, including 6 months to 1 year, 1 to 2 years, 2 to 3 years, and 3 years or more, and by year for 295 U.S. cities within the 50 largest metropolitan areas. We break down vacant units further into the three types of metros in appendix A.

Exhibit 2 illustrates the long-term vacant housing trajectories in 295 cities in the three types of metros after the foreclosure crisis. The top panel of exhibit 2 shows that cities experienced gradual decreases in long-term vacancy rates (0.6 percentage point in strong-growth, 1.2 in hard-hit, and 0.6 in weak-growth metros) from 2011 to 2014. The bottom panel of exhibit 2 shows that,

⁴ Data for the cluster analysis were obtained from ACS 2005 (1-year estimates), ACS 2011 (1-year estimates), ACS 2014 (1-year estimates), ACS 2010–2014 (5-year estimates), and the Bureau of Economic Analysis. The clusters are distinctive groups that show that the value of the silhouette measure of cohesion and separation is more than 0.5 and that analysis of variance results for the three clusters have significantly different means among the four clustering variables (Norusis, 2012).

Exhibit 2

Changes in Vacancy From the Second Quarter of 2011 to the Second Quarter of 2014 in 295 U.S. Cities



Note: Denominators of both long-term (6 months or more) and very long-term (more than 3 years) are all residential addresses in each tract in the second quarter of each year.

although the number of housing units vacant for less than 3 years gradually declined from 2011 to 2014, vacancies of more than 3 years markedly increased in all three types of metros. The number of properties vacant for longer than 3 years increased by 94.3 percent (61,706 to 119,908 units) in hard-hit metros, by 66.1 percent (180,888 to 300,535 units) in weak-growth metros, and by 64.9 percent (106,877 to 176,197 units) in strong-growth metros. Cities in hard-hit metros exhibited a greater reduction in vacancies over 6 months but did not have higher rates during the 2011-to-2014 period. Cities in weak-growth metros showed the small reductions in vacancies during the housing recovery period, but they consistently had the highest vacancy rates and larger increases in vacancies lasting more than 3 years.

Multivariate Analysis

We examined the association of long-term vacancies with neighborhood health outcomes in the three types of metropolitan areas using hierarchical linear modeling (HLM), which is commonly used to examine neighborhood characteristics and health outcomes (LeClere, Rogers, and Peters, 1998).

Although ordinary least squares regression assumes that all observations are not correlated, HLM allows for correlated observations when lower-level observations are clustered within higher-level groups. In this study, census tracts are used as proxies for neighborhoods clustered within metro areas.

We ran separate metro-tract HLM models in each of the three types of metropolitan areas. Our dependent variables included 13 health indicators. A key predictor variable in each model is the percentage of units that are long-term vacant (that is, those units vacant for 6 months or longer in 2014). This variable is the sum of long-term vacancies divided by the number of residential units in each census tract. Because of the positively skewed nature of long-term vacancy rates, we transformed these variables to logarithms. We also took the logarithm of the health indicators because this log-log form generated a good fit for these models. As all variables are in logarithmic form, the coefficients of the log-log models represent the elasticities of health indicators with respect to long-term vacancy (Wooldridge, 2009). That is, the coefficients represent the expected percentage change in the health outcome variable for each 1-percent increase in the vacancy rate.

We ran separate models using various durations of long-term vacancy in 2014, including 6 months to 1 year, 1 to 2 years, 2 to 3 years, and 3 years or more. Census tract-level neighborhood control variables, which were selected based on factors identified in previous research, include percent African-American, percent Hispanic, percent Asian, percent married households, median age, percent families below poverty, percent persons with less than a high school diploma, percent uninsured households, percent commuting more than 30 minutes, and Median Family Income (Cohen et al., 2003; Cohen et al., 2000; Houle, 2014; Pollack and Lynch, 2009; Ross and Mirowsky, 2001, 2010). Metropolitan-level control variables include changes in population and unemployment rates for the past decade (Cohen et al., 2003; Houle, 2014). To control for location affordability, we include HUD housing and transportation affordability indices of poverty-level households (HUD, 2017).

Results and Discussion

Exhibit 3 provides descriptive statistics for the three types of metros. Generally, health problems in cities in weak-growth metros exhibit the highest means (the exceptions were cancer and chronic kidney disease), and the means of hard-hit and strong-growth metros were similar. In all three types of metros, the health problem that has the highest percentage of adults living in cities is high cholesterol, followed by high blood pressure and arthritis. Vacancy rates in the second quarter of 2014 were consistently high in cities in weak-growth metros (4.6 percent), followed by those in hard-hit metros (3.0 percent), and then those in strong-growth metros (2.1 percent) metros. On average, weak-growth metros, which often include cities with declining populations and older industries, contain a higher share of African-Americans than other metros. They also consist of the most disadvantaged populations with higher poverty rates and lower educational attainment, due in part to racial discrimination and segregation.

The results of regressing 13 adult health outcome variables (in logged form) on long-term vacancy rates (in logged form) and the control variables show that the results for the control variables are generally consistent with prior research across the three types of metros (see appendix B). Neighborhoods with lower-income households, more African-Americans, and less-educated, higher-poverty populations are disproportionately exposed to health problems.

Exhibit 3

Descriptive Statistics (1 of 2)

Variable Description	Strong Growth		Hard Hit		Weak Growth		
	Mean	SD	Mean	SD	Mean	SD	
Neighborhood-level dependent variable							
<i>Health outcome (adults aged ≥18 years)^a</i>							
MHLTH	% Mental health not good for days ≥14	11.909	3.400	12.530	3.445	13.484	3.893
PHLTH	% Physical health not good for ≥14 days	12.141	4.194	12.509	4.247	13.912	4.866
CANCER	% Cancer (excluding skin cancer)	5.133	1.566	5.692	2.248	5.367	1.654
CHD	% Coronary heart disease	5.281	1.759	5.758	2.294	6.085	2.095
DIABETES	% Diagnosed diabetes	10.307	3.846	10.092	3.678	11.744	4.728
CASTHMA	% Current asthma	9.357	1.840	9.227	1.535	10.296	2.404
ARTHRITIS	% Arthritis	20.860	5.181	21.892	6.084	23.838	7.087
BPHIGH	% High blood pressure	29.678	6.732	29.369	7.358	32.048	9.194
STROKE	% Stroke	2.821	1.185	2.940	1.275	3.421	1.700
TEETHLOST	% All teeth lost	15.074	7.835	13.944	7.144	17.645	9.511
HIGHCHOL	% High cholesterol	35.804	4.429	36.324	5.279	36.495	4.598
COPD	% Chronic obstructive pulmonary disease	5.734	2.151	6.224	2.242	6.767	2.833
KIDNEY	% Chronic kidney disease	2.556	0.697	2.945	0.907	2.853	0.889
Neighborhood-level independent variables							
<i>Demographic characteristics^b</i>							
BLACK	% Black	17.410	23.063	15.483	22.521	27.909	33.571
ASIAN	% Asian	11.160	14.962	6.012	7.845	7.143	10.299
HISPANIC	% Hispanic	26.752	23.738	28.736	24.831	22.885	26.625
MARRIED	% Married households	42.223	16.719	42.975	17.007	36.936	17.727
AGE	Median age	35.911	6.236	37.013	8.563	35.759	6.675
<i>Socioeconomic characteristics^b</i>							
POVERTY	% Families below poverty level	14.429	12.599	14.472	12.777	18.206	15.034
INCOME	Median family income (\$10,000)	7.417	4.145	6.968	3.719	6.384	3.739
LOW_EDU	% Less than high school education	16.912	13.524	15.092	12.764	18.387	13.914
UNINSURED	% Uninsured households	15.405	10.040	15.866	9.609	14.722	8.884
COMMUTE	% Workers commuting > 30 minutes	47.133	19.041	37.567	12.282	41.014	15.001
<i>Vacant housing^c</i>							
VACANCY_6MPLUS_14	% Vacancy (6 months +) in 2Q 2014	2.126	3.400	2.965	3.591	4.571	6.620
VACANCY_6M_1Y	% Vacancy (6 months–1 year) in 2Q 2014	0.216	0.653	0.351	0.634	0.421	0.903
VACANCY_1Y_2Y	% Vacancy (1–2 years) in 2Q 2014	0.335	0.584	0.634	1.006	0.653	1.214
VACANCY_2Y_3Y	% Vacancy (2–3 years) in 2Q 2014	0.263	0.567	0.500	1.160	0.626	1.151
VACANCY_3YPLUS	% Vacancy (3 years +) in 2Q 2014	1.327	2.619	1.488	2.157	2.882	4.716

Exhibit 3

Descriptive Statistics (2 of 2)

Variable Description	Strong Growth		Hard Hit		Weak Growth		
	Mean	SD	Mean	SD	Mean	SD	
Metropolitan-level independent variables							
<i>Macro characteristics^d</i>							
POP_CH	% Change in population (2005–2014)	13.954	5.936	12.635	2.644	3.615	3.329
UNEMP_CH	Change in unemployment rate (2005–2014)	22.616	9.479	40.447	10.100	30.071	14.177
HCOST	Housing costs as a percentage of income (type2-poverty level)	115.380	20.821	105.773	13.052	106.728	15.859
TCOST	Transportation costs as a percentage of income (type2-poverty level)	50.425	5.137	55.262	4.082	51.193	4.351
N		7,552		4,017		7,405	

2Q = second quarter. SD = standard deviation.

Sources: ^a CDC (2014); ^b American Community Survey (ACS) 2011–2015; ^c 2014 U.S. Department of Housing and Urban Development (HUD)-U.S. Postal Service vacancy data; ^d HUD Location Affordability Portal, ACS 2005–2009, ACS 2010–2014, Bureau of Economic Analysis

Long-Term (6 Months or More) Vacant Housing and Neighborhood Health Outcomes

Exhibit 4 summarizes key results by reporting the coefficients for long-term vacancy. The significance and magnitude of long-term vacancy varies across the metro types. Long-term (6 months or more) vacancies are significantly and positively associated with 13 adult health problems in strong-growth metros, 13 in hard-hit metros, and 12 in weak-growth metros. Heart-related diseases such as CHD and stroke were most prevalent in adults living in neighborhoods with high vacancy across three types of metros after the recent foreclosure crisis. Among health outcomes, CHD is the health problem most strongly associated with high vacancy rates in strong-growth and hard-hit metros. For example, every 1-percent increase in long-term vacancy rate was associated with 0.0318- and 0.0225-percent increases in the proportion of residents who had CHD in strong-growth and hard-hit metros, respectively. In general, the magnitudes of the associations were high in strong-growth and hard-hit metros and lowest in weak-growth metros (the exceptions being mental health and asthma outcomes). For example, in our models, all else being equal, every 1-percent increase in the long-term vacancy rate was associated with 0.0136- and 0.0109-percent increases in the proportion of residents who had overall physical health problems in strong-growth and hard-hit metros, respectively, but only a 0.0082-percent increase in weak-growth metros. In addition, all else being equal, every 1-percent increase in the long-term vacancy rate was associated with 0.0171- and 0.0163-percent increases in the proportion of residents who had cancer in strong-growth and hard-hit metros, respectively, but it had no significant association in weak-growth metros.

At first glance, these results may seem counterintuitive. We might have expected that high levels of long-term vacancies would have stronger effects on health outcomes in weak-growth metros.

Exhibit 4

HLM for Long-Term Vacancy (6 Months or More) and Health in 295 U.S. Cities

Dependent Variable: log (% Health Outcome)	Independent Variables: log (% Long-Term Vacancy)	Strong Growth		Hard Hit		Weak Growth	
		Estimated Coefficient	t-Value	Estimated Coefficient	t-Value	Estimated Coefficient	t-Value
% Mental health	% Vacancy (6 months +), 2Q 2014	0.0034	2.330**	0.0050	3.310***	0.0053	2.410**
% Physical health	% Vacancy (6 months +), 2Q 2014	0.0136	5.620***	0.0109	4.190***	0.0082	3.270***
% Cancer	% Vacancy (6 months +), 2Q 2014	0.0171	4.120***	0.0163	3.920***	0.0039	1.060
% Coronary heart disease (CHD)	% Vacancy (6 months +), 2Q 2014	0.0318	5.830***	0.0225	8.090***	0.0127	3.250***
% Diagnosed diabetes	% Vacancy (6 months +), 2Q 2014	0.0197	5.610***	0.0147	3.890***	0.0110	4.930***
% Current asthma	% Vacancy (6 months +), 2Q 2014	0.0027	2.610***	0.0027	3.580***	0.0031	3.020***
% Arthritis	% Vacancy (6 months +), 2Q 2014	0.0160	4.930***	0.0141	3.400***	0.0088	5.270***
% High blood pressure	% Vacancy (6 months +), 2Q 2014	0.0149	6.410***	0.0117	5.010***	0.0082	4.090***
% Stroke	% Vacancy (6 months +), 2Q 2014	0.0284	5.740***	0.0213	8.440***	0.0138	4.140***
% All teeth lost	% Vacancy (6 months +), 2Q 2014	0.0189	5.100***	0.0139	7.660***	0.0093	2.300**
% High cholesterol	% Vacancy (6 months +), 2Q 2014	0.0107	5.280***	0.0074	3.860***	0.0059	5.900***
% Chronic obstructive pulmonary disease	% Vacancy (6 months +), 2Q 2014	0.0197	5.800***	0.0169	8.200***	0.0098	2.840***
% Chronic kidney disease	% Vacancy (6 months +), 2Q 2014	0.0163	5.720***	0.0127	7.500***	0.0078	3.630***

2Q = second quarter. HLM = hierarchical linear modeling.

** p < 0.05. *** p < 0.01.

However, these metros already had higher levels of vacancy before the foreclosure crisis and have other regional stressors that may be more influential on health outcomes, such as higher unemployment rates. These results suggest that neighborhoods in metros with historically lower vacancy rates (strong-growth and hard-hit metros) may be more sensitive to vacancy shocks at the neighborhood level, at least in terms of most of the health outcome measured here.

Except for asthma and mental health, in weak-growth metros the association between neighborhoods with high levels of vacancy and health outcomes were weaker. Of course, asthma and mental health are not trivial health problems. Asthma, in particular, has been the most prevalent chronic disease in residents living in poor housing and deteriorated neighborhoods, currently affecting more than 24 million Americans (NCHS, 2015a, 2015b). In our models, all else being equal, every 1-percent increase in the long-term vacancy rate was associated with a 0.0031-percent increase in the proportion of residents who had asthma in weak-growth metros, but only 0.0027-percent increases in strong-growth and hard-hit metros. In addition, every 1-percent increase in the long-term vacancy rate was associated with a 0.0053-percent increase in the proportion of residents who had overall mental health problems in weak-growth metros, but 0.0034- and 0.0050-percent increases in strong-growth and hard-hit metros, respectively. One explanation for this finding is the possible cumulative factors affecting asthma and mental health that are present in weak-growth metros and that may interact with vacancies. These effects are generally small. Nonetheless it appears that long-term neighborhood vacancy in weak-growth metros is modestly associated with asthma and mental health problems.

Hard-hit metros in exhibit 4 also exhibited a significant association between long-term vacant housing and health outcomes. Vacancy is associated with health outcomes in a way that is somewhat similar to that in strong-growth metros, but the coefficients are smaller in magnitude. Two distinct economic variables are associated with neighborhood health outcomes—housing affordability and changes in the unemployment rate at the metropolitan level (see appendix B). Generally, increases in housing costs as a percentage of income at the metro level were negatively associated with neighborhood health problems, indicating that spending more on housing may improve housing conditions and create a healthier environment, particularly in hard-hit metros after the foreclosure crisis. However, extremely low-income households (that is, those below the poverty level) have little to spend on housing, which can have negative spillover effects on health outcomes. This finding provides further support for the notion that housing cost burdens can have negative spillover effects onto health outcomes. Another economic condition, rising unemployment at the metropolitan level, is associated with neighborhood health problems, particularly in hard-hit metros.

Various Durations of Vacant Housing and Neighborhood Health Outcomes

Exhibit 5 provides estimation results for the relationship between various durations of long-term vacancy rates and health outcomes across the three types of metropolitan areas. Overall, our results show that very long-term vacant housing (more than 3 years) is significantly associated with health problems across all three types of metros. The coefficients of the very long-term vacancy rate are much larger than for any of the shorter durations, indicating that very long durations of vacancy have a particularly strong association with health problems. Generally, although health outcomes are associated with both shorter and longer durations of vacancy rates in strong-growth metros, health outcomes are also associated with very long durations of vacancy in weak-growth metros. In hard-hit metros, health problems more often occurred in the mid-duration of vacancy (from 1 to 2 years) and/or after very long durations. Because most vacancies in these metros were from recently foreclosed homes, foreclosure processes (that is, foreclosure notice, auction, and redemption or eviction) that lasted 1 to 2 years might have affected neighborhood health. Thus, when properties lie vacant for very long periods, they are strongly associated with health problems across all three types of metros.

Exhibit 5

HLM for Long-Term Vacant Housing in Various Duration and Health in Three Types of Top 50 Metropolitan Areas (1 of 4)

Dependent Variable: log (% Health Outcome)	Independent Variables: log (% Long-Term Vacancy)	Strong Growth		Hard Hit		Weak Growth	
		Estimated Coefficient	t-Value	Estimated Coefficient	t-Value	Estimated Coefficient	t-Value
% Mental health	% Vacancy (1/2-1 yr.), 2Q 2014	0.0022	2.220**	0.0009	0.720	0.0023	2.190**
	% Vacancy (1-2 yrs.), 2Q 2014	0.0014	1.170	0.0034	2.990***	0.0012	1.200
	% Vacancy (2-3 yrs.), 2Q 2014	0.0026	2.280**	0.0015	1.130	0.0006	0.500
	% Vacancy (> 3 yrs.), 2Q 2014	-0.0002	-0.120	0.0012	0.740	0.0031	1.720*
% Physical health	% Vacancy (1/2-1 yr.), 2Q 2014	0.0049	2.630***	0.0020	1.550	0.0026	1.850*
	% Vacancy (1-2 yrs.), 2Q 2014	0.0025	1.750*	0.0054	3.320***	0.0018	1.700*
	% Vacancy (2-3 yrs.), 2Q 2014	0.0049	2.840***	0.0016	0.900	0.0014	0.990
	% Vacancy (> 3 yrs.), 2Q 2014	0.0076	3.400***	0.0058	1.730*	0.0067	3.420***
% Cancer	% Vacancy (1/2-1 yr.), 2Q 2014	0.0027	1.620	0.0043	2.110**	0.0023	1.430
	% Vacancy (1-2 yrs.), 2Q 2014	0.0002	0.090	0.0059	1.850*	0.0016	0.670
	% Vacancy (2-3 yrs.), 2Q 2014	0.0024	1.720*	0.0042	1.010	0.0012	0.540
	% Vacancy (> 3 yrs.), 2Q 2014	0.0016	1.430	0.0076	1.380	0.0029	1.590
% Coronary heart disease (CHD)	% Vacancy (1/2-1 yr.), 2Q 2014	0.0092	2.520**	0.0043	1.890*	0.0029	1.570
	% Vacancy (1-2 yrs.), 2Q 2014	0.0051	2.580***	0.0082	2.370**	0.0023	1.100
	% Vacancy (2-3 yrs.), 2Q 2014	0.0110	2.730***	0.0041	0.990	0.0025	0.970
	% Vacancy (> 3 yrs.), 2Q 2014	0.0181	3.710***	0.0099	1.310	0.0102	3.670***

Exhibit 5

HLM for Long-Term Vacant Housing in Various Duration and Health in Three Types of Top 50 Metropolitan Areas (2 of 4)

Dependent Variable: log (% Health Outcome)	Independent Variables: log (% Long-Term Vacancy)	Strong Growth		Hard Hit		Weak Growth	
		Estimated Coefficient	t-Value	Estimated Coefficient	t-Value	Estimated Coefficient	t-Value
% Diagnosed diabetes	% Vacancy (1/2-1 yr.), 2Q 2014	0.0056	2.300**	0.0033	1.950*	0.0023	1.890*
	% Vacancy (1-2 yrs.), 2Q 2014	0.0019	0.920	0.0043	1.530	0.0001	0.040
	% Vacancy (2-3 yrs.), 2Q 2014	0.0081	2.520**	0.0016	0.630	0.0022	1.170
	% Vacancy (> 3 yrs.), 2Q 2014	0.0132	3.740***	0.0099	2.050**	0.0094	5.370***
% Current asthma	% Vacancy (1/2-1 yr.), 2Q 2014	0.0018	2.320**	0.0003	0.410	0.0012	1.900*
	% Vacancy (1-2 yrs.), 2Q 2014	0.0007	0.690	0.0011	1.400	0.0009	1.450
	% Vacancy (2-3 yrs.), 2Q 2014	0.0008	0.910	0.0006	0.820	0.0004	0.610
	% Vacancy (> 3 yrs.), 2Q 2014	0.0011	0.960	0.0017	2.100**	0.0015	1.820*
% Arthritis	% Vacancy (1/2-1 yr.), 2Q 2014	0.0074	2.670***	0.0031	1.900*	0.0027	2.110**
	% Vacancy (1-2 yrs.), 2Q 2014	0.0038	2.120**	0.0061	2.240**	0.0034	2.580***
	% Vacancy (2-3 yrs.), 2Q 2014	0.0061	2.120**	0.0036	1.090	0.0017	0.910
	% Vacancy (> 3 yrs.), 2Q 2014	0.0078	2.190**	0.0070	1.290	0.0043	2.840***
% High blood pressure	% Vacancy (1/2-1 yr.), 2Q 2014	0.0036	1.730*	0.0021	1.470	0.0017	1.740*
	% Vacancy (1-2 yrs.), 2Q 2014	0.0020	1.370	0.0038	1.550	0.0015	1.210
	% Vacancy (2-3 yrs.), 2Q 2014	0.0049	2.720***	0.0005	0.250	0.0018	1.050
	% Vacancy (> 3 yrs.), 2Q 2014	0.0104	4.480***	0.0078	2.130**	0.0059	3.460***

Exhibit 5

HLM for Long-Term Vacant Housing in Various Duration and Health in Three Types of Top 50 Metropolitan Areas (3 of 4)

Dependent Variable: log (% Health Outcome)	Independent Variables: log (% Long-Term Vacancy)	Strong Growth		Hard Hit		Weak Growth	
		Estimated Coefficient	t-Value	Estimated Coefficient	t-Value	Estimated Coefficient	t-Value
% Stroke	% Vacancy (1/2–1 yr.), 2Q 2014	0.0086	2.730***	0.0042	1.840*	0.0026	1.370
	% Vacancy (1–2 yrs.), 2Q 2014	0.0045	2.070**	0.0058	1.910*	0.0024	1.410
	% Vacancy (2–3 yrs.), 2Q 2014	0.0091	2.620***	0.0031	1.010	0.0017	0.780
	% Vacancy (> 3 yrs.), 2Q 2014	0.0171	3.860***	0.0148	3.420***	0.0111	4.210***
% All teeth lost	% Vacancy (1/2–1 yr.), 2Q 2014	0.0051	3.000***	0.0038	2.470**	0.0028	1.470
	% Vacancy (1–2 yrs.), 2Q 2014	0.0028	1.720*	0.0055	2.690***	0.0009	0.460
	% Vacancy (2–3 yrs.), 2Q 2014	0.0059	2.390**	0.0019	0.930	0.0007	0.360
	% Vacancy (> 3 yrs.), 2Q 2014	0.0099	3.330***	0.0064	2.960***	0.0079	2.340**
% High cholesterol	% Vacancy (1/2–1 yr.), 2Q 2014	0.0028	1.870*	0.0013	1.450	0.0009	1.180
	% Vacancy (1–2 yrs.), 2Q 2014	0.0023	2.350**	0.0018	1.140	0.0008	0.960
	% Vacancy (2–3 yrs.), 2Q 2014	0.0043	2.480**	0.0019	0.950	0.0004	0.320
	% Vacancy (> 3 yrs.), 2Q 2014	0.0056	2.560**	0.0046	1.600	0.0046	5.170***
% Chronic obstructive pulmonary disease	% Vacancy (1/2–1 yr.), 2Q 2014	0.0077	2.700***	0.0034	1.860*	0.0044	2.480**
	% Vacancy (1–2 yrs.), 2Q 2014	0.0050	3.250***	0.0088	3.790***	0.0037	1.990**
	% Vacancy (2–3 yrs.), 2Q 2014	0.0072	2.820***	0.0033	1.070	0.0018	0.890
	% Vacancy (> 3 yrs.), 2Q 2014	0.0093	2.880***	0.0068	1.490	0.0060	2.320**

Exhibit 5

HLM for Long-Term Vacant Housing in Various Duration and Health in Three Types of Top 50 Metropolitan Areas (4 of 4)

Dependent Variable: log (% Health Outcome)	Independent Variables: log (% Long-Term Vacancy)	Strong Growth		Hard Hit		Weak Growth	
		Estimated Coefficient	t-Value	Estimated Coefficient	t-Value	Estimated Coefficient	t-Value
% Chronic kidney disease	% Vacancy (1/2–1 yr.), 2Q 2014	0.0056	2.740***	0.0026	1.860*	0.0014	1.320
	% Vacancy (1–2 yrs.), 2Q 2014	0.0015	1.250	0.0032	1.550	0.0005	0.440
	% Vacancy (2–3 yrs.), 2Q 2014	0.0062	2.970***	0.0015	0.750	0.0013	0.850
	% Vacancy (> 3 yrs.), 2Q 2014	0.0097	3.890***	0.0087	2.640***	0.0070	4.120***

2Q = second quarter. HLM = hierarchical linear modeling.

* p < 0.1. ** p < 0.05. *** p < 0.01.

Limitations

Despite its contribution of providing evidence of an association between long-term vacancies and public health across housing markets, this study contains limitations that call for additional research. Because it relies on a cross-sectional design, we cannot conclude that long-term housing vacancy causes these health outcomes. Our study simply indicates an association between long-term vacancy and certain health conditions, controlling for important neighborhood and metropolitan characteristics. Further research should utilize expanded longitudinal data and causal inference methods.

A second limitation of this study is the use of census tracts as proxies for neighborhoods, which might generate biased results because smaller units of neighborhoods, such as block groups, provide more socioeconomically homogeneous data (McKenzie, 2013; Shuler et al., 1992). However, we used census tracts with about 4,000 residents because they are the smallest units in our datasets and because scholars generally agree that census tracts reflect reliable socioeconomic and housing data that are publicly available (Sawichi and Flynn, 1996).

Another limitation of this study is the possibility of omitted variable bias. Although our independent variables are generally guided by the existing literature, our access to data is limited. For example, we lack details on changes in the quality of the housing stock, which may have deteriorated more in strong-growth metros than in weak-growth metros. It may be that vacancy is not the proximate driver of the relationships found here, but rather something associated with vacancy that is not accounted for by the various control variables.

Conclusion and Implications

In this study, we examined how living in areas with high levels of long-term vacant housing is associated with neighborhoods' health outcomes during the housing market recovery period across metropolitan areas (metros), and how it has disproportionately impacted some metros. For our first research question, our findings suggest that city neighborhoods with high long-term vacancy rates are significantly associated with adult health problems across the cities, but the relationship varies according to the growth trajectories of the metropolitan areas. Although neighborhoods in strong-growth and hard-hit metros are strongly associated with more health problems, those in weak-growth metros have a weaker association with health outcomes, except for mental health and asthma. A change in the vacancy rate in neighborhoods with initially lower levels of vacancies in strong and hard-hit metros may have experienced more shock and stress resulting in more health problems; however, neighborhoods with historically higher vacancy rates in weak-growth metros may have cumulative factors that contribute to asthma and mental health issues that interact with vacancy.

Our findings with regard to the second question suggest that very long-term (more than 3 years) vacant housing is more strongly associated with health problems across all types of metros. Although long-term (6 months or more) vacancy in strong-growth metros is associated with health problems, only the very long-term vacancy is associated with a broad set of health problems in weak-growth regions.

These findings suggest several implications for planners and policymakers attempting to cope with highly concentrated vacant properties in neighborhoods. Generally, cities in weak-growth metros had the highest levels of neighborhood vacancy from 2011 through 2014, but long-term vacancy in these cities, compared with that in cities in strong-growth and hard-hit neighborhoods, had a weaker association with most health problems. (Again, the important exceptions were asthma and mental health.) This finding indicates that historically high levels of vacancies in neighborhoods may be less-significant determinants of poor health and that health outcomes in these metros may be more strongly associated with other regional or neighborhood factors, such as regional economic conditions, neighborhood environmental conditions, housing quality, and other latent variables that may be more salient drivers of health outcomes in weak-growth metros.

At the same time, when looking only at very long-term vacant units, these properties were strongly associated with negative health outcomes in cities in all three types of metros. Moreover, the relationships between these very long-term vacancies and health outcomes were much stronger than for vacancies between 6 and 36 months.

From a public health perspective, these findings suggest that, in weak-growth metros, efforts to reduce vacant properties should focus on those units that have been vacant for more than 3 years. However, in strong-growth and hard-hit metros, it is with good reason that one can expect significant public health benefits from addressing vacancies of between 6 and 36 months. Although other reasons to reduce vacant units of shorter durations may be valid in cities in weak-growth metros, the health effects are not likely to be significant, except on asthma and mental health outcomes.

The second key implication for policy and planning is that very long-term vacancies have the greatest negative impacts on health outcomes across all types of metros, so, from a public health perspective, addressing these sorts of vacancies should be prioritized. Shorter-duration vacant housing may be more easily purchased and reused by investors or homeowners, whereas very long-term vacancy is a more challenging issue. However, health-focused efforts should generally aim first to reduce the number of very long-term vacancies. When the property may not be salvageable, this focus may entail targeted demolition. At the federal level, HUD and the U.S. Department of Health and Human Services should consider efforts to address these very long-term vacancies. Moreover, local and state health planners should consider community development strategies for decreasing long-term vacancy rates to improve health outcomes.

Appendix A

Exhibit A-1

Vacant Housing Units and Vacancy Duration in 295 U.S. Cities in Three Types of Metropolitan Areas (1 of 2)

Metro-politan Area Type	Year	Residential Address	Residen-tial Vacancy	Vacancy < 3 Months	Vacancy 3-6 Months	Vacancy 6-12 Months	Vacancy 1-2 Years	Vacancy 2-3 Years	Vacancy 3 + Years
Strong growth	2Q, 2011	13,899,145	390,470 (2.81%)	22,311 (0.16%)	37,574 (0.27%)	54,284 (0.39%)	121,380 (0.87%)	48,044 (0.35%)	106,877 (0.77%)
	2Q, 2012	14,634,556	357,218 (2.44%)	28,817 (0.20%)	26,011 (0.18%)	30,791 (0.21%)	63,462 (0.43%)	82,041 (0.56%)	126,096 (0.86%)
	2Q, 2013	14,729,662	364,170 (2.47%)	15,296 (0.10%)	23,057 (0.16%)	47,117 (0.32%)	56,969 (0.39%)	46,355 (0.31%)	175,376 (1.19%)
	2Q, 2014	14,873,955	327,538 (2.20%)	18,126 (0.12%)	18,927 (0.13%)	29,901 (0.20%)	48,637 (0.33%)	35,750 (0.24%)	176,197 (1.18%)
	% change (2Q 2011-2Q 2014)	7.0%	-16.1%	-18.8%	-49.6%	-44.9%	-59.9%	-25.6%	64.9%
Hard hit	2Q, 2011	7,804,613	356,760 (4.57%)	31,283 (0.40%)	45,512 (0.58%)	66,888 (0.86%)	112,063 (1.44%)	39,308 (0.50%)	61,706 (0.79%)
	2Q, 2012	8,248,904	318,794 (3.86%)	34,413 (0.42%)	31,547 (0.38%)	40,310 (0.49%)	68,178 (0.83%)	68,940 (0.84%)	75,406 (0.91%)
	2Q, 2013	8,281,888	316,347 (3.82%)	18,876 (0.23%)	30,722 (0.37%)	46,097 (0.56%)	62,273 (0.75%)	45,430 (0.55%)	112,949 (1.36%)
	2Q, 2014	8,333,812	277,465 (3.33%)	14,900 (0.18%)	24,797 (0.30%)	28,042 (0.34%)	51,074 (0.61%)	38,744 (0.46%)	119,908 (1.44%)
	% change (2Q 2011-2Q 2014)	6.8%	-22.2%	-52.4%	-45.5%	-58.1%	-54.4%	-1.4%	94.3%

Exhibit A-1

Vacant Housing Units and Vacancy Duration in 295 U.S. Cities in Three Types of Metropolitan Areas (2 of 2)

Metro-politan Area Type	Year	Residential Address	Residen-tial Vacancy	Vacancy < 3 Months	Vacancy 3-6 Months	Vacancy 6-12 Months	Vacancy 1-2 Years	Vacancy 2-3 Years	Vacancy 3 + Years
Weak growth	2Q, 2011	11,718,195	572,529 (4.89%)	31,504 (0.27%)	46,551 (0.40%)	81,443 (0.70%)	170,896 (1.46%)	61,247 (0.52%)	180,888 (1.54%)
	2Q, 2012	12,343,906	548,121 (4.44%)	34,722 (0.28%)	39,358 (0.32%)	50,814 (0.41%)	98,003 (0.79%)	123,098 (1.00%)	202,126 (1.64%)
	2Q, 2013	12,388,877	558,141 (4.51%)	18,582 (0.15%)	33,094 (0.27%)	59,543 (0.48%)	91,705 (0.74%)	73,716 (0.60%)	281,501 (2.27%)
	2Q, 2014	12,453,654	531,138 (4.26%)	20,817 (0.17%)	27,270 (0.22%)	45,375 (0.36%)	71,191 (0.57%)	65,950 (0.53%)	300,535 (2.41%)
	Percent change (2Q 2011-2Q 2014)		6.3%	- 7.2%	- 33.9%	- 41.4%	- 44.3%	- 58.3%	7.7%

2Q = second quarter.

Appendix B

The tables on the following pages present the results of regressing 13 adult health outcome variables on long-term vacancy rates in cities in the three types of large U.S. metropolitan areas—strong growth (exhibit B-1), hard hit (exhibit B-2), and weak growth (exhibit B-3).

Exhibit B-1

HLM for Long-Term Vacant Housing and Health in 295 Cities in Top 50 U.S. Metropolitan Areas, Strong-Growth Metropolitan Areas

Variables	MHLTH	PHLTH	CANCER	CHD	DIABETES	CASTHMA	ARTHRITIS	BPHIGH	STROKE	TEETH-LOST	HIGHCHOL	COPD	KIDNEY
Fixed effects													
<i>Level 1: census tract</i>													
(Intercept)	1.1097*	1.5159**	2.7506**	3.008**	3.4456**	1.6414***	4.2534***	3.9024***	2.0102*	2.4066*	5.0162***	1.8152*	0.8482
BLACK	0.0014***	0.0027***	-0.0009*	0.002***	0.0081***	0.0024***	0.0024***	0.0052***	0.0074***	0.0053***	0.0005***	0.0010***	0.0044***
ASIAN	-0.0039***	-0.0047***	-0.0071***	-0.008***	-0.0027***	-0.0037***	-0.0067***	-0.0029***	-0.0065***	-0.0032***	-0.0018***	-0.0088***	-0.0045***
HISPANIC	-0.0011***	0.0005	-0.0024***	-0.001*	0.0030***	-0.0020***	-0.0014***	0.0002***	-0.0010***	-0.0004	0.0004**	-0.0040***	0.0017***
MARRIED	0.0005***	0.0021***	0.0029***	0.003***	0.0036***	0.0002	0.0038***	0.0021***	0.0022***	0.0004	0.0018***	0.0031***	0.0019***
AGE	-0.0059***	0.0121***	0.0340***	0.037***	0.0284***	-0.0027***	0.0279***	0.0228***	0.0315***	-0.0002	0.0163***	0.0194***	0.0233***
POVERTY	0.0037***	0.0065***	0.0006	0.006***	0.0054***	0.0026***	0.0036***	0.0041***	0.0070***	0.0057***	0.0024***	0.0071***	0.0037***
INCOME	-0.0237***	-0.0272***	-0.0087***	-0.023***	-0.0203***	-0.0102***	-0.0179***	-0.0062***	-0.0257***	-0.0478***	-0.0028***	-0.0370***	-0.0135***
LOW-EDU	0.0087***	0.0116***	-0.0004	0.009***	0.0093***	0.0050***	0.0047***	0.0029***	0.0112***	0.0164***	0.0018***	0.0127***	0.0059***
UNINSURED	0.0025***	0.0027***	-0.0022***	0.001	0.0015*	0.0004	0.0007	0.0004	0.0008	0.0036***	0.0005	0.0027***	-0.0006
COMMUTE	0.0008***	0.0002	-0.0011***	-0.002***	-0.0002	0.0003*	-0.0004	-0.0007*	-0.0011***	0.0002	-0.0005**	-0.0005**	-0.0008***
VACANCY_6MPLUS	0.0034**	0.0136***	0.0171***	0.032***	0.0197***	0.0027***	0.0160***	0.0149***	0.0284***	0.0189***	0.0107***	0.0197***	0.0163***
<i>Level 2: metropolitan area</i>													
POP_CH	-0.0165***	-0.0241***	-0.0241**	-0.035***	-0.0268**	-0.0159***	-0.0360***	-0.0208**	-0.0313***	-0.0218*	-0.0188***	-0.0218**	-0.0145*
UNEMP_CH	0.0021	0.0043	0.0063	0.013	0.0076	0.0001	0.0123**	0.0020	0.0116*	0.0075	0.0045	0.0050	-0.0029
HCOST	0.0001	-0.0033	-0.0067*	-0.012**	-0.0108**	-0.0007	-0.0132***	-0.0084**	-0.0106**	-0.0092**	-0.0075***	-0.0065*	-0.0041
TCOST	0.0316***	0.0174	-0.0225	-0.021	-0.0226	0.0184**	-0.0106	-0.0065	-0.0179	0.0234	-0.0210**	0.0023	-0.0033
Random Effects													
Level 1	0.0054***	0.0107***	0.0281***	0.0378***	0.0207***	0.0025***	0.0202***	0.0127***	0.0320***	0.0191***	0.0062***	0.0234***	0.0146***
Level 2	0.0066***	0.0065**	0.0217***	0.0301**	0.0223**	0.0042***	0.0096**	0.0169**	0.0173**	0.0313***	0.0069**	0.0154**	0.0163**
Model fit													
AIC	-17,652	-12,456	-5,213	-2,958	-7,453	-23,442	-7,687	-11,160	-4,233	-8,063	-16,573	-6,558	-10,150
BIC	-17,632	-12,435	-5,192	-2,938	-7,432	-23,422	-7,667	-11,140	-4,213	-8,043	-16,553	-6,538	-10,129
Number of observations													
Level 1:	7,552	7,552	7,552	7,552	7,552	7,552	7,552	7,552	7,552	7,552	7,552	7,552	7,552
census tract	15	15	15	15	15	15	15	15	15	15	15	15	15
metropolitan area	15	15	15	15	15	15	15	15	15	15	15	15	15

AIC = Akaike information criterion. BIC = Bayesian information criterion. HLM = hierarchical linear modeling.

