

Seeing the Big Picture with Multisector Data: Factors Associated with Exiting from Federal Housing Assistance by Exit Type

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Abstract

The U.S. Department of Housing and Urban Development (HUD) has a goal of increasing the proportion of households that exit HUD-supported housing for positive reasons, but little is known about factors associated with different exit types. Learning which tenants are likely to leave for positive or negative reasons can inform policies and programs that aim to encourage positive exits.

The authors linked data from two large public housing authorities (PHAs) to an existing multisector data system that contains behavioral health, homeless services, and Medicaid claims data. The authors used logistic regression to examine factors associated with exiting from housing assistance and used multinomial regression to explore factors associated with exit type, both at the head-of-household level.

Abstract (continued)

The analysis consisted of 8,266 exits: 2,610 negative, 4,538 neutral, and 1,118 positive. Male gender, homelessness within the previous 3 years, and having a behavioral health crisis event were all associated with increased odds of exit. Being older than age 25, increased time in housing (more than 6 years), larger household size, having a single-caregiver household, and having a disability were all associated with decreased odds of exit. Being of working age (25–61) was associated with positive exits but not negative exits. Heads of household in single-caregiver households, who had disabilities, experienced behavioral health crisis events, or had recent emergency department visits were all more likely to have negative exits and less likely to have positive exits compared with neutral exits.

Linked administrative datasets offer PHAs a means of routinely obtaining information about physical or mental health conditions, prior homelessness, or other factors that could influence outcomes for their tenants. This approach can serve as a model to PHAs for cross-sector partnerships with health departments and other groups interested in the health and well-being of housing assistance recipients.

Introduction

Housing affordability continues to be a significant challenge facing many American households. Nearly half of all renters are housing-cost burdened, defined as spending 30 percent or more of their income on housing costs (Martinez, 2022). Federal housing assistance, primarily in the form of housing choice vouchers (HCVs) or public housing (PH), reaches only 20 to 25 percent of eligible low-income households, leaving many people struggling to afford stable housing (Turner and Kingsley, 2008). One possible approach to ensuring as many people as possible get assistance is to create pathways for people in public housing so that they can become economically self-sufficient and no longer require public housing support. To that end, in 2019, HUD set a goal of increasing the proportion of households that exit HUD-supported housing for positive reasons (HUD, 2019).

To support that goal, public housing authorities (PHAs) must be able to identify which households are likely to experience positive or negative exits. However, grouping reasons for exiting housing assistance into positive and negative categories is not without challenges. First, it assumes that positive exits are more likely to yield better outcomes and are more conducive to economic self-sufficiency. However, as noted below, the issue has not been thoroughly tested. Second, there is no standardized process whereby PHAs collect reasons for exit, making comparisons across PHAs difficult. Third, PHAs may lack sufficient information to confidently categorize an exit as positive or negative, inflating the use of a neutral category.

If those difficulties can be overcome, then learning which tenants are likely to leave for positive or negative reasons could inform policies and programs that aim to encourage positive exits. However, it may not be feasible for PHAs to use predictors of exit type in a daily operational sense—for example, identify and target specific individuals or households at risk of negative exits based on a statistical model. Although PHAs routinely collect a relatively limited set of demographic, income,

and address information, they typically have limited access to data on other topics or limited capacity to analyze it in a way that would provide a comprehensive view of the people they serve. When additional contextual information is collected, it often takes the form of one-off surveys, research projects, or programmatic activities that do not cover all residents. In addition, it may be unethical or illegal under the Fair Housing Act and state legislations to target services based on such predictors as race and gender, even if they are found to be associated with exit types.

The challenges are surmountable. Outreach and services that aim to facilitate positive exits and reduce negative exits are practicable on a programmatic level for certain predictors. For example, households entering assistance from referral pathways whose eligibility criteria include homelessness or having a disability could be offered housing navigation and stability support and connected with other resources and care available in the community. If household composition is related to exit type, then services and outreach could be tailored appropriately. Linking administrative data from other sectors such as health care could lead to a better understanding of complex individual needs, provide insight into circumstances prior to exit, offer an opportunity to assess post-housing assistance outcomes, and have the potential to be more sustainable than PHA project-driven data collection. Successful cross-sector data linkages related to housing have previously examined physical health, behavioral health, criminal activity, and income (Actionable Intelligence for Social Policy, 2015; Albertson et al., 2020; Chetty, Hendren, and Katz, 2016; Ellen, Dragan, and Glied, 2020; Laurent et al., 2020). However, most examples are limited in that they linked across only one nonhousing sector or were one-off linkages of administrative data.

This article describes the results of a project that linked PHA data from a large, urban setting to an existing integrated data hub for the purposes of examining exits from HUD-housing assistance. The overall project, called Housing and Urban Development Health, Economic and Residential Stability (HUD HEARS), addressed questions related to both exit events and outcomes following exit. This article focuses on the linkage process, factors associated with exit and exit type, potential implications for policies and programs, and the sustainability of cross-sector data work.

Exits from Housing Assistance: What Is Already Known

Exits Overall

Of the limited literature on exits from housing assistance, researchers have focused primarily on two outcomes: duration of housing assistance and factors associated with exit from housing assistance. Several studies used panel data or HUD data systems such as the Multifamily Tenant Characteristics System and the Tenant Rental Assistance Certification System's databases to explore the topic, typically using survival analysis methods (Ambrose, 2005; Cortes, Lam, and Fein, 2008; Dantzler and Rivera, 2019; Freeman, 2005; Geyer, Dastrup, and Finkel, 2019; Hungerford, 1996; Kang, 2020; Lubell, Shroder, and Steffen, 2003; McClure, 2018; Olsen et al., 2005). Across the studies there was general agreement that increased age, female gender, non-White race, disability, and tighter rental markets were all associated with lower likelihood of exiting from housing. In their study of New York City residents, Bahchieva and Hosier (2001) found somewhat similar findings: that younger and White residents had higher exit rates. And even though that housing

market may not be typical of others in the United States, it has some similarities to this study setting as a high-cost, urban environment.

Larger households were generally found to be more likely to exit, but evidence was mixed on the presence of children. Ambrose (2005) found increased likelihood of exit among larger households but only for project-based vouchers, whereas Cortes, Lam, and Fein (2008) found decreased exits—especially if younger children were present. Geyer, Dastrup, and Finkel (2019) found that the introduction of small-area fair-market rents increased the probability of exit and shortened the median time to exit. Among Veterans Affairs Supportive Housing (VASH) participants, women were more likely to still be housed after 1 year than were men (Kaspro et al., 2000), but having a service-connected disability was associated with exiting (Montgomery et al., 2017).

Dantzer (2021) also used the Panel Study of Income Dynamics to examine factors associated with exit but made a case that the policy setting should not be ignored. Although some demographic findings reinforced earlier studies—with older age and longer time in housing being associated with remaining in housing assistance—the largest effect was exit after welfare reforms were introduced in 1996.

