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Patient-Centered Outcomes Following Project-Based and Scattered-Site Permanent Supportive Housing Among People Experiencing Homelessness

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Abstract

Permanent supportive housing (PSH) is widely used to address chronic homelessness, yet less is known about how different housing configurations may influence health and social outcomes. This study examined changes in patient-centered outcomes among people experiencing homelessness following placement into PSH and explored whether outcomes differed between project-based and scattered-site housing models. Participants were adults approved for PSH through the Los Angeles County Coordinated Entry System who completed baseline and monthly follow-up surveys after housing placement. Outcomes included housing stability, health status, health behaviors, and access to resources, and propensity score methods were used to adjust for baseline differences between individuals placed in project-based versus scattered-site housing. Among 329 participants, housing stability improved substantially during the first six months following housing placement, with declines in unsheltered homelessness and improvements in several health-related behaviors, including medication adherence and reductions in daily tobacco use. However, improvements in broader indicators of health and well-being were more modest, and food insecurity remained common. Comparisons between housing configurations revealed relatively few differences in outcomes after adjustment for baseline characteristics. These findings suggest that both project-based and scattered-site supportive housing models can support similar short-term outcomes for individuals exiting homelessness, while persistent challenges such as food insecurity and limited improvements in perceived health highlight the importance of integrating supportive housing programs with broader health and social service supports.

1. Introduction

Homelessness is increasingly recognized as a critical social determinant of health. People experiencing homelessness experience substantially higher rates of chronic illness, mental health conditions, substance use disorders, and premature mortality compared with the general population,[1–3] contributing to persistent health inequities in urban communities. These health disparities are compounded by barriers to consistent medical care, unstable living conditions, and limited access to basic resources such as food, sanitation, and safe environments. As a result, housing interventions are increasingly viewed as essential public health strategies for addressing homelessness and improving health outcomes.[4–6]

Permanent supportive housing (PSH) has emerged as one of the most widely adopted evidence-based approaches to addressing chronic homelessness. PSH combines long-term housing subsidies with voluntary supportive services designed to help tenants maintain housing stability while addressing complex health and social needs.[7] A large body of research demonstrates that PSH improves housing retention and quality of life among people experiencing homelessness and may reduce reliance on emergency services and institutional care.[8–10] However, despite strong evidence regarding housing stability, documentation that PSH leads to substantial improvements in broader health outcomes—including physical health, mental health, and health behaviors—remains more limited.[7]

One factor that may influence the health impacts of PSH is the configuration of housing and service delivery. PSH is typically implemented through two primary models: project-based and scattered-site housing. Project-based PSH places residents in buildings where most or all units are designated for people exiting homelessness and where supportive services are typically delivered onsite. In contrast, scattered-site PSH places tenants in individual rental units located throughout the community while supportive services are delivered through mobile case management teams.

These models differ in ways that may shape residents' experiences and outcomes. Project-based housing may facilitate easier access to services, peer support, and monitoring because residents and service providers are co-located. Such environments may also foster social connection and mutual support among tenants with shared experiences of homelessness.[11,12] In contrast, scattered-site housing may provide greater autonomy, privacy, and opportunities for community integration by embedding tenants within conventional housing environments rather than congregate settings. Meta-analytic evidence suggests that many individuals with mental health conditions prefer independent housing arrangements, although scattered-site housing may also increase risks of social isolation.[13] Empirical evidence comparing outcomes across these housing configurations remains limited and mixed. Some studies suggest project-based housing may reduce disability severity, and improve community integration and recovery outcomes for certain populations,[14] whereas others suggest scattered-site housing may better support autonomy and perceived quality of life.[13] As a result, most policy guidance regarding PSH prioritization focuses on identifying individuals with the greatest vulnerability rather than specifying which housing configuration may produce better outcomes.[7]

The COVID-19 pandemic created additional urgency around addressing homelessness as a public health issue. People experiencing homelessness faced elevated risks of infection and mortality due to underlying health conditions and challenges maintaining protective behaviors such as social distancing and hygiene.[15–19] In response, federal emergency funding expanded housing placements for people experiencing homelessness, including placements into permanent supportive housing programs.[20,21] These housing expansions created an opportunity to examine changes in health-related and patient-centered outcomes following housing placement.