* p < 0.1. ** p < 0.05. *** p < 0.01.

Notes: Long-term vacant is housing that is vacant for more than 6 months. All dependent variables are in natural log form.

Exhibit B-2

HLM for Long-Term Vacant Housing and Health in 295 Cities in Top 50 U.S. Metropolitan Areas, Hard-Hit Metropolitan Areas

Variables	MHLTH	PHLTH	CANCER	CHD	DIABETES	CASTHMA	ARTHRITIS	BPHIGH	STROKE	TEETH-LOST	HIGHCHOL	COPD	KIDNEY
Fixed effects													
<i>Level 1: census tract</i>													
(Intercept)	2.5717***	1.3496	0.3193	0.3078	0.8605	1.8702***	2.0309*	2.0676***	-0.9168	2.8613***	3.2004***	1.2358	0.3986
BLACK	0.0016***	0.0026***	-0.0019**	0.0012	0.0076***	0.0024***	0.0016**	0.0048***	0.0066***	0.0045***	0.0002	0.0009	0.0038***
ASIAN	-0.0031***	-0.0046***	-0.0079***	-0.0090***	-0.0023	-0.0030***	-0.0065***	-0.0033***	-0.0072***	-0.0040***	-0.0021***	-0.0085***	-0.0047***
HISPANIC	-0.0014***	0.0000	-0.0031***	-0.0013***	0.0038***	-0.0017***	-0.0019***	0.0000	-0.0012***	-0.0010*	-0.0001	-0.0047***	0.0016***
MARRIED	0.0001	0.0014***	0.0017***	0.0017**	0.0021***	-0.0001	0.0023***	0.0010**	0.0011*	0.0001	0.0011***	0.0019***	0.0011***
AGE	-0.0069***	0.0105***	0.0291***	0.0328***	0.0248***	-0.0027***	0.0240***	0.0205**	0.0278***	0.0005	0.0138***	0.0169***	0.0213***
POVERTY	0.0038***	0.0064***	0.0002	0.0054***	0.0051***	0.0027***	0.0035***	0.0040***	0.0063***	0.0052***	0.0024***	0.0070***	0.0031***
INCOME	-0.0199***	-0.0256***	-0.0058**	-0.0191***	-0.0164***	-0.0084***	-0.0132***	-0.0029*	-0.0242***	-0.0487***	0.0002	-0.0334***	-0.0123***
LOW-EDU	0.0081***	0.0111***	0.0003	0.0094***	0.0084***	0.0046***	0.0050***	0.0032***	0.0114***	0.0167***	0.0020***	0.0122***	0.0064***
UNINSURED	0.0033***	0.0029***	-0.0034***	-0.0007	0.0007	0.0005**	-0.0003	-0.0004	-0.0007	0.0048***	-0.0001	0.0022***	-0.0017**
COMMUTE	0.0005**	0.0005	0.0000	-0.0003	0.0007	0.0002	0.0007*	0.0001	-0.0003	-0.0005	0.0003	0.0003	0.0000
VACANCY_6MPLUS	0.0050***	0.0109***	0.0163***	0.0225***	0.0147***	0.0027***	0.0141***	0.0117***	0.0213***	0.0139***	0.0074***	0.0169***	0.0127***
<i>Level 2: metropolitan area</i>													
POP_CH	-0.0103	-0.0143	-0.0274	-0.0311	-0.0229	0.0030	-0.0193	-0.0298***	-0.0195	0.0170	-0.0151	-0.0122	-0.0035
UNEMP_CH	0.0113***	0.0174***	0.0171***	0.0207**	0.0162***	0.0031	0.0187***	0.0134***	0.0163**	0.0082*	0.0098**	0.0224***	0.0149***
HCOST	-0.0026	-0.0063*	-0.0055	-0.0092*	-0.0068*	-0.0003	-0.0083**	-0.0063***	-0.0057	-0.0089**	-0.0047*	-0.0095*	-0.0094***
TCOST	0.0008	0.0119	0.0125	0.0112	0.0073	0.0048	0.0076	0.0156*	0.0165	-0.0004	0.0009	0.0027	0.0018
Random Effects													
Level 1	0.0055***	0.0105***	0.0318***	0.0404***	0.0218***	0.0018***	0.0214***	0.0132***	0.0334***	0.0169***	0.0065***	0.0220***	0.0150***
Level 2	0.0043**	0.0206**	0.0128*	0.0423*	0.0170**	0.0047**	0.0197**	0.0039	0.0304*	0.0150**	0.0115**	0.0339**	0.0083**
Model fit													
AIC	-9,202	-6,572	-2,179	-1,204	-3,648	-13,580	-3,709	-5,705	-1,968	-4,682	-8,480	-3,612	-5,165
BIC	-9,187	-6,558	-2,165	-1,191	-3,634	-13,566	-3,695	-5,691	-1,954	-4,669	-8,466	-3,599	-5,151
Number of observations													
Level 1:	4,017	4,017	4,017	4,017	4,017	4,017	4,017	4,017	4,017	4,017	4,017	4,017	4,017
Level 2:	12	12	12	12	12	12	12	12	12	12	12	12	12
metropolitan area													

AIC = Akaike information criterion, BIC = Bayesian information criterion, HLM = hierarchical linear modeling.

* p < 0.1, ** p < 0.05, *** p < 0.01.

Notes: Long-term vacant is housing that is vacant for more than 6 months. All dependent variables are in natural log form.

Exhibit B-3

HLM for Long-Term Vacant Housing and Health in 295 Cities in Top 50 U.S. Metropolitan Areas, Weak-Growth Metropolitan Areas

Variables	MHLTH	PHLTH	CANCER	CHD	DIABETES	CASTHMA	ARTHRITIS	BPHIGH	STROKE	TEETH-LOST	HIGHCHOL	COPD	KIDNEY
Fixed effects													
<i>Level 1: census tract</i>													
(Intercept)	2.4380***	2.4662***	0.0210	0.3059	1.1275	2.2641**	1.2970	2.0924**	-0.0363	1.8408*	3.0563***	-0.2949	-0.8639
BLACK	0.0012***	0.0026***	-0.0010***	0.0016***	0.0077**	0.0024***	0.0022***	0.0049***	0.0067***	0.0040***	0.0003***	0.0009***	0.0046***
ASIAN	-0.0039***	-0.0046***	-0.0071***	-0.0063***	-0.0012	-0.0029***	-0.0066***	-0.0017***	-0.0035***	-0.0022**	-0.0017***	-0.0078***	-0.0028***
HISPANIC	-0.0013***	0.0002	-0.0035***	-0.0018***	0.0031***	-0.0017***	-0.0017***	0.0002	-0.0014***	-0.0011**	0.0000	-0.0043***	0.0015***
MARRIED	0.0002	0.0017***	0.0036***	0.0029***	0.0028***	-0.0001	0.0037***	0.0019***	0.0016***	-0.0001	0.0017***	0.0028***	0.0015***
AGE	-0.0053***	0.0103***	0.0274***	0.0297***	0.0234***	-0.0026***	0.0219***	0.0181***	0.0262***	0.0002	0.0127***	0.0156***	0.0200***
POVERTY	0.0034***	0.0059***	0.0009**	0.0052***	0.0050***	0.0024***	0.0035***	0.0036***	0.0064***	0.0043***	0.0023***	0.0066***	0.0033***
INCOME	-0.0250***	-0.0309***	0.0084***	-0.0230***	-0.0213***	-0.0092***	-0.0169***	-0.0066***	-0.0271***	-0.0500***	-0.0033***	-0.0388***	-0.0134***
LOW-EDU	0.0090***	0.0115***	0.0013***	0.0103***	0.0088**	0.0053***	0.0056***	0.0030***	0.0117***	0.0161***	0.0023***	0.0137***	0.0067***
UNINSURED	0.0025***	0.0017***	-0.0034***	-0.0019**	0.0000	0.0003	-0.0011	-0.0005	-0.0013*	0.0029***	-0.0006	0.0010	-0.0021***
COMMUTE	0.0006**	0.0006*	0.0004	0.0002	0.0002	0.0000	0.0006	-0.0004	-0.0001	-0.0004	0.0003	0.0004	-0.0001
VACANCY_6MPLUS	0.0053**	0.0082***	0.0039	0.0127**	0.0110**	0.0031***	0.0088***	0.0082***	0.0138***	0.0093**	0.0059***	0.0098***	0.0078***
<i>Level 2: metropolitan area</i>													
POP_CH	-0.0061	-0.0189**	-0.0407**	-0.0528***	-0.0377**	0.0050	-0.0400**	-0.0357***	-0.0422***	0.0041	-0.0225**	-0.0370**	-0.0353***
UNEMP_CH	-0.0009	-0.0002	0.0018	-0.0005	-0.0016	-0.0035	-0.0032	-0.0001	0.0025	-0.0086*	0.0008	-0.0044	-0.0009
HCOST	0.0015	-0.0040	-0.0019	-0.0051	-0.0053	0.0031	-0.0025	-0.0033	-0.0049	0.0025	-0.0031	0.0027	0.0002
TCOST	0.0021	-0.0013	0.0193	0.0177	0.0117	-0.0029	0.0264	0.0177	0.0093	0.0145	0.0060	0.0275	0.0193
Random Effects													
Level 1:	0.0057***	0.0107***	0.0240***	0.0320***	0.0190***	0.0021***	0.0167***	0.0110***	0.0285***	0.0186***	0.0059***	0.0206***	0.0127***
Level 2:	0.0048***	0.0061**	0.0236**	0.0129**	0.0217***	0.0109***	0.0217***	0.0124***	0.0120***	0.0146***	0.0107***	0.0176**	0.0115**
Model fit													
AIC	-16,759	-12,070	-6,138	-4,064	-7,821	-24,246	-8,801	-11,915	-4,948	-8,014	-16,438	-7,274	-10,808
BIC	-16,729	-12,038	-6,107	-4,032	-7,789	-24,215	-8,771	-11,883	-4,917	-7,984	-16,407	-7,242	-10,776
Number of observations:	7,405	7,405	7,405	7,405	7,405	7,405	7,405	7,405	7,405	7,405	7,405	7,405	7,405
Level 1:	7,405	7,405	7,405	7,405	7,405	7,405	7,405	7,405	7,405	7,405	7,405	7,405	7,405
Level 2:	22	22	22	22	22	22	22	22	22	22	22	22	22
metropolitan area													

AIC = Akaike information criterion, BIC = Bayesian information criterion, HLM = hierarchical linear modeling.

* p < 0.1, ** p < 0.05, *** p < 0.01.

Notes: Long-term vacant is housing that is vacant for more than 6 months. All dependent variables are in natural log form.

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Employment and Earnings Trajectories During Two Decades Among Adults in New York City Homeless Shelters

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Introduction

Few portrayals exist of homeless persons as wage earners. Instead, common images of this population manifest stereotypes of “drunk, stoned, crazy and sick” single adults (Snow, Anderson, and Koegel, 1994: 461; Wright, 1989) and of families headed by single parents beset by trauma and lacking human capital (Bassuk, 2007; ICPH, 2013; Rog and Buckner, 2008). Behind these negative portrayals lie more fundamental questions related to the relevance of work in a setting of extreme poverty.

In this study, we take up questions related to the role of employment and earnings in entries into and exits from homelessness, events related to broader dynamics of homelessness. The preponderance of research on homelessness remains focused on associations between individual characteristics and outcomes related to becoming or remaining homeless, although such associations are overstated (Draine et al., 2002) and facilitate the stigma that accompanies homelessness (Phelan et al., 1997). Employment, insofar as it has a bearing on homelessness, is more ephemeral than are the relatively static individual traits. Specifically, the vagaries of losing and gaining employment can lead to becoming homeless and, alternately, offer a means of exiting homelessness.

Such employment dynamics are consistent with a stochastic model of homelessness. A precipitating shock, reflecting a sudden and transitory change in circumstances, is prerequisite to becoming

homeless, and the magnitude of the shock needed to induce homelessness is inversely proportional to the degree of vulnerability an individual or family has to homelessness due to household (individual or family) social and economic factors (Goodman, Messeri, and O’Flaherty, 2016; O’Flaherty, 2012, 2009). In other words, adverse life events are instrumental for pushing a household into homelessness (Curtis et al., 2013). Job and earnings loss, as a commonly occurring economic shock (Couch, Daly, and Gardiner, 2011), is the event most often associated with falling into poverty, while regained work and earnings is the most frequent event that again lifts a household out of poverty (Bane and Ellwood, 1986; Cellini, McKernan, and Ratcliffe, 2008; Morduch and Siwicky, 2017). In a similar fashion, we investigate whether change in job status and earnings act as a catalyst for both subsequent homelessness (in the wake of a job-related shock) and for exits from homelessness (following regained work and earnings) in a large population of sheltered adults.

Research on employment and earnings among the homeless population has not attracted attention commensurate to the value that popular and policy discourse gives it (Long, Rio, and Rosen, 2007). One reason for this imbalance is that researchers have had much more difficulty accessing administrative records related to employment than records related to health and disability. Both types of data are considered highly sensitive and have considerable privacy safeguards. However, researchers examining the nature and extent of disability among the homeless routinely access health records, which are appropriately protected by confidentiality restrictions that include provisions of the 1996 Health Insurance Portability and Accessibility Act, or HIPAA (HHS, 2003). Meanwhile, administrative records on employment and income, from such sources as state employment agencies, the Internal Revenue Service, and the Social Security Administration (SSA), have been largely closed to researchers.

In this study, we provide one of the most expansive and systematic views to date of the role of employment and earnings in a large, sheltered homeless population consisting of both individual and family households. Using matched and aggregated administrative data from SSA and the New York City (NYC) Department of Homeless Services (DHS), we juxtapose aggregated earnings and shelter-use data for 160,525 sheltered adults during two decades of followup. If employment represents a shock of sufficient magnitude to precipitate homelessness, then these data should show associations between declines in employment and earnings and onset of shelter use. Furthermore, a correspondence between exits from homelessness and increases in employment levels and earnings would further underscore the ties between employment and homelessness.

We frame this investigation on three research questions. First, and basically, what is the extent of employment and earnings in a homeless population, before, during and after shelter use? Second, are changes in employment and earnings related to entering and exiting shelter? Finally, how do these dynamics between employment and homelessness differ among adults who are homeless as part of family households and those who are homeless as individuals?

Homelessness and Employment—A Review

How prevalent is employment among people who are homeless? Rossi’s (1989) monograph, based on results from Rossi, Fisher, and Willis (1986), provided the first comprehensive look at this question. Rossi portrayed homelessness as “the most aggravated state of a more prevalent problem,

extreme poverty” (Rossi, 1989: 8), with median monthly income for the average Chicago homeless person less than \$168 (\$378 in 2017 dollars). Thirty-two percent of the survey respondents reported receiving earnings in the month prior to being interviewed. Based on overall income levels, Rossi posited that this employment was typically low paying, intermittent, unsteady, and unskilled.

Findings on earnings and labor force participation from subsequent major surveys of homeless populations have been consistent with Rossi’s conclusions (Burt and Cohen, 1989; Zuvekas and Hill, 2000). In the most recent major survey of the national homeless population that assessed income and earnings, the National Survey of Homeless Assistance Providers and Clients undertaken by the U.S. Census Bureau, 44 percent of respondents reported income from work in the 30 days prior to taking the survey. For about one-half of these respondents, these earnings came from temporary positions, day labor, or informal jobs (Burt, 2001; Burt et al., 1999).

This 44 percent employment figure provides the benchmark for our first research question related to the prevalence of employment among the homeless population. This finding, simplified to the assertion that 44 percent of homeless people work, has become the most widely disseminated statistic about homelessness and employment (Jacobson, 2013; Shaheen and Rio, 2007; SAMHSA, 2013). Although this estimate lacks precision and now is dated, it does retain a symbolic balance in which, despite high unemployment rates among the homeless population, homeless persons nonetheless work more than is commonly assumed (Hartwell, 2000). Furthermore, having a substantial proportion of the homeless population in receipt of earnings underscores how the low wages and the sporadic, temporary, and irregular nature of their employment translates into insufficient income for exiting homelessness (Bartley and Roberts, 2006; Bogard et al., 2001; Shier, Jones, and Graham, 2012; Theodore, 2003). In this article, we empirically reassess this figure with a more updated homeless population.

Our second question, whether changes in employment and earnings are related to entering and exiting shelter, has a scant literature. Homeless persons, when asked the reasons for becoming homeless, will frequently invoke job loss as a precipitating event (Burt, 2001; Levin, McKean, and Raphael, 2004; Metraux et al., 2017). Furthermore, being homeless creates substantially increased barriers to locating and maintaining regular wage labor. These barriers include the stigma associated with being homeless, lack of dependable access to secure storage for one’s belongings, difficulty maintaining personal hygiene, and reconciling work hours with shelter schedules. These difficulties, in addition to other impediments to employment that homeless persons frequently have, contribute to a trajectory of attenuated attachment to the work force and a process in which informal work (for example, recycling, panhandling, illicit activities, childcare) progressively replaces wage labor as an income source (Gowan, 2010; Liebow, 1993; Snow and Anderson, 1993).

Three studies assessed employment and job loss insofar as they affected homelessness. Two studies followed adults in at-risk families in NYC—one (Smith et al., 2005) found that employment did not act as a protective factor for homelessness, but losing employment increased the risk of entering shelter; the other (Shinn et al., 2013) found that having employment was associated with families avoiding a shelter entry. In the third, Swami (2017), in an exception to this tendency, uses Journeys Home, an Australian study panel dataset of households who were homeless or at risk for

homelessness, to examine how homelessness affects employment transitions. This study finds a negative association between homelessness and employment entry but finds that individual traits, instead of homelessness, explain most of this association.

The third question takes into account that key differences exist in the circumstances around employment and wage income, and in responses to job-related shocks, between those who are homeless as individuals (that is, single adults) compared with adults who are homeless as part of families with children. Among the single adult homeless, the overall aging of this group has progressively eroded their workforce attachment since the 1980s (Culhane et al., 2013a, 2013b). Furthermore, high rates of mental disorder, substance abuse, and criminal history hampers steady employment (Shaheen and Rio, 2007; Zlotnick, Robertson, and Tam, 2002; Zuvekas and Hill, 2000). The homeless who stand to be most detached from the workforce are the roughly 20 percent who are deemed chronically homeless, who have been homeless for an extended period of time, and who have a disabling condition (Caton et al., 2005; Caton, Wilkins, and Anderson, 2008). Persons in this subgroup require extensive support for securing and maintaining stable employment but are typically difficult to engage in standard employment support programs (Shaheen and Rio, 2007).

A different set of dynamics prevails among adults who are homeless with families. Adults in families are predominantly in their twenties and female, single-parent providers for one or more preschool-age children (Rog, Holupka, and Patton, 2007; HUD, 2012). Adults in homeless families have lower rates of employment than their single adult counterparts (Burt et al., 1999, Zlotnick, Robertson, and Tam, 2002). However, three independent studies of sheltered families in NYC found that substantial proportions of adults in sheltered families have ties to the work force. A Vera Institute of Justice study found that 79 percent of a sample of sheltered families contained adults who had worked in the 5-year period before they entered shelter, with 69 percent becoming unemployed during the 5-year period before they entered shelter (Smith et al., 2005). Shinn and colleagues (2013) found that 44 percent of families entering shelter after applying for prevention services were working prior to shelter admission. Finally, a survey by the Institute for Children, Poverty, and Homelessness finds that 31 percent of adults in homeless families in NYC shelters were working either part or full time, and another 57 percent of this group was unemployed with previous work history (ICPH, 2013).

The ICPH report also found substantial barriers to employment among these families that included childcare needs, lack of education and work history, and mental health issues related to depression and experiences of trauma. These findings on high unemployment levels and substantial barriers to work among homeless heads of families are consistent with previous research (Brooks and Buckner, 1996; Rog and Buckner, 2008). Two studies compare employment dynamics among sheltered and housed heads of families. Shinn et al. (1998) found that among adults in families receiving Temporary Assistance for Needy Families, or TANF, a lower prevalence of work history occurs for those who were in shelters (38 percent) compared with their housed counterparts (49 percent). Lehmann et al. (2007) found that adults in newly homeless families, again compared with housed counterparts, were more likely to have stopped working in the year prior to interviewing for the study (47 and 11 percent respectively).

In a manner similar to single adult homeless, a minority of homeless families remains homeless for an extended period. However, the chronic single adult homeless also had high rates of disabilities and appear to be less employable, whereas homeless families with long stays are no more likely than other homeless families to be unemployed and may exhibit a resilience that facilitates the ability to endure the long wait that usually precedes obtaining subsidized housing (Culhane et al., 2007; Weinreb, Rog, and Henderson, 2010). For many of these long-term homeless families, the extended period that they spend in shelter occurs in transitional housing arrangements, which often provide structured vocational programming. As such, extended stays provide support for developing vocational skills and locating employment, with the ultimate goal of regained housing self-sufficiency (ICPH, 2013).

Given substantial demographic and contextual differences between homeless adults in individual and family households, we assess them separately and expect to find different work trajectories in each subpopulation. Research on job-related shocks found that in general low-income households are able to recover more quickly from earnings shocks than higher-income households (Guvenen et al., 2015), although they are also more susceptible to lasting economic “scarring” effects if the earnings shock extends into long-term unemployment (Guvenen et al., 2017). Additionally, the magnitude of this recovery varies by age, with workers in their early years much better positioned to recover economically from an earnings shock than their older counterparts (Karahan and Ozkan, 2013). Given younger age and childcare obligations, we expect relatively low workforce participation among the family adult subpopulation prior to their homelessness, but they will be better positioned to make long-term vocational recoveries. In contrast, among the individual adult subpopulation, older age and disability will make vocational recovery more difficult following homelessness.

The results of prior research collectively provide some guideposts to the present study, in which we examine work and earnings for a large group of sheltered adults during an extended period that includes the times before, during, and after homelessness. On a basic level, the previous benchmark of 44 percent employment provides a comparison with the prevalence of employment in this study group, and we add data on earnings to supplement the information provided by employment rates. Although we expect this study to find a temporal association between job loss and onset of homelessness that is consistent with findings from previous studies, the extent to which homeless households recover from the shock of job and earnings loss is, as far as we can tell, an unanswered question. If the dynamics of this recovery process among homeless households are consistent with dynamics among households more generally, then the recovery trajectories for adults in families should differ from single adults.

Additionally, the presence of two factors particular to homelessness—extended shelter stays and exits to stable housing—should also be associated with differential degrees of recovery from employment and earnings shocks. First, the difficulty in maintaining employment while homeless will have longer-term effects for those with extended shelter stays and will correspond with diminished ties between work and shelter exit. Conversely, exits from homelessness to stable housing will be associated with more positive outcomes, as employment will facilitate establishing stable housing, and vice versa. Although these two expected outcomes follow from the known with respect to the relationship between homelessness and employment, we do not have data that are capable of establishing a directional association between changes in employment and movement in and out of

homelessness, and either one can conceivably lay the groundwork for the other. Given the paucity of findings on this topic, however, confirming that a relationship exists and providing insight into the nature of these relationships should advance the current understanding of the manner in which employment and homelessness interact.

Methods

The research is a retrospective observational study based on matching two large administrative datasets to assess shelter use and employment during the course of more than 2 decades for 160,525 sheltered adults in New York City.

Sample and Data

Data used in this study were administrative records from two sources—DHS records on shelter use and earnings records from SSA. DHS operates or funds separate shelter networks for unaccompanied (that is, single) adults and families. Combined, these two shelter networks include approximately 85 percent of all general homeless shelter beds in NYC. DHS collected demographic and shelter-use information from these shelters in two administrative databases (one covering family shelters and the other covering single adult shelters) since the late 1980s.

DHS sent records for 175,524 persons, the universe of records for persons who had initial stays in DHS shelters (either family or single adult) between 1990 and 2002, to SSA, where they were matched with earnings records for the 10 years prior to and up to 10 years following onset of DHS shelter use. SSA provided these earnings records through the time period of 1980 through 2007, so a full 10 years of earnings was not available for all persons. SSA maintains comprehensive records of individual earnings for all individuals who receive wages that are subject to payroll tax deductions and who are, thereby, accruing eligibility for future SSA retirement benefits. Identifiers from DHS records (name, social security number, date of birth, and sex) were first verified through SSA records, using probabilistic and deterministic matching methods, and then matched with individual SSA records. Due to strict confidentiality policies surrounding individual SSA records, SSA personnel performed the data match.

The resulting dataset, which was aggregated and deidentified, became the basis for this study. SSA was able to unduplicate and validate 160,525 (91 percent) of these records.¹ These records were then aggregated so that the matched records were grouped in a deidentified, aggregated (frequency table) format, consisting of finely grained cells containing all available combinations of nine criteria. The nine criteria that formed the basis for subdividing the aggregated earnings information (annual earnings, number of persons receiving SSA wage income) into smaller cells included—

- **Year of earnings.** Divided into each of the 28 years for which earnings were examined for this study (1980–2007).
- **Shelter status.** Two categories, whether or not a person had a record of shelter use in each given year.

¹ See Metraux et al. (2011) for more details.

- **Year of first shelter use.** Divided into 13 cohorts, based on year of first recorded shelter use, 1990–2002.
- **Shelter type.** Two categories, based on whether the adult in question stayed in shelters primarily as an individual (that is, single adult) or as part of a family.
- **Pattern of shelter use.** Every adult was assigned one of three categories according to their pattern of shelter use in the 2-year period following their initial entry into shelter. These patterns of shelter use were assigned through cluster analysis methods and were based on configurations of total discrete stays and total days spent in shelter. The “transitional” designation signifies a pattern of a small number of days (typically less than 90) spent in shelter during a small number of stays (typically one or two). “Episodic” and “long-term” shelter use designations typically involved substantially longer stays consumed during the course of either few stays (chronic) or numerous stays (episodic). Detailed information on this cluster typology is available for singles (Kuhn and Culhane, 1998) and families (Culhane et al., 2007).
- **Exit from shelter.** Two types of housing associated with last shelter exit, permanent or non-permanent (A small number of persons did not have exit outcomes, because they did not exit by the end of the study period.). This information was abstracted from numerous disposition categories noted on the person’s latest shelter record. Any records not indicating an exit to permanent-housing placement we considered as nonpermanent exits.
- **Age.** Calculated at point of initial homelessness and grouped into eight categories. The first group included those ages 18 to 25; we classified persons ages 25 to 55 into six groups by 5-year increments; and the final category included persons older than 55. Also, we included a category for missing age.
- **Race or ethnicity.** Five categories—White, Black, Hispanic, other, and unknown.
- **Sex.** Three categories—male, female, and unknown.

Due to confidentiality safeguards, data on earnings (and thus, employment) were only provided if the number of persons in a particular cell who received any earnings was five or more, thus cells with fewer than five persons remained empty in the dataset generated for this study. Each of the cells contained data on total income amount (sum for all cases in the cell), the standard deviation of the mean income per person, the number of individuals earning income, and the total number of individuals in the cell. Earnings for all years were indexed for inflation to 2008 U.S. dollars (U.S. Bureau of Labor Statistics, 2012). From these data, this study uses three earnings-related outcomes—employment rate (number of income earners divided by the total number of individuals in the cell), annual average income for income earners only (total income for the cell divided by the number of income earners in the cell), and annual average income for the cell (total income for the cell divided by number of individuals in the cell). For illustrative purposes, data from several sample aggregated cells are presented in appendix exhibit A-1.

The aggregated dataset returned from SSA consisted of 67,409 different cells representing 3,049,708 persons-years of observation. However, we removed cells from the data for the following reasons: (1) Data went beyond 10 years before or after the first year of homelessness (4,477 cells);

(2) Fewer than five people had earnings (10,324 cells); (3) Average earnings were improbably high (annual income exceeding, on average, \$70,000 for earners only or \$40,000 for all cases, as these 17 cells were likely data anomalies). As a result, the final dataset consisted of 52,591 data cells representing 2,859,576 person years—1,098,258 (38 percent) from adults in families and 1,761,318 (62 percent) from single adults. Although the discarded 10,324 underpopulated cells represented 15 percent of the total cells, they contained only 6 percent of the total person years.

Aggregating these data limits possible analyses; our strategy to mitigate this limitation was to create aggregate cells that were specific as possible, given the available data. Using the nine criteria to create these granular cells led to 1,822,500 possible aggregate cell combinations (multiplying all combinations of the nine categories and taking into account time constraints), and the available 52,591 cells represented 3 percent of the possible cells. Appendix exhibit A-2 provides a further breakdown of this cell distribution. Many cells were unpopulated, for which no data were returned. As an example of this difference between limited population of possible cells, in the criterion “sex,” the possible cell combinations in the unknown category overwhelm the small number of unknown values. Furthermore, men in the family shelter data and women in the single shelter data are relatively sparse, leading to more unpopulated cells.

Because of the omission of some of the data cells, the number of persons represented in the data varied from year to year. “Year 0,” the year in which persons experienced their first shelter episode, contained data from 152,323 people—63,289 (42 percent) adults in families and 89,034 (58 percent) single adults.

Statistical Analysis

We conducted all analyses separately for adults who sought shelter as part of a family (that is, adults with families) and for adults who were homeless as individuals (that is, single adults). We first analyzed data descriptively, creating summaries of demographic, homelessness, and economic variables.

The three earnings outcomes (employment, overall earnings, earnings among wage earners) were then modeled longitudinally as dependent variables using weighted linear mixed-effects regression models. We modeled employment as the percent of individuals employed during a given year for each aggregated group in our sample. Earnings data were modeled as mean U.S. dollars during a given year per aggregated group. The multivariate analyses used logarithmic transformations of the earnings data. Performing this transformation helped to normalize the distribution of earnings. A preliminary visual inspection of the economic outcomes over time indicated a sharp change in trend for each of the dependent variables at the point of first occurrence of homelessness for nearly all subpopulations (decreasing trend rapidly changed into an increasing trend). Therefore, a piecewise (that is, segmented or spline) statistical modeling strategy was employed whereby two slopes or segments for time were specified (that is, a single knot at the time of the initial incidence of homelessness) (Draper and Smith, 1998). The change was so sharp that a global quadratic effect for time would not accurately model the observed effect. The first segment contained data for the 10-year period preceding the first recorded shelter stay, and the second segment spanned the

10-year period following this onset of first shelter use. The visual inspection also suggested a high degree of nonlinearity in the observed economic outcomes over time. Given the expected nonlinearity, we tested polynomial (or power) transformations for segments one and two in our models to improve fit (quadratic and cubic).

We selected mixed-effects models, because three levels of analysis (or clusters) were possible due to the aggregated and nested nature of the data: (1) Up to 20 repeated measurements over time of economic outcomes nested within aggregated groups (falling between 1980 and 2007); (2) Based on demographic and homelessness characteristics, 954 aggregated groups nested within year of first shelter-use cohorts; (3) Thirteen years of first shelter-use cohorts (years 1990–2002). Mixed-effects models allow for such clustering and correctly estimate the standard errors of model parameters, thus relaxing assumptions of independence of observations. In these models, allowing slopes for time (and their polynomial transformations) and intercepts to vary randomly at the aggregated group and cohort-levels can account for such clustering. The mixed-effects regression models included the following independent variables from the available data as fixed effects—sex, race or ethnicity, age group (treated as an ordinal variable), shelter status, exit housing type, and shelter-use pattern. Additionally, interactions between sex and time segments were included in all mixed-effects models to capture potential differences between men and women in all outcomes over time. Therefore, the mixed-effects models had the following form (random effects in italics)—

% employed or $\ln(\text{earnings}) \sim$ [level 1: repeated measures over time: *year before 1st shelter use* + (*year before 1st shelter use*)² + *year after 1st shelter use* + (*year after 1st shelter use*)²] + shelter status + pattern of shelter use + exit housing type + age + race/ethnicity + sex + sex* [each of the following: *year before 1st shelter use* + (*year before 1st shelter use*)² + *year after 1st shelter use* + (*year after 1st shelter use*)²] + [level 2: *demographic and homelessness cluster id*] + [level 3: *year of 1st shelter use cohort*]. (1)

To model the obtained frequency table data, all analyses were weighted by cell frequency (Venables and Ripley, 2002). We conducted all analyses using the R environment for statistical computing (R Development Core Team, 2016), with the *lme4* package for mixed-effects models (Bates, Maechler, and Bolker, 2010) and the *lattice* package for trellis graphics (Sarkar, 2008).

These regression models will be limited in their interpretability due to uncertainties in temporal sequencing among the covariates of interest. Specifically, precise times for such events as commencement of employment, shelter exits, and housing acquisition are unknown, and the associations in many of these relationships are potentially bidirectional. For example, exiting a shelter to housing can facilitate gaining employment as readily as gaining employment could facilitate a shelter exit. Such simultaneity bias precludes making inferences beyond the existence of an association. As no previous research has been conducted on whether or not associations between the covariates of interest exist, we feel the value is in assessing these associations despite the substantial circumscriptions around interpretation.

Results

Exhibit 1 summarizes the demographic and shelter-use characteristics for the adults in the family and single adult groups. The majority of the sample was single adults (62 percent) who were overwhelmingly male (80 percent). In contrast, the adults who were homeless as part of families (38 percent) were nearly exclusively female (93 percent). The former group was also substantially older when compared with the adults in the family households. Among the racial and ethnic group categories, a majority of both household types were of Black (non-Hispanic) race. About three-fourths of the single adults had short-term transitional shelter-use patterns, although only about one-half of the adults in families had such shelter-use patterns. A majority (63 percent) of the adults in families exited shelter to stable living situations, although only 20 percent of single adults were recorded as doing so.

Exhibit 1

Demographic Characteristics for Adults With Initial Shelter Use in New York City Between 1990 and 2002, Stratified by Family and Single Household Types

	Family	Single
Persons	63,289	89,034
Sex (%)		
Female	93	20
Male	7	80
Age at time of first shelter stay (%)		
18–24	49	15
25–29	18	15
30–34	13	18
35–39	8	16
40–44	4	11
45–49	1	7
50 or more	0	7
Missing	7	11
Race or ethnicity (%)		
Black (non-Hispanic)	55	56
Hispanic (any race)	30	24
White (non-Hispanic)	1	13
Other or missing	14	7
Year of initial shelter entry (%)		
1990	10	11
1991–1993	26	26
1994–1996	22	23
1997–1999	16	21
2000–2002	25	18
Shelter-use pattern (%)		
Transitional	51	77
Episodic	2	11
Long term	47	12
Exit to a stable living situation (%)	63	20

Exhibit 2 presents employment rates and mean earnings for the time periods before, during, and after shelter use. Results are reported separately for adults in family and single households and are further stratified by homelessness type and housing type on shelter exit. The proportions in exhibit 2 for employment reflect the weighted average annual rate for those receiving SSA-recorded earnings. For example, the participation rate for the entire sample (not shown on table) prior to the first instance of shelter use was 49 percent. This percentage means that, in an average year prior to the onset of shelter use, nearly one-half of the entire sample had earnings. The earnings similarly reflect average annual SSA earnings amounts (in 2008 dollars) during the course of each of the three periods. To illustrate this observation, we can again consider the entire sample (results not shown on table), where the weighted average annual earnings in the period before shelter use was \$5,697, when both earners and nonearners are included, and \$11,612 per year when only earners were included.

Employment rates and earnings showed different trajectories among adults in families and single adults. For example, adults in families had an average annual employment rate of 43 percent prior to the onset of shelter use that fell to 38 percent during the years of shelter use and then increased to 58 percent in the postshelter years. Looking at the subgroups defined by shelter-use measures, the 2 percent of adults in families who showed episodic patterns of shelter use (from exhibit 1) had worse outcomes, and virtually no differences in employment appeared between temporary and long-term subgroups or among those exiting to permanent-housing arrangements and those with exits to other arrangements. Average annual earnings also increased substantially after shelter exit, both for the total group and for the working subgroup. Average annual earnings among workers dropped from \$8,483 (preshelter) to \$7,342 (shelter onset) and then rose to \$13,531 after shelter exit. Overall, this finding represents a net 60 percent increase during the total course of the study period, despite the presumed setback of shelter use. This combined increase in both employment and in the amount of earnings means that, for the overall group (including nonworkers), the average annual amount of earnings more than doubled from the preshelter to the postshelter period (from \$3,677 to \$7,783). However, even when only considering the 58 percent of adults in families who had earnings, the average annual earnings amount (\$13,531) still was less than the poverty guidelines for a family of two (\$14,000 in 2008).

For single adults, a more mixed trend emerged. An average overall employment rate of 52 percent in the years preceding initial shelter use dropped to 45 percent during years with shelter use and dropped further to 42 percent in the years following shelter use. This decline was not uniform, however. For instance, those with long-term shelter-use patterns and those exiting shelter to permanent-housing arrangements had rates that rebounded slightly after exiting shelter. Despite the overall decline in employment among sheltered single adults over time, overall annual average earnings rebounded after shelter exit. When looking at the average annual earnings for workers, the 38-percent decrease in earnings (from \$12,965 to \$8,029) associated with the onset of shelter use was followed by annual postshelter earnings that averaged \$15,291, amounting to an 18-percent increase in average annual earnings during the entire study period. Furthermore, 42 percent of single adults who were in the workforce during the postshelter period earned enough, on average, to exceed the poverty guideline for a one-person household (\$10,400 in 2008). Again, persons with long-term shelter stay patterns and persons exiting to permanent housing had higher

Exhibit 2

Average Annual Employment Rates and Earned Income Amounts for Adults With Records of Shelter Use in New York City Between 1990 and 2002, Stratified by Family and Single Household Types and Shelter Stay Characteristics

Time Period	Variable	Level	Adults in Families			Single Adults		
			Employment (%)	Earnings (Workers Only) (\$)	Earnings (All) (\$)	Employment (%)	Earnings (Workers Only) (\$)	Earnings (All) (\$)
Prior to initial shelter stay	Total		43	8,483	3,677	52	12,965	6,746
	Homeless type	Long term	43	9,207	3,925	56	16,327	9,104
		Episodic	45	4,291	1,915	56	11,647	6,565
During initial shelter stay	Exit type	Transitional	44	7,856	3,459	51	12,718	6,496
		Permanent	43	8,792	3,811	58	14,844	8,603
		Other	43	7,900	3,422	51	12,533	6,372
After exit from shelter	Total		38	7,342	2,767	45	8,029	3,585
	Homeless type	Long term	37	7,947	2,965	50	9,204	4,590
		Episodic	26	4,115	1,054	44	7,053	3,082
	Exit type	Transitional	39	6,711	2,606	44	8,063	3,555
		Permanent	37	7,423	2,729	54	8,686	4,709
		Other	40	7,178	2,850	43	7,893	3,401
	Total		58	13,531	7,783	42	15,291	6,487
	Homeless type	Long term	59	13,709	8,056	51	19,058	9,775
		Episodic	52	9,660	4,999	40	13,264	5,312
	Exit type	Transitional	57	13,466	7,630	42	15,152	6,376
		Permanent	59	13,840	8,114	55	17,505	9,590
		Other	56	12,965	7,209	40	14,750	5,931

average annual earnings when compared with the other subgroups. The annual earnings averages for all single adults dropped from \$6,746 to \$3,585 (a 47-percent decline) with the onset of shelter use and increased again to \$6,487 in the years following shelter use to roughly regain the lost earnings. This relative parity reflects the offsetting trends of declining participation rate and rebounding earnings amounts.