Exit Types

Little in the published literature focuses on positive or negative exits. HUD's and states' Family Self-Sufficiency (FSS) programs might be expected to lead to positive exits, and Anthony (2005) found that younger adults, single participants, those without children, those with high school diplomas, and those who acquired more skills during the training were all more likely to succeed in the FSS program and exit housing assistance. Rohe, Webb, and Frescoln (2016) found a small effect of completion of the program on positive exits. However, the sample sizes in both evaluations were small and the specific nature of the FSS programs in question limits generalizability to the wider population receiving housing assistance.

Studies that concentrated on negative exits examined who was at risk of eviction or lease violation. Among residents of Mercy Housing—a large affordable-housing organization—increased age, Asian race, and living in senior or supported housing versus family housing were all associated with reduced risk of lease violations, whereas female gender, Black or other race versus White, being a larger household, and increased income were all associated with increased risk of lease violations (Brisson and Covert, 2015). Because of the counterintuitive nature of the finding regarding income, Brisson and Covert (2015) conducted further analyses and found that an increase in stable benefits was associated with decreased risk of a lease violation but that increases in work income, variable benefits income, and other income were all related to slightly higher likelihood of experiencing lease violations. Richter et al. (2021) explored who received eviction *orders* compared with only eviction *filings*. Though most of their findings were for all landlords combined, public housing and nonprofit organizations were the landlords in more than a quarter of all filings; and an unknown number of residents with private landlords would have been receiving HCVs. The authors found that male gender, White race versus Black, having more children, and receiving an eviction filing in the past were all associated with eviction *orders* versus receiving only eviction *filings*. Receiving an eviction *filing* by a public housing entity or nonprofit organization carried a lower risk of getting an

eviction *order*—relative to a filing by a private entity. Among VASH participants, male gender, older age, having alcohol and/or drug disorders, and having used acute care were all associated with increased levels of eviction (Montgomery and Cusack, 2017).

Just one study examined differences between those with positive exits and those with negative exits (Smith et al., 2014). There was no difference between positive and negative exits in terms of age, gender, or household size. At the end of the study, those with positive exits were more likely to be married, to have ever been married, and to be Hispanic, and those with negative exits were more likely to be non-Hispanic Black. Those with positive exits were less likely to have ever been homeless, less likely to live in overcrowded housing, and less likely to have a high housing-cost burden.

Methods

Setting and Participants

The authors included households served by the King County Housing Authority (KCHA) and the Seattle Housing Authority (SHA) from 2012 to 2019 in King County, Washington. Reasons for exit were available for SHA from 2012 onward and for KCHA from 2016 onward. The research was approved by the Washington State Institutional Review Board.

SHA and KCHA serve clients situated predominantly in an urban or suburban setting, though King County also encompasses a large rural area. Seattle and the surrounding area experienced huge increases in population, growing at two to three times the national average of 7.4 percent from 2010 to 2020 (Office of Planning and Community Development, 2021). That population boom has been accompanied by a large increase in wealth, with median annual income increasing from \$60,000 in 2010 to \$102,000 in 2019 in Seattle and from \$66,000 to \$102,000 in King County as a whole (not adjusted for inflation) (Public Health – Seattle & King County, 2022). Both the population and income changes have put pressure on the housing market, leading to an average rent increase of 43 percent from 2012 to 2017 (Regional Affordable Housing Task Force, 2019). The tight rental market has been accompanied by increases in homelessness—with the Seattle/King County Point-in-Time count growing by 50 percent since 2007—and greater demand for housing assistance, which is available to only one in four eligible households (HUD, 2022b).

Both KCHA and SHA are Moving to Work (MTW) PHAs. MTW is a program that gives PHAs greater flexibility in the ways they use federal funding, with the idea that they generate innovative ideas and programs that can be rolled out nationally (HUD, 2022a). MTW agencies may be better placed to respond to findings generated from cross-sector data analyses.

Data Sources and Variables

PHA demographic data come primarily from HUD Form 50058 Moving to Work, which collects data on households and individuals receiving federal housing assistance. The authors used the following variables from the 50058 data in the exit analyses: (1) head-of-household demographics: gender—male, female, or both male and female reported over time, which the authors termed *multiple*; age—younger than 25, 25–44, 45–61, and 62 or older, with senior-housing eligibility

beginning at age 62; race/ethnicity— American Indian/Alaskan Native, Asian, Black, Latina/o/x, multiple race, Native Hawaiian/Pacific Islander, and White; self-reported disability; and length of time in housing; and (2) household characteristics: household size, single caregiver—one adult and one or more children in the household—and assistance type—project-based vouchers (PBVs), PH, or tenant-based vouchers (TBVs). The authors used three categories of assistance type because the policy and program implications vary across each group; PHAs have a much greater ability to work with tenants in their own properties than they do with those renting in the private market or with partner nonprofits.

Exit reasons are collected on a separate form and stored in a different data system but were linked using the methods described below. Both KCHA and SHA had previously categorized exit reasons as positive, neutral, negative, or part of an additional aging or health category. Study team members with experience in working with housing data harmonized the existing categorizations across both PHAs and made minor adjustments. Positive exits consisted of reasons perceived to be likely associated with self-sufficiency—for example, increased income, homeownership, and moving to nonsubsidized rentals. Negative exits such as eviction, lease violations, criminal activity, or abandonment of a property were those expected to be associated with adverse life events and poorer outcomes. Several exit reasons could not be clearly identified as positive or negative and were classified as neutral. For example, exit for health reasons or moving in with family or friends could be associated with a positive or a negative trajectory depending on the circumstances. A full list of exit reasons and categories can be found in appendix A.

The authors restricted exits (1) to those with an at least 12-month gap between exit date and any subsequent housing (termed *true exits*) and (2) to nondeath exits. If a head of household had multiple exits during the study period, they used the most recent exit. If multiple exit categories were recorded for a single event, they prioritized the reason that belonged to the smallest group: positive, then negative, then neutral.

The HUD HEARS study looking at exits from housing drew from several other administrative datasets: (1) Behavioral Health and Recovery Division (BHRD) service data that includes mental health and substance use claims, (2) Employment Security Department (ESD) wage data, (3) Healthcare for the Homeless Network (HCHN) data, (4) Homeless Management Information System (HMIS), and (5) Medicaid claims data. The authors anticipated incorporating income when looking at factors associated with exit data, but ESD wage data were not available at the time of analysis and instead were used to examine post-exit outcomes. In addition, income data from the 50058 forms were not complete for all years and therefore could not be used.

Based on existing literature and PHA expertise, the authors hypothesized that health status and prior housing instability would influence exits from housing and exit type. In addition to the demographic factors listed above, the authors used BHRD data to identify people who had experienced acute behavioral health crisis events in the 12 months prior to housing exit. Homelessness was defined as one or more of the following in the 3 years prior to exit: appearing in HMIS or HCHN data, having a housing status in BHRD data that indicated housing instability, or having an address listed as “Homeless” in the Medicaid data (Johnson, McHugh, and Reimal, 2021). The authors used Medicaid data to identify those who had experienced emergency

department (ED) visits or hospitalizations for any reason in the 12 months prior to housing exit and those with one or more chronic conditions as defined by the Chronic Condition Warehouse (Centers for Medicare & Medicaid Services, 2022). The authors also created an enhanced definition of behavioral health crisis event that added behavioral-health-related ED visits from Medicaid to the BHRD data. Collectively, the Medicaid-derived all-cause ED-visit, hospitalization, and chronic-condition measures are proxies for a person's health status.