Using longitudinal survey data collected from individuals approved for permanent supportive housing through the Los Angeles County Coordinated Entry System, this study examines changes in patient-centered outcomes—including health status, quality of life, health behaviors, and access to resources—following housing placement. These analyses are part of a larger patient-centered outcomes study funded by the Patient-Centered Outcomes Research Institute (PCORI), for which a detailed final technical report describing the broader study design and findings is publicly available.[22] We also explore whether these outcomes differed between individuals placed in project-based versus scattered-site supportive housing. Because housing placements were not randomized, comparisons between housing models should be interpreted cautiously. Nevertheless, understanding whether housing configuration influences

outcomes may provide insights for improving housing placement decisions and service delivery within supportive housing programs.

2. Methods

2.1 Study Design and Setting

This study used a longitudinal observational design to examine patient-centered outcomes among people experiencing homelessness who were approved for permanent supportive housing (PSH) through the Los Angeles County Coordinated Entry System (CES). CES is the countywide system used to prioritize and match individuals experiencing homelessness to housing resources based on assessments of vulnerability and service needs.

Participants were recruited between January 2021 and July 2022 through referrals from case managers at 26 housing service agencies in Los Angeles County. These agencies were responsible for assisting individuals approved for PSH placements through CES. Because housing programs restricted in-person research activities during the COVID-19 pandemic, study recruitment relied on referrals from case managers who were already interacting with clients as part of the housing placement process.

Individuals were eligible to participate if they were 18 years of age or older, had been approved for PSH through CES, had either moved into a PSH unit within the previous two weeks or were expected to move into PSH within the next 30 days, spoke English or Spanish, and were able to provide informed consent. Case managers informed eligible individuals about the study and assisted interested participants in scheduling a phone or videoconference call with study staff to complete the enrollment process. During this call, participants completed informed consent using an electronic signature. All study procedures were approved by the [blinded for review] Institutional Review Board. This analysis represents one component of the broader PCORI-funded study, and additional details regarding study design, recruitment, and data collection are described in the publicly available final project report.[22]

2.2 Housing Placement

Housing placements were determined through the Los Angeles County Coordinated Entry System rather than by the research team. CES prioritizes individuals for housing based on vulnerability assessments and service needs and then matches them to available housing resources across the county's homelessness services system.

Participants in this study were placed into one of two housing configurations: project-based permanent supportive housing (PB-PSH) or scattered-site permanent supportive housing (SS-PSH). Project-based PSH refers to housing located within buildings in which most or all units are dedicated to individuals exiting homelessness and where supportive services are typically delivered onsite. Scattered-site PSH refers to housing placements in individual rental units located throughout the community in which tenants receive housing subsidies and supportive services delivered through mobile case management.

The specific housing placement available to participants depended largely on housing unit availability, program eligibility requirements, and provider decisions within CES. Participants were not randomly assigned to housing models, and housing placements were determined independently of the research team.

2.3 Rapid Rehousing Placements

During the COVID-19 pandemic, some housing placements funded through emergency programs resembled permanent supportive housing but were administratively categorized as rapid rehousing (RRH). These placements provided rental assistance paired with supportive services for individuals who were otherwise eligible for PSH. Because these placements served individuals approved for PSH and included ongoing supportive services, they were initially categorized as scattered-site supportive housing placements for the purposes of analysis. However, because RRH typically provides time-limited subsidies and differs structurally from PSH, sensitivity analyses were conducted excluding RRH placements to assess whether their inclusion affected the results.

2.4 Data Collection

Participants completed a baseline survey and five monthly follow-up surveys self-administered using smartphones provided by the study. Each phone included an unlimited talk-and-text data plan and was used to send participants text messages containing links to complete web-based surveys. Participants could also request assistance from study staff to complete surveys by telephone if needed.

At enrollment, participants completed an approximately 20-minute baseline survey capturing demographic characteristics, housing history, and health-related information. Participants then completed a second baseline survey approximately one day later that included additional baseline outcome measures to reduce respondent burden during the enrollment process. Participants who enrolled prior to moving into their housing unit completed an additional baseline survey shortly after their move-in date.

Participants subsequently completed five monthly follow-up surveys, each lasting approximately 20 minutes, which assessed patient-centered outcomes including housing stability, health behaviors, quality of life, and access to services. Surveys were available in both English and Spanish. Participants received a $15 electronic gift card for each completed survey.