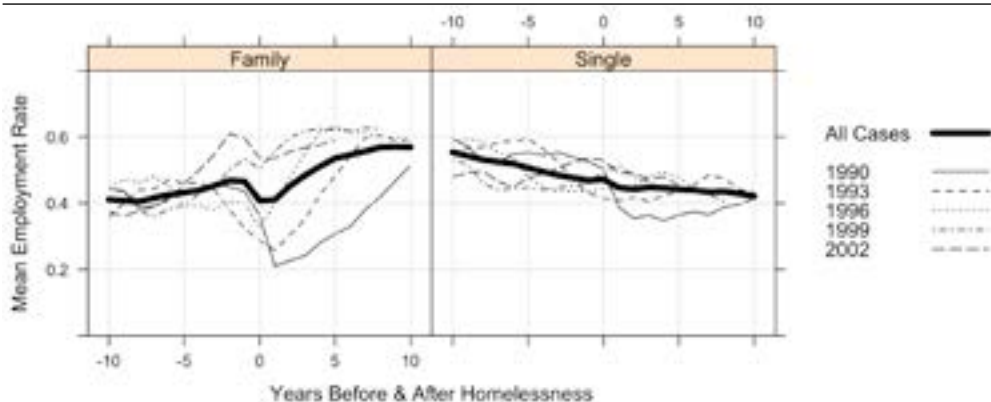
Exhibits 3 and 4 illustrate, by year and household type, the annual proportions of employment, and exhibits 5 and 6 illustrate average earnings amounts during a 2-decade period. For each of the two pairs of exhibits, exhibits 3 and 4 show results for the whole of the single adults and adults in families groups, and exhibits 5 and 6 compare each of these groups by sex. The exhibits provide a more temporal context for the overall annual trends for adults in families and single adults summarized in exhibit 2.

For adults in families, both employment and earnings dropped in conjunction with the onset of shelter use and subsequently recovered to levels higher than those preceding year 0 (exhibits 3 and 5). These trajectories differed among men and women heads of household. Employment (exhibit 4) among men recovered to about the rate prior to homelessness (roughly 60 percent). Women, who had a substantially lower participation rate in the preshelter period (40 to 45 percent), increased in the postshelter period to rates comparable with those of men (roughly 60 percent). For earnings (exhibit 6), male workers had, on average, more income than their female counterparts, but female workers made larger gains in earnings income from the preshelter to the postshelter time periods.

Among the single adults, although trends for the individual cohorts varied somewhat, the aggregated trend for employment showed a steady decline that did not appear affected by the onset of shelter use (exhibit 3). The decline was more pronounced over time for the men compared with women in the single adults group (exhibit 4). Looking at earnings (exhibit 5), workers realized a sharp drop in the years immediately preceding the onset of shelter use, and average annual earnings bottomed out in year 0 before regaining levels realized in the years preceding shelter use.

Exhibit 3

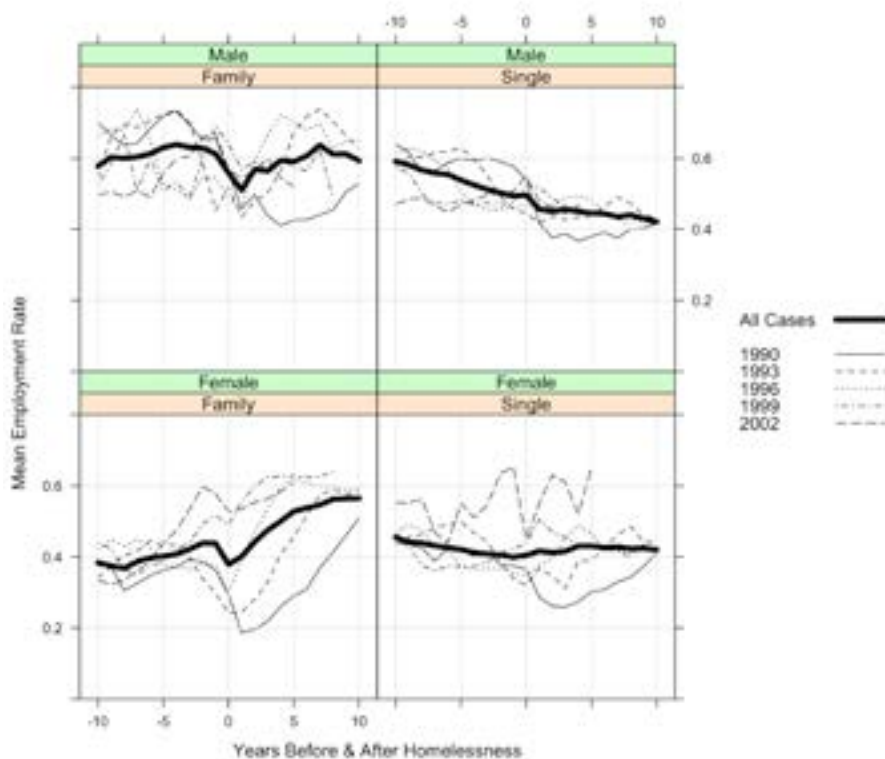
Employment Before and After First Instance of Homelessness for Families and Singles



Notes: Thick lines represent the trend for all 13 cohorts collapsed, and data from individual cohorts selected at 3-year intervals are presented for clarity. Year 0 indicates year of initial shelter entry.

Exhibit 4

Employment Before and After First Instance of Homelessness for Male and Female Single and Family Households



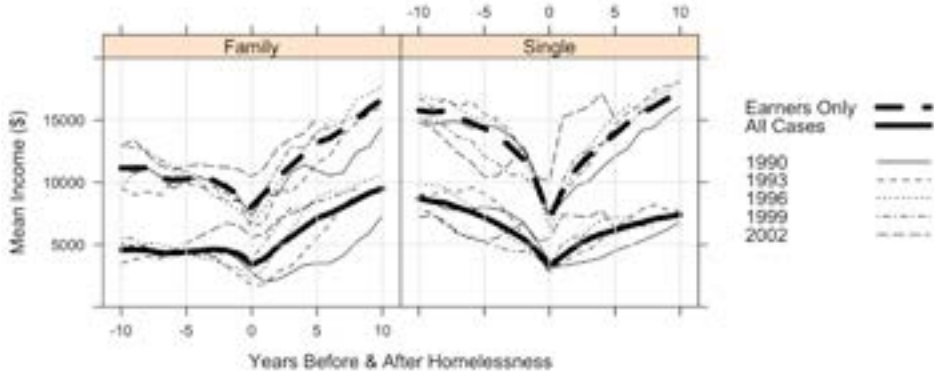
Notes: Thick lines represent the trend for all 13 cohorts collapsed, and data from individual cohorts selected at 3-year intervals are presented for clarity. Year 0 indicates year of shelter entry.

The earnings for all persons, reflecting the combined participation and worker-earnings trends, show an overall drop coinciding with the onset of shelter use and a much more modest recovery in the subsequent years. Although men on average received higher levels of earnings income than women, the earnings trends over time are similar for men and women (exhibit 6).

The regression results for employment and earnings for adults in families (exhibit 7) and for single adults (exhibit 8) were largely consistent with the descriptive results. Random effects are not presented, as fixed effects are of the most interest. Due to the large sample size, nearly all effects were statistically significant, so the focus in reporting the results will be on direction of the coefficient (that is, positive or negative association) and the corresponding magnitude of the effect of the estimators. Although the results for the interaction terms are reported in the tables, they were used as control measures (primarily to account for sex differences) and do not assist with interpreting the results.

Exhibit 5

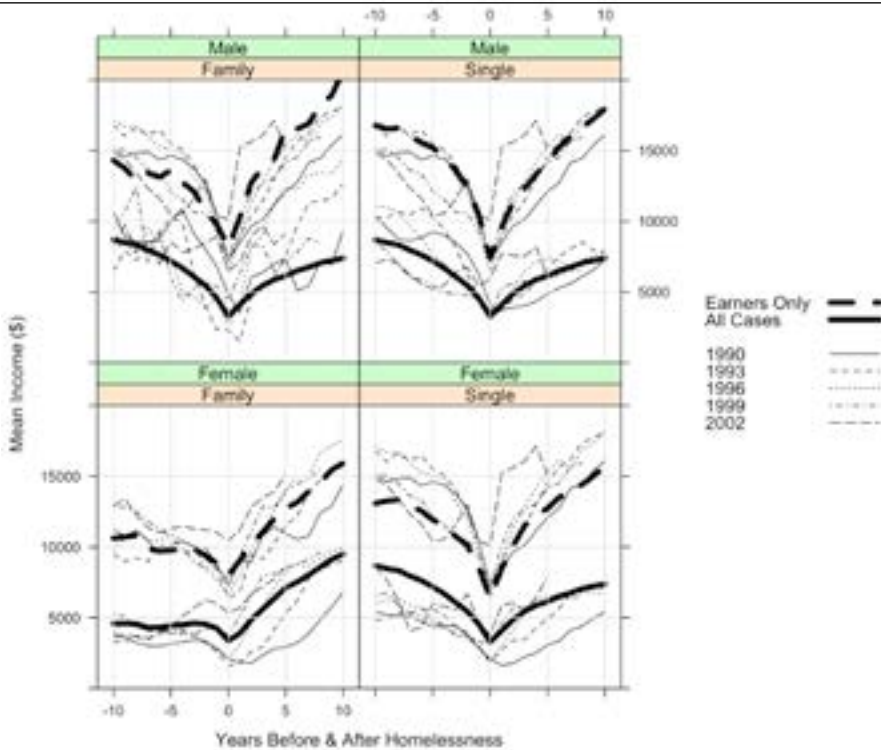
Earned Income Before and After First Instance of Homelessness for Families and Singles



Notes: Thick lines represent the trend for all 13 cohorts collapsed, and data from individual cohorts selected at 3-year intervals are presented for clarity. Year 0 indicates year of shelter entry.

Exhibit 6

Earned Income Before and After First Instance of Homelessness for Male and Female Single and Family Households



Notes: Two sets of results are presented in each part of the exhibit, for earners only and for all cases. Thick lines represent the trend for all 13 cohorts collapsed, and data from individual cohorts selected at 3-year intervals are presented for clarity. Year 0 indicates year of shelter entry.

Exhibit 7

Adults in Families—Results of Mixed-Effects Regression Models for Employment and Earned Income Over Time for Men and Women Who Had Records of Shelter Use in New York City Between 1990 and 2002

Independent Variables	Employment			Earnings (Earners Only)			Earnings (All)		
	b	SE	t	b	SE	t	b	SE	t
Intercept	46.02	0.45	101.79	846.11	1.11	765.80	758.10	1.93	393.20
Year (segment 1, 10 years preceding shelter)	-3.19	0.19	-16.75	-7.51	0.46	-16.20	-8.48	0.74	-11.50
Year (segment 2, 10 years following shelter)	2.06	0.19	10.62	14.14	0.30	47.90	19.78	0.36	54.00
Not in shelter	4.11	0.07	57.57	17.60	0.44	39.80	34.55	0.38	92.00
Episodic shelter use (versus long term)	-7.71	0.14	-53.43	-48.02	0.87	-55.40	-62.48	0.77	-80.80
Transitional shelter use (versus long term)	3.64	0.06	58.45	2.93	0.37	7.90	11.81	0.31	38.00
Exit to stable housing	3.77	0.06	62.14	5.06	0.37	13.80	12.64	0.30	41.50
Age	-4.10	0.02	-216.93	10.68	0.11	94.60	2.86	0.10	29.30
Male	13.78	0.15	92.54	10.29	0.70	14.70	48.55	0.74	66.20
White (versus Black)	-4.60	0.28	-16.40	-38.93	1.42	-27.30	-37.41	1.39	-26.90
Hispanic (versus Black)	-9.32	0.07	-141.37	-9.69	0.45	-21.60	-31.40	0.34	-92.30
Other (versus Black)	-0.60	0.10	-6.32	2.43	0.45	5.40	-7.22	0.45	-16.10
Year (segment 1, 10 years preceding shelter) squared	-0.75	0.02	-36.83	-1.00	0.04	-25.70	-1.26	0.06	-21.60
Year (segment 2, 10 years following shelter) squared	-0.05	0.00	-82.30	—	—	—	—	—	—
Male x year (segment 1)	-0.02	0.02	-1.42	-0.68	0.02	-30.10	-0.95	0.04	-27.20
Male x year (segment 2)	-0.99	0.08	-12.35	—	—	—	—	—	—
Male x year (segment 1) squared	-3.14	0.10	-30.56	0.72	0.30	2.40	-6.56	0.37	-17.60
Male x year (segment 2) squared	-0.04	0.01	-4.76	—	—	—	—	—	—
Male x year (segment 1) cubed	0.19	0.01	18.19	0.02	0.03	0.60	0.39	0.04	11.10

b = coefficient value. SE = standard error. t = t-value.

Notes: Employment rates are in percent units (for example, 45 percent), and coefficients can be interpreted in terms of the percent change in employment per a one-unit increase in each predictor, adjusted for other effects in the model (for example, employment drops 4.1 percent per increase in age interval). Earnings are in dollar units with a natural logarithmic transformation and, therefore, can also be interpreted in terms of the percent change in earnings per a one-unit increase in the value of each predictor, adjusted for other effects in the model (for example, for each increase in the age interval, earnings—among earners only—increases 10.68 percent).

Exhibit 8

Single Adults—Results of Mixed-Effects Regression Models for Employment and Earned Income Over Time for Men and Women Who Had Records of Shelter Use in New York City Between 1990 and 2002

	Employment			Dependent Variables Earnings (Earners Only)			Earnings (All)		
	b	SE	t	b	SE	t	b	SE	t
Intercept	57.67	0.23	253.30	833.45	0.85	985.10	778.61	1.00	776.20
Year (segment 1, 10 years preceding shelter)	-1.28	0.05	-27.60	-9.67	0.43	-22.70	-15.22	0.51	-30.10
Year (segment 2, 10 years following shelter)	-0.03	0.11	-0.30	13.86	0.28	50.30	15.52	0.44	35.40
Not in shelter	-0.04	0.08	-0.50	36.35	0.38	96.90	34.35	0.42	82.40
Episodic shelter use (versus long term)	-4.39	0.13	-34.90	-23.30	0.58	-40.60	-28.14	0.64	-44.20
Transitional shelter use (versus long term)	-1.36	0.10	-14.10	-2.22	0.44	-5.00	-12.21	0.48	-25.20
Exit to stable housing	9.02	0.08	113.00	13.91	0.36	38.80	36.59	0.40	91.90
Age	-5.87	0.02	-340.80	6.37	0.08	75.10	-5.99	0.09	-65.80
Male	13.22	0.10	135.20	22.01	0.51	43.10	49.44	0.51	97.10
White (versus Black)	-3.15	0.11	-29.30	-4.85	0.51	-9.50	-5.65	0.55	-10.20
Hispanic (versus Black)	-5.88	0.10	-61.80	-3.05	0.43	-7.10	-15.55	0.48	-32.10
Other (versus Black)	-0.26	0.12	-2.10	-0.88	0.55	-1.60	-1.17	0.60	-2.00
Year (segment 1) squared	-0.04	0.01	-3.30	-0.84	0.03	-24.30	-1.04	0.04	-23.70
Year (segment 2) squared	—	—	—	-0.83	0.03	-31.70	-0.95	0.04	-22.20
Male x year (segment 1)	-0.13	0.02	-6.00	-1.14	0.23	-4.90	0.74	0.23	3.30
Male x year (segment 2)	-1.89	0.05	-36.40	-1.08	0.21	-5.20	-6.50	0.24	-27.50
Male x year (segment 1) squared	—	—	—	0.05	0.02	2.60	0.15	0.02	9.80
Male x year (segment 2) squared	0.11	0.01	24.10	0.05	0.02	2.80	0.33	0.02	15.90

b = coefficient value. *SE* = standard error. *t* = *t*-value.
 Notes: Employment rates are in percent units (for example, 45 percent), and coefficients can be interpreted in terms of the percent change in employment per a one-unit increase in each predictor, adjusted for other effects in the model (for example, employment drops 5.87 percent per increase in age interval). Earnings are in dollar units with a natural logarithmic transformation and, therefore, can also be interpreted in terms of the percent change in earnings per a one-unit increase in the value of each predictor, adjusted for other effects in the model (for example, for each increase in the age interval, earnings—among earners only—increases 6.37 percent).

The results presented in exhibit 7 show how, for adults in families, the time around the onset of shelter use reflects an economic bottoming out. Across all three models, the contrasting effects for the 2-year variables indicate a progressive decline in employment and earnings in the decade leading up to shelter onset, followed by a reversal in coefficient value for the decade following shelter onset indicating a recovery from the losses of the prior decade. The positive coefficient values associated with the variable “year” in the time segment following initial shelter use were in addition to the strongly positive coefficient values associated with not being in shelter. Additionally, adults in families with episodic stay patterns had worse employment and earnings outcomes, and adults in families with temporary stay patterns had only modestly better, albeit significant, outcomes in these areas when compared with those with long-term shelter stay patterns. Exit to stable housing was associated with better outcomes in all three models for families. Finally, looking at the demographic covariates, increasing age was associated with declines in employment and with increases in earnings, with the earnings coefficient remaining positive in the earnings model for the complete group. Male heads of households in families clearly did better than women, especially with respect to employment. All racial and ethnic groups had worse outcomes in comparison with those of Black race.

Based on the results for the single adults in exhibit 8, a steady decline in employment was associated with the “year” covariate for the time period preceding the onset of shelter use and then a nonsignificant association in the subsequent period. Juxtaposing these findings means that single adults who did work, earnings also declined with time in the preshelter period but rebounded in the 10-year period following the initial shelter episode. This earnings rebound was strong enough so that it maintained its overall positive association with earnings in the years following shelter onset in the third model, which included all persons. Not being in shelter also had no effect on employment but had a strong, positive association with earnings. Compared with those in the long-term cluster, those single adults with both episodic and temporary stay patterns fared worse across all models, the former substantially so and the latter to a more modest degree. Stable exit was also associated with more positive participation and earnings outcomes for single adults. Among the demographic variables for single adults, increased age was associated with decreased participation and increased earnings, men had higher rates of participation and amounts of earnings compared with women, and the White and Hispanic groups had worse outcomes compared with the Black reference group.

Discussion

At the most basic level, the results of this study are consistent with the literature on employment among homeless adults—even when sheltered, 38 percent of adults in families and 45 percent of single adults received wage income. Beyond that, wage income bottomed out, and employment rates declined for both groups in the period only prior to the onset of homelessness. This finding supports an association between job-related shocks and homelessness that are frequently overlooked in research on homelessness, with its predominant focus on more static behavioral and physical health-related determinants.

Following the onset of homelessness, the vocational fortunes of adults in families and single adults diverge after job loss and homelessness. In what Ellwood (1982) described as the difference between “blemishes” and “scars” (Ruhm, 1991), adults in families, as a group, were more blemished in that, following their homelessness, posthomeless levels of employment and earnings recovered and exceeded prehomeless levels. For single adults, however, the job-related shock and homelessness were more scarring; although wages recovered, employment continued a steady decline. The divergences in these trends among the two subpopulations likely have bases in gender and age differences among the two sheltered subpopulations, shown in exhibit 1, and the differences in disability, employability, and family composition that stem from these demographic differences. Separate and more detailed explanations for these trends adults in families and single adults will be forthcoming shortly.

The aggregate levels of wages and employment prior to homelessness challenge stereotypes of homeless adults as unemployable and extremely low-income people. Among single adults, in an average year prior to becoming homeless, slightly more than one-half worked. Among those who did work, average earnings of nearly \$13,000 suggest that income could be on either side of the poverty income guidelines, depending on household size. For adults in families, average employment (43 percent) and average annual earnings of workers (\$8,483) were lower but still substantial considering that many of the adults in this group were single mothers with preschool-age children. As only aggregated data were available for this study, we are unable to lay out the individual dynamics between work, earnings, and homelessness. However, these findings support conclusions that, in the aggregate, the onset of homelessness is sensitive to loss of employment, regardless of whether this sequence is direct or mediated by factors such as physical or mental health crises that, *sui generis*, may also contribute to becoming homeless.

This conclusion applies to those adults in the study group who are homeless both as individuals and with their families. After the onset of homelessness, however, the employment trajectories for each of these subgroups diverge.

Families

The effect of homelessness on employment for adults in families more resembles a time-limited setback than a protracted decline. Many homeless adults in families started, resumed, or continued employment following shelter entry, as employment among this group dropped from 43 percent in the overall preshelter period to 38 percent during the time they were sheltered but then rebounded to 58 percent during the overall postshelter period. Among wage earners, average annual income from wages increased following shelter use to nearly \$16,000. This amount, depending on household size, hovers around poverty income guidelines.

Various factors may have contributed to this recovery. Disproportionately, families in shelters are homeless when their children are of preschool age (Culhane and Metraux, 1999). As the children age, options for childcare (including school enrollment) increase, and logistical barriers to working ease. Employment and earnings were also higher for adults in families who were sheltered later in the study period, a trend that likely reflects greater economic prosperity and increased job opportunities in the late 1990s and early 2000s but may also have been facilitated by the greater

emphasis on work for welfare recipients that was part of the Personal Responsibility and Work Opportunity Reconciliation Act (NASW, 1996), colloquially known as “welfare reform” that was enacted in 1996.

Also, homeless-specific factors were associated with employment and earnings. Longer shelter stays did not facilitate increased employment or earnings, which supports Culhane et al.’s (2007) skepticism about the benefit that homeless families receive from extended stays in shelter-based transitional housing programs. In contrast, exiting from shelter to stable housing was associated with higher employment and earnings. It is unclear from these data whether work facilitated housing stability or vice versa, or whether the relationships were bidirectional and mutually reinforcing (Swami, 2017). In addition, the qualities that enhanced the ability of persons to secure and maintain work may also have facilitated their making stable living arrangements on leaving shelter. Although more research is needed to understand the nature of this relationship, on a practical level, measures to increase opportunities for one domain (employment or housing) stand to facilitate improved outcomes in the other.

Single Adults

Like adults in families, those single adults who did work after their initial bout of shelter use realized aggregate earnings levels that exceeded preshelter earnings levels within a decade. Unlike adults in families, the levels of employment continued to decline (at a reduced level) after shelter use. This latter trend is consistent with the literature reviewed previously, in which homelessness typically occurred after a process of progressive detachment from the labor force. This fits the previously described narrative in which common barriers such as disability, substance abuse, criminal justice involvement, and lack of job skills all become more acute with increasing age.

Despite this trend, roughly 40 percent of the single adults did maintain at least some attachment to the work force. Judging by the average annual earnings (and assuming these earnings were sustained to some degree), this work generated enough income to facilitate lasting exits from homelessness for a substantial proportion of these wage earners. The positive association found between exits to stable housing and both higher earnings and employment supports this outcome. However, we also found an association between higher employment and earnings and long-term shelter stay patterns in both the descriptive and multivariate results, and both prior to and following onset of shelter. This finding is counterintuitive, as long-term, “chronic” stay patterns are typically associated with age and disability (Kuhn and Culhane, 1998; HUD, 2007) and should be tied to worse employment outcomes. The findings in this article suggest that a substantial constituency exists among single adults with long-term shelter-use patterns that would benefit from employment and vocational assistance (Gale and Rio, 2006). This association would indicate the need for a policy shift to counterbalance the disproportionate focus on sustained disability-related needs among this group.

Demographic Factors

Among demographic factors, the difference in participation rates, and in earnings, between men and women is the most prominent finding. This gender disparity mirrors that which is found in the general workforce. In this context, it disproportionately affects sheltered families, who are

overwhelmingly headed by single women, and affects the wellbeing of sheltered children and their prospects of regaining housing. Among the other demographic characteristics, increasing age, as expected, was associated with declining employment but also to higher earnings for those remaining in the workforce. Black race was associated with better participation and earnings outcomes when compared with the other racial and ethnic categories in this study, perhaps because more persons of Black race were homeless primarily for economic reasons (that is, with less disability and other vocational impairments) and were thus at an advantage, among the homeless milieu, in the labor market.

Limitations

Finally, we need to point out limitations to this study. This study, with its focus on Social Security Administration earnings, underreported total income received by homeless households in two ways. First, any under-the-table work (that is, work not reported to SSA) and income received from working in the informal economy were not represented in these data. An undetermined but substantial amount of income that extremely low-income people receive comes from such informal labor (Edin and Lein, 1997), which includes (but is not limited to) illicit activities, odd jobs, panhandling, and scavenging. Such labor is often more tenuous and less amenable to supporting efforts to gain and maintain stable housing (Gowan, 2010; Snow and Anderson, 1993).

A second way that these earnings data underreported total income was in their failure to include any income assistance received from benefit programs. This omission includes income from benefits for families, such as TANF, and for people with disabilities, such as the SSA's Supplemental Security Income. Although these income assistance programs and others like them often do not move a household above the poverty guidelines, they can represent a steady income source and, when coupled with other benefits such as Supplemental Nutrition Assistance Program, or SNAP (that is, food stamps), and subsidized housing, can lead to sustained exits from homelessness. Furthermore, many recipients of benefits from programs such as TANF and Supplemental Security Income are out of the workforce in that they are not actively searching for work and do not consider them employable. Thus, the employment rate reported in this article is lower than if one were only to consider those who are engaged in working or seeking work.

This study examined homelessness insofar as persons using shelter in Department of Homeless Service's administrative records appear. Thus, we did not include the undetermined number of persons not making use of shelter services. The size of this homeless subgroup is notoriously difficult to assess, but a general agreement is that in services-rich areas, such as New York City, the large majority of homeless persons come into at least some contact with the shelter system. In NYC, DHS administers or supports most shelters, approximately 85 percent, and they report into the DHS database.

This study examined a sheltered homeless population in an atypical U.S. city. Evidence suggests that, other than the scale of homelessness in NYC, the characteristics of its population are not that different than that of other U.S. cities (Metraux et al., 2001). However, we in no way maintain that the population examined was representative of other homeless populations. Nonetheless, the range of this study, with 160,525 sheltered persons and 2.9 million person years, renders this study group an important part of the homeless population to study in its own right.

The data for this study were only available in aggregated form, and although this aggregating ensured the confidentiality of personal data on employment and earnings, it created limitations on drawing conclusions. Population-level participation rates and earnings amounts could be tracked over time, but individual earnings could not be. Thus, no way of discerning individual employment trajectories was available that could be used to gain insights on key topics such as stability of earnings among individuals over time. Moreover, beyond information on shelter-use dynamics and basic demographics, no collateral information on individual or contextual factors exist that could also affect employment and earnings. This deficiency limits the parameters of this study to reporting basic employment trends among sheltered adults and leaves many unanswered questions for further research.

Finally, although we document trajectories and identify associations between such dynamics as employment and regained housing stability, or chronic homelessness and workforce participation, we reiterate that the data do not support making inferences about the directions of these associations, nor do these findings have any predictive value. Nonetheless, only identifying these associations provides clear directions for future research and policy initiatives.

Conclusion

This study represents, to our knowledge, the first to make use of administrative data on employment and earnings to systematically track a large homeless population during an extended period of time. A set of insights on employment among homeless adults emerges that is consistent with findings of previous research, and it also shows employment to play a larger role with descending into and recovering from a sheltered homeless episode than previously documented. This conclusion has implications not only for this population but also for those in the more general population of working low-income people. As a significant proportion of this population has a work history, similarly the precarious nature of low-wage employment leaves a broader segment of the working low-income people facing the very real risk of homelessness.

The levels of employment and wage earnings suggest that the homeless, as a population, struggle in the labor market. At the same time, the associations between employment and housing and the progressive gains adults in families made in the labor market following shelter stays show the promise of targeting employment as a means to prevent and ameliorate homelessness. Enhancing opportunities for and rewards from employment for the homeless population enjoys nearly universal support as a policy goal. In contrast, employment among the homeless population has been a lightly tread on area of research and hopefully additional research in this area, and more generally on the economic correlates of homelessness, will follow.

Appendix

The exhibits on the following two pages present further detail on the data cited in this article.

Exhibit A-1

Aggregated Dataset Observations—Eight Sample Cells

Cell	Earnings Year	Number With Earnings	Number With No Earnings	Total N	Earnings (Sum) (\$)	Earnings (SD) (\$)	First Year in Shelter	Shelter Type	Sex	Age	Race or Ethnicity	Exit Type	Shelter Stay Pattern
1	1980	15	3	18	263,409.21	9,793.89	1990	Single	M	35-40	White	Nonpermanent	Episodic
2	1987	7	10	17	92,159.48	16,968.66	1994	Single	F	35-40	Black	Permanent	Chronic
3	1986	14	11	25	92,901.24	6,406.28	1990	Single	M	18-25	Hispanic	Nonpermanent	Episodic
4	1997	8	9	17	136,229.14	11,180.92	1990	Single	M	25-30	Other	Nonpermanent	Temporary
5	1981	5	15	20	47,061.78	4,769.60	1990	Family	F	45-50	Hispanic	Permanent	Temporary
6	1994	6	7	13	123,301.79	14,517.00	1998	Family	M	30-35	Black	Permanent	Chronic
7	2001	9	3	12	59,132.08	5,862.01	1998	Family	F	18-25	White	Nonpermanent	Temporary
8	1999	7	15	22	111,394.35	10,159.53	1990	Family	F	45-50	Black	Permanent	Chronic

F = female, M = male, SD = standard deviation.

Notes: To limit table size, table does not show data for time period of data, that is, whether the data for the aggregated cluster were before, during, or after the first shelter stay. However, such data can be inferred by comparing the data included in the Earnings Year with that in the first Year of Homelessness columns.

Exhibit A-2

Distributions of Aggregate Cells by Component Criteria (1 of 2)

Criteria and Categories	Number of Cells	Possible Cells	Percent of Total	Percent of Possible
Total cells	52,591	1,822,500	100.0	2.9
Age				
18–24	6,475	202,500	12.3	3.2
25–29	6,852	202,500	13.0	3.4
30–34	7,339	202,500	14.0	3.6
35–39	6,885	202,500	13.1	3.4
40–44	5,234	202,500	10.0	2.6
45–49	3,433	202,500	6.5	1.7
50–54	1,718	202,500	3.3	0.8
55 or more	1,394	202,500	2.7	0.7
Unknown	13,261	202,500	25.2	6.5
Sex				
Male	28,167	607,500	44.7	3.9
Female	23,490	607,500	53.6	4.6
Unknown	934	607,500	1.8	0.2
Race or ethnicity				
Black	24,430	364,500	46.5	6.7
Hispanic	14,611	364,500	27.8	4.0
White	6,657	364,500	12.7	1.8
Other	4,523	364,500	8.6	1.2
Unknown	2,370	364,500	4.5	0.7
Shelter type				
Single	17,818	911,250	33.9	2.0
Family	34,773	911,250	66.1	3.8
First year of shelter stay				
1990	4,354	145,800	8.3	3.0
1991	4,336	145,800	8.2	3.0
1992	4,254	145,800	8.1	2.9
1993	4,126	145,800	7.8	2.8
1994	4,311	145,800	8.2	3.0
1995	4,376	145,800	8.3	3.0
1996	4,325	145,800	8.2	3.0
1997	4,302	145,800	8.2	3.0
1998	4,249	145,800	8.1	2.9
1999	3,821	138,510	7.3	2.8
2000	3,880	131,220	7.4	3.0
2001	4,129	123,930	7.9	3.3
2002	2,128	116,640	4.0	1.8
Shelter use pattern				
Chronic	16,330	607,500	31.1	2.7
Episodic	7,302	607,500	13.9	1.2
Transitional	28,959	607,500	55.1	4.8
Exit type				
To permanent housing	22,910	607,500	43.6	3.8
To nonpermanent housing	29,272	607,500	55.7	4.8
Unknown	409	607,500	0.8	0.1

Exhibit A-2

Distributions of Aggregate Cells by Component Criteria (2 of 2)

Criteria and Categories	Number of Cells	Possible Cells	Percent of Total	Percent of Possible
Timing of earnings year				
Before shelter	24,699	663,390	47.0	3.7
During shelter	10,313	568,620	19.6	1.8
After shelter	17,579	537,030	33.4	3.3
Earnings year				
1980	183	2,430	0.3	7.5
1981	363	4,860	0.7	7.5
1982	517	7,290	1.0	7.1
1983	701	9,720	1.3	7.2
1984	905	12,150	1.7	7.4
1985	1,125	14,580	2.1	7.7
1986	1,344	17,010	2.6	7.9
1987	1,557	19,440	3.0	8.0
1988	1,790	21,870	3.4	8.2
1989	1,984	24,300	3.8	8.2
1990	2,158	53,460	4.1	4.0
1991	2,278	87,480	4.3	2.6
1992	2,359	94,770	4.5	2.5
1993	2,413	94,770	4.6	2.5
1994	2,494	94,770	4.7	2.6
1995	2,546	94,770	4.8	2.7
1996	2,659	94,770	5.1	2.8
1997	2,744	94,770	5.2	2.9
1998	2,848	94,770	5.4	3.0
1999	2,964	94,770	5.6	3.1
2000	3,051	94,770	5.8	3.2
2001	2,795	87,480	5.3	3.2
2002	2,520	53,460	4.8	4.7
2003	2,234	48,600	4.2	4.6
2004	1,978	43,740	3.8	4.5
2005	1,677	38,880	3.2	4.3
2006	1,315	34,020	2.5	3.9
2007	1,089	29,160	2.1	3.7

Note: The 1,822,500 total cells represent the maximum combinations of cells for all criteria except for "Earnings Year" and "Timing," which have lower numbers of maximum combinations (1,462,860 and 1,769,040 respectively) due to logistical impossibilities related to some of the combinations (for example, not all earnings years can be timed as "after" onset of shelter use, as earnings years are tracked starting in 1980, and the earliest onset of shelter use was 1990).

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Exploring Patterns of Tax Increment Financing Use and Structural Explanations in Missouri's Major Metropolitan Regions

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Abstract

This article examines tax increment financing (TIF) in Kansas City and St. Louis, two heavy users of the tool under the same statutory authority. Based on a complete database of TIF projects through 2013 (2012 for Kansas City) and numerous interviews with local government officials in both metropolitan areas, we explore the TIF use of these two cities, which have different structural aspects and have gone through sharp policy changes, to examine if central cities that use different strategies beget different outcomes in their suburban areas. We document distinctly different patterns of use in the two central cities. When St. Louis dramatically increased its TIF use under Mayor Francis Slay, the number of projects per year in the suburbs increased. Kansas City suburbs appeared to fill the gap in TIF use when the city sharply decreased its use of TIF under Mayor Mark Funkhouser. More research is needed to determine the factors that drive these mixed effects and if they hold true by context and in other metropolitan areas.

Introduction

Tax increment financing (TIF) can be defined as “a geographically targeted tax, expenditure, and regulatory inducement to a specific location” that works by using “taxes derived from the increases in assessed values (the tax increment) resulting from new development... to pay for infrastructure needs and development expenditures in the TIF district” (Man, 2001: 1). This incentive is different from a tax abatement, which eliminates the need to pay taxes on any portion of the improvements

to the property for a specific period of time, for example, 10 years. Why is this difference important? The proposed benefit of TIF is that development or redevelopment can be funded with future revenue as opposed to current revenue or foregone revenue. At the time a locality uses TIF, the locality frequently sells a bond and pays it back from future revenue typically via increased property taxes generated from the development. In theory, this program provides an incentive for development that might otherwise not occur.

Critics argue that in practice TIF subsidizes development in a region that would have occurred anyway, but not necessarily in that particular location, were it not for the TIF. For example, real estate consultants have adopted and promoted TIF as an urban development strategy and at times at the expense of other economic development opportunities (Weber and O'Neill-Kohl, 2013). A bigger concern of critics is that TIF also has the potential to take revenue from districts, such as schools and library districts, which would have otherwise been gained in the form of property tax increases from the development. The one time that would not be the case is when a region shares a state border and the movement of development across the state border would actually produce a net loss for a particular state but not the region. Another criticism is that TIF projects are not evaluated on serving regional land-use needs. This evaluation would require a regionwide perspective to consider whether the location of a particular project is the best use of the land and whether that project would be better allocated elsewhere to utilize land within the region in a more appropriate manner (Luce, 2003: 4–5).

As municipalities look for ways to move ahead after the recession of 2007–2009, it is important that their limited resources work in ways that generate the best outcomes overall. This consideration raises the possibility that how a central city uses TIF may have a negative influence at the regional level if it draws investment from suburbs that might be a better location for certain projects than in the central city. However, little is known about the effect of central city TIF strategies on economic development outcomes in the suburbs. Given that previous studies have shown the existence of competitive dynamics in TIF use, it is plausible that the TIF use of a region's largest political and economic entity could have an outsized effect on the surrounding suburbs. Moreover, if central cities pursue different strategies, those strategies could obviously lead to different effects in the suburbs. Teasing out these relationships can advance our knowledge of how to advance the economic well-being of regions and combat the worst aspects of competitive behavior, such as a competition described by Tiebout (1956), in which cities chase revenue opportunities while trying to push out land uses they deem less desirable such as low-income housing.

No evidence of significant research exists on whether large central cities' TIF use has an effect on the way suburbs of those cities respond and use TIF, although it seems likely core cities could be influencing the use of TIF regionwide. As such, this research explores whether the activities of central city might shape the behavior of the suburbs when it comes to the use of TIF. Specifically, this research examines the policies and practices of Kansas City and St. Louis and the way their TIF usage influences the outcomes of their suburban areas' TIF use. We aim to answer the question of whether or not central-city TIF use affects the use of TIF in suburban cities in the same metropolitan statistical areas (MSAs) within the same state.

Utilizing the nearly comprehensive data on TIF generated by the *TIF Annual Reports* (2010–2014) of the Missouri Department of Economic Development, we were able to map and chart TIF use and search for patterns in the adoption of this economic development tool between 1988 and 2013. In addition, we used extensive interviews to confirm our understanding of the usage patterns in each region and to reach some tentative explanations for the reasons cities adopted certain patterns. Our findings were mixed but suggestive. Kansas City and St. Louis, both in Missouri, are definitely pursuing different TIF strategies, with larger projects in Kansas City and more numerous projects in St. Louis. As Kansas City reduced its use of TIF, the Kansas City suburbs stepped in to fill an economic development vacuum that Kansas City created by lessening its use of TIF. In St. Louis, something else is uniquely happening in the region, as the increase in TIF in the core city did not result in a reduction in the suburbs. Finally, our interviews show that many aspects of TIF remain controversial 30 years after the state legislature originally authorized TIF.

This article begins with a review of the literature on the strategies of cities to use TIF in general and the way TIF projects in particular fit into the overall regional economic development schema. An emphasis is on qualitative studies of major uses of cities. We then discuss the procedures and methods we used in the study and present an analysis of the results. In the conclusion, we consider policy implications and directions for further research.

Literature Review

California was the creator of the first TIF statute in 1952 in response to the decline of federal funding for slum clearance and redevelopment provided in statutes in the 1930s and 1940s (O'Toole, 2011: 7; Van Fossen, 2010: 749). When Congress repealed Title I of the 1949 Housing Act in 1974, eight other states provided local governments the authority to use TIF. Nearly all the other states were using TIF by 2000 (Johnson and Man, 2001).