Data Linkage

To link the data sources, the authors used an existing multisector data system. The King County Integrated Data Hub (IDH) combines identities across several datasets, including BHRD, HCHN, HMIS, and Medicaid. The IDH uses a mix of probabilistic and deterministic methods to match individuals across data systems via a proprietary tool (Informatica, Redwood City, CA). PHA data in the form of 50058 and exit data from both KCHA and SHA were probabilistically linked by name, Social Security number, date of birth, and gender using the RecordLinkage package in R v4.2.0 and RStudio v2022.2.3.492 (R Core Team, 2022; RStudio Team, 2022; Sariyar and Borg, 2020). IDH, ESD, and PHA data were then linked using the same RecordLinkage approach. PHA addresses were geocoded using an in-house Esri ArcGIS locator (Redlands, CA).

Statistical Analysis

The primary analyses aimed to answer two questions: What factors are associated with exiting from housing assistance? And what factors are associated with each exit type? For both analyses, the unit of analysis was the head of household. Although some exit reasons may apply to an entire household, other reasons focus on the individual, and other household members may continue to receive housing assistance.

To answer the first question, the authors randomly matched four controls who were heads of household who remained in housing for each exit without replacement and assigned the controls a pseudo-exit date that matched the exit date for the purposes of assessing demographic and other variables noted above. The authors used a 4:1 ratio because greater ratios yield minimal gain in power to detect differences and only a limited number of controls were available for matching (Breslow, 2005). Controls were eligible for matching if they remained in housing for at least 12 months after the case exit date. Because the authors wanted to examine how each variable was associated with exits, they did not match controls on any other characteristics. If the authors had matched on a factor such as age, they would have artificially balanced the distribution of that factor between those who exited and the controls, meaning that no relationship between the factor and exiting would be found.

The authors first examined descriptive statistics to find programmatically meaningful differences in characteristics as defined by subject matter experts who work with the PHA population. Then the authors used a binomial logistic regression to evaluate the relationship between each variable and exiting from housing. To examine factors associated with exit type, the authors used a multinomial logistic regression with neutral exits as the reference category. The authors used the DHARMA R package to conduct model checking (Hartig, 2022).

Secondary Analysis

Healthcare utilization data from ED visits, hospitalizations, and diagnosed chronic conditions were available only for those enrolled in Medicaid prior to exiting. The authors therefore conducted a secondary analysis of the subset of exiting and controls participants who had full, nondual—meaning that they were not also enrolled in Medicare—Medicaid coverage for at least 7 of the 12 months prior to the exit or pseudoexit date. That minimum-coverage requirement ensures that if a person visited an ED, was hospitalized, or was diagnosed with a chronic condition, the event would likely be detected in the claims data (Washington State Health Care Authority, 2022). Because the authors excluded Medicaid members with dual Medicare coverage, they also restricted secondary analyses to those younger than age 62, because most older Medicaid recipients also have Medicare, and Medicaid claims may be incomplete.

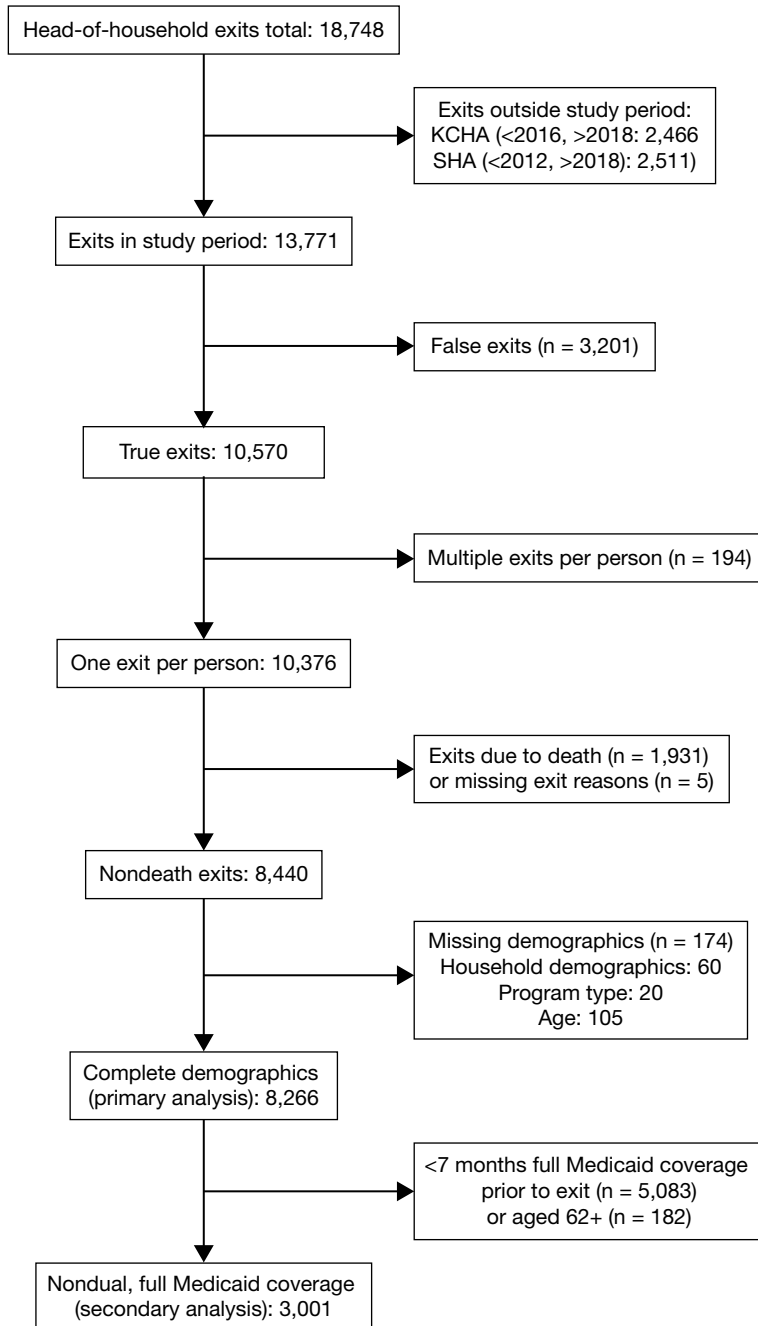
Results

Sample Size

There were 19,411 exit records in the KCHA and SHA data, 19,013 (97.9 percent) of which matched to records in the 50058 data; multiple exit categories were found in 50 (0.3 percent) of the matched exits; and extra categories were removed by prioritizing the smallest group: positive, then negative, then neutral. An additional 260 exit events matched to individuals in the 50058 data who were not recorded as heads of households and so were excluded, for a total of 18,748 heads of household. After restricting to the study period during which exit reasons were consistently recorded, after removing false exits wherein the individual remained receiving housing assistance after a recorded exit, and after removing exits due to deaths, missing exit reasons, or other missing variables, the authors analyzed 8,266 exits in the regression analysis: 2,610 negative, 4,538 neutral, and 1,118 positive (exhibit 1). The secondary analysis of PHA recipients who also had full, non-dual Medicaid coverage prior to exit was limited to 3,001 households.