2.5 Measures

The study assessed a range of patient-centered outcomes, including self-rated physical and mental health, satisfaction with social relationships, neighborhood satisfaction, food insecurity, health care utilization, medication adherence, and substance use behaviors. Because data collection began during the COVID-19 pandemic, surveys also included questions assessing COVID-19–related health behaviors such as masking, testing, and vaccination. Detailed descriptions of constructs and measurement instruments are provided in Tables 1 and 2.

Table 1
Description of patient-centered quality of life and health behavior outcomes

Construct	Variable	Measure
Patient-centered outcomes		
Life satisfaction	Quality of life	Mean score of seven items adapted from the WHOQOL-100[34] measuring satisfaction with general quality of life, ability to perform activities of daily living, social relationships, social support, and leisure time rated on a 5-point Likert scale (0 = *very dissatisfied* to 4 = *very satisfied*). Higher scores correspond to greater life satisfaction.
Physical health status	Self-rated physical health	Mean score of three items derived from the PROMIS Global Health Scale Version 1.2[35] measuring general physical health and ability to carry out every day physical activities rated on a 5-point Likert scale (0 = *poor or not at all* to 4 = *excellent or completely*). Higher scores correspond to better self-rated physical health.
	Quality of sleep	One item from the WHOQOL-100[34] related to difficulty sleeping on a 5-point Likert scale (0 = *none at all* to 4 = *an extreme amount*). This is the number of participants who indicated very much or extreme regarding difficulty sleeping.
Mental health status	Self-rated mental health	Mean score of two items derived from the PROMIS Global Health Scale Version 1.2[35] measuring general mental health and emotional problems rated on a 5-point Likert scale (0 = *poor or always* to 4 = *excellent or never*). Higher scores correspond to better self-rated mental health.
Social health status	Satisfaction with social relationships	Mean score of three items adapted from the WHOQOL-100[34] measuring satisfaction with social interactions and social support rated on a 5-point Likert scale (0 = *very dissatisfied* to 4 = *very satisfied*). Higher scores correspond to greater satisfaction.
	Food insecurity	Two items modified from the USDA Food Insecurity Scale[36]: "I worry whether my food will run out before I get money to buy more" and "The food I bought just doesn't last and I don't have money to get more." Possible response options were "never true," "sometimes true," and "often true." This variable captured the number of participants who indicated "sometimes true" or "often true" for at least one item.
Environmental health status	Neighborhood satisfaction	Mean score of five items derived from the Wright & Kloos HES-NQ[37] measuring access to basic needs, services, and social network and perception of crime and noise rated on a 5-point Likert scale (0 = *strongly disagree* to 4 = *strongly*

Abbreviations: ASK-12, Adherence Starts with Knowledge 12; HES-NQ, Housing Environment Scale – Neighborhood Quality; PROMIS, Patient-Reported Outcomes Measurement Information System; USDA, U.S. Department of Agriculture; WHOQOL, World Health Organization Quality of Life.

Construct	Variable	Measure
Patient-centered outcomes		
		agree). Higher scores correspond to greater neighborhood satisfaction.
	Unsheltered homelessness in past 30 days	Number of participants who indicated sleeping in an unsheltered situation (e.g., in an abandoned building; in a bus station, train station, airport; outside on the street, park, or beach; in a tent or makeshift shelter; or in a vehicle) for at least one night in the past 30 days.
	Most often housed in past 30 days	Number of participants who indicated sleeping in their own home exclusively or most of the time in the past 30 days.
Health behaviors		
Health care use	Unmet health care need in past 30 days	Participants were asked "Have you seen a doctor or other health care provider for nonemergency care in the past 30 days?" For participants who indicated "no," they were then asked to indicate the reason(s) they did not get care from a provided list (e.g., could not afford to get care, had an appointment but the provider cancelled, was unable to schedule an appointment, did not know where to go, other). This variable is the number of participants that indicated not receiving care in past 30 days for any reason except they did not have any health need.
	Case management contact in past week	Number of participants who indicated being in contact with someone from their housing provider (e.g., case worker) in the past week.
	Emergency room utilization in past 30 days	Number of participants who reported going to the emergency room in the past 30 days.
Medication behaviors	Medication use	Number of participants who indicated taking any type of regular medications prescribed by a medical provider (e.g., medications for high cholesterol, diabetes, heart disease, HIV, preexposure prophylaxis, psychiatric needs).
	Medication adherence	Mean score of six items derived from the ASK-12[38] measuring barriers to medication adherence and adherence-related behaviors (e.g., forgetting to take medication on time, taking medication more or less often than prescribed, skipping or stopping medication due to cost) rated on a 5-point Likert scale (e.g., 0 = *never* to 4 = *always*). Higher scores correspond to greater barriers or lower medication