The effect of TIF use has been studied from the perspective of outcomes for jurisdictions. Some authors analyzed the effect of TIF projects on spatial inequality (Anderson and Wassmer, 1995; Dye and Merriman, 2000). Sands, Reese, and Trudeau (2007: 68–69) find the balance of needs, both citywide and for neighborhoods, is important to prevent taxing jurisdictions of “have” and “have not” neighborhoods, where some neighborhoods are excluded from growth in their library or school tax base for years due to the constraints of TIF funds paying off a bond, for example. In this case, additional potential revenue that may have gone to a school district or library is diverted to the TIF until the loan is paid, while neighboring non-TIF districts in the region may see property tax revenues rise and realize those benefits during the life of the TIF. Similarly, Merriman, Skidmore, and Kashian (2011) find that significant property value reallocation occurs with TIF use rather than absolute property value increases. As fruitful future research, Merriman, Skidmore, and Kashian (2011: 243) also recommended careful consideration of who benefits from TIF use and who does not. To this point, Pacewicz (2013: 415) found that “the degree to which cities use TIF is puzzling, because urban leaders believe that their own use of TIF is fiscally unsustainable and yet continue to create TIF-backed securities at ever-higher rates.”

The literature is unclear about the relationship between central cities and suburbs. Some scholars contend suburbs are no longer dependent on cities and that suburbs compete for economic activity, although other scholars note suburbs and cities are interconnected, complementing one another's economies (Ihlanfeldt, 1995). Pelissero and Fasenfest (1989: 303–305) found the type of suburb is a predictor of the way the suburb behaves within a region. The suburbs' policy orientation drives their stance from reactive to aggressive with regard to their approach to economic development issues.

The literature also reveals differences in outcomes due to forms of governance and leadership. Feiock, Jeong, and Kim (2003) noted that mayor-council governments and council manager governments bring with them different styles and motivations that result in action that is more long term and less risky from council—manager forms of government to more high risk behavior that can lead to short term political benefits, which is behavior more likely associated with mayor council governments. DeSoto, Tajalli, and Opheim (2006) found that regardless of the type of government (that is, council managers or mayor-council), mayors' capacity to govern has strengthened over time, enhancing both their authority and management strategies. This enhancement provided mayors with more latitude to address issues in their cities. Even though relationships between cities and suburbs, in regard to their regional economies, is still debated, more evidence exists that mayors, regardless of form of government, can play a formidable role in economic policy, orientation, and outcomes of their cities.

A previous examination of the spatial patterns of municipal TIF use (Mason and Thomas, 2010) found that being geographically nearer or adjacent to a city that uses TIF increases the likelihood of the use of TIF on other cities. This relationship has implications for metropolitan regions as a whole. For example, if what Mason and Thomas (2010) found applies to a region and not only to cities in general, then cities that compete more by using TIF would potentially do so regardless of the size of the city with which they compete due to being adjacent cities. In turn, larger central cities might find the cities nearest them use TIF more often than cities farther away. Betz et al. (2012) found a proximity argument that supports metropolitan factors are at play and identified that not only counties with more Republican voters increase the number of economic development activities undertaken but also their proximity to a metropolitan region. Felix and Hines (2013) found two features of communities offering incentives for development include cities that are closer to state borders and those that are poorer, but not necessarily the poorest communities, were the cities more likely to use tax incentives. Additionally, they found at the county level the economic conditions of the area are inversely associated with implementing economic development policies. Another way regional differences may affect outcomes could be due to regions within a state having unique fiscal governance systems and, as such, this similarity has an effect on both the degree and way TIF is used in a region, as Weber, Hendrick, and Thompson (2008) found. Pacewicz (2016: 265–266) found additional evidence that regional factors may be at play and concluded that the ability of city leaders to maximize TIF outcomes for their jurisdiction relies on local considerations such as geographical, fiscal, and regulatory constraints, which in turn created different outcomes by place. Taken together, spatial proximity and regional differences may have their own unique effects, such as fostering competition in one situation and pleading no contest between areas in another region. However, consideration of the way large cities within a metropolitan region use TIF as part of a larger economic development strategy has been given scant attention.

Research Design and Methodology

The St. Louis and Kansas City metropolitan regions dominate Missouri's use of TIF. They provide two interesting cases to explore, because their central cities have the most TIF projects by far. These two cities have different structural aspects, as explained in the following paragraphs. Moreover, the two cities underwent sharp policy changes, which gives us the opportunity to explore whether central cities that use different strategies beget different outcomes in their suburbs. This article examines three questions. The first is, what patterns can be seen in the use of TIF in the St. Louis, MO-IL and Kansas City, MO-KS MSAs? Second, what role, if any, does competition from other communities within their MSA in Missouri or adjacent neighboring states (that is, Kansas and Illinois) play that are part of the greater MSA? In relation to the second question, several explanations may be found, for example, the city and the suburbs are complements, so if a core city engages in the use of TIFs, the suburbs are less likely to do so. Alternatively, it could be that if the core city does not use TIF, the suburbs will secure their own development using TIF. It is equally likely that when a core city uses TIF, the suburbs behave as competitors and aggressively seek development using TIF as well, which was previously demonstrated in Missouri suburbs among the adjacent cities in suburbs and more rural areas (Mason and Thomas, 2010). Alternatively, it is possible that if the core city does not use TIF, the suburbs also do not pursue TIF to enhance their development prospects. The third question explores the causes that might account for the patterns found? Could leadership, geography, structural aspects of government, or path dependency play a role?

Kansas City and the city of St. Louis are the two largest cities in Missouri in terms of geography, population, and economic impact. Kansas City is the largest city, with a population of 459,787 (as of 2010), but resides in the second largest MSA, with a population of 2,087,471. St. Louis is the second largest city in the state of Missouri, with population of 319,294 (as of 2010), but resides in the most populous MSA in the state of Missouri, with 2,811,588 people (U.S. Census Bureau, 2016). The geography of Kansas City is much larger, encompassing 319 square miles compared with only 66 square miles for St. Louis, yet the geography of the MSAs are the reverse, with Kansas City being smaller at 7,856 square miles and the St. Louis MSA being larger at 9,391 square miles (Geolytics, 2000). The Gross Metropolitan product of the Kansas City MSA within Missouri is \$41.68 billion (as of 2004), which is 20.5 percent of the Missouri Gross State Product compared with the city of St. Louis MSA within Missouri at \$80.94 billion, which is 39.8 percent of the state's Gross State Product (Global Insight, 2006: 59). Both cities have mayor-council governments, and the MSAs each have their own Metropolitan Planning Organizations that are also councils of governments. The Metropolitan Planning Organization in St. Louis documented incentives used to support hundreds of projects in eight counties across the region that raise concerns about the regional economic value of TIF (EWGCOG, 2011).

Using the nearly comprehensive data on TIF generated by the *TIF Annual Reports* (2010–2014) of the Missouri Department of Economic Development, we tabulated the data by city and suburb for the two regions and searched for patterns in the adoption of this economic development tool. In addition, we conducted extensive semi-structured interviews to confirm an understanding of the usage patterns in each region and to reach some tentative explanations for why cities adopted the patterns they did.

For this study, we interviewed people in a variety of positions, including four current and former economic development officers, five city officials, four school board members, three TIF commissioners, and one other person from the core cities and their in-state suburbs. We conducted 17 interviews from 2012 to 2014. We identified initial interviewees from state and local economic development agencies and used the snowball technique to increase the variety and number of interviewee perspectives. We sampled a range to begin to identify at least some of the mechanics through which city and suburbs argue for or against TIF use in each of the regions. We continued interviews until we were learning little if anything new from the additional interviews. We assured interviewees confidentiality and, therefore, are not referenced individually. This method provided a wealth of inductive qualitative evidence derived from the participants' perspectives as opposed to the researcher.

All interviewees were from areas that used TIF, because we were interested in understanding more about TIF use. We do not attempt to say our findings are generalizable. Our goal is to ask the question and explore the relationships between cities and suburban TIF use, if one exists. Adhering to Small's (2009: 10, 25) advice for studying processes that are not known, we used qualitative research, which is superior for this type of work and illuminates more information than other types of research when asking questions about how and why processes work. Additionally, we place in juxtaposition a rare case and period involving the mayors of Kansas City and St. Louis for comparison in the same approximate timeframe. These more recent mayors of the core cities of St. Louis and Kansas City took very different approaches to the use of TIF. The city of St. Louis dramatically increased its TIF usage after the election of Mayor Francis Slay (2001–2016), whereas Kansas City substantially decreased its TIF usage during the administration of Mayor Mark Funkhouser (2007–2011). These differences may help to further illuminate the relationship between central cities and suburbs. In this way, we follow Small's unique or deviant case emphasis to understand more about what is going on in general; for example, "when X occurs, whether Y will follow depends on Z" (Small, 2009: 21, 23). The deviant case can provide emergent knowledge from the cases, although not populations of similar cases (Small, 2009: 20), to reveal knowledge and perhaps develop hypotheses about a broader picture of the relationships between cities and suburbs and their TIF use. Finally, the creation of tables and graphs by year permits an examination of TIF use by both regions to examine if any regional effects were due to the differences in TIF use by the central cities of the metropolitan areas. The maps provide information on the spatial proximity of TIF use within the region and in relation to their proximity to the central cities.

Economic Development Strategies

In Missouri, three means occur to justify the use of TIF for redevelopment—blighted, conservation, or economic development areas. The definition of each follows.

- Blighted area is an area that by reason of the predominance of defective or inadequate street layout, unsanitary or unsafe conditions, deterioration of site improvements, improper subdivision or obsolete platting, or the existence of conditions that endanger life or property by fire and other causes, or any combination of such factors, retards the provision of housing accommodations or constitutes an economic or societal liability or a menace to the public health, safety, morals, or welfare in its present condition and use.

- Conservation area is any improved area within the boundaries of a redevelopment area in the territorial limits of a municipality, in which 50 percent or more of the structures are aged 35 years or more.
- Economic development area is any area or portion of an area within the territorial limits of a municipality that does not meet the requirements of blighted or conservation areas, respectively, and in which the governing body of the municipality finds that redevelopment will not be solely used for development of commercial businesses that unfairly compete in the local economy and is in the public interest, because it will—
 - Discourage commerce, industry, or manufacturing from moving their operations to another state.
 - Result in increased employment in the municipality.
 - Result in preservation or enhancement of the tax base of the municipality.

The definition of blight is particularly vague, which, coupled with permitted uses of TIF for economic development, make the tool ripe for any project (Kelsay, 2007: 14–15). Between 2005 and 2012, TIF bond sales by state reveal that Missouri ranked fourth at \$722 million in TIF bonds of all the states that have adopted TIF in the United States, behind California, Colorado, and Connecticut (O'Toole, 2011). Additionally, Missouri is 1 of only 18 states to allow for economic activity taxes that permit taxes for earnings, profits, utilities, and sales taxes in addition to the standard use of property tax increases for reimbursement of a development plan (Briffault, 2010). In Missouri, 50 percent of the economic activity tax increment can be used to help fund the development plan. Missouri even provides for a Super TIF, which makes available the entire economic activity tax increment to the developer (Kelsay, 2007: 2).

In one influential early study, The Brookings Institution found that the Kansas City region had six cities with TIF districts, and the vast majority of the districts were in the central core of the city (Luce, 2003: v). The author found that TIF was more likely to be used in stressed communities than in nonstressed communities in Kansas City compared with St. Louis (Luce, 2003: 13). The suburbs closest to Kansas City were also greater users of TIF than the more far-flung areas (Luce, 2003: 8). As we detail in the following sections, these patterns have changed since the study's publication.

Kansas City Economic Development Strategy

One striking feature of Kansas City TIF projects is the large number of huge projects, with a TIF value of more than \$100 million. Of the 100 Kansas City TIF projects listed in various issues of the Missouri Department of Economic Development's *TIF Annual Reports* (2010–2014), 9 have values of more than \$100 million (exhibit 1).

More than one-half of interviewees suggested that the most likely reason for the numerous large projects is that Kansas City officials try to make the city conducive for businesses and developers to stay in the state of Missouri, instead of the Kansas side of the region. The large TIF projects are a result of the intensity of the competition Missouri has with the state of Kansas as a way to keep jobs and businesses in the Missouri side of the region.

Exhibit 1**Kansas City TIF Projects With Reimbursable Costs of More Than \$100 Million**

Name of Project	Date	TIF Value (\$)	Total Project Cost (\$)	Aid Intensity^a (%)
Briarcliff West	1990	116,567,038	547,896,964	21
Hickman (Aventis)	1992	230,104,500	655,199,600	35
Santa Fe	1993	166,931,257	575,791,682	29
Shoal Creek	1994	130,718,310	186,246,912	70
Riverfront	1999	225,527,306	582,558,906	39
Pershing Road	2000	314,434,599	589,057,605	53
Three Trails	2002	186,144,576	949,355,059	20
Kansas City Live	2004	167,948,209	371,135,195	45
H&R Block	2004	292,317,824	308,399,088	95

TIF = tax increment financing.

^a *Aid Intensity is TIF reimbursable costs divided by total project costs.*

Source: Missouri Department of Economic Development (2011)

Illustrating this point, one interviewee explained that developers, who demonstrate they cannot make the project finances work without the incentive, initiate most uses of TIF. The interviewee went on to explain—

We have a few proactive TIFs where we take an area considered blighted and make a conscious decision to stimulate redevelopment. There are a number of TIFs used to stimulate redevelopment for our neighborhood. Our metro area is split by a state line with affluent suburban communities in Kansas and we have aggressive battles on business retention. Business leaders have been trying to get Kansas and Missouri states to stop it. Recently, Kansas got AMC headquarters for 47 million dollars to move 5 miles across the state line.¹

Although a common use of TIF for development in Kansas City is for large projects, five TIF districts in Kansas City use TIF for home repair projects. Individual projects can receive up to \$20,000; the program has resulted in “\$3.8 million in public and private reinvestments in 400 neighborhood homes as of 2008” (PeopleTrust, 2011: 14). Looking at the years 1988 through 2006, prior to the election of Mayor Funkhouser, Kansas City approved 118 TIF projects. From 2007 through 2011, only 5 TIF projects were approved.

St. Louis Economic Development Strategy

TIF usage in St. Louis differs in important respects from that in Kansas City. Only 3 of 132 TIF projects in St. Louis have a subsidy value more than \$100 million, as listed in exhibit 2 (Missouri Department of Economic Development, 2014, 2013, 2012, 2011, 2010).

The average size of TIF projects and the average *aid intensity*² in St. Louis are lower than in Kansas City.³ Only 10 St. Louis projects have a TIF value of more than \$20 million. By contrast, in Kansas City, 28 projects have a TIF value of more than \$20 million. It should be no surprise that St. Louis has a low aid intensity because the city’s policy is to adhere to a 15-percent limit for each project, except under special conditions (PFM, 2016: 17).

¹ For more on this move, see Hawley (2011).

² This term is borrowed from the European Union, where it is defined as subsidy/investment. This standardized measure enables comparison of the size of subsidies given to projects of different magnitudes.

³ Calculated from Missouri Department of Economic Development (2015, 2014, 2013, 2012, 2011).

Exhibit 2

St. Louis TIF Projects With Reimbursable Costs of More Than \$100 Million

Name of Project	Date	TIF Value (\$)	Total Project Cost (\$)	Aid Intensity ^a (%)
Grand Center	2002	104,679,000	531,316,000	20
Northside	2009	390,648,325	3,634,000,000	11 ^b
Cortex	2012	158,200,000	2,200,000,000	7

TIF = tax increment financing.

^a Aid Intensity is TIF reimbursable costs divided by total project costs.

^b This figure does not include state tax credits the project received, making the true aid intensity higher.

Sources: Good Jobs First (2017); Missouri Department of Economic Development (2011); Volkmann (2009)

Since Luce's (2003) report was published, the city of St. Louis began to use TIF exponentially more frequently. This greater intensity in usage resulted from the election of Mayor Slay (2001–2017), who inaugurated the widespread use of the tool in St. Louis. Prior to 2002, the city of St. Louis had approved a total of 11 TIF projects, but 121 projects were approved from 2002 through 2013. The average aid intensity for the entire period was 36 percent in Kansas City versus 9 percent in St. Louis, as exhibits 3 and 4 show.

Exhibit 3

Kansas City—Number and Amount of TIF Projects, by Year

Year	Number Approved	Total TIF Reimbursement (\$)	Total Project Cost (\$)	Average Aid Intensity (%)
1988	2	36,902,828	85,632,052	43
1989	0	0	0	NA
1990	1	547,896,964	547,896,964	100
1991	4	32,769,144	276,760,144	12
1992	5	339,019,319	947,470,993	36
1993	4	179,944,707	691,863,307	26
1994	15	339,528,180	789,067,022	43
1995	5	61,026,473	134,459,599	45
1996	4	59,584,585	376,033,522	16
1997	6	64,889,767	165,207,382	39
1998	6	36,123,575	156,142,172	23
1999	19	370,668,283	975,724,443	38
2000	15	440,791,216	889,601,960	50
2001	0	0	0	NA
2002	3	236,465,494	1,130,470,381	21
2003	4	56,706,803	730,240,373	8
2004	13	485,385,007	949,838,897	51
2005	4	73,276,366	238,888,067	31
2006	7	166,441,551	786,704,789	21
1988–2006	117	3,5127,420,262	9,872,002,067	21
2007	1	1,720,000	15,022,034	11
2008	3	65,437,277	194,591,696	34
2009	1	4,233,145	18,046,801	23
2010	0	0	0	NA
2011	0	0	0	NA
2007–2011	5	71,390,422	227,660,531	32
2012	1	2,621,500	44,203,654	6
Total	123	3,601,432,184	10,143,866,252	36

NA = not applicable. TIF = tax increment financing.

Source: Missouri Department of Economic Development TIF Annual Reports (2010–2014)

Exhibit 4**St. Louis—Number and Amount of TIF Projects, by Year**

Year	Number Approved	Total TIF Reimbursement (\$)	Total Project Cost (\$)	Average Aid Intensity (%)
1988	0	0	0	NA
1989	0	0	0	NA
1990	1	14,365,000	53,312,932	27
1991	1	2,728,919	44,860,000	6
1992	0	0	0	NA
1993	0	0	0	NA
1994	0	0	0	NA
1995	0	0	0	NA
1996	0	0	0	NA
1997	1	300,000	3,518,000	9
1998	1	14,500,000	14,500,000	100
1999	3	50,140,000	244,510,258	21
2000	1	400,000	3,850,000	10
2001	3	12,600,000	21,320,000	59
1988–2001	11	95,033,919	385,871,190	25
2002	10	119,986,332	737,381,811	16
2003	11	49,382,458	222,783,871	22
2004	23	110,376,919	637,738,179	17
2005	15	39,275,000	278,809,316	14
2006	17	142,896,000	820,244,372	17
2007	10	36,410,220	215,557,174	17
2008	15	59,113,361	421,147,134	14
2009	8	406,203,325	8,233,920,390	5
2010	3	30,517,640	125,859,866	24
2011	2	5,670,000	21,901,000	26
2012	4	9,550,000	58,253,830	16
2013	3	45,950,000	544,975,000	8
2002–2013	121	1,055,331,255	12,318,571,943	9
Total	132	1,150,365,174	12,704,443,133	9

NA = not applicable. TIF = tax increment financing.

Source: Missouri Department of Economic Development TIF Annual Reports (2010–2014)

According to one local official, an important reason for the lower number of large TIF subsidies in St. Louis is that, unlike Kansas City, very few were district-type TIF projects. Indeed, this official said the city had only three such projects—Lafayette Square, Grand Center, and Cortex.⁴ Instead, a large number of St. Louis' tax increment financing projects consisted of the renovation of a single historic downtown building. Additionally, according to one official, Kansas City has more Greenfield TIF projects than St. Louis does.

According to one local official, the perception and reality of the city's decline drove St. Louis' economic development strategy. The city's population was 856,796 in 1950 and fell to 319,294 in the 2010 census, a drop of 63 percent (Moore, 2011). Moreover, as the city is not part of any county, it does not have the option to annex adjacent areas to spur growth. "Our challenge was to give people confidence the city had a future," said this interviewee.

St. Louis had been an early adopter of TIF in 1990 with the St. Louis Marketplace project, but it struggled to keep tenants (Tucci, 1996). The city was saddled with paying off general

⁴ A fourth, Northside, was in legal limbo at the time of the interview, although the Missouri Supreme Court later approved it.

obligation bonds due to the poor performance of the project, rather than having shifted the risk to bondholders with revenue bonds. Until Mayor Slay came into office, the city largely avoided the use of TIF as a result of that bad experience. Under Mayor Slay, St. Louis approved scores of new TIF projects, many of which were to rehabilitate a single building.⁵ Except for one other project, the city avoided the use of general obligation bonds.

Patterns of Tax Increment Financing Use in the Kansas City and St. Louis Suburbs

Because scores of suburbs surround both Kansas City and St. Louis and the competitive dynamics of the core cities in regions are different, it makes no sense to say an overall strategy of use was present in the suburbs. However, it is possible to identify clear patterns of use that changed over time. Interviewees underscored this point when asked to describe the strategy or pattern of TIF use and competition with suburbs, cities, and states. One interviewee indicated the strategy was “willy nilly.” Another interviewee from Kansas City pointed out that in terms of competition with the suburbs, “not much with Missouri suburbs because the state is not involved in those situations.” A St. Louis interviewee noted: “Municipalities are a mixed bag; some are very competitive. But generally, there has been cooperation with the Council and three [undisclosed] suburban cities.”

In Kansas City, suburban TIF use increased in amount and number after 2001 (exhibits 5 through 8), when a number of TIF projects were approved at the fringes of the Kansas City metropolitan area, in contrast to the findings of Luce (2003). From 1988 through 2006, 69 TIF projects were approved whereas from 2007 to 2011, 26 TIF projects were approved.⁶ In general, the use of TIF in Kansas City supersedes that of the suburbs by wide margins, however, prior to 2007, the use of TIF spiked in both Kansas City and its suburbs.

The number of TIF projects increased around 2002, but the actual amount of reimbursable TIF in the suburbs did not surge until slightly prior to 2007. After 2007 and during the recession, the use of TIF subsided substantially in both the city and suburbs, although TIF use was slightly greater by suburban cities than Kansas City during this period. Furthermore, the use of TIF was considered destructive in Kansas City when dealing with competition from another state. One economic developer noted—

There is very intense inter-state competition, a race to the bottom it is sometimes called, that makes taxes move to another area giving the business/developer a huge incentive, but we have the same number of jobs with a new building and remodeled location but the other state may gain tax revenues.

Another interviewee noted the effect of cross state competition in Kansas City as—

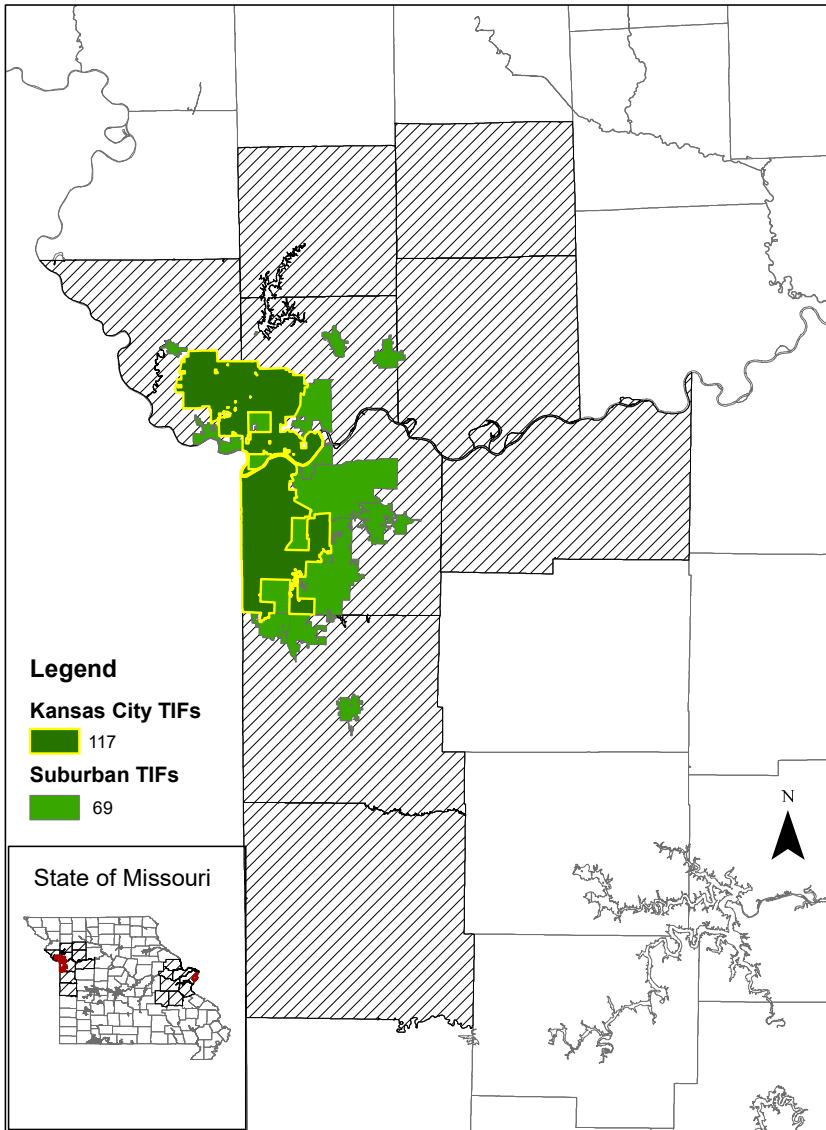
... impossible to describe how intense and destructive not just that it is not helpful but it hurts the state of MO and [the funds] could be used for development but it is squandered.

⁵ See project descriptions in Missouri Department of Economic Development (2011).

⁶ See exhibits 3 and 13 for overall use of TIF in the Missouri part of the Kansas City metropolitan area.

Exhibit 5

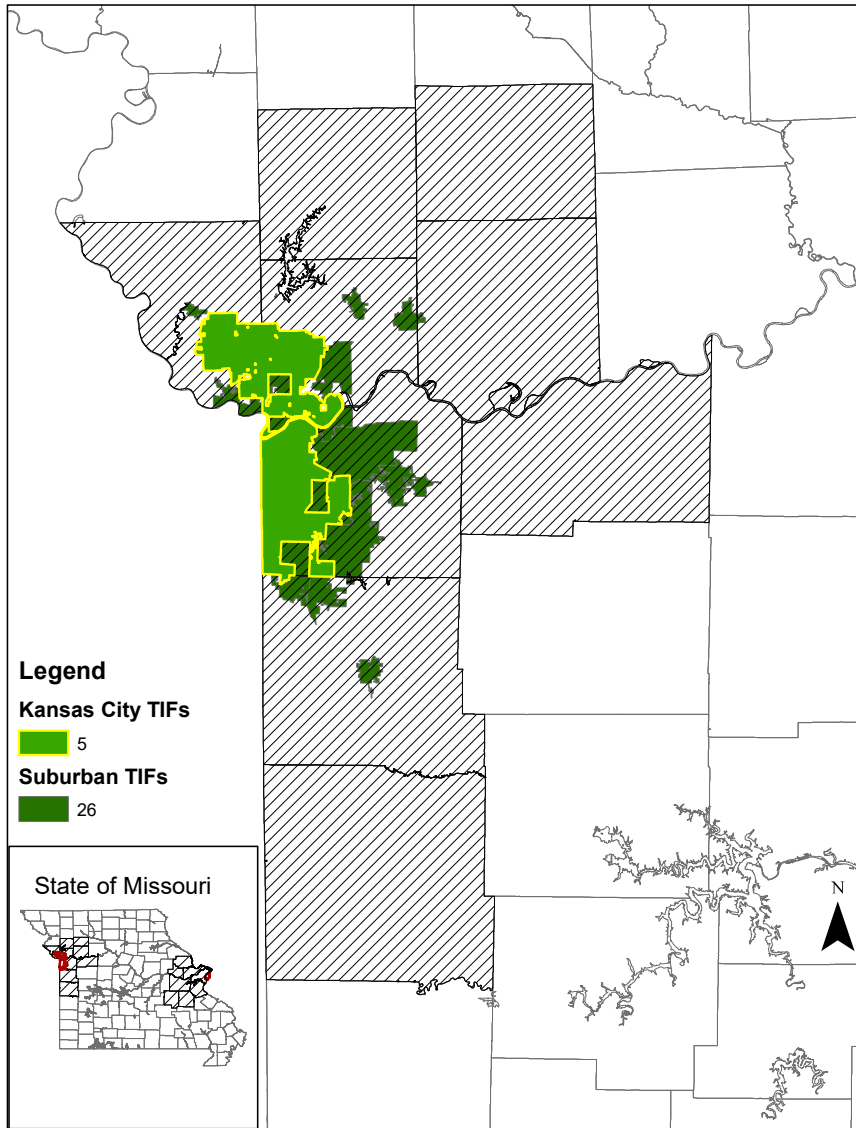
Kansas City and Suburbs—Number of TIF Projects, 1988–2006



TIF = tax increment financing.
Note: Striped area represents the study area.

Exhibit 6

Kansas City and Suburbs—Number of TIF Projects, 2007–2011



TIF = tax increment financing.
Note: Striped area represents the study area.

Exhibit 7

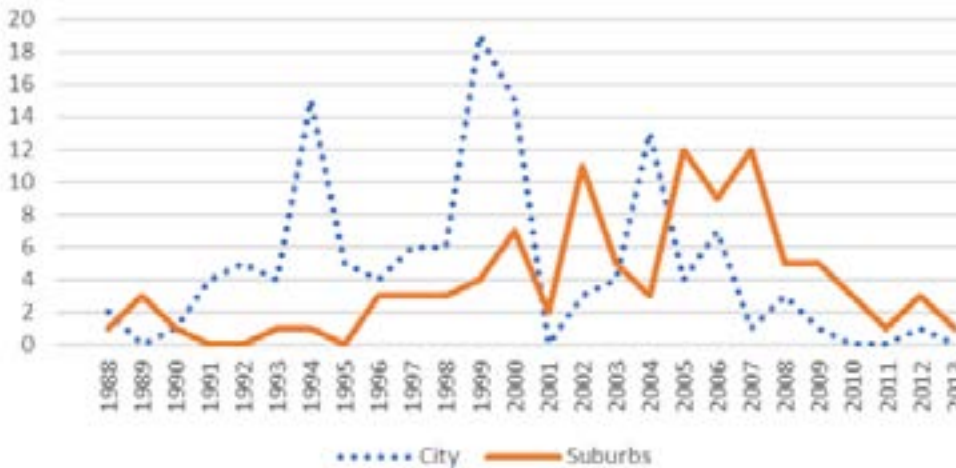
Kansas City and Suburbs—Total Reimbursable TIF, 1988–2013



TIF = tax increment financing.

Exhibit 8

Kansas City and Suburbs—Number of Approved TIF Projects, 1988–2013



TIF = tax increment financing.

Another interviewee noted the competition or strategy of TIF use is—

Varied depends on what portion of the city you are talking about. It varies [even more] in the suburbs and seems to be used to stimulate growth and economic development quicker and I think to attract consumers to the area and this has proven to be the case that you will see in an area in our school district.

As one measure of this intensity, the Hall Family Foundation in Kansas City documented \$217 million in state subsidies through the Promoting Employment Across Kansas Program, or PEAK, in Kansas and the Missouri Works Program in Missouri that were used during 5 years to lure companies across the state line within the Kansas City MSA. Ultimately, 3,289 jobs moved from Missouri to Kansas, and 2,824 jobs moved in the other direction, a net of 465 in Kansas' favor (*The Economist*, 2014). This outcome works out to \$466,667 per net job in subsidies, and even those 465 jobs are not new to the metropolitan area. Before this article was completed, on November 5, 2017, the border war got a typical John Oliver sendup on his show "Last Week Tonight" (Campbell, 2017).

From 2014 to 2016, momentum was strong for tamping down this job piracy. In 2014, the Missouri General Assembly passed a law that would ban the use of Missouri Works Program subsidies for relocations within the Kansas City metropolitan area. This ban would come into effect if the state of Kansas were to pass a corresponding law by August 2016 (Eulitt, 2016). However, just when it seemed that a truce was in reach, Kansas Governor Sam Brownback proposed legislation for a truce in 2016 that included exceptions for creating net new jobs or constructing a new building costing \$10 million or more. Missouri leaders did not approve of these changes, and the agreement collapsed (Eveland and Stafford, 2016).

In the St. Louis suburbs from 1988 through 2001, 42 TIF projects were approved, and 48 projects approved from 2002 through 2013. TIF was not used in a significant way in the suburbs until the mid-1990s. The first big uptick in TIF use for the city of St. Louis is not until 2001 (exhibits 9, 10, 11, and 12).⁷

The pattern of TIF usage in the St. Louis suburbs appears similar throughout the time period after the mid-1990s. Additionally, the overall average aid intensity of St. Louis' suburbs was 20 percent compared with 27 percent in the Kansas City suburbs (exhibits 13 and 14). However, a marked difference prevails in the average aid intensity for Kansas City (36 percent) compared with the city of St. Louis (9 percent).⁸

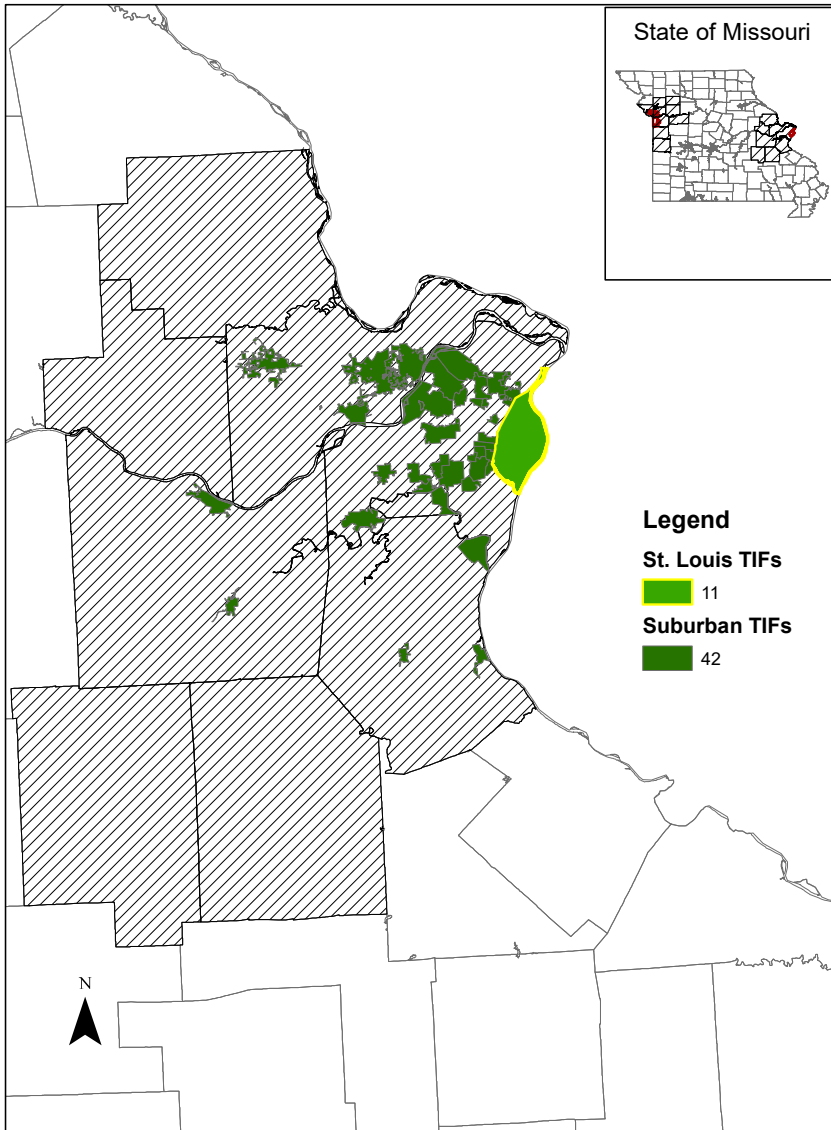
Summing up the kind and spatial allocation of TIF in the Kansas City and St. Louis regions, we found the TIF projects were larger in Kansas City and mainly in the downtown area, although in the Kansas City suburbs, TIF projects are nearer the city and airport and typically involve retail or commercial development with a small percentage of total TIF dollars going to housing. In St. Louis, we noted TIF projects are smaller and primarily involve single-building developments and retail, with a noteworthy exception of one large retail and commercial TIF that performed so poorly it stymied TIF use for years, prior to Mayor Slay taking office. In the St. Louis suburbs, TIF was occasionally used in areas adjacent to the city of St. Louis. However, these suburban St. Louis TIF projects were much more likely to be farther from the city of St. Louis than in the Kansas City region. Throughout St. Louis and its suburbs, retail was the predominant use of TIF. In both regions, the primary use of TIF did not seem to be in areas that were particularly blighted nor greenfields, but rather near neighborhoods and often for retail, and in the case of Kansas City, for more stressed areas in general.

⁷ See exhibits 4 and 14 for overall TIF use in the Missouri part of the St. Louis metropolitan area.

⁸ See exhibits 3 and 4.

Exhibit 9

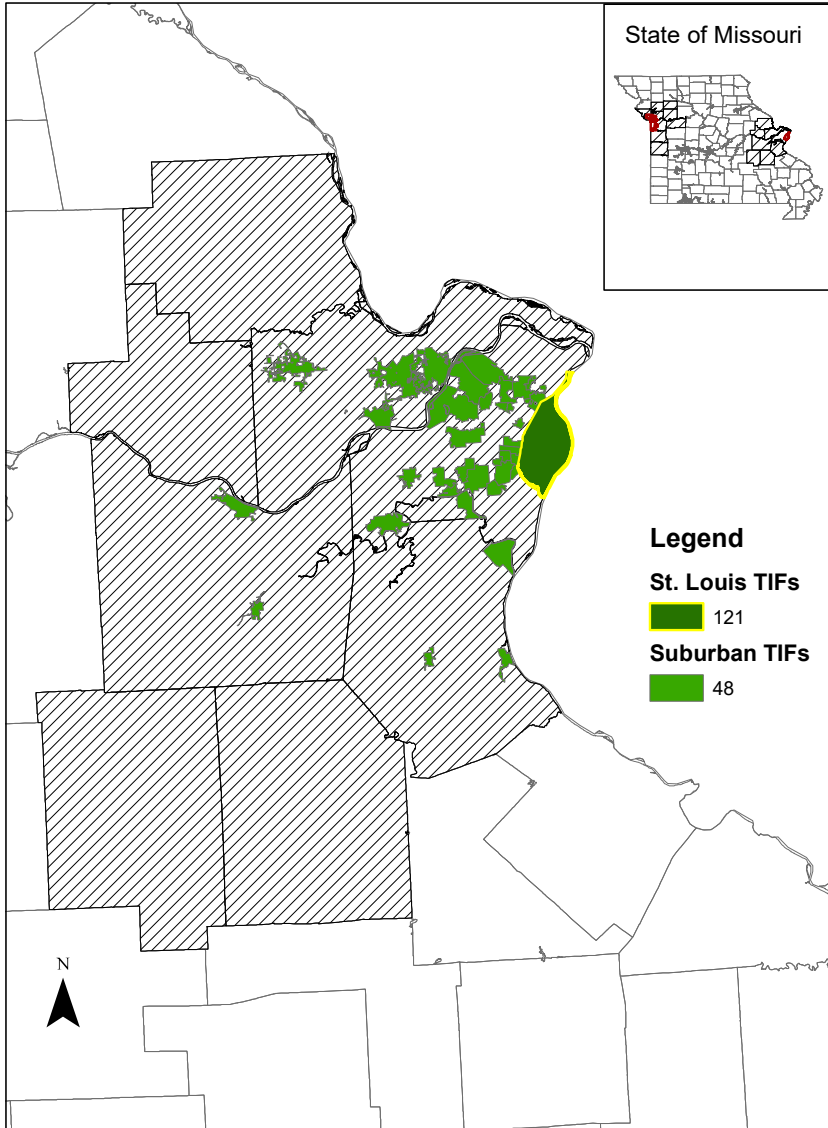
St. Louis City and Suburbs—Number of TIF Projects, 1988–2006



TIF = tax increment financing.
Note: Striped area represents the study area.