Exhibit 1

Sample Size for Primary and Secondary Analyses



KCHA = King County Housing Authority. SHA = Seattle Housing Authority.
Source: NO HARMS integrated study dataset

Descriptive Statistics

Heads of households who exited were more likely to have the following attributes than were those who remained in housing (exhibit 2).

- Male (39.9 percent versus 34.5 percent).
- Shorter average tenure receiving housing assistance (median of 3.7 years versus 5.5 years).
- Receiving PBV assistance (43.4 percent versus 18.6 percent).
- Experienced recent homelessness (39.4 percent versus 22.8 percent).
- Have had a recent behavioral health crisis (6.9 percent versus 1.6 percent).

Exhibit 2

Demographics of Heads of Households Who Exited Versus Controls Who Did Not, by Exit Type (1 of 2)

	Remained (N=25,162)	Exited (N=8,266)	Neutral Exit (N=4,538)	Positive Exit (N=1,118)	Negative Exit (N=2,610)
Age					
Mean (years)	52.4	50.7	53.2	48.9	47.2
Median (years)	52	49	52	47	45
Senior (aged 62+)	29.9%	26.9%	33.3%	21.0%	18.3%
Gender					
Female	16,117 (64.1%)	4,869 (58.9%)	2,628 (57.9%)	678 (60.6%)	1,563 (59.9%)
Male	8,692 (34.5%)	3,300 (39.9%)	1,862 (41%)	423 (37.8%)	1,015 (38.9%)
Multiple	353 (1.4%)	97 (1.2%)	48 (1.1%)	17 (1.5%)	32 (1.2%)
Race/Ethnicity					
AI/AN	329 (1.3%)	158 (1.9%)	81 (1.8%)	<20	65 (2.5%)
Asian	2,464 (9.8%)	689 (8.3%)	421 (9.3%)	118 (10.6%)	150 (5.7%)
Black	8,558 (34%)	2,866 (34.7%)	1,413 (31.1%)	437 (39.1%)	1,016 (38.9%)
Latina/o/x	1,684 (6.7%)	561 (6.8%)	299 (6.6%)	72 (6.4%)	190 (7.3%)
Multiple	2,530 (10.1%)	737 (8.9%)	367 (8.1%)	114 (10.2%)	256 (9.8%)
NH/PI	203 (0.8%)	67 (0.8%)	34 (0.7%)	<10	25 (1%)
White	9,394 (37.3%)	3,188 (38.6%)	1,923 (42.4%)	357 (31.9%)	908 (34.8%)
Time in Housing					
Mean time (years)	5.9	5	4.5	6.2	5.6
Median time (years)	5.5	3.7	3	5.6	4.5
Household Characteristics					
Head of household disability	44.3%	42.0%	45.4%	25.2%	43.3%
Mean household size	2.2	2	1.7	2.6	2.1
Median household size	1	1	1	2	1
Single caregiver	19.0%	17.3%	15.0%	14.5%	22.6%
Program Type					
PBV	4,672 (18.6%)	3,586 (43.4%)	2,761 (60.8%)	308 (27.5%)	517 (19.8%)
PH	7,118 (28.3%)	1,840 (22.3%)	912 (20.1%)	331 (29.6%)	597 (22.9%)
TBV	13,372 (53.1%)	2,840 (34.4%)	865 (19.1%)	479 (42.8%)	1,496 (57.3%)

Exhibit 2

Demographics of Heads of Households Who Exited Versus Controls Who Did Not, by Exit Type (2 of 2)

	Remained (N=25,162)	Exited (N=8,266)	Neutral Exit (N=4,538)	Positive Exit (N=1,118)	Negative Exit (N=2,610)
Health and Homelessness Events					
Experienced recent homelessness	5,726 (22.8%)	3,256 (39.4%)	1,972 (43.5%)	226 (20.2%)	1,058 (40.5%)
Experienced 1+ behavioral health crisis events in year prior to exit (excl. Medicaid ED visits)	408 (1.6%)	570 (6.9%)	339 (7.5%)	18 (1.6%)	213 (8.2%)
Experienced 1+ behavioral health crisis events in year prior to exit (inc. ED visits) ¹	313 (0.9%)	240 (2.8%)	122 (8.0%)	<10	82 (7.2%)
Average # ED visits in year prior to exit ¹	0.8	1	2	0.8	2.1
Experienced 1+ ED visits in year prior to exit ¹	13,435 (36.6%)	3,381 (40.0%)	862 (56.6%)	118 (34.7%)	689 (60.5%)
Average # hospitalizations in year prior to exit (per 100 people) ¹	6.1	7.8	17.5	6.8	15.4
Experienced 1+ hospitalizations in year prior to exit ¹	1,657 (4.5%)	440 (5.2%)	175 (11.5%)	19 (5.6%)	107 (9.4%)
Average # of chronic conditions ¹	1	0.9	1.8	1.5	2

AI/AN = American Indian/Alaskan Native. ED = emergency department. NH/PI = Native Hawaiian/Pacific Islander. PBV = project-based voucher. PH = public housing. TBV = tenant-based voucher.

¹ Health event data available for those aged <62 enrolled in Medicaid. Remained N = 9,234. Exited N = 3,001. Negative N = 1,139. Neutral N = 1,522. Positive N = 340.

Source: NO HARMS integrated study dataset

Race, household size, whether there was a single caregiver, or whether the head of household had a disability did not substantially vary between those exiting and those remaining in housing. In the secondary analysis of Medicaid recipients, people exiting had greater healthcare use in the year prior to exit when it came to both ED visits—55.6 percent had more than one versus 46.9 percent of people remaining—and hospitalizations: 10.0 percent versus 8.8 percent.

In a comparison of exits by type, those with neutral exits tended to be older than those with positive or negative exits (median age 52 years compared with 47 and 45 years, respectively), were slightly more likely to be male (41.0 percent versus 37.8 percent and 38.9 percent), were more likely to be White (42.4 percent versus 31.9 percent and 34.8 percent), and had shorter average tenures in housing assistance (median of 3 years versus 5.6 and 4.5 years) (exhibit 2). Those with positive exits had larger average household sizes (mean of 2.6 versus 1.7 and 2.1 for neutral and negative exits, respectively), were more likely to be living in public housing (29.6 percent versus 20.1 percent and 22.9 percent), and were less likely to have experienced recent homelessness (20.2 percent versus 43.5 percent and 40.5 percent) or behavioral crises (1.6 percent versus 7.5 percent and 8.2 percent). Among Medicaid recipients, those with positive exits had lower levels of recent

ED visits (34.7 percent versus 56.6 percent and 60.5 percent), hospitalizations (5.6 percent versus 11.5 percent and 9.4 percent), and chronic conditions (average of 1.5 versus 1.8 and 2.0).