Abbreviations: ASK-12, Adherence Starts with Knowledge 12; HES-NQ, Housing Environment Scale – Neighborhood Quality; PROMIS, Patient-Reported Outcomes Measurement Information System; USDA, U.S. Department of Agriculture; WHOQOL, World Health Organization Quality of Life.

Construct	Variable	Measure
Patient-centered outcomes		
		adherence. Asked only of those who indicated taking prescription medication.
Substance use	Alcohol abuse more than once a week in past month	Number of male participants who indicated having five or more standard alcoholic drinks and female participants who indicated having four or more drinks in a single day more than once a week in the past month.[39]
	Daily tobacco use	Number of participants who indicated using tobacco (e.g., cigarettes, cigars, vaping, hookah, or chewing tobacco) daily in the past month.[39]
	Drug use more than once a week in past month	Number of participants who indicated using any drugs (e.g., marijuana or cannabis, methamphetamines, cocaine, crack, heroin, fentanyl, prescription opioids not as prescribed by a physician) more than once a week in the past month.[39]

Abbreviations: ASK-12, Adherence Starts with Knowledge 12; HES-NQ, Housing Environment Scale – Neighborhood Quality; PROMIS, Patient-Reported Outcomes Measurement Information System; USDA, U.S. Department of Agriculture; WHOQOL, World Health Organization Quality of Life.

Table 2
Description of COVID-19-related health behavior outcomes, measured monthly

Construct	Variable	Measure
Health behaviors	Fully vaccinated	Number of participants who indicated receiving at least two doses of the Moderna or Pfizer-BioNTech COVID-19 vaccines or one dose of the Johnson & Johnson COVID-19 vaccine
	Tested for COVID-19	Number of participants who indicated taking at least one COVID-19 test by the time they were surveyed
	Wore mask most or all of the time when in public	Number of participants who indicated wearing a mask most or all the time when out in public or who indicated that they did not go out in public in the past 7 days
	Practiced social distancing in past 7 days	Number of participants who indicated always staying at least 6 feet away from people they did not live with in the past 7 days

Baseline covariates used to characterize the study population were guided by the Behavioral Model for Vulnerable Populations,[23] which conceptualizes determinants of health care use in terms of predisposing, enabling, and need factors. Predisposing factors included demographic characteristics, social structure variables, and health beliefs. Enabling factors included variables related to access to resources such as income, public benefits, and health insurance. Need factors included indicators of physical health, mental health, and substance use disorders.

2.6 Analytic Sample

A total of 562 participants enrolled in the study and completed a baseline survey. Participants were excluded from the analytic sample if they were missing key variables (N = 8), were never assigned a PSH unit during the study period (N = 95), or were lost to follow-up or discontinued the study (N = 125). Additional exclusions were applied to participants with missing housing move-in dates or who had not moved into their assigned housing unit before completing the baseline survey (n = 5).

The final analytic sample included 329 participants, of whom 215 were placed in project-based PSH and 114 were placed in scattered-site PSH. Comparisons between the analytic sample and those without follow-up data indicated that the two groups were largely similar across most baseline characteristics.

2.7 Statistical Analysis

Descriptive statistics were calculated for baseline characteristics for the full sample and separately by housing placement type. Differences between PB-PSH and SS-PSH participants were assessed using chi-square tests or Fisher's exact tests for categorical variables and Wilcoxon rank-sum tests for continuous variables.

To assess changes in outcomes over time, baseline measures were defined as the first survey completed after a verified housing move-in date. Follow-up outcomes were defined as the final survey completed during the five- to six-month follow-up period.