Exhibit 10

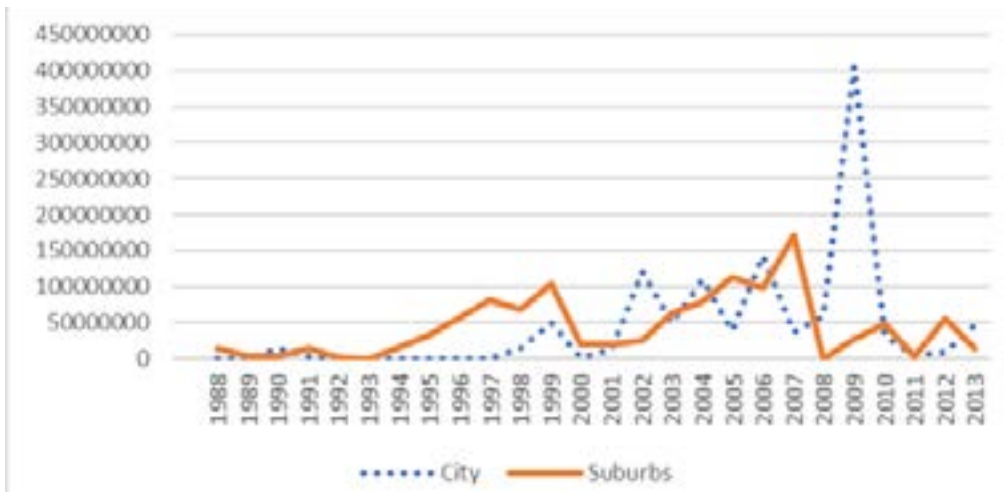
St. Louis City and Suburbs—Number of TIF Projects, 2002–2013



TIF = tax increment financing.
Note: Striped area represents the study area.

Exhibit 11

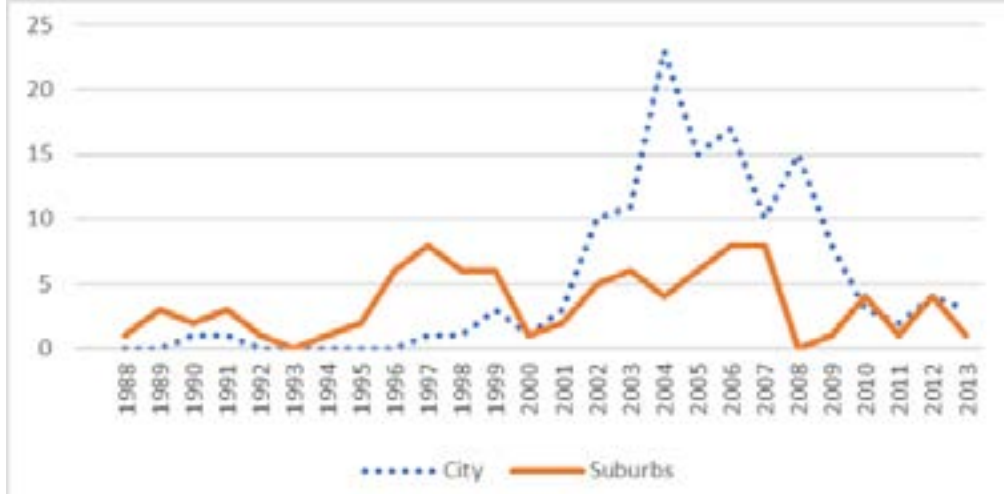
St. Louis and Suburbs—Total TIF Reimbursement, 1988–2013



TIF = tax increment financing.

Exhibit 12

St. Louis and Suburbs—Number of Approved TIF Projects, 1988–2013



TIF = tax increment financing.

Exhibit 13

Kansas City Suburbs—Number and Amount of TIF Projects Approved, by Year

Year	Number Approved	Total TIF Reimbursement (\$)	Total Project Cost (\$)	Average Aid Intensity (%)
1988	1	33,922,324	33,922,324	100
1989	3	12,514,891	37,255,078	34
1990	1	12,408,045	13,732,580	90
1991	0	0	0	NA
1992	0	0	0	NA
1993	1	3,073,176	13,054,813	24
1994	1	8,380,910	80,810,850	10
1995	0	0	0	NA
1996	3	100,815,450	254,606,578	40
1997	3	24,268,198	68,491,196	35
1998	3	22,955,374	120,173,275	19
1999	4	5,872,880	48,544,000	12
2000	7	160,766,568	577,083,932	28
2001	2	28,127,186	68,294,794	41
2002	11	140,747,476	471,634,760	30
2003	5	38,786,713	273,535,623	14
2004	3	123,634,098	479,428,624	26
2005	12	111,805,341	508,923,957	22
2006	9	141,966,146	574,841,327	25
1988–2006	69	970,044,776	3,624,333,711	27
2007	12	251,235,442	1,018,294,757	25
2008	5	14,612,855	68,406,345	22
2009	5	92,186,351	438,256,312	21
2010	3	33,818,560	93,584,163	36
2011	1	1,850,000	6,030,216	31
2007–2011	26	393,703,208	1,624,571,793	24
2012	3	66,557,088	136,598,024	49
2013	1	6,296,249	22,203,161	28
Total	99	1,436,601,321	5,407,706,689	27

NA = not applicable. TIF = tax increment financing.

Source: Missouri Department of Economic Development TIF Annual Reports (2010–2014)

Exhibit 14**St. Louis Suburbs—Number and Amount of TIF Projects, by Year**

Year	Number Approved	Total TIF Reimbursement (\$)	Total Project Cost (\$)	Average Aid Intensity (%)
1988	1	14,366,800	49,428,000	29
1989	3	3,177,280	3,177,280	100
1990	2	2,845,620	2,845,620	100
1991	3	14,416,380	46,416,380	31
1992	1	2,096,000	36,771,000	6
1993	0	0	0	NA
1994	1	15,430,000	57,000,000	27
1995	2	33,680,000	142,080,000	24
1996	6	56,730,000	556,735,421	10
1997	8	82,102,000	684,349,000	12
1998	6	69,046,000	370,141,000	19
1999	6	104,699,421	278,980,033	38
2000	1	19,600,000	133,683,000	15
2001	2	19,985,000	64,645,000	31
1988–2001	42	438,174,501	2,426,251,734	18
2002	5	25,750,000	90,500,000	28
2003	6	63,152,194	172,793,000	37
2004	4	79,381,530	202,809,855	39
2005	6	113,150,000	825,346,562	14
2006	8	98,112,748	729,481,038	13
2007	8	171,954,890	888,439,743	19
2008	0	0	0	NA
2009	1	26,750,000	26,750,000	100
2010	4	48,520,000	93,120,000	52
2011	1	4,002,000	23,552,000	17
2012	4	55,085,750	148,335,975	37
2013	1	15,000,000	46,199,000	32
2002–2013	48	700,859,112	3,247,327,173	22
Total	90	1,139,033,613	5,673,578,907	20

NA = not applicable. TIF = tax increment financing.

Source: Missouri Department of Economic Development TIF Annual Reports (2010–2014)

Findings

The processes of employing TIF in St. Louis and Kansas City reveal several significant differences. First, the outlooks of the mayors may have an influence on TIF usage. In Kansas City, Mayor Funkhouser is on record opposing TIF use. Moreover, Kansas City has term limits for the mayor, whereas St. Louis does not. Mayor Slay, who vastly increased TIF use in St. Louis, was reelected to his fourth term in 2013. Second, Kansas City faces much more competition from cities in Kansas than St. Louis faces from cities in Illinois. In the judgment of several interviewees, relatively little competition occurs between Missouri cities in the Kansas City metropolitan area. By contrast, in the St. Louis metropolitan area, a relatively high level of competition exists among cities within the region, especially in regard to retail projects.⁹ The third difference is that the TIF Commission in Kansas City consists of 11 persons, with 6 appointed by the city and 5 by the school board and

⁹ Some competition is found between the city of St. Louis and Clayton, an upscale suburb that is the county seat of St. Louis County, for office and headquarters projects. Thus, St. Louis recently gave a \$7 million TIF to Laclede Gas Company for a new headquarters after it threatened to move to Clayton (Weideman, 2013).

other affected taxing districts. St. Louis, by contrast, has only 9 people on the TIF Commission,¹⁰ with six appointed by the city, two representing the school board and one representing all other taxing districts. This six-to-three city-appointed majority makes it easier for proposed TIF projects to receive commission approval in St. Louis than in Kansas City, whereas in Kansas City the majority is six to five. According to one official, the St. Louis TIF Commission has never rejected a proposal brought by the St. Louis Development Corporation. A fourth factor interviewees mentioned is that Kansas City has an advisory panel to the TIF Commission and St. Louis does not.

One interviewee in St. Louis noted, “The city didn’t use TIF much [before Slay’s election] but did use lots of tax abatements. Now that they use TIF, it’s for small projects with the occasional large one.” Another local official in St. Louis pointed out the tension between the city and the school board, which perfectly overlap in area, in regard to both TIF and tax abatement. Indeed, the school board sued the city over a tax abatement in 1992 (*St. Louis Post-Dispatch*, 1992).

In Kansas City and its suburbs, a symbiotic relationship is present, about which one interviewee in Kansas City indicated—

It has enhanced development in terms of bricks and mortar...there are negative and positive impacts both [for cities and suburbs] if you talk to the superintendent of [undisclosed] suburb they have big box retail abated at 75 percent but they felt nothing was going to happen without doing it. In my district [in the central city] TIF enhances the quality of life for residents but if we get additional students that erodes our district revenue.

He went on to note that their school district crosses into both city and suburban boundaries. This overlap also happens further out in the suburbs as well, where one community’s school district has a large number of students from a neighboring city. The upshot is Kansas City or the hinterland city may have a TIF that is increasing revenue from sales tax from a “big box retail,” yet a school district with an overlapping boundary has property tax abated, making the school district suffer while serving two communities—one with the development and one that does not realize the sales tax revenue. In essence, a similar phenomenon plays out in the central city, first-ring suburbs, and communities further out because of overlapping taxing jurisdictions with communities that use TIF and those that do not. Another interviewee provided a more explicit example of the way this scenario has played out.

The [undisclosed] TIF has caused a tremendous amount of growth in our district. This growth has been both on the side of retail development and residential. Parents looking for a quality school system and easy access to the Interstate, International Airport, and quality shopping now have many subdivisions from which to choose on the one side of our school district. There are many positive aspects of this growth, but there are also many challenges that this growth has caused, ranging from overcrowded schools to traffic congestion. It has also caused some political tension with the City of [Undisclosed], since the taxes are collected by Kansas City, but much of the expense of educating the new students falls on the businesses and homeowners in [undisclosed] city.

¹⁰ This difference derives from the state TIF Statute.

Another Kansas City interviewee noted when “cities and suburbs share profits, it affords them regional benefits. When working together, they can get benefits of a stadium or amenities. But when you compete, they spend it on corporate welfare. It is a cancer dragging down the whole region.”

In terms of the quantity of TIF developments in the two periods, the total number of suburban TIF projects approved dropped from 69 through 2006 to 26 during 2007 to 2011. However, the number of TIF projects averaged per year through 2006 was 3.5 compared with an average of 5.2 TIF projects per year in the Kansas City suburbs. In the St. Louis suburbs, TIF projects increased both in number and on average from 42 prior to and through 2001, an average of 3.2 TIF projects per year, to 48 after during 2002 to 2013, or on average 4 TIF projects per year. After 2001, a greater frequency of use prevailed in the suburbs, and those communities using TIF were nearer the central city than previously. Once again, much of the city’s change in TIF use was tied to the mayor in office during the time. Mayor Funkhouser had a reputation of retrenching from the use of TIF, whereas Mayor Slay advocated it as a way for the city of St. Louis to move forward. The actions of the central city have an impact on the suburbs but in different ways. In the case of Kansas City, the suburbs appear to use the tool more when the central city does not. In the case of the city of St. Louis, the suburbs increased their use slightly as the city increased its frequency of TIF use considerably. In both cases, suburban use continued and also declined most precipitously during the recession years.

Discussion and Conclusions

Although more research is clearly needed in regard to the central cities, the lack of mayoral term limits may play a role in St. Louis by making it easier for the mayor to put into place a desired economic development strategy. In Kansas City, the mayor has limited opportunity (two 4-year terms) and must be strategic in leveraging the support of stakeholders who helped the mayor get elected or may be in a position to help in future elections. Additionally, St. Louis faces little competition from Illinois on economic development projects. Most competition comes from within the region on the Missouri side of the state. In the case of Kansas City, the state of Kansas began to leverage state dollars that make competition for economic development with the city of Kansas City, Missouri fierce in a way that more often leads to a bidding war between the state and the city. One interviewee specifically spoke to this issue noting—

Have to have both states say no to playing the game but no one wants to be the first to say no because they don’t want the development to go to the other side. Kansas tax cuts and tax incentives that Governor Brownback supports. In KC it is with TIF, but not in Kansas state. It is definitely a brutal situation for KC as it is on the border. This won’t be as big of deal in St. Louis because the Illinois side is not as attractive.

Moreover, in St. Louis mayoral appointees enjoy a six-to-three majority on the TIF Commission compared with a six-to-five majority for Kansas City on its TIF Commission, making it easier for St. Louis to pass TIF proposals than Kansas City. Indeed, the St. Louis TIF Commission has never rejected a proposed TIF, whereas the Kansas City TIF Commission rejected at least three. In addition, the data suggest that central city subsidy choices cast a shadow over the economic

development decisions of their suburbs, at least in the Kansas City area, which faces strong neighboring-state competition with potentially substantial effects. Finally, our interviews show that many aspects of TIF remain controversial 35 years after the state legislature originally authorized TIF. The most significant issue remains the ability of a municipality to use the property tax revenues that would have gone to other taxing districts as part of the funding for a TIF subsidy in Missouri. In a number of other states, the school board and other taxing districts can opt out or even have veto power over TIF proposals.

In particular, the 2001 election of Mayor Slay in St. Louis, who served four terms through 2017, led to a drastic increase in the use of TIF in the city. In Kansas City, by contrast, the city saw far fewer TIF projects approved when Funkhouser was mayor from 2007 to 2011.

The findings are suggestive. Kansas City and St. Louis definitely are pursuing different TIF strategies, with larger projects in Kansas City. The onslaught of new developments in St. Louis (more than 100 since Mayor Slay was elected compared with about 6 before his election) may contribute to an increasingly competitive atmosphere in the region. The two periods that saw annual increases in TIF projects in the St. Louis suburbs were the pre-Slay years (1988–2000) with 46 TIF projects and the Slay years (2001–2013) with 53 TIF projects. In the Kansas City suburbs, the number of projects decreased from 73 during 1988 through 2006 to 26 during 2007 through 2011. With the exception of 2007, the suburbs of Kansas City, Missouri also appeared to reduce their use of TIF. Perhaps this reduction was due to the economic recession, or perhaps they were following the lead of the central city and not competing as assertively for development. In the St. Louis region, the increase in TIF in the core city is also witnessed in the suburbs but nowhere near the degree as the central city. These findings suggest that to a small extent, suburbs may take cues from their central cities, but the outcomes are somewhat different. In the Kansas City region, the suburbs picked up the use of TIF when the core city was not using TIF as much. This result may corroborate Felix and Hines' (2013) findings that interstate competition breeds more tax incentive use than intrastate competition. In short, in the case of Kansas, this outcome may be due to the large size of TIF projects the core city pursued to keep the state of Kansas from moving business out of the state but remain within the region. In St. Louis, TIF use in the suburbs is more or less similar, perhaps because competition of TIF use is with adjacent cities, regardless of whether that city is a core city. This situation may be because the city of St. Louis is less of a threat than Kansas City is in terms of being a magnet for development opportunities or because St. Louis faces less interstate competition in their region than the Kansas City region.

In light of these findings, a review of the Missouri TIF statute is necessary to investigate changes that would further regional cooperation instead of intraregional competition, such as all communities sharing in the cost and benefits of the TIF, such as the effect on taxing resources for all the jurisdictions that benefit from the economic development. The Missouri General Assembly in 2008 created county TIF Commissions in St. Louis, St. Charles, and Jefferson Counties, which replaced individual municipal TIF Commissions.¹¹ However, more broad-based actions, as the

¹¹ The county TIF Commissions can recommend against local TIF projects, but a two-thirds majority of the local city council can override the county TIF Commission recommendations, leading one local official to describe the county TIF Commissions as “toothless” and suggest that their decisions be made final; that is, not subject to override by the municipality.

one suggested here, are needed in the region and statewide. One reason cooperation may not be attractive, as one interviewee noted, is “Nice word ‘Truce’ if you are winning why would you quit if you were Kansas why let you catch up?” Another driver that might prevent more cooperation is the reverse; if you are behind, why not try to use every advantage or tool you have to gain jobs or development? Some interviewees underscored the need for reform, including this person who indicated—

KC and perhaps St. Louis are similar in that they are difficult in terms of helping you understand [TIF use] as the players and the plan, the vast number of players, they ways [TIF uses] are set-up and the way TIF is being used.... Having said that, there is no one in taxing jurisdictions that is not frustrated by TIF.

Ultimately, our findings suggest the way central cities use TIF may also influence the way suburban cities use TIF as well. To some degree, the core city’s behavior may bolster suburbs, where the outlying cities replicate the similar behavior, in the case of St. Louis, but may not be competing explicitly with the city of St. Louis for development, as other studies have shown cities often do in adjacent city competition. In the case of Kansas City, suburban cities may take the lead when the core city does not use the tool as much. This reversal of roles has tremendous implications for the way our regions grow, especially regions that cross state lines and may have another competing source for development. Driving the size and aid intensity of TIF, not only in the city but also regionwide, may be the fact that Kansas City, Kansas and other Kansas-side suburbs compete for jobs and development so fiercely.

In the case of Kansas City, one might say that the city behaves in a risk-averse fashion, as the state of Kansas’s grab for development threatens the city’s investment and tax base. Later, when Kansas City declines to engage in the bidding with the state of Kansas, this tactic sends a signal to its suburbs that they may want to engage in risky decisions to avoid a loss in regional development. It also appears in contrast to Pacewicz’s (2013) findings that Kansas City, under the direction of Mayor Funkhouser, was behaving in a less puzzling manner in terms of financial sustainability, as Funkhouser curbed the use of TIF. In the case of St. Louis, the behavior of using TIF may be perceived more as a gain compared with the previously poor experience with TIF that made the city reluctant to use it, in addition to the cost of the perception and reality of the city’s decline. For the city of St. Louis, obtaining development at some cost, or a small loss, warrants some level of TIF use for the city to improve its image, especially when they do not face much competition from the neighboring state of Illinois. Also, St. Louis may have acted sustainably, using their tax incentives to focus on smaller TIF projects, although more numerous than the Funkhouser-administration period. The suburbs of St. Louis probably do not see the city as a competitor, but rather hope that the city’s demise will be stymied and not spread. This strategy would subdue the competition from the suburbs and make it not as reactive to the behavior in the central city, as seen in Kansas City. In a one-state study, the end effect on a bistate region, if any, is hard to determine. However, other taxing jurisdictions, such as libraries and school districts, suffer from less revenue and potential tax value loss, which should return in 23 years, except in places like St. Louis where the city and the county share the same geographic boundaries. Furthermore, more often than not, by the time properties again generate tax revenue, the loss in property value that is taxed negates the gain. Some interviewees in the Kansas City area have even called for amendments to the TIF

length. One interviewee suggested the length of the TIF should end when the development is complete or simply made more definitive. Another interviewee noted that the current 23-year period could be expanded by 10 more years when the TIF boundaries are expanded and that TIF redevelopment plans can be amended many times.

In St. Louis, where virtually no competition for jobs and development occurs regionally with the neighboring state of Illinois, TIF use in the central city (St. Louis, Missouri) is concentrated on smaller projects. Although project size has increased in the suburbs in both regions, the findings reveal that TIF size and aid intensity are not as large in the St. Louis metropolitan area as in Kansas City. It is possible that the communities' perceptions of their situations influence the views of their TIF actions. For example, Kansas City facing real losses to Kansas and St. Louis facing no threat from Illinois may help explain two divergent patterns of TIF use in these central cities but complementary ones with their suburbs. One solution for cities and taxing districts under siege or wishing to improve their state, whether their anchor is one of loss or gain, would be to share in both the benefits and costs of the TIF projects regionwide. In the case of Kansas City, the city could become a formidable threat to the State of Kansas in a bidding war when it comes to jobs and growth. In the case of St. Louis, the allocation of costs and benefits could be more evenly distributed and enrich the entire community, as opposed to abating only momentarily a further decline. Much like Sands, Reese, and Trudeau (2007) note, this strategy could help balance regionwide both city and neighborhood needs. Finally, our interviews show that many aspects of TIF remain controversial 30 years after the state legislature originally authorized TIF.

More research is needed, specifically on additional comparisons of central cities and their suburbs. Consideration to municipalities' anchoring points (of loss or gain) along with the more structural factors—such as mayoral term limits, commission majorities, regional competition, barriers to cooperation, and historical use, as well as amount and size of TIF projects—would be helpful to determine driving factors and further explain existing patterns of TIF use.

In light of these findings, changes to the Missouri TIF statute are probably necessary to promote regional cooperation more than intraregional competition. Although it is possible, cities might not want to forgo their competitive nature for fear of losing a chance at development or giving another area an edge, surrendering tax dollars to development that might be just as well suited in another part of the region, may need to be considered. An equity based approach to using development incentives regionally may return better outcomes for all jurisdictions than competing with tax dollars that may affect the future of services such as education. In 2007, the Missouri General Assembly established county TIF Commissions in St. Louis, St. Charles, and Jefferson Counties, where municipalities have only 3 of the 12 votes, and negative decisions by the Commission require the cities to obtain a two-thirds city council supermajority to approve a TIF (Butler, 2012: 65). The city of Ellisville did override the county TIF Commission in 2012 adopting an \$11 million TIF for a Wal-Mart store (Deere, 2012), and several St. Louis interviewees suggested that these county TIF Commissions should be strengthened to make it even more difficult for a city to adopt a TIF proposal that the commission has ruled against. In 2016, the state legislature did just that, restricting TIF in those cases to expenditures on land clearance and building demolition only (Schlinkmann, 2016). The situations that several Kansas City interviewees described suggest that extending the law statewide could be a valuable reform. In fairness to both the communities and

the regions, it may be that now is the time to take a regional approach to economic development. If the spoils and costs are shared more evenly across a region, not unlike the case of Minneapolis-St. Paul's regionwide economic development revenue sharing and joint development of wastewater infrastructure, some unintended consequences may be averted.

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Departments

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Data Shop

Data Shop, a department of Cityscape, presents short articles or notes on the uses of data in housing and urban research. Through this department, the Office of Policy Development and Research introduces readers to new and overlooked data sources and to improved techniques in using well-known data. The emphasis is on sources and methods that analysts can use in their own work. Researchers often run into knotty data problems involving data interpretation or manipulation that must be solved before a project can proceed, but they seldom get to focus in detail on the solutions to such problems. If you have an idea for an applied, data-centric note of no more than 3,000 words, please send a one-paragraph abstract to david.a.vandenbroucke@hud.gov for consideration.

The Long-Term Dynamics of Affordable Rental Housing: Creating and Using a New Database

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Abstract

In a study recently released by the Hudson Institute, the authors reported on the dynamics of affordable rental housing during the period between 1985 and 2013. In this article, we describe the data used in that analysis, present some of the most important findings, and explain how to obtain the data and the documentation, as well as the study.

Introduction

Housing assistance for low-income households has been a public policy objective since the 1930s, and housing has long been recognized as part of the social safety net. Assistance is not, however, an entitlement, and a large share of the housing occupied by low-income families is provided privately, both with and without federal support. As a result, little is known about the affordable rental stock, particularly how it has changed over time. Taking advantage of the longitudinal nature of the American Housing Survey (AHS) between 1985 and 2013, we have created a longitudinal database covering the whole period and analyzed the changes in the affordable rental stock during those years (Weicher, Eggers, and Moumen, 2017). This article briefly describes the creation of the database and summarizes the empirical results of the analysis.

The study used all 15 national AHSs derived from the sample drawn in 1985 and augmented through 2013. We classify rental units, both occupied and vacant, as affordable, moderate, or high rentals by comparing gross rent to local family median income with adjustment for the number of bedrooms. Once units enter the AHS sample, their status can vary across surveys. Possible statuses are rental (differentiated by affordability), owner stock, use as seasonal or second homes, temporarily out of the stock, or permanently out of the stock. We observed both stability and substantial variation with respect to status in the paths followed by units across surveys. A number of issues had to be resolved before analyzing the data. A fundamental issue was how to identify those rental units that are assisted; we used two approaches to solve this problem. The next section discusses these issues and describes how we resolved them.

We looked at the dynamics of affordable rental housing in three ways. First, we tracked the career paths of all units from either 1985 or the time they entered the housing stock until either 2013 or when they left the housing stock permanently. Second, we report on what happened by 2013 to those units that were affordable rentals in 1985 and also on where those units came from that were affordable rentals in 2013. Finally, we aggregated affordable rental housing across all 15 surveys and identified the types of units that provided that housing. In the third section, we report some of the more interesting findings from these analyses.

The concluding section explains how to obtain a copy of the report. It also describes the datasets available for use by others and indicates how to acquire them.

Data, Definitions, and Issues

We use a sample of 65,540 housing units obtained from the AHS that the U.S. Department of Housing and Urban Development (HUD) sponsors and the U.S. Census Bureau conducts. The sample was drawn in 1985; 66 percent of our units come from that original 1985 sample. HUD and the Census Bureau have added to the 1985 AHS sample with each survey to represent units that have entered the housing stock through new construction or by other means. The remainder of our sample comes from these additions through 2013, the end year of our analysis and the final year of data collection for this AHS sample.

Once a unit is in the AHS sample, the Census Bureau surveys the household occupying that same unit every 2 years, enabling us to observe changes in both housing units and their occupants over time. The sample is large and was carefully designed to represent the housing stock nationwide, and the information on both the housing units and its occupants is detailed and consistently reported. Like the Census Bureau, we weight each observation so that the sample of 65,540 observations can represent the 156 million housing units that were in the housing inventory for all or some of the years between 1985 and 2013. In order to adjust for some problems with the AHS sample, we have had to modify the pure weight assigned to each unit by the Census Bureau.

Our definition of affordable rental housing is—

A rental unit is affordable if the sum of rent, utilities, and related costs, adjusted for the number of bedrooms, is less than or equal to 30 percent of 50 percent of local area median income.

This definition takes both costs and income into account. Affordability improves (or worsens) as either housing costs decrease (or increase) or household incomes increase (or decrease). “Fifty percent of local area median income” is the HUD definition of very low income and is also the standard for eligibility for assisted housing. “Thirty percent” is the required contribution of income from tenants of assisted housing and is supposed to represent a reasonable boundary between what a family should spend for housing and what it should spend on other goods. The bedroom adjustment recognizes that an affordable rent for a two-bedroom unit would not be the same as an affordable rent for a one-bedroom unit.

Resolving Data Issues

In the course of the study, we identified several special issues. We addressed them in ways that we considered appropriate for this study.

- **Missing data:** Not all units in the survey provided complete interviews. We filled in missing values for various questions using the status of the unit in an adjoining survey—taking the response from the nearest survey. If two surveys were equally near with different responses, we chose the previous survey if the unit’s control number was odd and the next survey if the control number was even. We had to allocate responses in 1 year for 12,041 units and in 2 or more years for 8,882.
- **Sample reduction:** For the 2007 and 2009 surveys, about 5,000 units were dropped from the sample for cost considerations. These units returned to the survey in 2011. We employed our allocation procedures for missing data to fill in responses for the two surveys.
- **Median income adjustments:** Through 2005, HUD calculated median incomes for metropolitan areas or nonmetropolitan counties using the most recent decennial census. In 2007, HUD changed its methodology, using the American Community Survey (ACS). HUD observed that the income data from the ACS tended to be lower than the income data from the decennial census. We used the data from the 2005 and 2007 ACS surveys to make the 2007 and later local median incomes consistent with the 2005 and earlier local median incomes.

- Variation in bedroom counts: For nearly one-half of our sample units, respondents provided the same count of bedrooms in each survey; slightly more than one-half (51.4 percent) had more than one count of the number of bedrooms. To see how serious this variation might be, we did an alternative analysis in which we limited the variation in bedroom counts.
- Units not included in all surveys: From time to time, the AHS for a given year contains information for some units that is not available in other years. A special mobile home sample was added for only the 2005 survey, for example, and units were added in 2011 and retained in 2013 to enhance the sample. We eliminated these units from our database, because we did not have information about them for each survey and could not use them as part of our longitudinal analysis.

Assisted Housing

Identifying assisted housing has been a difficult problem in the AHS. Until 2011 identification of assisted units had to be based on the household interviewee's response to questions about assistance. Unfortunately, these responses have not been a satisfactory method for identifying units receiving assistance. Many more households have reported receiving housing assistance in the AHS than were actually receiving assistance, according to HUD program data.¹ The problems with the AHS in this regard have been recognized for many years. HUD's efforts to address them have included several revisions of the questionnaire, most recently in 1997.²

We have addressed these problems in two ways. First, we used the consistency of AHS responses to identify assisted units. We classified units that were always or nearly always identified as "assisted" by the responding occupant as being assisted through the entire period. Units that were infrequently identified as "assisted" were classified as not being assisted. Although the data are imprecise in any one survey, we considered this to be the best available method of identifying households that received assistance that was tied to the units. Second, we made use of program information on assistance status that has been provided only for the 2011 and 2013 surveys. In those surveys, HUD-assisted units were identified by matching the address of the sample unit to the administrative records for HUD programs. Units that were either public housing or privately owned assisted projects in 2011 or 2013 were identified as assisted back to 1985 or to the first year in which the unit was part of the AHS sample.

Using both approaches, we find that public housing and privately owned assisted housing projects were an important source, but never the predominant source, of affordable rental housing. Assisted housing projects accounted for 21 percent of the affordable rental inventory in 1985 and 16 percent in 2013. We believe that the decline represents the shift of federal housing assistance from project-based assistance to housing vouchers.³

¹ Units assisted in Farmers Home Administration (FmHA) multifamily programs are not identified in the AHS but cannot account for the overreporting of assistance by households in the sample. The Section 514 and 515 programs have 434,000 assisted units, according to FmHA program data that have recently been made available (Sccally and Lipsetz, 2017).

² The 1997 revisions are described in HUD (2000: A-22–A-25) and ICF (2001: 43).

³ HUD data show that project-based assistance reached a plateau around 1984 at about 3.1 million units and peaked in 1995 at about 3.2 million; by 2010, only 2.6 million units were assisted in this manner. No units received housing vouchers or certificates until 1976; by 1988, more than 1 million units were assisted, and by 2002, over 2 million were assisted (Weicher, 2012: Table 4-5).

Overall, the quality of the affordable rental stock improved steadily from 1985 to 2013, using both the standard measure of inadequacy reported in the AHS since the late 1980s and a more detailed measure developed for this analysis. This improvement in quality was also the case for moderate rent and high rent units, and for the owner stock. Not surprisingly, affordable rental units were found to be of lower quality than other rental units or owner units but, for the most part, affordable rental units were of acceptable quality. Assisted housing units were generally of higher quality than unassisted affordable rental but the quality differential had virtually disappeared by 2013 as the assisted stock aged.

Key Findings

Most of our key findings come from either a comparative static analysis that explained the changes in affordable rental housing between 1985 and 2013 or an aggregate analysis, which we termed “unit-years,” that examined the sources of affordable rental housing over all 15 surveys.

Counting Affordable Units

To track the “career path” of a housing unit, we classify it as being in one of eight statuses at the time of each of the 15 AHS surveys from 1985 and through 2013. The eight statuses and the numbers we assign to them⁴ are—

- 0 Not yet in the sample
- 1 Affordable rental unit
- 2 Moderate rental unit
- 3 High rental unit
- 4 Owner unit
- 5 Seasonal unit or second home
- 7 Temporarily out of the housing stock
- 8 Permanent loss from the housing stock

A moderate rent unit is defined in a similar manner to an affordable unit; the sum of rent, utilities, and other costs must be “greater than 30 percent of 50 percent of local area median income, and less than or equal to 30 percent of 80 percent of local area median income.” A high-rent unit has housing costs “greater than 80 percent of local area median income.” We include vacant units in categories 1 through 3 if they are vacant for rent, vacant for rent or sale, or rented but not yet occupied, and in category 4 if they are vacant for sale only or sold but not yet occupied. All other vacancies, such as seasonal use only, are put into category 5. Temporary losses include units used for nonresidential purposes or units needing repairs to be habitable. By 2013, 7,447 of our sample units had become permanent losses.

⁴ In the first stage of our analysis, we assigned a value of “6” to units with missing information on status in a given year. In subsequent stages, we assigned a status value for that year using the procedure described previously.

Using these statuses, we identify 25,642 unique paths that our sample units took during the course of the 15 surveys. The most common path is “always owner-occupied” from 1985 through 2013; 12,279 sample units take this path, 18.7 percent of the sample. The second most common is always affordable rental housing from 1985 through 2013; the 1,388 sample units that take this path constitute 2.1 percent of the sample. The next 14 most common paths are units that entered the sample after 1985 and were always owner-occupied, once they did so—units entering the sample in 1987, for example.

At the other end of the distribution, 22,488 units take unique paths; only one unit in the sample follows that path. These unique paths constitute 34.3 percent of the sample, more than the number of units that were always owner occupied once they entered the sample. Only two units each follow another 1,456 paths. Put another way, only one unit follows 87.7 percent of the paths, and only two units each follow another 5.7 percent. The career paths followed by housing units are many and diverse.

Comparative Statics: Looking Backward and Forward

Affordable rental housing has constituted a remarkably stable share of the total stock. The proportion was 14.8 percent in both 1985 and 2013. During the period, the share never rose above 16.4 percent or fell below 14.5 percent. With the growth of the housing stock, the number of affordable rental units rose from 15.0 million in 1985 to 19.7 million in 2013. These additional units came from three sources (as exhibit 1 shows).

- Rental units that were not affordable in 1985 but became so by 2013—4.6 million units.
- Housing units that were not rental in 1985; they were part of the owner stock or were seasonal or second homes—3.8 million owner units (owner-occupied or available for sale) and 0.5 million whose occupants had a usual residence elsewhere (URE), such as seasonal housing units or second homes.

Exhibit 1

Backward-Looking Analysis: Where Did the 2013 Affordable Rental Stock Come From, Vis-à-Vis 1985?

Status in 1985	Frequency	Percent of 2013 Affordable Rental Stock
Affordable	6,243,000	31.7
Were in higher rent categories	4,615,000	23.4
Were owner stock	3,845,000	19.5
Were seasonal/URE stock	463,000	2.3
Were temporarily out of the housing stock	200,000	1.0
Were additions to stock	4,337,000	22.0
New construction	2,557,000	13.0
Other additions	1,780,000	9.0
Total	19,702,000	100.0

URE = usual residence elsewhere.

- Units that did not exist or did not provide housing in 1985—4.5 million, of which 2.5 million were new construction; 1.8 million were added to the stock by merging two or more units into a single unit, splitting one unit into two or more, or conversion from other purposes; and 0.2 million were temporarily out of the housing stock in 1985.

Looking forward from 1985, about 6.2 million affordable rental units were also affordable rentals in 2013. The other 8.8 million were no longer affordable, or no longer rental, or no longer provided housing (as exhibit 2 shows).

- Affordable rental units in 1985 that were still rental in 2013 but not affordable—1.7 million units.
- Units that were no longer rental—2.7 million, of which 1.9 million were in the owner stock and 0.8 million were no longer primary residences but had become UREs, such as seasonal or second homes.
- Units that had been lost to the housing stock—4.3 million, of which 4.0 million were permanent losses and 0.3 million were temporary losses that could be reversible.

Thus the most common reason for losses from the affordable rental stock between 1985 and 2013 was that the unit was no longer providing housing—it was permanently lost. During the same period, the most common source of additional affordable rental housing was the higher rent stock.

Exhibit 2

Forward-Looking Analysis: What Happened to the 1985 Affordable Rental Stock by 2013?

Status in 2013	Frequency	Percent of 1985 Affordable Rental Stock
Still affordable	6,243,000	41.7
Gentrified	1,722,000	11.5
Owner stock	1,884,000	12.6
Seasonal, URE, or similar	791,000	5.3
Temporary, reversible loss	276,000	1.8
Permanent loss to housing stock	4,053,000	27.1
Total	14,969,000	100.0

URE = usual residence elsewhere.

Comparative Statics: Looking Both Ways

Exhibit 3 puts the gains and losses together to account for the increase in the number of affordable rental units. Of the additional 4.7 million affordable rental units, only 0.2 million came from net additions to the housing stock; the losses nearly matched the number of new units. The other 4.5 million came as a result of changes within the 1985 existing housing stock; 2.9 million from changes in the rent levels of the 1985 rental stock, units that filtered down exceeding those that gentrified; and 1.6 million from tenure shifts between owned or URE units and rental housing. The net increase from filtering is nearly twice as important as the net increase from tenure shifts, and far more important than the net increase from new construction and demolitions (and other sources of additions or removals). The gross increases are very similar—4.6 million from filtering,

Exhibit 3

Accounting for the Net Change Between 1985 and 2013

	Frequency
1985 affordable rental stock	14,971,000
New construction or other additions	4,537,000
Demolitions or other losses	4,330,000
Net effect	207,000
Filtering—becoming affordable	4,615,000
Gentrifying—rising rents	1,722,000
Net effect	2,892,000
Tenure shift—owned or URE/seasonal to affordable rental	4,307,000
Tenure shift—affordable rental to owned or URE/seasonal	2,675,000
Net effect	1,632,000
Net addition	4,732,000
2013 affordable rental stock	19,702,000

URE = usual residence elsewhere.

4.5 million from new construction and other additions, 4.3 million from the nonrental housing—but fewer units are lost from gentrification than from tenure shifts and far fewer than from demolitions and other losses.