Among both those who remained and those who exited, people with 7 or more months of full Medicaid coverage in the year prior to exit were younger (44/41 years for remained/exited and had Medicaid versus 59/56 years for those without Medicaid), were more likely to be female (70.2 percent/64.6 percent versus 60.0 percent/55.3 percent), were more likely to be Black (43.8 percent/43.5 percent versus 27.6 percent/29.1 percent), were more likely to have larger households (mean 2.8/2.4 versus 1.8/1.7), and were more likely to have a single caregiver (30.1 percent/28.4 percent versus 11.8 percent/10.4 percent) but less likely to have disabilities (35.4 percent/37.0 percent versus 50.1 percent/45.2 percent) (exhibit B-1). Among those with Medicaid coverage, those exiting were more likely to be receiving PBVs than were those who remained (49.4 percent versus 22.2 percent).

Regression Results

Results from the regression analysis show that after adjusting for other factors, male gender, receiving a project-based voucher, homelessness within the previous 3 years, and having behavioral health crisis events were all associated with increased odds of exits of any type (exhibit 3). Being older than age 25, increased time in housing (more than 6 years), larger household size, having a single-caregiver household, and having a disability were all associated with decreased odds of exit. Race/ethnicity was not associated with exiting. For the secondary analysis of housing recipients who also had more than 7 months of full Medicaid coverage in the year prior to exit, experiencing one or more ED visits in the year prior to exit was positively associated with exit (adjusted odds ratio (aOR): 1.27, 95 percent confidence interval (CI): 1.16–1.40, $p < 0.001$); experiencing a hospitalization in the same time frame was not associated with exit; and having two or more chronic conditions was negatively associated with exits (0.75, 95 percent CI: 0.68–0.83, $p < 0.001$) (exhibit 3 and exhibit B-2).

Exhibit 3

Regression Output for Heads of Households Who Exited Versus Controls Who Did Not (1 of 2)		
	Odds Ratio ¹	95% CI
Age		
<25	ref	—
25-44	0.67***	0.58–0.78
45-61	0.48***	0.41–0.55
62+	0.50***	0.43–0.58
Gender		
Female	ref	—
Male	1.08**	1.02–1.15
Multiple	0.96	0.76–1.21
Race/Ethnicity		
White	ref	—
AI/AN	1.25*	1.01–1.53
Asian	0.92	0.83–1.01
Black	1.06	1.00–1.13

Exhibit 3

Regression Output for Heads of Households Who Exited Versus Controls Who Did Not (2 of 2)

	Odds Ratio ¹	95% CI
Race/Ethnicity		
Latino	0.97	0.87–1.09
Multiple	1.00	0.90–1.10
NH/PI	1.10	0.81–1.47
Time in Housing		
<3	ref	—
3–5.99	1.15***	1.07–1.23
6–9.99	0.95	0.89–1.03
10+	1.16***	1.07–1.26
Household Characteristics		
Head of household disability	0.70***	0.66–0.75
Household size	0.90***	0.89–0.92
Single caregiver	0.76***	0.70–0.82
Program Type		
TBV	ref	—
PBV	2.94***	2.75–3.14
PH	1.20***	1.12–1.29
Health and Homelessness Events		
Experienced recent homelessness	1.41***	1.32–1.51
Experienced 1+ behavioral health crisis event in year prior to exit (excl. ED visits)	2.91***	2.53–3.35
Experienced 1+ behavioral health crisis event in year prior to exit (incl. ED visits) ²	2.12***	1.69–2.66
Experienced 1+ ED visit in year prior to exit ²	1.27***	1.16–1.40
Experienced 1+ hospitalization in year prior to exit ²	0.96	0.82–1.12
2+ chronic conditions ²	0.75***	0.68–0.83

AI/AN = American Indian/Alaskan Native. CI = confidence interval. ED = emergency department. NH/PI = Native Hawaiian/Pacific Islander. PBV = project-based voucher. PH = public housing. TBV = tenant-based voucher.

¹ * = $p < 0.05$. ** = $p < 0.01$. *** = $p < 0.001$.

² Health event data available only for those aged <62 enrolled in Medicaid (N = 9,234 for controls, 3,001 for exits).

Source: NO HARMS integrated study dataset

Among those who exited, male gender, a longer time in housing, and living in public housing were all associated with both negative exits and positive exits when compared with neutral exits (exhibit 4). Older age was negatively associated with both positive and negative exits, and, although not statistically significant, working-age adults aged 25–61 were more likely to have positive exits. Race was generally not associated with positive versus neutral exits, though people who identified as Black were slightly more likely to have positive exits than were Whites. People in the American Indian/Alaskan Native, Black, and Latina/o/x groups were all more likely to have negative exits than were Whites. Those receiving PBVs were substantially less likely to have negative or positive exits compared with those receiving TBVs, and those in PH were also less likely to have negative exits but were not significantly different with regard to positive exits. Having a single-caregiver household, experiencing recent homelessness, and experiencing more than one crisis event or ED visit were positively associated with negative exits and negatively associated with positive exits.

Exhibit 4

Regression Output for Exit Type

	Negative/Positive Exits Versus Neutral Exits (Neutral N=4,538)			
	Negative Exits (N=2,610)		Positive Exits (N=1,118)	
	Odds Ratio ¹	95% CI	Odds Ratio ¹	95% CI
Age				
<25	ref	—	ref	—
25-44	1.02	0.78–1.33	1.43	0.95–2.16
45-61	0.87	0.66–1.15	1.43	0.94–2.17
62+	0.43***	0.32–0.58	0.59*	0.38–0.91
Gender				
Female	ref	—	ref	—
Male	1.33***	1.18–1.51	1.34***	1.14–1.56
Multiple	1.00	0.61–1.64	1.16	0.64–2.11
Race/Ethnicity				
White	ref	—	ref	—
AI/AN	1.86**	1.26–2.74	0.92	0.49–1.76
Asian	0.80	0.64–1.01	0.99	0.77–1.27
Black	1.25***	1.10–1.43	1.20*	1.01–1.43
Latino	1.30*	1.03–1.63	1.13	0.84–1.52
Multiple	1.10	0.90–1.35	1.14	0.87–1.48
NH/PI	1.27	0.69–2.32	0.85	0.37–1.94
Time in Housing				
<3	ref	—	ref	—
3-5.99	1.18*	1.01–1.37	1.28*	1.05–1.56
6-9.99	1.14	0.97–1.34	1.36**	1.11–1.68
10+	1.20*	1.00–1.43	1.54***	1.24–1.92
Household Characteristics				
Head of household disability	1.03	0.90–1.17	0.53***	0.45–0.63
Household size	0.98	0.94–1.02	1.11***	1.06–1.16
Single caregiver	1.33***	1.12–1.57	0.62***	0.50–0.77
Program Type				
TBV	ref	—	ref	—
PBV	0.07***	0.06–0.09	0.31***	0.26–0.38
PH	0.45***	0.39–0.52	0.86	0.71–1.03
Health and Homelessness Events				
Experienced recent homelessness	1.76***	1.53–2.03	0.63***	0.52–0.76
Experienced 1+ behavioral health crisis event in year prior to exit (excl. ED visits)	1.68***	1.36–2.08	0.43***	0.26–0.71
Experienced 1+ behavioral health crisis event in year prior to exit (incl. ED visits) ²	1.50*	1.06–2.12	0.70	0.31–1.56
Experienced 1+ ED visit in year prior to exit ²	1.30**	1.08–1.58	0.62***	0.47–0.82
Experienced 1+ hospitalization in year prior to exit ²	0.79	0.59–1.06	0.74	0.44–1.26
2+ chronic conditions ²	0.91	0.75–1.11	0.96	0.72–1.29

AI/AN = American Indian/Alaskan Native. CI = confidence interval. ED = emergency department. NH/PI = Native Hawaiian/Pacific Islander. PBV = project-based voucher. PH = public housing. TBV = tenant-based voucher.