Because some outcome variables contained missing data, multiple imputation methods were used under a missing-at-random assumption. Continuous variables were imputed using predictive mean matching and binary variables were imputed using logistic regression models. Five imputed datasets were generated and combined for subsequent analyses.

2.8 Propensity Score Adjustment

Because housing placements were not randomized, propensity score methods were used to account for baseline differences between participants placed in PB-PSH and SS-PSH. Propensity scores representing the probability of placement into PB-PSH were estimated using a multivariable logistic regression model including baseline characteristics such as age, race and ethnicity, relationship status, physical health conditions, alcohol use disorder, drug use disorder, health activation score, housing preferences, and the month and year of the baseline survey.

Full matching on the estimated propensity score was used to balance baseline characteristics between housing groups. Matching weights derived from the full matching procedure were applied in subsequent regression models.

Outcome analyses used an analysis-of-covariance framework in which follow-up outcomes were modeled as a function of housing type while adjusting for baseline values of the outcome variable.

Linear regression models were used for continuous outcomes and quasi-binomial logistic regression models were used for binary outcomes. All statistical analyses were conducted using R version 4.3.0.

3. Results

3.1. Descriptive characteristics of the study sample at baseline by PSH assignment type

Baseline characteristics of the study sample are presented in Table 3. Participants assigned to project-based housing differed from those assigned to scattered-site housing on several predisposing characteristics, including age, gender, race and ethnicity, and duration of homelessness, whereas enabling factors such as income, insurance coverage, and receipt of public benefits were broadly similar across groups.

Table 3

Distribution of baseline characteristics by PSH assignment type, N = 329

Characteristic	Total	PSH Assignment		*p*[a]
		PB-PSH	SS-PSH	
N **= 329**	***n*** **= 215**	***n*** **= 114**		
n (%)	**n (%)**	**n (%)**		
Predisposing factors				
Demographic characteristics				
Age (years), *M* (*SD*)	47.5 (14.1)	49.2 (13.8)	44.3 (14.2)	**< .01**
Gender identity				**< .01**
Man	177 (53.8)	130 (60.5)	47 (41.2)	
Woman or other	152 (46.2)	85 (39.5)	67 (58.8)	
Sexual orientation				.89
Heterosexual or straight	273 (85.3)	181 (85.8)	92 (84.4)	
LGB+	37 (11.6)	24 (11.4)	13 (11.9)	
Prefer not to answer	10 (3.1)	6 (2.8)	4 (3.7)	
Missing	9	4	5	
Relationship status				**< .01**
Single (never married)	216 (67.7)	146 (71.2)	70 (61.4)	
Married or domestic partnership	35 (11.0)	11 (5.4)	24 (21.1)	
Separated, divorced, or widowed	68 (21.3)	48 (23.4)	20 (17.5)	
Missing	10	10	0	
Veteran of the military (yes)	22 (6.7)	21 (9.8)	1 (0.88)	**< .01**
Missing	1	1	0	
Criminal justice involvement, ever				**.02**
None	132 (40.7)	75 (35.6)	57 (50.4)	
Prior involvement	163 (50.3)	118 (55.9)	45 (39.8)	
On parole or probation	29 (9.0)	18 (8.5)	11 (9.7)	
Missing	5	4	1	
Social structure				

Characteristic	Total	PSH Assignment		p^a
		PB-PSH	SS-PSH	
N **= 329**	***n*** **= 215**	***n*** **= 114**		
n (%)	**n (%)**	**n (%)**		
Race and ethnicity				**< .01**
Black	126 (38.3)	93 (43.3)	33 (29.0)	
White	75 (22.8)	40 (18.6)	35 (30.7)	
Hispanic or Latino	82 (24.9)	46 (21.4)	36 (31.6)	
Other or multiracial	46 (14.0)	36 (16.7)	10 (8.8)	
Educational attainment				.74
Less than high school	87 (26.8)	60 (28.3)	27 (23.9)	
High school or GED	95 (29.2)	63 (29.7)	32 (28.3)	
Some college	95 (29.2)	60 (28.3)	35 (31.0)	
Associate or bachelor's degree or higher	48 (14.8)	29 (13.7)	19 (16.8)	
Missing	4	3	1	
Employment status, current				.13
Employed full- or part-time	35 (11.3)	18 (8.9)	17 (15.6)	
Unemployed	232 (74.6)	152 (75.3)	80 (73.4)	
Retired	44 (14.2)	32 (15.8)	12 (11.0)	
Missing	18	13	5	
Co-residing children < 18 years old (yes)	41 (12.5)	19 (8.9)	22 (19.3)	**< .01**
Missing	2	2	0	
Lifetime years of homelessness				**< .01**
Less than 5	126 (38.4)	73 (34.1)	53 (46.5)	
5–9	93 (28.4)	55 (25.7)	38 (33.3)	
10–19	64 (19.5)	52 (24.3)	12 (10.5)	
20 or more	45 (13.7)	34 (15.9)	11 (9.7)	
Missing	1	1	0	