Sources of Affordable Housing During 1985–2013

To look at affordable rental housing *throughout* the entire period, we developed the concept of unit-years of housing. If 100 units furnish affordable rental housing for 10 years, we record this activity as 1,000 *unit-years* of affordable rental housing. Similarly, 100 units furnishing 10 years of owner-occupied housing would be said to provide 1,000 unit-years of owner stock. Of course, the same unit can provide unit-years of different types of housing, for example, 8 unit-years of affordable rental, 4 unit-years of seasonal housing, and 10 unit-years in the owner stock. Units following a variety of paths can provide unit-years of affordable rental housing.

During the entire period, about 535 million years of affordable rental housing existed—about 17.9 million units each year on average. The largest contributors to affordable housing during these years are diverse and quite surprising.

- The largest contributors to affordable rental housing throughout the years were the 44 million units that were most often part of the owner stock but were affordable rentals for less than one-half of their time in the housing stock. These units accounted for 24.4 percent of all affordable rental housing. On average, they were affordable rentals for 3 years out of the 30.
- Another 5.8 million units served both the owner and renter sectors but were affordable rentals for one-half or more of their time in the housing stock. These units provided nearly 18 years of affordable rental housing on average and accounted for 19.1 percent of all affordable rental housing.
- Taken together, units that were both rental and owner (or seasonal) accounted for 43.5 percent of all affordable rental housing.

- The 3.5 million assisted units accounted for 17.8 percent of all affordable rental housing.
- The 20.8 million units that were permanently lost by 2013 accounted for 12.1 percent of all affordable rental housing.
- The 2.8 million units that were always rental and affordable for one-half or more of their time in the housing stock accounted for another 10.3 percent.
- The 6.1 million units that were always rental but affordable for less than one-half of their time in the housing stock accounted for another 6.3 percent. These last two categories encompass most units that were filtered or gentrified.
- Often filtration is thought of as a smooth process in which units move from high rent to moderate rent to affordable. We found only 1.1 million units that followed this path, and they accounted for 2.6 percent of all affordable rental housing. Further analysis shows that 80 percent of these units were never high rent during the period studied.
- Similarly, gentrification is often thought of as a smooth process from affordable to moderate rent or high rent. We found only 0.4 million units that followed this path, accounting for 0.7 percent of all affordable rental housing.
- Private units that were always affordable, and units that were always affordable except for one survey, accounted for the remaining 6.8 percent of all affordable rental housing.
- Finally, 65.7 million units were never rental and another 3.3 million units were always either moderate or high rental.

Looked at another way, close to one-third of all affordable rental housing during the period was provided by units that were affordable rentals for less than one-half their time in the housing stock.

Conclusion: Accessing the Databases and Our Analysis

In the course of our research, we created two databases and documented the construction of each database and the special variables they contain. The databases, documentation, and the full study, “The Long-Term Dynamics of Affordable Rental Housing,” are available on the Hudson Institute website at <https://www.hudson.org/research/13340-data-for-the-long-term-dynamics-of-affordable-rental-housing>.

The first database, *hudson_institute_file_1*, contains 95,444 observations and 2,164 variables. This file merges all 15 AHS national surveys based on the sample drawn in 1985 and extracts key AHS variables. New variables were created for use in the merging and cleaning of the individual AHS files for each survey. We also appended relevant variables from HUD’s Housing Affordability Data System and the Census Bureau’s Where Did They Go file, which contains historic information on all units that are part of the national sample. Finally, we eliminated units that were part of supplemental samples used in some but not all the AHS surveys.

The second database, *hudson_institute_file_2*, contains 65,540 observations and 3,728 variables. The second file modifies the first by eliminating cases that were absent from too many AHS

surveys, cases with too much missing information on affordability, and cases that were defective in other respects. It also standardizes descriptive variables based on 2013 values or the most recent values if 2013 data are missing. Further, the file includes a new bedroom variable that reduces survey-to-survey variation in the bedroom count, a variable identifying assisted project-based housing, the weights used in our analyses, and several special variables created for our analysis.

Hudson_institute_file_1 is designed for researchers who want to conduct different analyses than ours but also want to avoid the work of merging the files and extracting the data. *Hudson_institute_file_2* is available to researchers who want to conduct longitudinal analyses of housing policy issues and take advantage of some of the special features developed in the course of our study.

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Continuous Repayment Structures in Japanese Housing Finance for Elderly People: Applications To Mitigate Counterparty Risk Through U.S. Reverse Mortgage Design

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Abstract

What innovations can improve the risk management of the Home Equity Conversion Mortgage (HECM) and HECM mortgage-backed securities (HMBS) programs? The Japanese housing finance sector has relevant insights for reverse mortgage design in the United States. Through the Japan Housing Finance Agency, or JHF, the Special Repayment System for the Elderly program can inform the strengthening of U.S. efforts for senior citizens. As HECM and HMBS counterparties confront challenges with the financial sustainability of their business operations, recurring repayment structures, like those embedded in Japanese housing finance products, can be considered to help alleviate strains on lenders and, more particularly, issuers and servicers.

This article assesses the alternative approach of continuous payments from Japanese loan design for elderly people within the American reverse mortgage context. The conclusion is that broad-based collaboration and mutual awareness are required to manage cash flow timing risks and advanced servicing liabilities with stakeholders

Abstract (continued)

toward strategically advancing HECM and HMBS market development. Collective action to mitigate counterparty risk can ensure the option is preserved—if not bolstered in a responsible manner—for aged homeowners seeking to financially supplement their income at affordable terms while continuing to live in their homes.

Introduction

Reverse mortgages can support the economic security of senior homeowners who lack adequate financial resources to maintain their livelihoods. The benefits of Home Equity Conversion Mortgage (HECM) products are evident, as they enable elderly borrowers to monetize their home equity while concurrently aging-in-place at their pledged residence. Aside from these advantages, the pioneering accrual-based structure has an appeal to HECM borrowers.¹ Mortgagors liquidate a proportion of their home equity and do not make continuous interest rate payments throughout the term of the loan. In lieu of these recurring borrower payments, borrowers repay the entire principal, as well as the full interest amount accumulated at maturity since the reverse mortgage's origination.

Despite borrower attraction to deferred payments, lenders, issuers, and servicers participating in the HECM and HECM mortgage-backed securities (HMBS) programs will incur business operation costs. Issuers and servicers must have sufficient capital resources on two fronts.² First, the programs mandate counterparties to provide intermediate funding to borrower draws prior to being sold for securitization into HMBS as participations.^{3,4} Furthermore, once HECMs reach maturity—occurring when the unpaid principal balance attains 98 percent of the Maximum Claim Amount (MCA)⁵—counterparties must buy out the loan with associated costs and await reimbursement from the Federal Housing Administration (FHA).⁶ The result is distinctive financial exposure for reverse mortgage counterparties for significant periods of time, accentuated with delayed FHA insurance claims, especially when influxes occur in maturing HECM volume.

¹ The accrual-based structure refers to the manner in which reverse mortgages accumulate owed capital without an immediate cash transaction. Eventually, a disbursement is made repaying the lent money and interest to the lender.

² Issuers are business entities in the Ginnie Mae mortgage-backed securities program that aggregate collateral and sell securities to fund their operations. Servicers are commercial organizations that administer and process loan transactions.

³ Counterparties are defined in this article as the operational stakeholders—consisting of lenders, issuers, and servicers—participating in the FHA mortgage insurance and Ginnie Mae mortgage-backed securities programs.

⁴ Ginnie Mae's HMBS program allows for issuers and servicers to include components of the HECM loan beyond principal draws as participations, such as monthly insurance premiums, servicing fees, and guaranty fees (Ginnie Mae, 2017). This mechanism is an important divergence from forward mortgages where pools consist of collateralized principal.

⁵ The MCA is the arbitrary amount these reverse mortgages can accumulate prior to FHA buy out as policy determines.

⁶ These instances in which the issuer is responsible to use “their own funds” for repurchase “to ensure that security holders receive outstanding principal and interest” is commonly referred to as Mandatory Purchase Events (Ginnie Mae, 2017: 35-4).

The nature of deferred servicing fees and interest rate margins has been a notable barrier to entry for new counterparties. The delayed borrower remittance structure has to some extent limited the deepening of reverse mortgage activities. The concentration of reverse mortgage lending and securitization issuance is disproportionate within a relatively small segment of counterparties for both programs.⁷ The consequence is systemic risk that can affect the continued provision of reverse mortgage products at accessible and affordable terms for senior homeowners. The hazard is valid, as reduced programmatic participation has resulted in unrealized potential, as well as reduced stability and constrained growth, which is inherent in the design and administration of reverse mortgages and their securities.

Alternatively, Japan has been actively experimenting with housing finance approaches as their society substantially ages (Feather, 2018). The recent Special Repayment System for the Elderly program—through the Japan Housing Finance Agency (JHF)—is one facet of their efforts in expanding financial means for senior homeowners.⁸ The program is different than the American reverse mortgage counterpart as elderly borrowers are required to repay interest rates continuously each month, similar to the payment structure of forward mortgages in both countries. Japanese borrowers likewise do not pay loan principal until maturity, analogous to the product design of the HECM and HMBS.

The following assesses the merits of this Japanese feature, focusing on how continuous repayment could deepen development of the HECM and HMBS programs. Specifically, the recurring payment structure present in the Japanese program can be a means to alleviate a dimension of financial strain imposed on U.S. counterparties with advanced servicing liabilities⁹ and cash flow timing¹⁰ in both funding intermediate borrower HECM draws, as well as the mandatory repurchase at FHA assignment at 98 percent of the MCA.

Although benefits for counterparties exist, so do drawbacks. Adapting the HECM and HMBS design in allowing for continuous payment features, similar to those of the Japanese program, can directly affect end-user appeal in the United States, especially as one in five Americans will be age 62 and older in 2019 and beyond (Census, 2017). Additionally, such a change in loan product design can alter investment channeled through capital markets and impact liquidity levels in the HMBS market.¹¹

⁷ Although HECMs are a small share of the mortgage portfolio at FHA, these reverse mortgages make up more than one-half of housing loans by dollar volume assigned to the U.S. Department of Housing and Urban Development's (HUD's) balance sheet (FHA, 2016).

⁸ The JHF program is dually referred to as the "Special Repayment System for the Elderly" and the "Special Repayment Rules for the Elderly" depending on the translation from Japanese to English.

⁹ This article defines advanced servicing liability as the mortgage insurance premium and Ginnie Mae guaranty payments that counterparties must advance to the U.S. government.

¹⁰ Likewise deferred cash flow timing—for the purposes of this article—is defined particularly for the programmatic mandate that counterparties must repurchase HECM loans and related HMBS participations that reach 98 percent of the MCA. The assignment of these reverse mortgages to FHA means counterparties must advance interest rate payments to investors and await reimbursement from their filing of FHA mortgage insurance claims for these HECMs. Deferred cash flow can also include the intermediate time between counterparty funding of borrower draws and securitization through the sale of participations to the capital markets. However, for ease of reference, the article uses this definition.

¹¹ The full faith and credit guarantee of timely principal and interest payments that the U.S. government assures on Ginnie Mae MBS, including HMBS, provides a "high quality bond alternative" in the fixed income space, including U.S. Treasuries (Irving and Schmitt, 2013: 1).

The ensuing sections analyze the strengths and weaknesses of continuous repayment structures for reverse mortgages. Reverse mortgage design can be a tool to mitigate counterparty risk.¹² It is fundamental, however, for stakeholders to understand the largely overlooked contribution counterparties have in enabling the operations of the reverse mortgage programs in the United States. More important than the novel structure of recurring borrower payments for reverse mortgages is the further development of attentive counterparty risk management and inclusive collaboration toward strengthening the HECM and HMBS programs among consumers, government, and industry.

Special Repayment System for Elderly People in Japan

Japan is popularly referred to as the oldest country in the world for having the largest concentration of elderly persons. As Japanese society experiences accelerated aging, public and private sector entities are exploring innovative approaches to successfully meet the socioeconomic needs of senior citizens among this unprecedented demographic change. Fundamental to these efforts is the need to expand adequate housing supply configured for elderly people.

JHF has several programs to promote access to residences designed and serviced for elderly people (Kobayashi, Konishi and Takeishi, 2017).¹³ The Special Repayment System for the Elderly is a housing finance program that provides funds enabling senior homeowners, age 60 and older, to renovate their residences for the purpose of actualizing age-friendly design features (Kojima, 2013).¹⁴ The Special Repayment System, as a component of JHF's urban development lending, also allows for elderly borrowers to purchase reconstructed condominium housing as their residence.¹⁵

Whether for renovation or urban development loan purposes, lenders provide borrowers with upfront principal in the form of a lump sum principal advance. Borrowers are only required to make continuous interest rate payments during the term of the loan. Specifically, the program eases repayment burden on the borrower, as it provides a "grace period" whereby principal is repaid only when the borrower dies (JHF, 2014: 37). On death, lenders and servicers collect the remaining outstanding loan balance from the borrower's estate.¹⁶

¹² Counterparty risk is defined here as the hazard in which FHA lenders and Ginnie Mae issuers and servicers fail in financial and operational terms, resulting in the inhibited provision of HECM and HMBS, as well as substantial costs to the U.S. government.

¹³ JHF provides multifamily loans to developers as well. The purpose of this program is to construct rental housing with nursing services for elderly people (JHF, 2016, 2014). The United States has correspondingly made significant investments in housing with assisted living and nursing homes (Manda, 2015). In addition, JHF launched a new rental insurance program to provide lessors with guaranteed lease payments to overcome rental discrimination for elderly people in 2017 (Kobayashi, 2017).

¹⁴ Besides age-friendly housing renovations, the Special Repayment System for the Elderly program began focusing on anti-seismic earthquake modifications (JHF, 2014). The program began in the aftermath of the 2011 Great East Japan Earthquake and resulted in 1,658 loans between 2012 and 2014 (JHF, 2014).

¹⁵ JHF consults with management associations and developers seeking to adapt condominium units for purchase by elderly people through the urban development lending component of the program (JHF, 2016).

¹⁶ In 2017, this mechanism was extended to include loan modifications for elderly homeowners age 70 and older who are delinquent and facing payment difficulties (Kobayashi, 2017).

The open-ended housing finance mechanism for this program is unique for the country's broader sector. Elderly borrowers in Japan often encounter mortgage restrictions when applying for residential loans. Particularly, senior citizen borrowers are required to make all loan repayments by the time they attain 80 years of age (Kojima, 2013). The outcome is that the Special Repayment System provides a means for elderly Japanese households to access financing in an otherwise exclusive market.¹⁷

Although no home equity liquidation occurs, the Special Repayment System for the Elderly has relevant operations for reverse mortgage financing in the American context. Equivalent to the FHA's provision of mortgage insurance of HECM, JHF provides insurance contracts on Special Repayment System loans from small- and medium-sized financial institutions (JHF, 2014).¹⁸

The continuous interest payment structures that Japanese senior borrowers must pay is among the differences between the Japanese and American programs. The program requires monthly interest payments on the loan. Some critics argue this is a "not ideal" feature for borrowers, as the loan obligation imposes a financial burden on participating elderly households (Kojima, 2013: 9).¹⁹ Nonetheless, a relatively low-interest rate environment—in which Japanese elders accumulate substantial cash deposits—has made such a concern relatively negligible.

HECM and HMBS Counterparties in the United States

Irrespective of their role as lender, issuer, or servicer, HECM and HMBS counterparties make the underlying legal framework and programmatic policies work in delivering financing to senior borrowers.²⁰ Undoubtedly, the unprecedented scale of FHA endorsements and Ginnie Mae securitizations—in the historical global development of reverse mortgages—validates the fundamentals of reverse mortgage design and the employed public-private partnerships model in the United States.²¹ Notwithstanding, the HECM program has encountered challenges in achieving durable fiscal soundness for FHA's financial health (Szymanoski, Lam, and Feather, 2017).^{22,23} The financial

¹⁷ The Special Repayment System for the Elderly program enables borrowers to withdraw ¥10 million (approximately \$89,380) or less (Kojima, 2013). The Japanese loan is recourse-based, with the borrower retaining the title of the property until obligations are settled. The U.S. HECM loan is nonrecourse for senior homeowners.

¹⁸ JHF seeks to expand the provision of reverse mortgages through the provision of mortgage insurance similar to FHA's HECM insurance program (JHF, 2016).

¹⁹ Another key difference for the Special Repayment loans is the aforementioned recourse-based characteristic (Kobayashi, Konishi, and Takeishi, 2017).

²⁰ Ginnie Mae issuers are often the servicers as well for their mortgage pools (HUD, 2011). Ginnie Mae enables issuers to enter into servicing agreements with subservicers as well. However, subservicers must also be Ginnie Mae-approved issuers (Ginnie Mae, 2007).

²¹ FHA endorsements refer to reverse mortgages approved for mortgage insurance to lenders.

²² For example, in fiscal year 2016, FHA's Mutual Mortgage Insurance (MMI) Fund suffered economic value losses valued at \$7.7 billion. This cash outflow from the MMI Fund was greater than those annually incurred following the global financial crisis from 2008–2009 (FHA, 2016; Szymanoski, Lam, and Feather, 2017).

²³ Critics cite recent modifications, beginning in 2011, as the cause for Mutual Mortgage Insurance Fund "volatility" for the HECM Insurance Program (FHA, 2016: 50). The critics contend the dual purpose of the modification—for consumer protection and fiscal soundness—have limited borrower demand and negated business incentives for deepened counterparty participation.

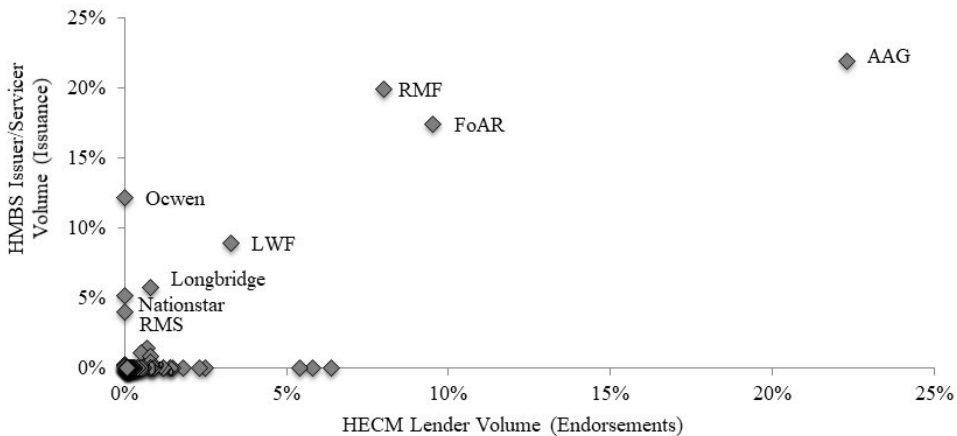
issues FHA confronts with HECMs relate to an array of credit, interest rate, policy, and other economic risks.²⁴ Principal among risks for HUD and U.S. taxpayers is the threat of counterparty insolvency.

The risk among counterparties is disproportional in both programs. In 2017, the top eight HECM lenders composed 63.2 percent of the primary reverse mortgage market (RMI, 2017). The secondary market is concentrated to an even greater extent. During the same year, the six leading HMBS issuers furnished more than four in five of total Ginnie Mae guaranteed reverse mortgage securities. Moreover, for all intents and purposes, one entity services most of the issuers in these programs. The condensed nature of both primary and secondary market actors poses systemic risks to the future provision of reverse mortgages.

As observed in exhibit 1, overlap is common with several counterparties in the reverse mortgage industry. For instance, American Advisors Group, Reverse Mortgage Funding and Finance of America Reverse are the top three market leaders for both lending HECMs and issuing and servicing HMBS.²⁵ If several counterparties default, especially those from the HMBS program, then

Exhibit 1

Comparing HECM and HMBS Counterparty Production, January–December 2017



AAG = American Advisors Group. FoAR = Finance of America Reverse. HECM = Home Equity Conversion Mortgage. HMBS = HECM mortgage-backed security. Longbridge = Longbridge Financial LLC. LWF = Live Well Financial. Nationstar = Nationstar Mortgage. Ocwen = Ocwen Loan Servicing. RMF = Reverse Mortgage Funding. RMS = Reverse Mortgage Solutions. Sources: RMI, 2017; Ginnie Mae disclosure data

²⁴ Recent FHA changes in mortgage insurance premium rates and Principal Limit Factors underscore the ongoing policy efforts to “sustain the HECM program as a viable financial resource” (FHA, 2017: 2).

²⁵ Besides their dominant status, these three counterparties are nonbank financial institutions. The prominence of such nondepository institutions in the housing finance sector is a recent market change since the 2008–2009 global financial crisis (Ginnie Mae, 2016, 2014). FHA also stated this change to smaller nonbank lending partners “increases counterparty risk exposure” (FHA, 2016: 50). Accordingly, less than 1 percent of HMBS issuers were banking institutions in 2017. For HECM counterparties, approximately less than 10 percent are deposit-based entities in 2017.

operations could potentially cripple reverse mortgage operations. In such a scenario, the outcome would be ominous, especially given the U.S. government obligations through the provision of mortgage insurance and the full-faith and credit guarantee by FHA and Ginnie Mae respectively.

Should economic market conditions falter, unsavory lending practices and mismanagement grow or unintended consequences from policy modifications occur, FHA and Ginnie Mae could be unexpectedly called on to rescue the HECM and HMBS program.²⁶ In such a scenario, large-scale servicer and issuer default likely would necessitate that the U.S. government engage and support the proper sale and transfer of portfolios, loan pools, and mortgage servicing rights.²⁷

Were confidence inhibited, and few interested parties sought reverse mortgage portfolio acquisition, the government could possibly take over management and administration, acting as a counterparty of last resort, due to outstanding obligations with senior borrowers and investors.²⁸ This active government role with HECMs, HMBS, or both products would likely result in capital infusions of taxpayer dollars. The bailout, depending on the political climate,²⁹ could attract undue attention and potentially jeopardize efforts to return the HECM and its securitization to their former status or anything closely resembling it.³⁰ In such scenarios, the consequence likely would be inhibited access to reverse mortgages for senior citizens. Reduced access would mean few options for senior citizens seeking to bolster their retirement security and age in place.

Strategic approaches to counterparty risk management are essential to prevent and mitigate possible counterparty failures. U.S. government processes already exist to strengthen controls and avoid such losses for forward mortgages. FHA evaluates these lenders across specific default and delinquency metrics. In instances of “excessive default and claim rates compared to peers,” FHA monitors—and can limit, if not terminate—any counterparty’s Lender Insurance (LI) authority in originating and underwriting reverse mortgages with mortgage insurance (FHA, 2014a: 1; 2014b).

Correspondingly, Ginnie Mae launched the Issuer Operational Performance Profile (IOPP) to measure operational and default performance in early 2015 (Ginnie Mae, 2017a).³¹ Similar to LI authority at FHA, the IOPP helps inform the amount of commitment authority Ginnie Mae approves to issuers forming the underlying collateral pools for HMBS securities (Ginnie Mae, 2017a).

²⁶ HMBS issuers can encounter mismanagement issues special to HECM and HMBS. One example is the assignment of HECMs to FHA once the outstanding balance crosses more than 98 percent of the MCA. Improper operational management by counterparties can result in unrecoverable claims from FHA once loans exceed the 98-percent benchmark.

²⁷ Ginnie Mae has used its authority to seize mortgage pools from defaulted issuers in several cases to ensure investors received timely principal and interest payments (Whalen, 2017). The defaulted portfolios have been auctioned to the highest bidder to resume administrative processes and servicing.

²⁸ Ginnie Mae seeks to counter issuer default risk through “Master SubServicer,” or MSS, arrangements. Through MSS, Ginnie Mae-contracted agents provide full servicing support to defaulted issuer pools.

²⁹ Some critics have argued the “subsidize[d] risks” of “taxpayer funds” merit limiting the government’s role in the HECM insurance program (Shadab, 2012: 1).

³⁰ In such a catastrophic scenario, where interest or confidence in the programs is severely limited, immediate financial relief could immediately come from FHA’s Mutual Mortgage Insurance Fund or Ginnie Mae’s collection of guarantee fees. In instances where these resources are not enough, additional capital infusions could come from the U.S. Department of the Treasury, which would probably need authorization and appropriation from the U.S. Congress.

³¹ Ginnie Mae monitors issuer financial risk for liquidity and corporate credit and default risk based on delinquency ratios for securitized loans (Ginnie Mae, 2016a; GAO, 2011).

Counterparty Financial Burdens With Deferred Payments

Beyond extending operational performance assessments to HECM lending as is done with HMBS and issuer activity, reverse mortgage design is another tool that can mitigate counterparty risk. Compared with forward mortgages and mortgage-backed securities, the structures of HECM and HMBS have distinctive liabilities for the involved counterparties. The exceptional accrual-based structure presents, in part, certain financial burdens for those actors delivering financing to borrowing senior homeowners. Realignment of borrower payment schedules and counterparty advances can mitigate risks that limit issuer and servicer participation in these reverse mortgage programs.

Like forward mortgages, cash flow for reverse mortgages consists of lent capital, transaction costs, and accumulated interest. Different is the gradual buildup of interest and embedded costs during the duration of the loan. Although servicers regularly submit monthly statements to the borrowers, the costs are, in some sense, imperceptible to the mortgagor, as minimal financial burden is realized during the life of the borrower.

The borrower pays the aggregated loan amount on the reverse mortgage's maturity. Besides voluntary prepayment or the mortgagor moving out of the pledged residence, the loan regularly matures when the borrower passes away. In instances of mortality, the borrowers' heirs have the option of paying the accrued obligation amount from another source of funds or selling the home to use proceeds to compensate counterparties.³² As such, the senior borrower routinely does not witness the settling transaction that concludes the life of the reverse mortgage.

Despite the somewhat discrete nature of reverse mortgage costs borrowers realize, counterparties are keenly aware of the cash flow schedule, because it largely determines the financial viability of their business. For the average senior borrower, costs usually represent a significant, albeit relatively small component of their borrowing. For lenders, issuers, and servicers, these costs determine financial viability of their businesses and the accessibility of HECMs for prospective senior homeowners.

Alone the sums of interest rate payments and fees are smaller components than principal, as modeled in exhibit 2, for the typical cash flow of a HECM loan and related HMBS costs. However, accrued interest for the average reverse mortgage, during the typical American life expectancy, is commonly 34 percent of the total loan amount value.³³ Fees and closing costs are less, accounting for 6 percent. Upfront and annual mortgage insurance premiums to FHA are between 8 and 9 percent.³⁴

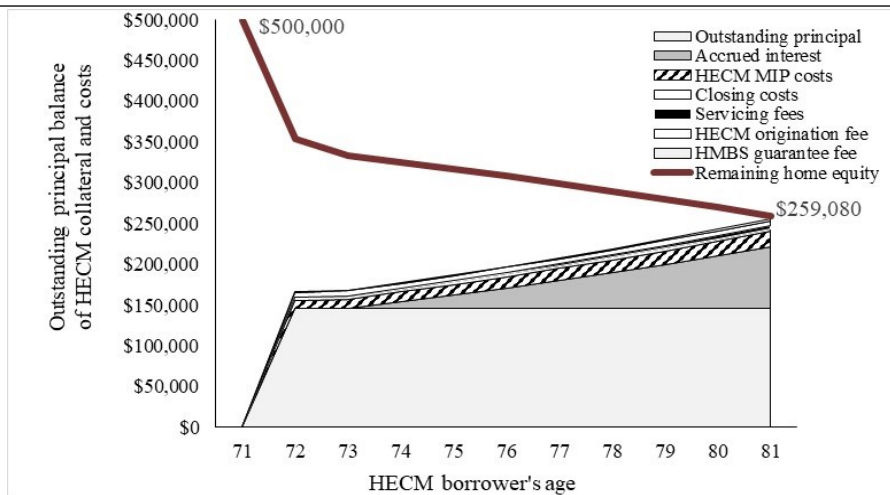
³² FHA rules for HECM lenders ensure heirs will not have to pay more than the full loan balance or 95 percent of the appraised value, whichever is less. In situations where the loan balance is worth more than the home, heirs will not have to pay the excess amount (FHA, 1994).

³³ The average loan amount has approximately a principal balance of \$300,000 with an interest rate of 5 percent in 2016 (FHA, 2016). This calculation assumes all costs are financed into the HECM for a single lump sum disbursement.

³⁴ The HECM mortgage insurance premiums reflect the change in the upfront premium structure from 2 percent of the maximum claim amount and the annual premium structure from 0.5 percent of the outstanding reverse mortgage balance in 2017 (FHA, 2017). The increased annual premiums for the outstanding HECM balance rather than the principal limit means greater financial resources are required for issuers to advance these payments to FHA. Additionally, the updated Principal Limit Factor is applied October 2, 2017, and forward.

Exhibit 2

HECM and HMBS Cash Flow Model for Typical Senior Borrower With Lump Sum Disbursement^a



HECM = Home Equity Conversion Mortgage. HMBS = HECM mortgage-backed security. MIP = mortgage insurance premium. Note: "Closing Costs" include fees related to appraisal, HECM counseling, credit report, flood certification, escrow settlement and closing, document preparation, recording, courier, pest inspection, survey, and title insurance.

^a Besides the detailed interest rate amounts, fees, and closing costs, senior HECM borrowers must also make property tax and flood and hazard insurance payments, otherwise the program deems such delinquencies as loans in default. The costs for flood and homeowners insurance are on average \$700 and \$964 per year. Property taxes are typically 1 to 1.5 percent of home value, approximately \$6,250 for the average home annually.

Together, the approximate 49 percent sum constitutes a substantial component of the total loan amount. Although interest rate index and margin are one-half of these costs, they represent the largest component of the overall HECM amount after the principal the borrower receives. These interest payment amounts are critical, however, as they support the operating costs and earnings for reverse mortgage stakeholders, including counterparties and the U.S. government.

Both HECM and HMBS counterparties rely on interest rate margins as profit to grow their business. However, reverse mortgage counterparties—particularly issuers and servicers—have longer term revenue collection timelines, often times years after origination.³⁵ Issuers and servicers often recoup cash flow from securitization, after funding borrower draws.

Once the unpaid principal balance of HECMs reaches 98 percent of the MCA, counterparties must also buy out the loans and the substituent HMBS participations providing principal and interest rate payments to investors. The result is more capital-intensive for reverse mortgage counterparties funding borrower draws, as well as HECM assignments to FHA. In this respect, the accrual-based structure poses greater counterparty risk than the continuous payment schedule of forward mortgages with interest rate payments paid monthly.

Borrowers typically pay few out-of-pocket costs when their reverse mortgage is issued. Should the senior borrowers not have the funds immediately on hand to pay closing costs, origination fees and

³⁵ According to publicly available financial filings from issuers, the average loan life for HECM is often fewer than 5 years.

the upfront mortgage insurance premium, lenders provide the option for payment to come from the principal drawn from the HECM. In these cases, lenders receive payments from the borrower's principal drawn at issuance. As a result, HECM lenders receive many of their costs at issuance at the borrower's expense, either in direct transfer or from financing through the loan's principal drawn.³⁶

Once the HECM is issued, the nature of the cash flow substantively changes; issuer and servicer revenue sources start accruing. Interest rate payments accumulate, and the borrower pays them only when the HECM becomes due and payable. Without intermediate funding through the securitization of HECM participations, servicing fees are similarly collected and transferred to servicers only when the reverse mortgage matures.

Alternatively, FHA's annual mortgage insurance premiums (MIPs) and Ginnie Mae's guaranty fees are paid to the U.S. government each and every month. The fees are calculated based on the outstanding principal balance on the HECM loan and its securitized participations. Although the U.S. government receives these payments regularly throughout the life of the loan, these fees do not transfer from the borrower to the servicer. Instead the administrating counterparty must advance monthly the insurance premium and guaranty fee to the U.S. government from the issuer and servicer's own corporate funds.

The components of HECM and HMBS revenues are either paid to the program stakeholder or deferred, as exhibit 3 summarizes. At issuance, lenders and the FHA receive their fees, costs, and upfront MPI either directly from the borrower or from the principal drawn through the HECM.³⁷

After issuance, counterparties pay FHA and Ginnie Mae monthly their annual MIPs and guaranty fees. These payments, however, are advanced from issuer and servicer funds. FHA and Ginnie Mae insurance premiums and guaranty fees are subordinate to issuer, servicer, and investor interest rate payments and servicing fees.

The servicing and administration obligations for HECM and HMBS counterparties have significant liabilities due to the nature of which revenues are disbursed. Per exhibit 4—sans securitization and

Exhibit 3

HECM and HMBS Stakeholder Revenue Sources

Stakeholder	Revenue Item	Are Payments Deferred?
Lender	Closing costs	No, can be financed into HECM and paid from principal.
Lender	Origination fees	No, can be financed into HECM and paid from principal.
FHA	Upfront MIP	No, can be financed into HECM and paid from principal.
FHA	Monthly MIP	Yes, but counterparty must advance monthly.
Ginnie Mae	Guaranty fee	Yes, but counterparty must advance monthly.
Servicer	Servicing fee	Yes, obtained at maturity.
Issuer and investors	Interest rate index and margin	Yes, both components disbursed at maturity.

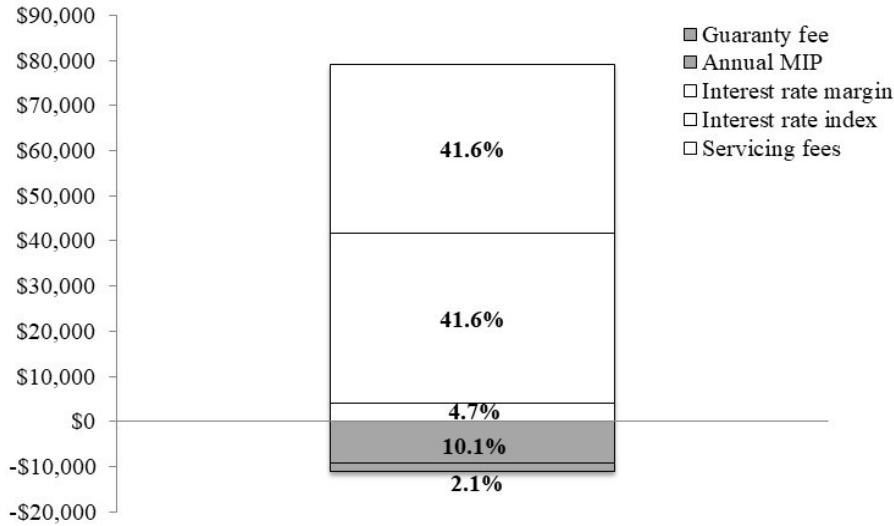
FHA = Federal Housing Administration. HECM = Home Equity Conversion Mortgage. HMBS = HECM mortgage-backed security. MIP = mortgage insurance premium.

³⁶ Depending on the HECM lender's evaluation of borrower risk, the mortgagee can waive or discount origination fees and omit certain closing costs.

³⁷ Without the upfront MIP payment, "FHA cannot endorse the mortgage" (FHA, 1994: 7–3, 4).

Exhibit 4

Estimating HECM and HMBS Counterparty Revenue Liabilities per Whole Loan^a



Color Code	Financial Type	Value	Percentage
	Advanced servicing liabilities	\$10,989	12.2%
	Counterparty revenues ^a	\$79,230	87.8%
	Sum	\$90,219	100%

HECM = Home Equity Conversion Mortgage. HMBS = HECM mortgage-backed security. MIP = mortgage insurance premium.

^a The estimates are made for typical lump sum disbursement for HECM collateral home value of \$500,000 at an adjustable rate, increasing from a 4.65 percent interest rate during the average life expectancy of a senior borrower of 72 years of age in 2016.

^b Counterparty revenues include costs for servicing and interest rate index obligations to lenders. As such, counterparty profits are likely less than these figures, especially when considering business expenditures.

purchase of participations from the capital markets—counterparties must advance 12.2 percent of the revenues they will receive to FHA and Ginnie Mae in the form of the annual MIP and guaranty fee. This amount can be around \$10,989 per HECM loan serviced.

Inevitably, reverse mortgage counterparties—retaining the whole loans on their portfolio—will earn revenues from the substantially larger deferred interest rate payments as well as servicing fees. For the typical loan during an average American life expectancy of 81 years, revenues can amount to \$79,230. The issuer and servicer only receive these revenues when the HECM and HMBS become due and payable, typically years later following origination and securitization. Minus the costs, the profit per reverse mortgage loan is estimated to be equivalent to or less than advanced servicing liabilities that are reimbursed to the counterparty on HECM maturity.

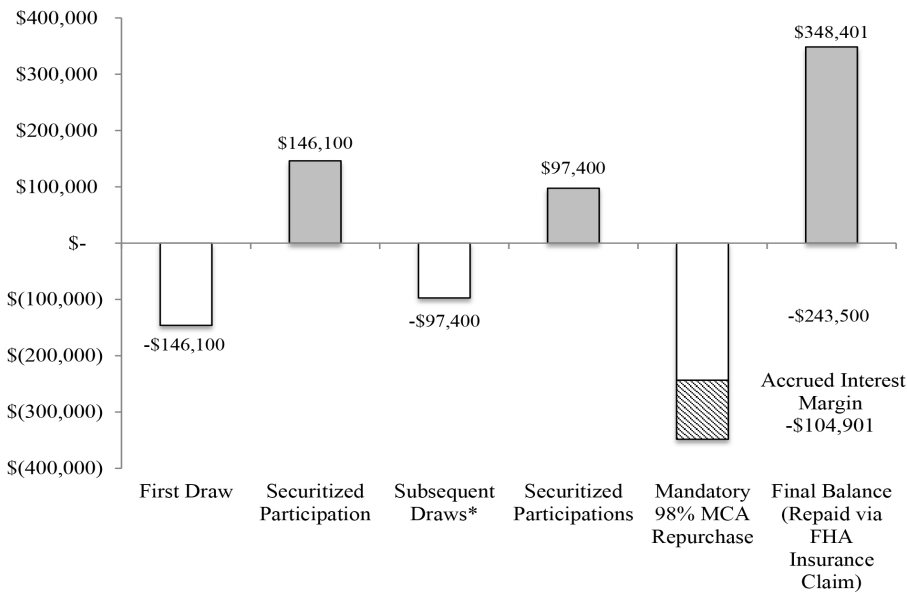
The revenues are substantial for counterparties, which must already have substantial cash available to participate in HECM and HMBS for these advanced payments. For counterparties without the

requisite cash reserves, they likely will explore participating in other businesses. The forward mortgage market could be more appealing as these products have recurring interest rate payments, lower net worth requirements, and fewer obligations delaying cash flow.³⁸

Counterparties typically receive financial cash flow relief through HMBS securitization as exhibit 5 illustrates. Many counterparties sell the HECM participation securities to support the funding of borrower draws. However, the counterparty must buy out the loan and its accrued costs once the unpaid balance of a HECM reaches mandatory 98 percent of the MCA. The buy out provides interim funding and thereby gives investors a more definitive timeline when their accrued interest and principal payments, as well as reimbursement for their purchase of participations consisting of MIPs and guaranty fees. The consequence, however, is that counterparties must reassume these costs—an estimated cost of \$104,901 for interest rate margin payments per loan, as exhibit 5 indicates—and wait for FHA to offset these costs and revenues.³⁹

Exhibit 5

Modeling HECM and HMBS Issuer-Servicer Cash Flow Advances and Deferred Reimbursement From Investors and FHA per Multiple Disbursements



FHA = Federal Housing Administration. HECM = Home Equity Conversion Mortgage. HMBS = HECM mortgage-backed security. MCA = maximum claim amount.