¹ * = p<0.05. ** = p<0.01. *** = p<0.001.

² Health event data available only for those aged <62 enrolled in Medicaid (N = 1,522/1,139/340 for neutral/negative/positive exits).

Source: NO HARMS integrated study dataset

Conclusion

After adjusting for other factors, the authors found that male gender, receiving PBV or PH assistance versus TBV, homelessness within the previous 3 years, and having a behavioral health crisis event were all associated with increased odds of exit. Conversely, age older than 25, increased time in housing (more than 6 years), larger household size, having a single-caregiver household, and having a disability were all associated with decreased odds of exit. Demographics associated with exit were similar to previous studies with regard to age, gender, disability, and time in housing (Ambrose, 2005; Cortes, Lam, and Fein, 2008; McClure, 2018). Although there was no association for most race/ethnicity groups. The factors with the strongest association with exit were (1) recent behavioral health crisis events (aORs of 2.91 for all heads of household and 2.12 when restricted to Medicaid members but including behavioral health ED visits) and (2) receiving PBV assistance (aOR of 2.94).

Among those who exited, there was some commonality between positive and negative exits, compared with neutral exits. Both male gender and longer time in housing were positively associated with both positive and negative exits, and age older than 62 and receiving PBV assistance were negatively associated with both positive and negative exits. It is unclear why these factors have similar associations for both positive and negative exits, and a deeper analysis of specific exit reasons may yield a better understanding of the finding.

There were also substantial differences in factors associated with positive and negative exits. Those who are American Indian/Alaskan Natives, Black, or Latina/o/x were more likely to have negative exits compared with Whites; and Asians were less likely to have negative exits. The reasons for differences by race/ethnicity are unclear; there may be systemic factors that affect certain race/ethnicity groups differently, or race/ethnicity may be a proxy for additional factors not included in the model. Heads of household in single-caregiver households, who had disabilities, who experienced behavioral health crisis events, or who had recent ED visits were all more likely to have negative exits and less likely to have positive exits compared with neutral exits. These associations suggest that single caregivers or those with health problems face barriers to working and may also experience other obstacles to stable housing. Those with recent homelessness were less likely to have positive exits, but there was no difference between negative and neutral exits.

The findings are similar to those found in a previous examination of factors associated with exit type (Smith et al., 2014), which found no difference between age and gender and a negative association between prior homelessness and positive exits. However, this was the first study to look at factors associated with exit types among all federally supported housing recipients rather than a Moving to Opportunity subset, which included very low-income households with children. The large sample size facilitates a robust analysis and examination of smaller demographic groups. Another major strength was the addition of data from Medicaid, behavioral health, and homeless management systems. Factors derived from those sources had some of the strongest associations with both exits in general and exit type.

Limitations

There were some limitations to the study, which are shared by most of the previous studies on this topic. First, the authors looked only at heads of households, which presents two challenges: (1) other household members' experiences may affect the entire household, but that does not get captured in the factors examined; for example, an incarceration or health event could destabilize the household; and (2) other household members exit housing for varying reasons, none of which are captured in the existing data and some of which may differ from the head of household's reason for exiting. PHAs could consider expanding their data collection processes to include reasons for each individual person's exit.

A second limitation is lack of contextual information behind the recorded exit reason. Previous studies have taken a mixed-methods approach to explore exit experiences in more depth (Smith et al., 2014), and although the authors did not have the resources to incorporate qualitative methods in this study, they strongly encourage that approach in future work—or even as a routine part of data collection at the time of exit. Guidance for PHAs on the collection of exit information could also improve data quality and completeness. KCHA and SHA had different sets of exit reasons that had to be harmonized, and more than 20 percent of exits had nonspecific reasons such as “Client would not disclose” or “Moved out, location unknown.” The revised 50058 MTW form will in the future collect information on reasons for end of participation, but limitations in household-level information and lack of context will remain.

The categorization of exit reasons may also be problematic. For example, households that are over income are considered positive exits. However, in the Seattle metropolitan area, an exit for that reason does not guarantee that the household is no longer rent burdened; a household earning just over 80 percent of the area median income would still be paying 38 percent of income for the median rental price (Ellis, 2022; KCHA, 2022).

Finally, the secondary analysis of health-related factors was restricted to those with Medicaid coverage, who were not demographically representative of the entire housing population (exhibit B-1).

Policy and Program Implications

The authors' analysis identified several factors associated with exiting from housing assistance and exit type. How PHAs use that information will depend on policy imperatives, resources, and what is legally permissible. With regard to policy, the framing for the undertaking of the HUD HEARS project was in the context of HUD's desire to increase the number of positive exits from assisted housing, with the expectation that that would increase the number of people able to receive housing assistance. The results show that there is a way to go to achieving that goal; positive exits made up only 13.5 percent of all nondeath exits in the study.

For PHAs that are working to increase positive exits while minimizing negative exits, the findings present some challenges. First, certain factors such as gender and type of housing assistance had the same associations for both positive and negative exit types, compared with neutral. Second, some factors are generally immutable such as age, gender, and race/ethnicity; and it may be illegal or unethical to dedicate services based solely on those factors. To address such challenges, further

investigation into why those characteristics are associated with exits and exit types could help adapt services accordingly.

When there was a more specific association between factors and exit type, policy and program implications became clearer. Although not statistically significant, the relationship between being of working age and positive exits suggests that emphasis on workforce training and other self-sufficiency programs may be warranted. Longer tenure in housing assistance was associated with increased odds of a positive exit, which suggests that a stabilization period is required before a household can get itself into a position in which positive exits are more possible. PHAs may wish to investigate what it is about the early years of housing assistance that is not conducive to positive exit and then determine what can be done to help households through the transition period.

Knowing that recent homelessness is a risk factor for negative exits suggests that efforts to support people in their transitions from homelessness into housing are crucial. Indeed, the PHAs in this study are already participants in federal initiatives involving specific voucher types such as Emergency Housing Vouchers and Veterans Affairs Supportive Housing vouchers that pair housing with supportive services. The PHAs also (1) fund supportive initiatives through their own programming, (2) contract with community-based organizations and local governments, and (3) maintain referral partnerships with local providers. However, not all PHAs are in a position to do this; KCHA and SHA can undertake these programs through grant funding and because their MTW authority offers flexibility in the ways funds can be used. PHAs without MTW authority are less able to resource these kinds of support.