Characteristic	Total	PSH Assignment		*p*[a]
		PB-PSH	SS-PSH	
N **= 329**	***n*** **= 215**	***n*** **= 114**		
n (%)	**n (%)**	**n (%)**		
History of unsheltered homelessness (yes)	285 (88.5)	183 (87.6)	102 (90.3)	.47
Missing	7	6	1	
Health beliefs				
Health activation score, *M* (*SD*)[b]	2.00 (0.49)	2.05 (0.50)	1.91 (0.46)	**.02**
Missing	21	16	5	
Prefer to live alone or with roommates				.86
Alone or with spouse or family	285 (94.4)	187 (94.4)	98 (94.2)	
With roommate	16 (5.3)			
No preference	1 (0.3)			
Missing	27	17	10	
Prefer to live with other homeless residents				.07
Most residents with homeless experience	56 (17.7)	43 (21.0)	13 (11.6)	
Most residents with no homeless experience	75 (23.7)	43 (21.0)	32 (28.6)	
No preference	186 (58.7)	119 (58.1)	67 (59.8)	
Missing	12	10	2	
Enabling factors				
Receive any type of public benefits (yes)	298 (90.6)	199 (92.6)	99 (86.8)	.09
Income (USD), past month				.09
Less than $500	155 (47.1)	110 (51.2)	45 (39.5)	
$500–$999	82 (24.9)	54 (25.1)	28 (24.6)	
$1,000–$1,999	76 (23.1)	43 (20.0)	33 (29.0)	
$2,000 or more	16 (4.9)	8 (3.7)	8 (7.0)	
Health insurance (yes)	304 (93.8)	201 (95.3)	103 (91.2)	.14

Characteristic	Total	PSH Assignment		*p*[a]
		PB-PSH	SS-PSH	
N **= 329**	***n*** **= 215**	***n*** **= 114**		
n (%)	**n (%)**	**n (%)**		
Missing	5	4	1	
Need factors				
Physical health condition (yes)	232 (73.0)	152 (74.2)	80 (70.8)	.52
Missing	11	10	1	
Mental health condition (yes)	235 (72.8)	167 (79.2)	68 (60.7)	**< .01**
Missing	6	4	2	
Drug use disorder (yes)	60 (18.2)	40 (18.6)	20 (17.5)	.81
Alcohol use disorder (yes)	45 (13.7)	40 (18.6)	5 (4.4)	**< .01**
Housing needs (yes)[c]				
Spouse, partner, or family member allowed	124 (37.7)	75 (34.9)	49 (43.0)	.15
Pets allowed	121 (36.8)	82 (38.1)	39 (34.2)	.48
Enough space for possessions	108 (32.8)	77 (35.8)	31 (27.2)	.11
Handicap accessible	86 (26.1)	63 (29.3)	23 (20.2)	.07
Particular neighborhood	80 (24.3)	46 (21.4)	34 (29.8)	.09
Other	46 (14.0)	27 (12.6)	19 (16.7)	.31
None of the above	58 (17.6)	37 (17.2)	21 (18.4)	.78
Prefer not to answer	18 (5.5)	15 (7.0)	3 (2.6)	.10

Notes: Values are *n* (%) unless otherwise noted. Percentages may not add to 100 due to rounding. PSH = permanent supportive housing. PB-PSH = place-based permanent supportive housing. SS-PSH = scattered-site permanent supportive housing. M = mean. SD = standard deviation. LGB + = lesbian, gay, bisexual, or other sexual orientation. GED = general education development test. USD = United States dollar.