^a This model has multiple draws and participations to illustrate the issuer-servicer cash flow process on HECMs with additional disbursements. For this reason, the resulting sum of interest rate payments is less than equivalent lump sum disbursements, as exhibits 2 and 4 showed.

³⁸ In 2015, Ginnie Mae raised net worth requirements requiring HMBS issuers to have \$5 million (Ginnie Mae, 2017b). HMBS issuers have a higher net worth requirement than single-family and multifamily mortgage-backed securities counterparts for Ginnie Mae securities at \$2.5 and \$1 million respectively (Ginnie Mae, 2017b).

³⁹ Already counterparties incur costs from defaulted HECM loans, approximately one in five of which are defaulted and therefore ineligible to be assigned to FHA.

The reverse mortgage industry is concerned that HMBS counterparties must “wait” because FHA cannot process HECM insurance claims fast enough (NRMLA, 2016: 3). Specifically, the processing times can be lengthy for the assigned HECMs at 98 percent of the MCA. Delayed FHA claim processing can become even more deferred, as mandatory purchase events have been predicted to affect 81 percent of the active pool count by 2020 (Ginnie Mae, 2015). In 2018 alone, nearly 34,000 HECMs are expected to be assigned from counterparties to FHA (Ginnie Mae, 2015). Further delays in FHA insurance claim processing can severely constrain the financial viability of counterparties and threaten the HECM and HMBS programs.⁴⁰

Regardless of the supporting cash flow to counterparties from investors, the deferred cash flow, particularly the mandatory repurchase event at 98 percent of MCA, constitutes a significant barrier to entry for counterparties and underscores the capital-intensive nature of reverse mortgages compared with their forward analogs. Such barriers to entry for both new and expanded counterparties merit stakeholder consideration on whether to modify HECM, and thereby HMBS programmatic policies. Permitting the option for continuous repayment structures would have various implications for each participant beyond solely reverse mortgage counterparties.

Policy Implications in Permitting Recurring Interest Rate Structures

Continuous repayment structures, like those utilized in Japan’s Special Repayment System for the Elderly program, can help toward mitigating financial burdens on HECM and HMBS counterparties, especially with the advanced servicing liabilities and deferred cash flow for issuers and servicers. Deciding whether to permit recurring interest rate payment structures in reverse mortgages has significant policy implications for each stakeholder. In considering the inclusion of payment structures with this option, consumers, industry, investors, and policymakers must thoroughly understand and opine on the ramifications of such policy change.

For senior citizens, continuous interest rate payments can add a significant financial burden and affect their participation in the HECM program. Traditionally, senior borrowers have sought reverse mortgages in instances when they are cash-poor homeowners. If recurring interest rate payment structures were to be permitted into the HECM program, borrowers would need to have either the needed money on hand or reduced principal draws allocated for monthly interest rate payment amounts.

Recent HECM program changes in the reverse mortgage have sought to reposition the product into a financial planning tool rather than a product of last resort. For these borrowers, seeking to bolster their retirement security, adding the aforementioned 9- to 10-percent interest rate payment options of the total loan value may not jeopardize the financial wellbeing for this intended group of senior households. Moreover, such a change would be less impactful for borrowers in a low-interest

⁴⁰ Aside from reverse mortgage design through recurring interest rate payment structures, Ginnie Mae could consider monitoring the issuance of head and tail HMBS participation typologies. Specifically, tracking tail participations—the subsequent uncertificated portions of the HECM—could help assess the financial burden on issuers and servicers who may rely on securitization of guaranty fees and annual MIPs to derive temporary cash flow from investors through their purchase of HMBS pools.

rate market environment. Should counterparties be able to verify that continuous interest rate payments would lower business costs and thereby provide better financing terms on HECMs, consumers and advocate groups may be more receptive in considering the potential allowance of these structures.

Lenders, especially those specialized in HECM origination, may not be affected by the allowance of continuous interest rate payment structures. The business model of many lenders primarily derives revenue from originating fees and closing costs paid at or before issuance of the reverse mortgage. Further the borrower already pays these fees and costs either out of pocket or through principal draws.

Conversely, HMBS issuers and servicers likely would benefit from allowing recurring interest payment structures in the HECM. The current obligations of advanced servicing liabilities and delayed cash flow add an extra burden on secondary mortgage market actors. Issuers need to fund all HECM borrower draws, prior to securitization, and finance repurchase when FHA assignment occurs in addition to property disposition for loan defaults. Certainly, many counterparties have overcome these challenges and achieved success, as indicated by the super majority HMBS market share that the three largest businesses amassed. Regardless, continuous interest rate payments may help improve appeal and minimize financial barriers to entry for new operators.

The participating U.S. government entities, FHA and Ginnie Mae, require their MIPs and guaranty fees to be paid continuously throughout the duration of the HECM until maturity. The requirement is logical given the government's role in enabling the reverse mortgage market. The payment precedence of annual MIPs and guaranty fees also reinforces the primacy of the American taxpayer in supporting the reverse mortgage market more than issuer and servicing interest rate payments and servicing fees.

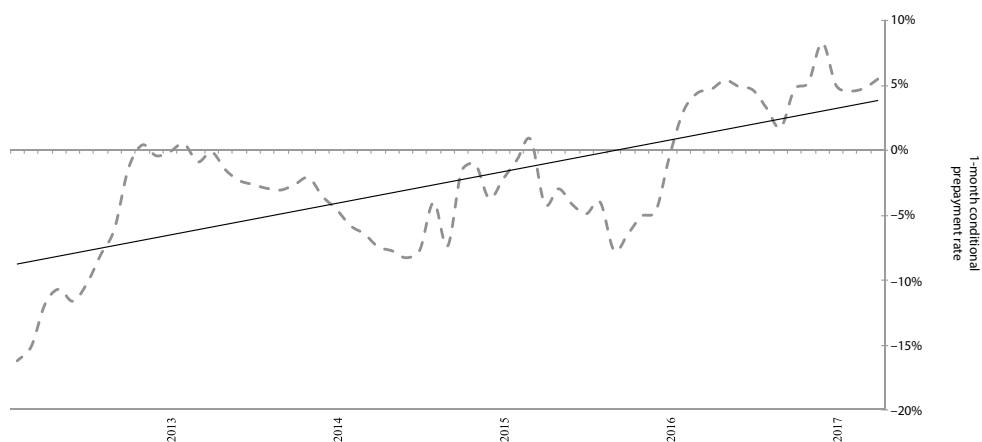
FHA's provision of mortgage insurance alleviates credit risk concern for lenders and investors while expanding access to such financing for senior homeowners. Ginnie Mae concurrently improves investment into HMBS with the full-faith and credit sovereign guaranty from the U.S. government for the timely principal and interest rate payments to bondholders. The channeling of investment into HMBS improves liquidity in the secondary reverse mortgage market and provides more affordable terms for the financing of HECMs for senior borrowers.

The proposed continuous interest rate structure can affect investment into HECM securities and liquidity into the HMBS market. At present, investors are encouraged to buy HMBS pools since interest rate payments can be 30 to 50 basis points higher than the yields on conventional collateralized mortgage obligations or CMOs. The recurring structure, however, likely would transition interest rate payments to a monthly cash flow schedule for HMBS investors. The change may also affect the prepayment rate on such securities.

If borrowers are aware of the financial burden recurring interest rate payments present, then end-users may be more likely to voluntarily repay reverse mortgage obligations to reduce prospective cost liabilities. For this reason, such a change may increase prepayments and shorten overall HECM and HMBS pool durations. The recent shift to faster prepayment speeds for the HECM during the 30-year Ginnie II Single-Family MBS, as exhibit 6 illustrates, may counter specific investor concern of increased prepayment speeds. Oppositely, the new structure could also result in even faster rates on HMBS pools.

Exhibit 6

HECM to G2SF (30-Year) Prepayment Spread, January 2013–March 2018



G2SF = Ginnie II Single-Family Mortgage-Backed Securities. HECM = Home Equity Conversion Mortgage.
Sources: NVA, 2018; Ginnie Mae Disclosure Data

Conclusion

Disproportionate risks exist in the HECM and HMBS programs despite the relatively small share of reverse mortgages within FHA's insured and Ginnie Mae's guaranteed portfolios.⁴¹ Primary among hazards is counterparty risk that can imperil the future provision of affordable reverse mortgage products in primary and secondary markets, where HECM and HMBS are largely the only vehicle for the consideration of senior homeowners.⁴² In the event of a major counterparty or sectorwide default, few issuers and servicers may be able to take on additional risks, forcing the U.S. government to directly act.

The present concentration in the reverse mortgage market, in terms of HECM lending and securitization, merits consideration of innovative approaches in limiting potential risks that contribute to sweeping failures with counterparties. As such, it is in the interest of the U.S. government to strengthen the HECM and HMBS programs. Beyond government contingency plans and oversight through monitoring the performance and operations of HECM and HMBS counterparties, reverse mortgage product design is a complementary tool for consideration in mitigating counterparty risk. Among approaches, it may be prudent to strategically reduce barriers to entry and overcome operational deficiencies in both programs to increased counterparty participation.

⁴¹ In 2016, HECMs constituted 3.9 percent of FHA's single-family insured mortgages (FHA, 2016). Correspondingly, HMBS were around 3.2 percent of Ginnie Mae's outstanding guaranteed MBS (Ginnie Mae, 2016b).

⁴² No mainstream reverse mortgage products alternatively exist; similarly, neither private-label entities nor the government-sponsored enterprises securitize reverse mortgages.

The accrual-based HECM and HMBS structure is certainly one of the many innovative features of the reverse mortgage in the United States.⁴³ However, issuers and servicers have made a largely unrecognized contribution to certain deficiencies embedded in this reverse mortgage cash flow structure. Moreover, the constant efforts of issuers and servicers in financially adapting cash flow between funding ongoing borrower HECM draws, selling pooled participation securities to the capital markets and repurchasing HMBS pools, as they are assigned to FHA, deserves recognition. In addition, alternative payment structures need to be explored with regard to reverse mortgages in the United States. The Japanese approach, as evidenced through the Special Repayment System for the Elderly, can provide a prospective solution for consideration to alleviate certain financial burdens placed on counterparties.

Recurring payment structures can improve management of cash flow timing risks and assuage advanced servicing liabilities unique to the design of HECM and HMBS products. However, permitting continuous interest rate payments into HECMs and HMBS structures has profound ramifications. Recurring interest rate payments may provide more certainty into counterparty business operations but may also significantly affect other stakeholders, particularly borrowers and investors.

The exploration of recurring payment structures necessitates close collaboration and validation with stakeholders. Continuous interest rate structures have the potential to deepen counterparty participation and reduce the business risks and costs associated with reverse mortgages. The outcome can be more affordable terms for senior homeowners seeking to strengthen their retirement security.

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⁴³ The U.S. government, through HUD, pioneered the innovative approaches. "FHA was the first organization to insure reverse mortgages on a national scale" (FHA, 2016: 17). Likewise Ginnie Mae executed the first HECM securitization through the HMBS program.

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Creating Permanent Housing Affordability: Lessons From German Cooperative Housing Models

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Introduction

The United States and Germany, as major economic and world powers and, respectively, the first and second largest destination for immigrants worldwide, are each faced with their own unique challenges in creating economic opportunity for their most vulnerable residents. Moreover, in both Germany and the United States, the location, quality, and quantity of affordable housing is one of the most significant factors in creating greater equality of opportunity (Katz, Noring, and Garrelts, 2016). This article explores Germany's use of cooperative housing as a platform for long-term affordable housing and better economic outcomes for low- and moderate-income persons. In the United States, shared equity housing models, which typically take the form of community land trusts and cooperative housing, have become increasingly popular in the past few years, in part, as a local response to increases in inequality. Germany has a robust market for cooperative housing with around 2,000 cooperative projects offering approximately 2.2 million units (Bundesministerium, 2017). Lessons from Germany's experience with cooperative housing can inform recent efforts in the United States.

What Is Cooperative Housing?

The term "cooperative housing" describes many different forms of housing, ranging from for-profit cooperative owner-occupied housing to affordable cooperative housing to cohousing. This article will focus on the type of affordable cooperative housing that is most prevalent in the United States, namely limited-equity cooperative housing, which has an equivalent in the German context. However, cohousing, community land trusts and similar "shared equity" living forms will also be discussed. In each case, the type of housing will be identified and defined.

Affordable Housing: A Comparison of German and U.S. Markets

In both Germany and the United States, the location, quality, and quantity of affordable housing are significant factors in creating greater equality of opportunity. Stanford researchers Chetty and Hendren's (2015) work shows that, in the United States, the neighborhood in which a person resides affects nearly every other aspect of their life, whether it is availability of jobs, quality of schools and medical services, availability of other social infrastructure (parks, childcare, and cultural amenities), and transportation mobility options. According to this research, racial and income neighborhood segregation in the United States is associated with less upward economic mobility from childhood into adulthood and the persistence of poverty through multiple generations (Chetty and Hendren, 2015). In a 2009-to-2012 German study, researchers found a correlation between the quality of the built environment, particularly that of the neighborhood, with that of employment, education, and income levels of the inhabitants (BBSR, 2012). In fact, many similarities to the housing and urban development policy environments exist between both countries, most significantly, their similar structures for financing urban development activities at the federal level. The following section will briefly explore the two countries' affordable housing sector and current trends.

Affordable Housing in Germany

In Germany, the bulk of affordable housing construction began during reconstruction after World War II. Between 1950 and 2000, the government subsidized approximately 24 million units, of which 9 million were dedicated for low-income residents, called *soziale Wohnungen* or social housing (Harlander, 2017). In the early 1970s, the construction of new housing units decreased as historic preservation, revitalization efforts, and modernizing projects took a larger role. After reunification of East and West Germany in the 1990s, Germany saw a renewed, if smaller, demand for affordable housing development due to the poor state of the housing stock in former East Germany and an influx of asylum seekers from the Balkans (Harlander, 2017).

Several important housing policy shifts began in the 1990s, including the privatization of formerly government-owned social housing stock and, in 2007, a shift in responsibility for affordable housing production from the federal government to the 16 states or *Länder* (BPB, 2009). The federal government now supplements state finances for new affordable housing production with funding called *soziale Wohnraumförderung*. This funding is distributed from the federal government to the 16 states and then to eligible localities, with each level of government providing one-third of the funding. States and localities use this resource to finance a number of affordable housing activities, including subsidizing private developers who create affordable units. Due to an increase in demand for affordable housing, the federal portion of this funding has increased in recent years from €518.2 million annually in 2015 to €1.5 billion in both 2016 and 2017 (Bundesministerium, 2017).

Affordable housing is also supported through vouchers, which provide direct payments to residents from the federal government (*Wohngeld*) and from the local governments (for example, *Kosten der Unterkunft*). This voucher system is a means-tested program in which all qualifying households receive housing assistance. In 2016, Germany provided *Wohngeld* to 631,000 households (DeStatis,

2017). In addition to *Wohngeld*, housing allowances are provided under the social welfare system. Each year Germany spends about €17 billion providing housing vouchers to a total of 5 million households (Housing Europe, 2017). Although the constitution gives states the responsibility for the provision of affordable housing, most devolved this responsibility to their larger cities, and as such, the type and mix of affordable housing varies significantly at the local level.

Beginning in 2004, the German federal government elevated the importance of cooperative housing to that of ownership and renting (Bundesministerium, 2018). Because each member of a housing cooperative is part owner, with a life-long right to occupancy, the government views the benefits of this housing type as providing the means for self-governance, self-help, and the financial development of residents. Further, this housing is considered important to retaining long-term affordability in the face of gentrification. Today, approximately 2.2 million cooperative housing units are in existence, which equate to 6 percent of all housing units in Germany. Five million citizens currently live in one specific type of housing cooperative—*Genossenschaft* (Bundesministerium, 2018). This statistic does not include the number of persons residing in cohousing and other shared equity housing models throughout the country.

Affordable Housing in the United States

The U.S. housing market has been defined by several phases. One of the most significant was the growth of the single-family housing market in the suburbs after World War II. For the first time in U.S. history, bank loans became available to many households due to the development of new financial products. Before the Fair Housing Act of 1968 made housing discrimination illegal, the Federal Housing Administration (FHA) made home loans available mainly to White families in new suburban single-housing divisions (Rose, 2010). Further, many homeowners placed restrictive covenants in their deeds, prohibiting the sale of their home to people of color (Khadduri, 2015). The result, by the beginning of the 1960s, was a highly unequal housing distribution with middle- and upper-class White persons living in the suburbs or more desirable urban neighborhoods and people of color largely relegated to the less attractive neighborhoods and older housing stock in urban areas. The repercussions of these policies continue today and affect more than only the quality of housing. The federal homeownership mortgage interest tax deduction allows for households to accumulate significant savings and, over time, wealth. The lack of homeownership opportunity historically for people of color has contributed significantly to the lack of wealth accumulation for this group and the increasing inequality between White people and people of color in the United States.

Today, the Low-Income Housing Tax Credit (LIHTC) program, funded by the U.S. Department of Treasury and distributed by states, is responsible for the largest share of new affordable housing construction in the United States. Through this program, states and local bodies issue up to \$8 billion in tax credits for the preservation, rehabilitation, and creation of new affordable housing units by private developers (HUD, 2017). The U.S. Department of Housing and Urban Development (HUD) also provides direct transfers to landlords in a program similar to *Wohngeld* called the Housing Choice Voucher (HCV) program, or Section 8. With this subsidy, households are responsible for paying one-third of their income toward rent, and the HUD subsidy provides the remaining amount, up to a set threshold. Approximately 2.2 million households participate in this program. The existing pool of public housing units that the federal government built between

the 1930s and the 1970s serves another 1.1 million households (Gould Ellen and Yager, 2015). Only approximately one of every four households that qualify for housing assistance in the United States receive that assistance from the federal government (CBO, 2015).

Cooperative and shared equity housing models are less prevalent in the United States than in Germany; however, they have recently seen a resurgence in popularity in the United States as a tool for preserving affordability in increasingly expensive cities and regions (GSN, 2016a). The Grounded Solutions Network, the largest association of shared equity housing providers in the United States, defines *shared equity* as any housing model that creates or preserves housing with lasting affordability (GSN, 2016b). In the United States, prevalent models include community land trusts and limited equity cooperatives. Community land trusts are nonprofit, community-based organizations whose mission is to provide affordable housing by owning land and leasing it to those who live in houses built on that land, creating permanent affordability (Greenstein and Sungu-Eryilmaz, 2005). Limited equity cooperative housing is housing eligible to low-income members who purchase shares at below-market prices and are subject to limitations on the amount of profit they can receive on the resale of their units (Mallin, 2018).

Comparison of Affordable Housing: United States and Germany

The United States and Germany have remarkably similar funding instruments for housing and the urban development programs that support affordable housing. For example, the HCV program is comparable with the *Wohngeld* program. Each program provides that the tenant receives a governmental grant to finance the rental costs, with the subsidy going to the landlord in the case of HCV and, typically, the tenant in the *Wohngeld* program. The *soziale Wohnraumförderung* program can be compared with the LIHTC program. Although not set up with the sole purpose for incentivizing private developers, *soziale Wohnraumförderung* allows for this use and many localities provide guaranteed payments to developers who produce new affordable housing units in tight housing markets. Both countries provide block grants to localities for urban development activities through similar programs called *Städtebauförderung* and Community Development Block Grant, respectively.

For all the similarities, the scale of the German programs outpace those in the United States. When evaluated as a percentage of Gross Domestic Product, or GDP, Germany provides significantly more public funding than the United States toward affordable housing preservation and production. Second, only 14 percent of low-income renters in Germany face housing cost overburden (spend 40 percent or more of disposable income on housing costs), although 59 percent of comparable renters do in the United States (DeStatis, 2018; OECD, 2017a). An analysis of all U.S. funding sources shows that only 31 units of affordable housing are available for every 100 low-income families who would otherwise qualify (NLIHC, 2016).

German and U.S. housing markets differ in other ways as well. Germans tend to rent their homes, with an average of 55 percent of households renting, whereas U.S. citizens are more likely to be homeowners—only 35 percent are renters (OECD, 2017b). In German cities, the percentage of renters can be even higher. For instance, in the city of Leipzig, the share of renters is 87 percent (Bild, 2017). As such, a significant political base in Germany advocates to keep rents affordable and tenants protected. In the United States on the other hand, renters are, as a percentage, smaller and tend to have lower incomes than homeowners; therefore, they are less politically potent.

Despite these differences, both the United States and Germany are grappling with two similar trends in their housing markets. The first trend is a growing issue of gentrification, marked by increased migration into urban centers largely by young professionals and, therefore, an increase in demand for existing housing stock. Another trend is increasing unaffordability of goods, including rent, due to sluggish growth in wages during the past 15 years (HUD, 2016). A third trend is the increase in single-person headed households (Zabel, 2016). Due to high demand for housing, particularly in urban areas, and rising inequality, pressure is increasing on affordable housing for people in need and historically marginalized groups.

Why Cooperative Housing?

One of the most unique aspects of Germany's affordable housing market is the use of cooperative housing models; typically developed and supported at the local level. As in the United States, this sector of the housing market is growing—both in terms of resurgence of traditional cooperative housing forms (*Genossenschaften*) and new shared housing models. Although cooperative housing is also present in the United States, it comprises a small share of the affordable housing mix. The Urban Homesteading Assistance Board estimates that of an original 425,000 units of affordable cooperative housing, approximately 167,000 units remain. In Germany, approximately 2.2 million cooperative housing units serve 4.6 million residents (COOP, 2018). This housing is considered important, particularly in retaining long-term affordability in the face of gentrification (Gerhardt, 2017).

In Germany, the cooperative housing field is quite broad, encompassing many legal and organizational structures, project sponsors, and goal. In general, two main types of cooperative housing exist in Germany—that provided by large and well-established cooperative housing organizations and the smaller project-cooperatives. The latter are characterized by interest in a group of people in the renovation or new construction of housing units for long-term self-use. Most projects in Germany are owner occupied, multifamily buildings, in which each household has their own living space (Ache and Fedrowitz, 2012). The legal and operating structures are quite similar to those used in the United States. Typically, private firms, small organizations (similar to U.S. nonprofit organizations), or self-formed groups of people establish a legally recognized organization and bylaws that govern the operation of the entity. The organization or group takes on low-interest financing to purchase, build, and renovate an existing building and, sometimes, contribute to the renovation directly through sweat equity. In the end, each tenant has their own living space and access to shared amenities, such as terraces, outdoor space, laundry facilities, and shared kitchen areas. As in the United States, one can create a cooperative housing model, which places no limit on the equity that can be raised by the “shareholders” or tenants, or create a limited-equity cooperative, in which shareholder values are capped based on the bylaws of the organization, thus preserving affordability for generations.

In Germany, the only subsidy available to build cooperative housing is through government-sponsored low-interest mortgages (COOP, 2018). The government-owned development bank, KfW, offers attractive financing with low-interest rates for the new construction, purchase, and renovation of housing for self-use (KfW, 2018a). Individuals may also qualify for a loan to purchase a share in a cooperative housing organization. Interest rates are quite low on these products, even lower than comparable HUD low-interest mortgages. However, compared with the United States, the amount of capital that is available to an individual borrower is limited. For example, KfW's products for

home or cooperative share purchase are capped at a maximum of €50,000 (KfW, 2018b). Although these borrowing amounts may increase when coupled with regional bank products that each state offer and with special incentives for the use of energy efficiency building techniques, individuals still need significant savings to invest. With some regions seeing sharp increases in land value, cooperative living is now out of reach for some moderate- and low-income families (Gerhardt, 2017).

Cooperative housing models meet many societal goals in Germany, including creating multigenerational living, in which older residents age in place with younger residents, mixed-functional living quarters, in which persons with disabilities can live independently and in an integrated setting, as well as long-term or permanently affordable housing in quality neighborhoods (Selbstnutzer, 2017). These models also have several indirect benefits, which include (1) revitalization of empty or underused building stock, (2) provision of ownership of housing to groups often underserved by traditional financial markets, and (3) improvement in the stability and quality of affordable housing because residents own a share in the building and must be committed to the project to see it to fruition. Although cooperative housing has many benefits, disadvantages must also be considered that continue to pose challenges within the German context. First, as previously discussed, the startup costs for residents in terms of finances and also investment of time and energy can be high. Second, such living forms could have the potential to aggravate segregation in the affordable housing sector if the initial tenants choose new residents based on their similarity to existing members. In the United States, however, this concern can be mitigated by enforcement of antidiscrimination and fair housing laws, and many times these projects are completed with a goal for a better socioeconomic or social mix. For example, a study of cooperative and cohousing efforts in the state North Rhine Westphalia frequently showed a mix of residents with different backgrounds, such as old and young, families and single persons, different nationalities, and different income groups (Ache and Fedrowitz, 2012).

Due to Germany's long history with cooperative housing and relatively large number of projects, innovations are found that may be useful to consider in the United States. The following examples exemplify innovations in the German market and further illustrate potential benefits to cooperative housing.

City of Munich: Cooperative Housing as an Antidote to Gentrification

The city of Munich has seen the greatest demand for housing and increase in housing prices in the country, due in large part to migration into the city of young professionals and E.U. citizens seeking jobs in this economic powerhouse. To protect its citizens from increasing living costs, specifically housing costs, the city released a 4-year housing strategy that was laid out in their 2012-to-2016 "Housing Offensive" and their 2017-to-2021 Housing in Munich VI strategy (Landeshauptstadt, n.d., 2012). As part of both strategies, Munich stated that of the city-owned land set aside for new housing, 20 to 40 percent would be provided at reduced prices to cooperative housing groups (Landeshauptstadt, n.d., 2012). The city of Munich stated that it viewed cooperative housing groups as important partners due to their interest in creating permanently affordable housing that fit into the fabric of existing neighborhoods. In addition to inexpensive land, cooperative housing projects that enumerated goals in line with the overall Munich strategy could receive additional benefits such as reduced borrowing costs.

City of Leipzig: Cooperative Housing as a Tool for City Revitalization

As part of former East Germany, much of the city of Leipzig's downtown housing stock was neglected between World War II and reunification. After reunification in the 1990s, most of the population was attracted to new housing stock being built on the outskirts of the city or to West Germany in search of new employment (Harlander, 2017). The building stock left in the urban core was largely blighted and uninhabitable. Since the 1990s, the city of Leipzig has slowly revitalized, beginning with the historic city center and moving outward into surrounding neighborhoods. This revitalization occurred mainly due to private investments, which benefited from tax reduction for this purpose. However, about one-third of buildings remained difficult to refurbish for various reasons including locations along main traffic roads and in neglected areas with low qualities of public and green spaces.

A key part of this revitalization strategy has been the use of new, smaller, and project-oriented cooperative housing models, used to incentivize private investment in city housing stock (Gerhardt, 2017). In this climate, several nonprofit organizations formed to work in partnership with the city to help groups of interested residents obtain clear titles to properties or contact abandoned building owners in the hopes of obtaining agreements for their reuse. Today, much of Leipzig has revitalized successfully, and it is one of the fastest growing cities in Germany (Stadt Leipzig, 2017). Due to high demand for housing and land, the city and all organizations involved in the reuse of blighted housing stock have formed one umbrella organization—*Netzwerk Leipziger Freiheit* (2018)—to bring investors to potential cooperative projects quickly and advise promising projects with the goal to obtain as much financing as possible.

Citywide Incubators

Most large cities in Germany offer city-run incubators for the creation of cooperative and shared housing models. For example, in Leipzig, the *Netzwerk Leipziger Freiheit* provides free consultation, connection with similar projects, access to and information about available financial grants, and financial consulting for persons interested in such a project. Incubators can also be used to promote cooperative housing to a specific segment of the population, specifically one that is vulnerable or in need of more affordable housing options. For example, the city of Berlin provides a consulting service for families and seniors who are interested in setting up multigenerational cohousing for the purposes of aging in place called *Netzwerkagentur Generationen Wohnen* (2018), or Network Agency for Cross-generational Living. The service provides access to peer learning from other such projects and facilitation in the founding of the projects. In 2010, the Faculty of Spatial Planning at Dortmund University found that 26 municipalities across Germany supported cohousing projects, with support ranging from a website to more comprehensive approaches with the provision of special funding or city-owned land (Ache and Fedrowitz, 2012).

Sharehaus Refugio, Berlin: Using a Cooperative Living Model To Provide Transitional Housing for Refugees

The Sharehaus Refugio project in Berlin provides an example of an innovative cooperative housing model. Refugio provides temporary living space for up to 18 months to as many as 40 residents

who apply and meet the criteria to live in a shared setting and bring a particular skill to the community. In 2017, one-half of the residents were recent refugees seeking political asylum in Germany. Of the other one-half, some were German nationals and others voluntary newcomers to Berlin. In all, 10 nationalities were represented in the house (Harutyunyan, 2017). The residents of the house can offset their monthly “rent” costs by running a popular café on the ground floor, hosting events in a resident-refurbished banquet room, and providing city tours, which are provided from the perspective of recent refugees and formerly homeless individuals—all on a volunteer basis. German residents provide help with language skills and job searching for refugee residents, and refugee and non-German residents organize events that introduce German residents to their cultures. In 2017, Sharehaus planned to open a new building using the same model but offered exclusively to families (Refugio Berlin, 2017).

Barriers to Cooperative Housing in the U.S. Market

For all the potential positive outcomes of cooperative housing, why does the United States not produce more? In fact, research has shown very low default rates for U.S. mortgages originated for cooperative housing as compared with traditional housing for low-income persons (HUD, 2012). Therefore, cooperative housing could be a low-risk and low-public subsidy method for providing home ownership to persons typically not qualified to enter traditional financial markets. Despite this advantage, several reasons exist for the lack of cooperative housing to date in the U.S. market.

1. **The U.S. housing market as an investment vehicle.** Wealth in the United States is mostly undiversified and invested in the housing market as opposed to cash, bonds, and mutual funds (Salzman and Zwinkels, 2017). Housing is not the most efficient investment vehicle; however, economists have shown that consumer biases, such as overconfidence in the perceived future value of homes and fear of not making a beneficial investment decision (that is, not buying a home), lead to less efficient consumer behavior. For this reason, even low-income households that might benefit from the stability of a limited-equity cooperative home aim to purchase at market rate to take a chance at a high return. In Germany, where housing is not the dominant savings and investment mechanism and where healthcare, retirement, and other social costs are largely borne by the government, greater consumer interest is found in the stability of a limited-equity cooperative housing model.
2. **Available financial products.** In Germany, each state provides a range of tools conducive to creating cooperative housing, including low-interest mortgages and down-payment assistance. In the United States, cooperative housing loans are costly to originate, as they tend to be unique, provide financing for small amounts, and require extra legal work. Since the sunset of previous FHA-insured loan products and decreases in other government funding for affordable housing during the past 10 years, financing these housing models in the United States has become more difficult (Ortiz, 2017).

HUD offers insurance through the FHA for mortgage loans for nonprofit cooperative housing corporations (Section 213 of the National Housing Act of 1961). However, the volume of deals is quite low. In 2015, HUD insured one project with 77 units for \$13.5 million. Cooperative housing projects can sometimes use Shared Appreciation Mortgage products—or second mortgages in which a nonprofit organization or local borrower offers a no-payment mortgage that is paid back

at the time of sale with an agreed-on amount of appreciation. These funds are typically reinvested in the property to make homeownership affordable to another low-income buyer (HUD, 2012). However, such products are often financed at the local level by the federal HOME Investment Partnerships Program, a program for which Congress has decreased funding in recent years.

3. **The local tax structure.** For cooperative housing to remain affordable in the long term, particularly amid gentrification of the surrounding neighborhood, it is helpful for localities to provide property tax relief or conveyance of undervalued land (publicly owned land, publicly owned housing units, decommissioned public buildings, and so on) for this purpose (Davis and Jacobus, 2008). However, most U.S. localities rely on property tax income as their largest revenue source. Therefore, incentives are not aligned for localities to favor such incentives. Localities in Germany are financed primarily by transfers from higher levels of government and, thus, are less sensitive to fluctuations in property value.
4. **Awareness and education.** Traditional lenders and affordable housing developers are largely unaware of this housing model, the benefits of this housing type, how to analyze risk, underwrite, and create the correct loan products for its creation. More education is needed particularly for traditional mortgage lenders and the LIHTC industry. LIHTC is the financing vehicle for most new affordable housing in the United States.

Greater awareness is required in the public sector as well. Greater awareness could lead to municipal policies that encourage limited-equity cooperative homeownership, for example, rights of first refusal. With available financing products and incentives, this policy allows for tenants' associations to convert their existing multifamily buildings into cooperative owner-occupied housing, preserving affordability.

5. **Development patterns and preferences.** In Germany, the focus of housing development has been on retaining compact, dense, transit-oriented living. Certainly, suburban and rural villages and towns exist throughout the country; however, a higher percentage of the population already lives in multifamily housing than in the United States (Carliner and Marya, 2016). The community-oriented nature of this model may not suit the tastes of many Americans who are used to living in close proximity to neighbors or prefer rural and suburban, single-family living.

Despite these barriers, recent trends in the United States, including sluggish wage growth compared with housing prices, the rise of single-family households, greater interest in a sharing economy, and demand for housing in major metropolitan areas and corresponding unaffordability of home ownership, have led to an increased interest in shared equity housing models at both local and federal levels. Many localities, including Baltimore, Detroit, and Washington D.C. among others, have recently announced either community land trust or cooperative housing models to improve long-term affordability in target neighborhoods (Semuels, 2015). In addition, the Federal Housing Finance Agency (FHFA) and the conservator of Fannie Mae and Freddie Mac (the government-sponsored enterprises, or GSEs) recently announced plans to increase liquidity and awareness in this market.

As a requirement of the Housing and Economic Recovery Act of 2008, FHFA was instructed to develop strategies to direct more financing to underserved markets. In 2016, FHFA released its Enterprise Duty to Serve Underserved Markets Final Rule.¹ With this rule, FHFA directed the GSEs to increase the amount of investment capital available to support shared equity financing for affordable homeownership, including reducing the burden of underwriting loans for cooperative and other shared equity housing models. In December 2017, FHFA released the Underserved Market Plans for Fannie Mae and Freddie Mac. In its plan, Fannie Mae committed to improve liquidity in the mortgage market for shared equity housing models, such as cooperative housing, by purchasing an additional 1,100 to 1,300 loans from this market during the next 3 years. Freddie Mac, for its part, will conduct pilots to align financial product offerings with the needs in the field and explicitly mention shared equity models in its Seller/Service Guide. Both GSEs will conduct outreach and education to traditional lenders to promote more shared equity loan originations (Abraham, 2017; FHFA, 2018). This new injection of capital may alleviate one of the largest barriers to production of cooperative housing in the United States—access to financial products.

Conclusion

Germany and the United States can learn a great deal from one another. Both countries have diverse residents and communities, are destinations for immigrants, have similar urban development and housing policy environments, face similar issues regarding affordable housing—such as recent movement into and preference for housing stock in urban cores, tight housing markets, and wage stagnation since the great recession—and share similar potential mitigating factors to address these challenges. Both countries seek policy interventions that alleviate income inequality, provide chances for greater diversity in neighborhoods, and accommodate an aging population. Cooperative housing is one housing policy ripe for transatlantic exchange. This exchange is particularly relevant now as the U.S. housing finance environment is focused on producing liquidity in the shared equity market and as local governments in both countries signal a willingness to implement new housing models to counter increasingly high prices in their housing markets.

In Germany, cooperative housing is seen as a preferred method of providing affordable housing, because it is self-created, self-governed, stable, and requires lesser government subsidy. Such housing can also produce other social benefits, such as the ability of older generations to live with young families into old age, integrated housing for people with disabilities, an alternative to shelter for newly arrived residents, and an ownership opportunity for those normally excluded from traditional financial markets. The opportunities are varied and, with recent changes in housing finance and increasing local action, the United States is poised to benefit.

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¹ Enterprise Duty To Serve Underserved Markets Final Rule 12 CFR Part 1282. *Federal Register* 81 (250) December 29, 2016. <https://www.gpo.gov/fdsys/pkg/FR-2016-12-29/html/2016-30284.htm>.

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SpAM

SpAM (Spatial Analysis and Methods) presents short articles on the use of spatial statistical techniques for housing or urban development research. Through this department of Cityscape, the Office of Policy Development and Research introduces readers to the use of emerging spatial data analysis methods or techniques for measuring geographic relationships in research data. Researchers increasingly use these new techniques to enhance their understanding of urban patterns but often do not have access to short demonstration articles for applied guidance. If you have an idea for an article of no more than 3,000 words presenting an applied spatial data analysis method or technique, please send a one-paragraph abstract to rwilson@umbc.edu for review.

Understanding and Enhancing the U.S. Department of Housing and Urban Development's ZIP Code Crosswalk Files

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Abstract

ZIP Codes¹ are commonly used for mapping, spatial analyses, creating tables, or other reporting products. Used for these tasks, the results from using these geographies often are distorted because of adverse statistical properties inherent with ZIP Codes. Summarizing ZIP Code data to other large geographies (for example, county, Core Based Statistical Area, state) associates them with these other geographies to create aggregate counts so that metropolitan or county rankings can be reported. This process requires ZIP Codes to be properly allocated to these other geographies to accurately associate a record with that area. Although some companies or government organizations already provide a crosswalk to these geographies, the allocation method used is unclear, leaving it indiscernible as to the accuracy of the assignment of ZIP Codes. In this article, we demonstrate how to use the U.S. Department of Housing and Urban Development

¹ ZIP Code is the acronym for Zoning Improvement Plan Code.

Abstract (continued)

(HUD) United States Postal Service ZIP Code Crosswalk Files to more directly control the ZIP Code allocation process of records to alternative geographies. In meeting this objective, we also provide results of an analysis using the HUD Crosswalk File in associating a ZIP Code with U.S. counties.

ZIP Codes Are Problem Geographies

Organizations use ZIP Codes for many analytical tasks, such as to verify addresses, allocate resources, or create analytical products (for example, maps, tables, or conduct reports). Although ZIP Codes have legitimate—but limited—use in analysis, they have adverse effects on the results. ZIP Codes are problematic, because their boundaries are not created for analytical purposes like other geographies. ZIP Codes were designed to more efficiently deliver mail, not as geographies to be used for analysis. Because of their nature, the boundaries vary in size and shape that amplifies a common, adverse statistical problem when used for analysis. This effect, known as the Modifiable Areal Unit Problem (MAUP), is ever present in analyses that use geography. It is well documented in several studies on how ZIP Codes are notorious for distorting policy-related analyses (Beyer, Schultz, and Rushton, 2007; Cudnick et al., 2012; Dai, 2010; Grubestic and Matisziw, 2006; Hipp, 2007; Krieger et al., 2002; Montalvo and Reynal-Querol, 2017; Wilson, 2015). Further, when mapping ZIP Code data, the choice of the thematic mapping method used to display the data can further exacerbate the misrepresentation of results through erroneous patterns depicted in the map (Wilson, 2011). A final deficiency in the use of ZIP Codes for analysis is that they typically do not contain any social, demographic, or economic data that can be used to create contextualized statistics of ratios, percentages, rates, or densities from the record counts contained within. When data are provided, those values are distorted from the same aggregation problems mentioned in the following paragraphs.