Associations between both ED visits and crisis events with negative exits emphasize that housing is interconnected with other aspects of a person's life. The policy and programmatic implications for PHAs are complicated by laws such as the Health Insurance Portability and Accountability Act, which places some limits on how health data can be shared. However, such restrictions can be ethically addressed by obtaining appropriate and informed consent from housing assistance recipients, meaning that holistic interventions that encompass health elements and housing elements are possible. Such undertakings will require collaborations between PHAs and healthcare organizations that have mutual interests in avoiding both ED visits and negative exits.

Summary

The data platform described here offers a wealth of opportunities beyond this study. PHAs can obtain information about physical or mental health conditions, prior homelessness, or other factors that could influence outcomes for their tenants. The data platform also provides a means of examining events after exit from housing assistance, and planned future studies will examine health, economic, and residential-stability outcomes. By the very nature of an exit, housing recipients disappear from PHA data systems, and PHAs know little about what happens to households beyond that point of exit. By building on an existing administrative data linkage, this analysis and any other kind of examination of postexit outcomes can become routine data processes that PHAs use for evaluating programs and monitoring progress toward goals rather than being one-off research projects. The authors believe that such an approach can serve as a model

that PHAs can follow for establishing cross-sector partnerships with health departments and other groups that have an interest in the health and well-being of housing assistance recipients.

This study adds important information to the discussion about exits from housing assistance. It also demonstrates the value of using cross-sector data linkages to gain more holistic pictures of the people being served. PHAs can use the knowledge from this study to more completely learn who is most likely to experience a negative exit and then adapt programs and policies accordingly.

Appendix A

Exhibit A-1

Exit Reasons and Categories (1 of 2)

Exit Category	Exit Reason
Negative	180 Days Away From Assisted Unit
Negative	Absence – Extended Leave
Negative	Absence – Incarceration
Negative	Absence – Treatment/Hospital
Negative	Absence – Treatment/Hospital
Negative	Client Location Unknown/Abandoned Unit
Negative	Criminal Activity
Negative	Domestic Violence
Negative	Eviction – Abandonment
Negative	Eviction – Judgment/Physical
Negative	Eviction – Judgment/Physical – Criminal
Negative	Eviction – Judgment/Physical – Other
Negative	Eviction – Nonpayment
Negative	Failure to Provide Information
Negative	Failure to Complete Housing Quality Standards Inspection
Negative	Failure to Complete Reexamination
Negative	Fraud – Household Composition
Negative	Fraud – Household Income
Negative	Fraud – Other
Negative	Housing Quality Standards Breach
Negative	Inspection/Damages
Negative	Landlord Eviction
Negative	Lease Enforcement
Negative	Lease Violation – Criminal
Negative	Lease Violation – Noncriminal
Negative	Location
Negative	More than 60 Days Absent From the Unit
Negative	Moved – Shelter
Negative	Moved – Transitional Housing Program
Negative	Neighborhood Quality
Negative	Nonpayment of Rent
Negative	Nonpayment of Retro Rent
Negative	Noncompliance – Citizenship/Immigration
Negative	Noncompliance – Criminal Activity
Negative	Noncompliance – Housing Quality Standards
Negative	Noncompliance – Paperwork Violation
Negative	Noncompliance – Payment Plan/Debt to SHA
Negative	Noncompliance – Program Partnership
Negative	Other Violation of Participant Obligations
Negative	PB/MR Moved due to Incarceration
Negative	PB/MR Moved to Shelter
Negative	Rent Too High
Negative	Section 8 PB Failed Social Services Program
Negative	Serious/Repeated Lease Violations (Criminal)

Exhibit A-1

Exit Reasons and Categories (2 of 2)

Exit Category	Exit Reason
Negative	Serious/Repeated Lease Violations (Noncriminal)
Negative	Subsidy in Jeopardy Client Choice
Negative	Unit/Property Quality
Negative	Voucher Expired
Neutral	Client Would Not Disclose Reason
Neutral	Deceased
Neutral	Expired – Ported Out
Neutral	Expired – Term-Limit Program
Neutral	Family Unification Program Youth 18-Month Expiration
Neutral	Health
Neutral	Ineligible – Citizenship/Immigration
Neutral	Moved – Changed Subsidy Program Type
Neutral	Moved – Needed Higher Level of Services
Neutral	Moved In With Family or Friends
Neutral	Moved to Non-KCHA-Subsidized Rental
Neutral	Mutual Termination
Neutral	No Longer Used as of 2016-09-14 (other)
Neutral	Other
Neutral	Other Subsidized Housing/Housing Choice Voucher
Neutral	PB/MR Moved Out Location Unknown
Neutral	PB/MR Moved to Hospital or Assisted Living
Neutral	PB/MR Moved to Non-Time-Limited Subsidized Housing
Neutral	PB/MR Moved to Temporary Housing With Family or Friends
Neutral	PB/MR Moved to Transitional Housing Program
Neutral	PM Move to KCHA Section 8 Voucher
Neutral	Port Out Termination
Neutral	Section 8 Absorption
Neutral	Section 8 Cross-Absorption
Neutral	Section 8 Incoming Portability Move Out
Neutral	Section 8 Sponsor-Based Provider-Based Move Out
Neutral	Transitional Housing Graduate to any Section 8 Voucher
Neutral	Transitional Housing Graduate to KCHA Managed Units
Neutral	Transitional Housing Graduate to KCHA PBA
Neutral	Transitional Housing Graduate to Other Subsidized Rental
Neutral	Transitional Housing Nongraduate Early Program Exit
Neutral	Vacated PB/MR Unit
Neutral	Voluntary Self-Termination
Positive	180 Days \$50 or Less Housing Assistance Plan
Positive	180 Days Zero Housing Assistance Plan
Positive	Graduated – 180 Days \$50 or Less Housing Assistance Plan
Positive	Homeownership
Positive	Moved to Nonsubsidized Rental
Positive	PB/MR moved to Non-Time Limited Market Rate
Positive	Section 8 Over Income
Positive	Transitional Housing Graduate to Nonsubsidized Rental

KCHA = King County Housing Authority. MR = mod rehab. PB = project-based. PBA = project-based assistance. SHA = Seattle Housing Authority. Source: KCHA and SHA

Appendix B

Exhibit B-1

Demographics of Heads of Households Who Exited Versus Those Who Did Not—by Medicaid Enrollment Status

	Remained, no Medicaid (N=15,214)	Remained, Medicaid (N=9,948)	Exited, no Medicaid (N=5,083)	Exited, Medicaid (N=3,183)
Age				
Mean (years)	58	44	56.5	41.4
Median (years)	59	44	56	41
Senior (aged 62+)	44.8%	7.2%	40.1%	5.7%
Gender				
Female	9,131 (60%)	6,986 (70.2%)	2,813 (55.3%)	2,056 (64.6%)
Male	5,875 (38.6%)	2,817 (28.3%)	2,209 (43.5%)	1,091 (34.3%)
Multiple	208 (1.4%)	145 (1.5%)	61 (1.2%)	36 (1.1%)
Race/Ethnicity				
AI/AN	171 (1.1%)	158 (1.6%)	75 (1.5%)	83 (2.6%)
Asian	1,763 (11.6%)	701 (7%)	522 (10.3%)	167 (5.2%)
Black	4,202 (27.6%)	4,356 (43.8%)	1,481 (29.1%)	1,385 (43.5%)
Latina/o/x	1,011 (6.6%)	673 (6.8%)	339 (6.7%)	222 (7%)
Multiple	1,539 (10.1%)	991 (10%)	468 (9.2%)	269 (8.5%)
NH/PI	119 (0.8%)	84 (0.8%)	45 (0.9%)	22 (0.7%)
White	6,409 (42.1%)	2,985 (30%)	2,153 (42.4%)	1,035 (32.5%)
Time in Housing				
Mean time (years)	6.2	5.5	5.4	4.4
Median time (years)	6.2	4.5	4.3	3
Household Characteristics				
Head of household disability	50.1%	35.4%	45.2%	37.0%
Mean household size	1.8	2.8	1.7	2.4
Median household size	1	2	1	2
Single caregiver	11.8%	30.1%	10.4%	28.4%
Program Type				
PBV	2,462 (16.2%)	2,210 (22.2%)	2,013 (39.6%)	1,573 (49.4%)
PH	4,985 (32.8%)	2,133 (21.4%)	1,330 (26.2%)	510 (16%)
TBV	7,767 (51.1%)	5,605 (56.3%)	1,740 (34.2%)	1,100 (34.6%)
Health and Homelessness Events				
Experienced recent homelessness	2,373 (15.6%)	3,353 (33.7%)	1,448 (28.5%)	1,808 (56.8%)
Experienced 1+ behavioral health crisis events in year prior to exit (excl. Medicaid ED visits)	220 (1.4%)	188 (1.9%)	343 (6.7%)	227 (7.1%)

AI/AN = American Indian/Alaskan Native. CI = confidence interval. ED = emergency department. NH/PI = Native Hawaiian/Pacific Islander. PBV = project-based voucher. PH = public housing. TBV = tenant-based voucher.

Source: NO HARMS integrated study dataset

Exhibit B-2

Regression Output for Heads of Households Who Exited Versus Controls Who Did Not (Medicaid Population)

	Odds Ratio ¹	95% CI
Age		
<25	ref	—
25-44	0.67***	0.56–0.81
45-61	0.50***	0.41–0.61
Gender		
Female	ref	—
Male	1.05	0.94–1.17
Multiple	0.97	0.65–1.43
Race/Ethnicity		
White	ref	—
AI/AN	1.23	0.90–1.67
Asian	0.94	0.77–1.15
Black	1.03	0.93–1.15
Latino	0.92	0.76–1.10
Multiple	0.90	0.76–1.07
NH/PI	0.89	0.52–1.45
Time in Housing		
<3	ref	—
3-5.99	1.18**	1.05–1.32
6-9.99	1.16*	1.01–1.32
10+	1.22**	1.05–1.42
Household Characteristics		
Head of household disability	0.81***	0.72–0.90
Household size	0.93***	0.90–0.96
Single caregiver	0.82***	0.73–0.92
Program Type		
TBV	ref	—
PBV	2.80***	2.52–3.11
PH	1.26***	1.11–1.43
Health and Homelessness Events		
Experienced recent homelessness	1.74***	1.57–1.94
Experienced 1+ behavioral health crisis event in year prior to exit (incl. ED visits)	2.12***	1.69–2.66
Experienced 1+ ED visit in year prior to exit	1.27***	1.16–1.40
Experienced 1+ hospitalization in year prior to exit	0.96	0.82–1.12
2+ chronic conditions	0.75***	0.68–0.83

AI/AN = American Indian/Alaskan Native. CI = confidence interval. ED = emergency department. NH/PI = Native Hawaiian/Pacific Islander. PBV = project-based voucher. PH = public housing. TBV = tenant-based voucher.

¹ * = $p < 0.05$. ** = $p < 0.01$. *** = $p < 0.001$.

Note: Health event data available only for those aged <62 enrolled in Medicaid (N = 9,234 for controls, 3,001 for exits).

Source: NO HARMs integrated study dataset

Exhibit B-3

Regression Output for Exit Type (Medicaid Population)

	Negative/Positive Exits Versus Neutral Exits (Neutral N=1,522)			
	Negative Exits (N=1,139)		Positive Exits (N=340)	
	Odds Ratio ¹	95% CI	Odds Ratio ¹	95% CI
Age				
<25	ref	—	ref	—
25-44	0.97	0.70–1.35	0.99	0.58–1.67
45-61	0.86	0.60–1.22	0.92	0.53–1.61
Gender				
Female	ref	—	ref	—
Male	1.08	0.88–1.34	1.21	0.90–1.63
Multiple	0.77	0.33–1.82	2.14	0.85–5.37
Race/Ethnicity				
White	ref	—	ref	—
AI/AN	1.67	0.98–2.85	0.56	0.17–1.92
Asian	0.85	0.54–1.33	1.35	0.82–2.22
Black	1.14	0.93–1.40	1.00	0.74–1.36
Latino	1.24	0.87–1.79	1.26	0.74–2.14
Multiple	0.95	0.68–1.33	0.93	0.57–1.54
NH/PI	2.58	0.90–7.36	1.19	0.23–6.12
Time in Housing				
<3	ref	—	ref	—
3-5.99	1.41**	1.12–1.78	1.36	0.96–1.93
6-9.99	1.55**	1.18–2.02	1.61*	1.10–2.36
10+	1.85***	1.35–2.53	2.49***	1.63–3.82
Household Characteristics				
Head of household disability	0.90	0.72–1.13	0.48***	0.33–0.68
Household size	0.93*	0.88–0.99	1.10*	1.02–1.18
Single caregiver	1.12	0.89–1.40	0.56***	0.40–0.78
Program Type				
TBV	ref	—	ref	—
PBV	0.11***	0.09–0.14	0.59**	0.42–0.82
PH	0.82	0.63–1.07	2.08***	1.45–2.98
Health and Homelessness Events				
Experienced recent homelessness	2.12***	1.69–2.65	0.87	0.63–1.20
Experienced 1+ behavioral health crisis event in year prior to exit (incl. ED visits)	1.50*	1.06–2.12	0.70	0.31–1.56
Experienced 1+ ED visit in year prior to exit	1.30**	1.08–1.58	0.62***	0.47–0.82
Experienced 1+ hospitalization in year prior to exit	0.79	0.59–1.06	0.74	0.44–1.26
2+ chronic conditions	0.91	0.75–1.11	0.96	0.72–1.29

AI/AN = American Indian/Alaskan Native. CI = confidence interval. ED = emergency department. NH/PI = Native Hawaiian/Pacific Islander. PBV = project-based voucher. PH = public housing. TBV = tenant-based voucher.

¹ * = p<0.05. ** = p<0.01. *** = p<0.001.

Source: NO HARMS integrated study dataset

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