First, grouping characteristics by an area boundary that is too large, oddly shaped, or a combination of both leads to summary statistics that may not be representative of the population within the boundary. A second adverse effect is one that can hide a pattern of extreme values on either end of the characteristic values (Wilson, 2013). In this instance, extreme differences that exist for a characteristic are canceled out because the summary statistic represents the norm and does not reveal either extreme. A third adverse effect, and related to the second,² is the reversal of

² For both the second and third adverse effects of ZIP Codes use, the phenomenon is known as Simpson's Paradox that occurs from aggregation bias. Simpson's Paradox occurs when data are aggregated to groups and prevents any analysis from detecting underlying patterns between cases that share a commonality. This problem occurs because statistical techniques treat combined observations as a single group, in which the observations are assumed to be indistinguishable from one another and not have any shared commonalities that might affect the results. However, cases often do share commonalities that may have converse relationships between an outcome and the explanatory factors when analyzed as a subgroup. The repartitioning of the underlying data from smaller to larger geographic units can cancel out or reverse patterns in smaller units. The paradox is a consequence of the MAUP, in which statistical results are affected by modifications to the geographic unit's boundary size or shape or both. Aggregated data are uniquely partitioned by their geography, and when geographic units are changed, the new boundary sizes and shapes are repartitioned.

a relationship if two characteristics are examined together (Hipp, 2007; Montalvo and Reynal-Querol, 2017; Wilson, 2015). Here, a positive or negative relationship between two characteristics is reversed from what it would be if a more appropriate area were used in the analysis because the characteristics would have been assigned to differing areas.

About Allocating ZIP Code Data to Other Geographies

Several private companies obtain address data from the U.S. Postal Service (USPS) or ZIP Code geographies from the U.S. Census Bureau to enhance them and sell the information. Companies in the private industry add value to these products, making them more robust by adding geographic information or the creation of boundaries for mapping.³ The boundaries created are estimated or modified by delineating areas using topographical point or line landmarks following each organization's proprietary method, including comparisons with the ZIP Code Tabulation Areas (ZCTAs) provided by the Census Bureau. Each company has their own undisclosed method of creating these boundaries, with each claiming theirs is the most accurate.

ZIP Codes typically overlap with other geographies and cannot always be completely associated with areas in another geography. Exhibit 1 demonstrates how a decision must be made in allocating address counts from ZIP Codes to the census tract geography. The map shows a ZIP Code (light gray outline) crosscutting three census tracts (dark gray outline) and the geographic distribution of addresses within each tract. For many analyses, address counts must be associated with only one other geography, lest the addresses be counted multiple times and adversely affect statistical results. The ZIP Code in exhibit 1 has 2,860 addresses, with 1,962 (65.8 percent) in tract C, 872 (30.5 percent) in tract B, and 26 (1.0 percent) in tract A. If the address locations are available, then those proportion counts get assigned to each tract.

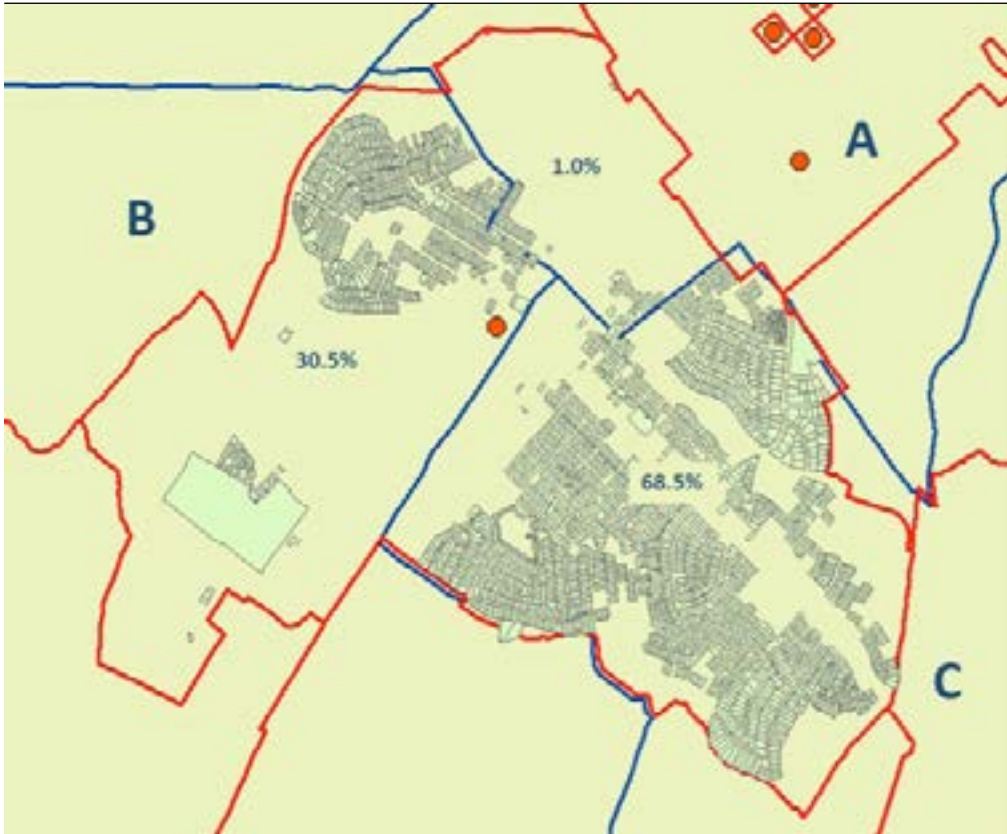
However, without knowing the location of the address, a decision must be made to either assign all the addresses within a ZIP Code to one of the other geographies or proportionally divide the addresses to each of the three tracts.

If all 2,860 of the addresses in the ZIP Code are assigned to one of the tracts without knowing where the actual addresses are, the counts will be assigned by using one of two general methods that assigns the ZIP Code addresses to other geographies based on the geometric properties of the areas. The first method uses the center location (large gray points) of the ZIP Code—that is, the centroid—and assigns the full count of addresses to the geography in which that center is located. In the previous example, the ZIP Code will be assigned to tract B, because the center is slightly inside the boundary next to tract A. One variant of this approach is the simple assigning of address counts to the geography, with the largest proportion of an area that the ZIP Code crosscuts. In the previous example, the ZIP Code will be assigned to tract C, because it has the largest portion of its area in that county. The second approach assigns a proportion of address counts that is commensurate with proportion of tract areas inside the ZIP Code. In the previous example, tract C will get

³ The USPS has never made a ZIP Code boundary file available to the public.

Exhibit 1

ZIP Code Boundary Crosscut With Census Tracts



54 percent of the addresses, 33 percent of address will go to tract B, and the remaining 13 percent will go to tract A. Regardless of method, allocating from either of these methods has varying risks to numerical accuracy of the allocation.

Other ZIP Code products provide crosswalks to other geographies that use a similar geocoding method as HUD. An examination of ZIP Code Download, ZIP Boundary, and the HUD data sets shows that the difference between identified counties and Core Based Statistical Areas (CBSAs) is less than 1 percent of each other in regard to which geographies the ZIP Codes become associated. Therefore, the differences between them are negligible. The HUD product, however, is the only one of the three that crosswalks ZIP Codes to census tracts, making it valuable for micro-analyses.

Geocoding Address Data and Identifying Related Geographies

HUD can overcome the aforementioned analytical problems, because the agency has a Geocode Service Center (GSC) that provides a high level of accuracy in assigning corresponding geographies

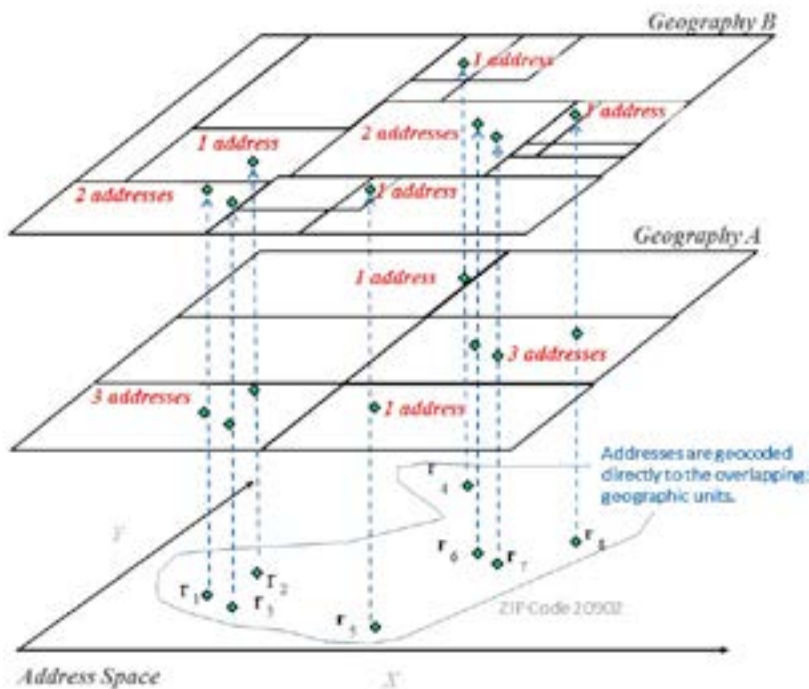
to the addresses received from USPS. On a quarterly basis, HUD receives domestic address data from USPS that are sent to the GSC to match, standardize, and return geographic information that staff can use in HUD products. This additional information offers a wide selection of geographic information to meet the many varied analytical questions the agency asks from its data systems. Diagnostics are also returned from the GSC helping to ensure the data are correctly geocoded, enabling staff to evaluate the quality of address matching and geographic positioning of the location.

Having the actual locations of the addresses facilitates HUD's capabilities in accurately analyzing applicant data with mapping and spatial analysis. With the longitude (X) and latitude (Y) that the GSC produces, mapping and spatial analysis can be conducted directly on the locations, eliminating error when examining groups.

The GSC also returns the names and codes of geographies in which the addresses fall so that other types of analyses can be done that will not require the locations. With location geocoding of addresses, an address can be directly associated to other geographies to which they are contextually associated. For example, an address can be associated to the census block, block group, tract, county, and CBSA they are within or other non-Census geographies that are available. These geographies can facilitate the (1) simple tabulating of counts by geography, (2) mapping or spatial analysis of socioeconomic data, or (3) creation of geographic data for advanced statistical modeling. Exhibit 2 demonstrates this spatial overlay process.

Exhibit 2

Geocoding Process of Addresses by ZIP Code to Overlapping Geographies



HUD cannot release the geocoded USPS address data at the location level, but the agency can release a file that takes advantage of this geocoding to produce a file that can crosswalk ZIP Codes to several other geographies so that other agencies may use those geographies instead of using ZIP Codes as analytical units. The value of HUD's USPS ZIP Code Crosswalk Files is that they enable users to escape the adverse effects of using ZIP Codes by allocating the data to more appropriate geographies for analysis.

HUD USPS ZIP Code Crosswalk Files

HUD produces USPS ZIP Code Crosswalk Files that correspond to four Census Bureau geographies, which are (1) census tracts, (2) counties and county equivalents, (3) CBSAs, and (4) congressional districts. Each file contains two general pieces of information.⁴ The first is the ZIP Code and geographic identification of the corresponding geography. The second is the ratios of address type in the geography the ZIP Code overlaps. Each crosswalk file contains the following address type ratios: (1) residential, (2) business, or (3) other. Exhibit 3 contains the full descriptions of the each element in each of the crosswalk files.⁵

Because many ZIP Codes overlap the boundaries of the other geographies, duplicate ZIP Code records will exist, requiring the user to make a decision about which geography to associate the ZIP Code. Exhibit 4 shows the structure of the HUD ZIP Code to County Crosswalk File. As an example, in Mt. Airy, Maryland, four records for ZIP Code 21771 are highlighted, with each recording the proportion of residential addresses in that ZIP Code. That ZIP Code overlaps four counties, with residential ratios distributed at 0.4652 (47 percent), 0.4143 (41 percent), 0.1088 (11 percent), and 0.0117 (1 percent), all adding up to 1.0 (100 percent).

Exhibit 3

Data Elements in the HUD USPS ZIP Code Crosswalk Files

Element	Description
ZIP	5 digit USPS ZIP code
TRACT	11 digit unique 2000 or 2010 Census tract GEOID consisting of state FIPS + county FIPS + tract code. The decimal is implied and leading and trailing zeros have been preserved.
COUNTY	5 digit unique 2000 or 2010 Census county GEOID consisting of state FIPS + county FIPS.
CBSA	5 digit CBSA code for Micropolitan and Metropolitan Areas as defined by OMB in February of 2013. ZIP codes with a CBSA code of '99999' are not located within a CBSA. In Metropolitan Areas that are broken out into Divisions, the code reported is the CBSA Metropolitan Division code.
RES_RATIO	The ratio of residential addresses in the ZIP – Tract, County, or CBSA part to the total number of residential addresses in the entire ZIP.
BUS_RATIO	The ratio of business addresses in the ZIP – Tract, County, or CBSA part to the total number of business addresses in the entire ZIP.
OTH_RATIO	The ratio of other addresses in the ZIP – Tract, County, or CBSA part to the total number of other addresses in the entire ZIP.
TOT_RATIO	The ratio of all addresses in the ZIP – Tract, County, or CBSA part to the total number of all types of addresses in the entire ZIP.

CBSA = Core Based Statistical Area. FIPS = Federal Information Processing Standards. GEOID = geographic identification. HUD = U.S. Department of Housing and Urban Development. OMB = Office of Management and Budget. USPS = United States Postal Service.

⁴ huduser.gov/portal/datasets/usps_crosswalk.html.

⁵ More details can be found on the HUD USPS ZIP Code Crosswalk Files website at huduser.gov/portal/datasets/usps_crosswalk.html - codebook.

Exhibit 4

Example of the ZIP Code to County Crosswalk File

	ZIP_CODE	COUNTY_CODE	res_ratio	bus_ratio	oth_ratio	tot_ratio
9597	21766	24001	1.000000000	1.000000000	0.000000000	1.000000000
9598	21767	24043	1.000000000	1.000000000	1.000000000	1.000000000
9599	21769	24021	0.995981246	0.988304094	1.000000000	0.995745203
9600	21769	24043	0.004018754	0.011695906	0.000000000	0.004290797
9601	21770	24021	1.000000000	1.000000000	1.000000000	1.000000000
9602	21771	24013	0.465155904	0.807650273	0.752212389	0.492245026
9603	21771	24021	0.414295451	0.155191257	0.230089436	0.394093696
9604	21771	24027	0.108877151	0.033879781	0.017699115	0.102656058
9605	21771	24031	0.011671434	0.003279689	0.000000000	0.010966300
9606	21773	24021	1.000000000	1.000000000	1.000000000	1.000000000
9607	21774	24021	1.000000000	1.000000000	1.000000000	1.000000000
9608	21775	24021	0.000000000	1.000000000	0.000000000	1.000000000
9609	21776	24013	0.879154079	1.000000000	1.000000000	0.894915742
9610	21776	24021	0.120845921	0.000000000	0.000000000	0.115084258
9611	21777	24021	1.000000000	1.000000000	1.000000000	1.000000000
9612	21778	24021	1.000000000	1.000000000	0.000000000	1.000000000
9613	21779	24043	1.000000000	1.000000000	0.000000000	1.000000000
9614	21780	24021	0.947813822	1.000000000	0.000000000	0.948965517
9615	21780	24043	0.052186178	0.000000000	0.000000000	0.051034483
9616	21781	24043	0.000000000	1.000000000	0.000000000	1.000000000
9617	21782	24043	1.000000000	1.000000000	1.000000000	1.000000000
9618	21783	24021	0.137710633	0.061728395	0.000000000	0.135540464
9619	21783	24043	0.862289367	0.938271605	1.000000000	0.864459636
9620	21784	24013	0.939181882	0.990284525	0.990811639	0.945208556
9621	21784	24027	0.060818118	0.009715476	0.009188361	0.064714144

The res_ratio, bus_ratio, and oth_ratio columns show the proportions of the corresponding address type within each county. The tot_ratio column is the total number of all address types within each county. Again, for ZIP Code 21771 and rounding up at the fourth decimal place, from top to bottom, the tot_ratio column is $0.4922 + 0.3931 + 0.1027 + 0.011 = 1.0$.

The ratios can be used to help decide which county to assign to the ZIP Code. For ZIP Codes with ratios of 1.0, no decision needs to be made, because all the addresses are contained within a single county. For ZIP Codes with ratio proportions, a decision can be made to assign the addresses to a county based on one of two approaches. The first approach is to assign all addresses to the county with the largest ratio. With probability theory, any address with that ZIP Code has a greater chance of being in the county with the largest proportion of addresses.

A second approach is to proportionally assign the addresses to each county through geoprocessing in a geographic information system or cross-tabulating in statistical or general database software. This approach can allocate addresses in one of two ways. The first approach is to randomly assign each address to a county by proportion if only counts, rates, and densities are all that are needed for analysis. In this instance, it would not matter if an address was assigned to the wrong county, because only the aggregate value from its assignment is used and not a characteristic such as sex, ethnicity, or age. The second approach is to use an additional geography file, such as a street

network, to determine if the street of the address was primarily in one county or a neighboring county. This file is used if the desire is to have more accurate counts or rates for characteristics such as sex, ethnicity, or age.

Examining Geographic Overlap in the HUD USPS ZIP Code Crosswalk Files

The number of overlaps between a ZIP Code and another geography is a function of scale. The smaller the overlapping geography is, greater is the overlap of the ZIP Codes. Exhibit 5 shows the total number of ZIP Codes overlaps with the CBSA, county, and census tract boundaries. For the ZIP Codes that overlap multiple geographic boundaries, tracts have the smallest number of no overlaps—about 36 percent, 74 percent for counties, and 83 percent for CBSAs. These data translate into the chance an address is not in the boundary (error) being 61 percent for tracts, 26 percent for counties, and 17 percent for CBSAs. For CBSAs and counties, the opportunity for error is even lower if the proportion of addresses in one of the overlaps is examined.

For counties, the distribution of residential ratios also shows a low potential for error in misassociation of county to ZIP Code. Of the 26 percent of residential address that are in multiple counties, 16 percent of residences are 90 to 99 percent in one area, four percent are 80 to 89 percent in one area, leaving 6 percent of residences 30 to 79 percent in one or more counties. The crosswalking of ZIP Codes to census tracts are of particular concern when assigning a one-to-one relationship.

Exhibit 5

ZIP Code Overlap Results Across Three Geographies

ZIP Code Overlap Counts, by Geography						
Cross-cuts	Tract		County		CBSA	
	Count	Percent	Count	Percent	Count	Percent
None	14,106	35.89	29,107	73.8	32,908	83.4
2	5,730	14.58	7,772	19.7	5,658	14.3
3	4,313	10.97	2,141	5.4	829	2.1
4	3,090	7.86	399	1.0	66	0.2
5	2,218	5.64	36	0.1	1	0.0
6	1,550	3.94	6	0.0	0	0.0
7	1,226	3.12	0	0.0	0	0.0
8	1,059	2.69	0	0.0	0	0.0
9	930	2.37	0	0.0	0	0.0
10	816	2.08	1	0.0	0	0.0
11 to 68	4,263	10.86	0	0.0	0	0.0
Total	39,301	100	39,462	100.0	39,462	100.0

CBSA = Core Based Statistical Area.

Exhibit 6 shows the residential ratio distribution across overlapping ZIP Codes.^{6,7} The exhibit gives an indication of the chance an address will be misassociated with a particular geography when a ZIP Code overlap occurs. For CBSAs and counties, the potential for error is minimal, with most of the residential ratios being largely in one area more than the others.

Of the 17 percent of residential addresses that are in multiple CBSAs, about 10 percent of residences are 90 to 99 percent in one CBSA, 3 percent are 80 to 89 percent in one, leaving only 4 percent of residences 50 to 79 percent in one or more CBSAs—with the possibility of being outside of a CBSA, because they do not completely cover the United States.

Exhibit 6

Nonduplicate ZIP Code Results Across Three Geographies

Residential Ratio Distribution of Zip Code Overlap, by Geography						
Res Ratio	Tract		County		CBSA	
	Count	Percent	Count	Percent	Count	Percent
0 (Outside)	4,897	12.5	4,938	12.5	4,938	12.5
0.01 to 0.04	0	0.0	0	0.0	0	0.0
0.05 to 0.09	124	0.3	0	0.0	0	0.0
0.10 to 0.14	1,003	2.6	0	0.0	0	0.0
0.15 to 0.19	1,778	4.5	0	0.0	0	0.0
0.20 to 0.29	3,183	8.1	1	0.0	0	0.0
0.30 to 0.39	2,327	5.9	20	0.1	6	0.0
0.40 to 0.49	2,059	5.2	91	0.2	32	0.1
0.50 to 0.59	2,688	6.8	633	1.6	378	1.0
0.60 to 0.69	2,217	5.6	741	1.9	433	1.1
0.70 to 0.79	2,216	5.6	1,002	2.5	607	1.5
0.80 to 0.84	1,272	3.2	695	1.8	435	1.1
0.85 to 0.89	1,378	3.5	900	2.3	574	1.5
0.90 to 0.94	1,547	3.9	1,409	3.6	926	2.4
0.95 to 0.99	2,971	7.6	4,724	12.0	3,110	7.9
1 (Inside)	9,641	24.5	24,308	61.6	28,023	71.0
Total	39,301	100	39,462	100.0	39,462	100.0
Total Whole:	14,538	39.3	29,246	74.1	32,961	83.5
Total Part:	24,763	60.7	10,216	25.9	6,501	16.5

CBSA = Core Based Statistical Area.

⁶ Duplicate ZIP Code records were removed by keeping only the ZIP Code with the highest residential ratio in a geography, the geography to which all the ZIP Codes would get assigned.

⁷ The ZIP Codes are those that are outside of a county or census tract, or are in some other geographic boundary other than a county or its equivalent in U.S. territories or military bases.

The distribution in exhibit 6 shows that of the 61 percent of residential address that are in multiple tracts, only about 12 percent of residences are 90 to 99 percent in one area, 7 percent are 80 to 89 percent in one area, but 45 percent of residences are in one tract or another. These percentages translate into approximately of one-third of ZIP Codes having the greatest chance of an address being assigned to the wrong census tract if a one-to-one approach is used in associating ZIP Codes to a tract using the highest residential proportion of addresses.

Even more precarious is that some ZIP Codes are split among numerous tracts, leaving the highest residential ratio less than 50 percent, with the other ratios similar to the other tracts. Exhibit 7 shows the records for ZIP Code 36067 in Autauga County, Alabama, which overlaps 13 census tracts. Exhibit 8 shows the size and shape disparity among the geographies.

Exhibit 7 shows the highest tract residential ratio to be in tract 0100102082 at only approximately 23 percent, followed by four tracts with 10 to 14 percent. The remaining eight tracts have between 1 and 7 percent of residential addresses. This even distribution makes the assignment of a ZIP Code to any of these tracts dubious, because 77 percent of the remaining residential population is spread over a large enough area to have equal representation of that ZIP Code.

However, unlike assigning a ZIP Code to county, CBSA, or congressional district geographies, where each will get a ZIP Code assignment, this approach has an analytical consequence when using census tracts. Because tracts are often smaller than ZIP Code coverage, a problem of incomplete coverage occurs—that is, geographic holes form. Exhibit 9 shows the census tracts in the Mid-Atlantic states after assigning the ZIP Codes to the tract with the highest residential ratio. The dark gray polygons are the tracts assigned ZIP Codes because they had the highest residential ratio, with the light gray areas being the holes in which a tract was not associated with a ZIP Code.

The geographic holes occur because the ZIP Codes in those areas are larger than the tracts, as exhibit 6 indicates of the more even distribution of residential ratios. When a ZIP Code is assigned to

Exhibit 7

Census Tract Address Distribution for ZIP Code 36067, Autauga County, Alabama

	ZIP_CODE	TRACT_CODE	res_ratio	bus_ratio	oth_ratio	tot_ratio
1	36067	01001020100	0.061892061	0.030518820	0.057471264	0.059618842
2	36067	01001020200	0.072874176	0.309257375	0.206896552	0.091262136
3	36067	01001020300	0.111539128	0.108867752	0.264367816	0.113700108
4	36067	01001020400	0.003686853	0.093551048	0.022388506	0.010284070
5	36067	01001020500	0.000392218	0.016276704	0.000000000	0.001510248
6	36067	01001020600	0.138766365	0.083418108	0.172413793	0.135275081
7	36067	01001020700	0.126843426	0.207527976	0.074712644	0.131895002
8	36067	01001020801	0.107079620	0.046795524	0.063218391	0.102265372
9	36067	01001020802	0.232271729	0.072227874	0.103448276	0.219345559
10	36067	01001020900	0.062598055	0.008138352	0.028735632	0.058324344
11	36067	01001021000	0.042751804	0.006103764	0.000000000	0.039626034
12	36067	01001021100	0.038751177	0.007121058	0.005747126	0.036102122
13	36067	01051021300	0.000156887	0.009155646	0.000000000	0.000791082

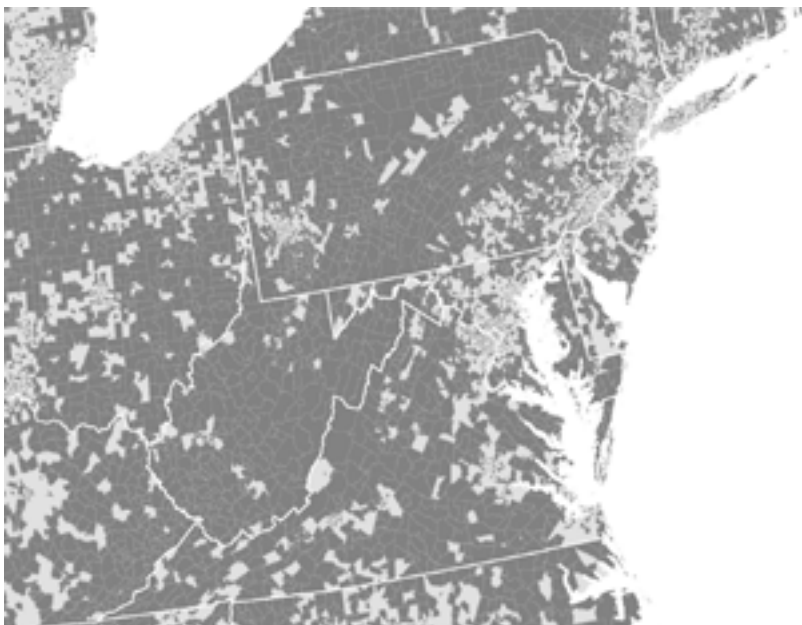
Exhibit 8

Census Tract Overlap With ZIP Code 36067, Autauga County, Alabama



Exhibit 9

Remaining Census Tracts After ZIP Code Assignment of Highest Residential Ratio



one tract, all the adjacent tracts are omitted from an analysis, because they have no associated ZIP Code. As seen, this omission primarily occurs in urbanized areas. Unless the analytical objective is to only know which tract has the highest residential ratio, a proportion assignment solution must be found to assign a ZIP Code to all overlapping tracts with a one-to-many approach.

A potential way to approach the use of the ZIP Code to tract Crosswalk File is to consider less the idea of a one-to-one match with a census tract, but instead take a many-to-one approach that connects the ZIP Code to an associated place name, and assign it instead. This approach changes the geographic relationship from an assignment to a single overlapping geography to one of proximity to a recognized place with a name preferred by USPS and the Census Bureau. The tracts and any related socioeconomic data and all ZIP Codes associated with the place can be used in a more representative way. With that relationship, the data can be linked to the Census Bureau place-name geography and mapped, tabulated, or spatially analyzed with distance-based statistics.

Further, if the ZIP Code to census tract file is not reduced to a single one-to-one match to a tract, then the file can be linked to the ZIP Code Tabulation Area or other ZIP Code boundary file and geoprocessed to integrate the two layers and provide the proportions of addresses in each tract across all the overlapping ZIP Codes. Then, the tract Federal Information Processing Standards (FIPS) or geographic identification can be summarized to create aggregate residential ratios to the tracts, thereby transferring the residential ratios—and other ratios—to each tract.

Enhancing and Evaluating the HUD USPS ZIP Code Crosswalk Files

The Crosswalk Files contain only the most basic information about the geographies the ZIP Codes overlap, which are Census Bureau FIPS identification. Without the geography names, it is difficult to know to which of the corresponding parts of the United States the data refer. However, with a geographic identification, the Crosswalk Files can be linked to a number of other data sources to create a file that contains more robust and contextual information about the ZIP Code. As mentioned, several other data sources are available that provide additional information that can be matched to the Crosswalk Files. Companies, such as ZIP Boundary⁸ and ZIP Code Database Org⁹ provide information that contains additional characteristics associated for each ZIP Code. In addition, SAS[®] software users have access to ZIP Code data that are provided in the SAS Help library, which SAS purchases from ZIP Code Download.¹⁰ These additional sources of information can enhance and evaluate the HUD USPS ZIP Code Crosswalk Files analysis.

Enhancing a Crosswalk File

The SAS¹¹ ZIP Code data are used to demonstrate enhancing the HUD Crosswalk File with U.S. counties and equivalents. ZIP Code data from the companies mentioned previously provide similar

⁸ <http://www.zipboundary.com/>.

⁹ <https://www.unitedstateszipcodes.org/zip-code-database/>.

¹⁰ <https://zipcodedownload.com/>.

¹¹ SAS ZIP Codes are in the SAS Help library, to which the data originate from ZIP Code Download <https://zipcodedownload.com/>.

variables to create a geographic context for the HUD ZIP Code Crosswalk Files. Exhibit 10 lists the additional information the SAS data provide. These enhancements offer the opportunity to geographically contextualize the HUD Crosswalk File, as well as facilitate a comparison of the accuracy with other crosswalk files. ZIP Codes and their geographies change frequently, and each company processes the updates differently, which means similar analyses will yield slightly different results.

A number of variables in the SAS file are valuable when examining the HUD United States Postal Service cross-walk files. First is the COUNTYNM variable that contains the name of the county that corresponds with county code in the HUD cross-walk file. Note that the Metropolitan Statistical Area (MSA) is contained in the SAS data, but not the Core Based Statistical Areas information. Using the county code, this data can be linked with the CBSA listing from the Census Bureau to add that information.

Exhibit 10

Additional ZIP Code Information From the ZIP Code Database

SAS ZIP Code Table Variables			
#	Variable	Type	
1	ZIP	The 5-digit ZIP Code	
2	X	Longitude (degrees) of the center (centroid) of ZIP Code.	
3	Y	Latitude (degrees) of the center (centroid) of ZIP Code.	
4	ZIP_CLASS	ZIP Code Classification: P=PO Box U=Unique zip used for large organizations	
5	CITY	Name of city/org	
6	STATE	Two-digit number (FIPS code) for state/territory	
7	STATECODE	Two-letter abbrev. for state name.	
8	STATENAME	Full name of state/territory	
9	COUNTY	FIPS county code.	
10	COUNTYNM	Name of county/parish.	
11	MSA	Metro Statistical Area code by common pop-pre 2003; no MSA for rural	
12	AREACODE	Single Area Code for ZIP Code.	
13	AREACODES	Multiple Area Codes for ZIP Code.	
14	TIMEZONE	Time Zone for ZIP Code.	
15	GMTOFFSET	Diff (hrs) between GMT and time zone for ZIP Code	
16	DST	ZIP Code obeys Daylight Savings: Y-Yes N-No	
17	PONAME	USPS Post Office Name: same as City	
18	ALIAS_CITY	USPS - alternate names of city separated by	
19	ALIAS_CITYN	Local - alternate names of city separated by	
20	CITY2	Clean CITY name for geocoding	
21	STATENAME2	Clean STATENAME for geocoding	

FIPS = Federal Information Processing Standards. MSA = metropolitan statistical area. USPS = United States Postal Service.

The ZIP CLASS variable identifies if a ZIP Code is (1) military,¹² (2) post office box,¹³ (3) standard, or (4) unique.¹⁴ These distinctions provide insight into understanding the types of ZIP Codes contained in the Crosswalk Files that help to understand why some ZIP Codes do not match up to a ZIP Code boundary or location, such as the ZCTA or the boundary files from private companies. Linking the HUD ZIP Code to County Crosswalk File to the SAS ZIP Code file shows that 22 percent (9,201) ZIP Codes are Post office boxes, 73 percent (29,783) are standard, and 5 percent (2,090) are unique.

ZIP Codes are often used to represent place names and linking the HUD Crosswalk File to the SAS data can help identify those places. ZIP Codes can have multiple names associated with it that reflect successful mail deliver to and address with one of several cities, towns, or subdivisions (places) within its boundaries. These names are in the CITY, PONAME, ALIAS CITY, and ALIAS CITYN variables. However, a ZIP Code will always have exactly one place that is the primary (default) city, town, or subdivision that is captured in the CITY variable. These names can be used in identifying all the places associated with a ZIP Code, including using one of them as an alternative to assigning a ZIP Code to a census tract as discussed previously.

In a similar manner, if the SAS ZIP Code information is linked to the ZIP Code to County Crosswalk File, a summarization by county that includes a listing of the contained places can be conducted. Additional analyses can be done with socioeconomic data linked to the places. Additional geographic information is provided that indicates the telephone area codes covered, time-related factors, and the Cartesian X and Y coordinates that represent the geometric center of the ZIP Code area.

Evaluating A Crosswalk File

As described previously, HUD directly geocodes address data to the overlapping geographies that contain them, allowing for a specific cross-referencing between a ZIP Code and other geographies. As well, other companies do not provide information about how ZIP Codes are *crosswalked* to another geography. With the processed ZIP Code to County Crosswalk Files on the largest residential ratio, a difference comparison can be conducted between the county designations in the HUD Crosswalk Files and the SAS data. The results show that about 3 percent (909) of the ZIP Codes differ in county assignment. Exhibit 11 shows the ZIP Code areas and locations that mismatch between the two sources.

ZIP Codes overlapping multiple counties are highlighted with a black outline. The black and white points are ZIP Code locations that are either associated with another county or is a nondeliverable ZIP Code. The large ZIP Code in the center that cuts across four counties is identified in the HUD

¹² A military ZIP Code is a single entity code that represents an armed forces base or other property in which all mail is sent to a central location and distributed to the addresses within that property.

¹³ A post office box ZIP Code represents multiple locations for same address, that is, delivery to same organization in multiple properties or building.

¹⁴ Unique ZIP Codes represent a single high-volume address, for example, large organizations (government, academic, company, nonprofit). Mail delivery is to the organization that is in one large building across multiple properties or buildings or both. Some large organizations have multiple receipt centers to make mail management more efficient by delivering and collecting from multiple stops across the organization. At other times, the post office box ZIP Code is at a post office that is in another county and that has a different ZIP Code. Further, branch offices for large organization can be physically located in another county outside the ZIP Code to which it belongs.

Exhibit 11

County Assignment Mismatches With HUD ZIP Code Crosswalk Files



Crosswalk Files as belonging to Montgomery County, Maryland, which is the county with the smallest overlap, instead of Frederick County, Maryland. However, about 47 percent of the residences are in that very small area, making it the county with which the ZIP Code becomes associated when using the highest residential ratio in the HUD Crosswalk Files. The SAS data, however, show that the ZIP Code belongs to Frederick County, which is the county that has the west section of the ZIP Code area. According to the HUD file, that part of the ZIP Code (in Frederick County) has only about 41 percent of the residential addresses, with Carroll and Howard Counties having about 11 and 1 percent, respectively.

Similarly in exhibit 11, ZIP Code locations (white points) in Montgomery County and in Prince George's County, Maryland are both federal government agencies and are associated with a Washington, D.C. ZIP Code. The other locations in the exhibit are locations that were simply in another county according to the HUD file by comparison to designation in the SAS data.

Data Limitations of the HUD USPS ZIP Crosswalk Files

Four limitations of the HUD Crosswalk data are of note. First, the Crosswalk Files do not contain the ZIP Codes for armed forces (military) and for the U.S. territories of American Samoa and the North Mariana Islands (Saipan). However, the territories of Guam, Puerto Rico, and the U.S. Virgin Islands are included.

Second, aside from the missing ZIP Codes noted previously, a small number—less than 1 percent—of addresses HUD receives from USPS cannot be geocoded due to errors in the addresses or the base maps. This means that some five-digit ZIP codes may not be in the Crosswalk Files.

Third, several other ZIP Codes across the United States are unavailable in the HUD Crosswalk Files. In some instances, this means that an undeliverable ZIP Code will be active but does not show up on the USPS list of ZIP Codes. A ZIP Code may be active, but it will not be found in the HUD Crosswalk Files, because that ZIP Code has been associated with its parent instead. In exhibit 12, more than 1,629 ZIP Code locations from the SAS dataset are shown that are not in the HUD Crosswalk Files.

Not all the unmatched ZIP Codes are post office boxes. Of these nonmatches, 48 (3 percent) are standard, 889 (55 percent) are post office boxes, and 692 (42 percent) are unique. About 54 percent of the nonmatches are for large private, government, or academic organizations with their own ZIP Codes that have mail delivered or collected from a central location within the organization. The remaining 46 percent have no name associated with the code and likely do not have mail directly delivered to that location, but from another mail-receiving ZIP Code.

Finally, HUD has not yet tabulated a crosswalk for CBSAs that solely use the CBSA code for every metropolitan area. This limitation means that in the ZIP Code to CBSA Crosswalk File, the metropolitan division code is used in place of the actual CBSA code, which does not always correspond with the Census Bureau-assigned CBSA code. To remedy, a separate file matching the Census

Exhibit 12

ZIP Codes Not in HUD ZIP Code Crosswalk Files



Bureau CBSA delineation files and the CBSA Crosswalk Files must be made on the metropolitan division codes to obtain the correct CBSA codes. However, at the time of this article, HUD is correcting the previously discussed limitation. By the fourth quarter of fiscal year 2017, HUD will split the ZIP Code-CBSA Crosswalk File into two products. One file will contain the CBSA codes, and the second file will contain metropolitan division codes. Users who need the CBSA Crosswalk Files prior to the fourth quarter of 2017 must use the Census Bureau CBSA delineation files to identify the CBSAs. After the fourth quarter of 2017, users can select the appropriate Crosswalk Files for their needs.

Summary

The HUD Crosswalk Files are one valuable piece of the geographic context puzzle when making use of ZIP Codes. The files contain no geographic information other than ZIP Codes and the corresponding identifications of the geographies that they cross-reference. This relationship enables the files to easily expand an address dataset to another geography that can connect to a wealth of other geographic information and socioeconomic data. Because the Crosswalk Files contain the ratios of address types, the most important aspect of the data is that users are empowered in making their own decisions about assigning ZIP Codes to other geographies.

Authors

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