[a] Wilcoxon rank sum test, Fisher's exact test for count data with simulated *p*-value (based on 10,000 replicates), or Pearson's chi-square test.

[b] Possible health activation scores ranged from 0–3, with higher values indicating greater patient activation.

[c] Responses are not mutually exclusive.

3.2. Predisposing factors

Participants assigned to PB-PSH were slightly older than those assigned to SS-PSH, with a mean age of 49 years versus 44 years, respectively ($p < .01$). A higher proportion of those in PB-PSH identified as a man (41% vs. 60%; $p < .01$), were currently single (71% vs. 61%; $p < .01$), and had served in the military (10% vs. 1%; $p < .01$). Further, about 36% of those in PB-PSH reported to have no criminal justice involvement, compared to 50% of those in SS-PSH ($p = .02$). A higher proportion of those in PB-PSH identified as Black (43% vs. 29%; $p < .01$), whereas a higher proportion of those in SS-PSH identified as White (31% vs. 19%; $p < .01$) or Hispanic or Latino (32% vs. 21%; $p < .01$). Nearly 9% of persons in PB-PSH reported having co-residing children younger than 18, compared to 20% in SS-PSH ($p < .01$). In addition, people in PB-PSH were more likely to report at least 10 years of lifetime homelessness (40% vs. 21%; $p < .01$), although the proportion of those with a history of unsheltered homelessness was similar in both groups (88% in PB-PSH and 90% in SS-PSH). Individuals assigned to PB-PSH had higher mean health activation scores than those in SS-PSH, indicating greater knowledge, skills, and confidence in managing their health (2.1 vs. 1.9; $p = .02$). Finally, no statistically significant differences were observed by PSH assignment in sexual orientation, educational attainment, employment status, or housing preferences. Most participants identified as heterosexual or straight (85%), had at least a high school education (73%), and were unemployed (75%).

3.3. Enabling factors

No statistically significant differences in enabling factors occurred by PSH assignment in the receipt of public benefits, monthly income, and health insurance status. In the total sample, 91% reported receiving any type of public benefit and 94% reported having health insurance. Further, almost half (47%) of all participants reported having a monthly income of less than $500.

3.4. Need factors

Compared to those in SS-PSH, a statistically significantly higher proportion of people in PB-PSH reported having been diagnosed with any mental health condition (61% vs. 79%, respectively; $p < .01$) and any alcohol use disorder (4% vs. 19%; $p < .01$). No statistically significant differences were detected in physical health or drug use disorder diagnoses. In the total sample, 73% reported having been diagnosed with any physical health condition and 18% reported having been diagnosed with any drug use disorder. Finally, we detected no statistically significant differences in any assessed housing needs by PSH assignment.

3.5. Overall differences from baseline to 6-month follow-up

As shown in Table 4, statistically significant improvements occurred from baseline to 6-month follow-up in the overall sample (either PB-PSH or SS-PSH; $N = 329$) across a few patient-reported outcomes, including frequency of food insecurity, any unsheltered homelessness in the past 30 days, and time spent at home in the past 30 days.

Table 4
Changes in patient-centered and COVID-19-related outcomes from baseline to follow-up among participants assigned to PSH, *N* = 329

Outcome	Baseline	Follow-Up				
	M or %	*M* or %	Δ [a]	*d* [b]	Stat. [c]	*p*
Quality of life indicators						
Quality of life[d]	2.29	2.39	0.10	.10	1.73	.08
Self-rated physical health[d]	2.17	2.14	-0.03	.03	-0.57	.57
Difficulty sleeping	31.06%	27.96%	-3.10	.07	1.06	.30
Self-rated mental health [d]	1.87	1.91	0.04	.03	0.52	.60
Satisfaction with social relationships [d]	2.24	2.36	0.12	.11	1.81	.07
Food insecurity	77.45%	69.67%	-7.78	.18	6.28	.01
Neighborhood satisfaction [d]	2.05	1.93	-0.12	.16	-2.77	< .01
Unsheltered any time in past 30 days	23.10%	5.84%	-17.26	.51	41.16	< .01
Housed most of the time in past month	49.67%	85.17%	35.50	.82	82.59	< .01
Health care use and need						
Unmet health care need in past 30 days	19.70%	18.30%	-1.40	.04	0.14	.71
Case management contact in past week	73.13%	57.99%	-15.14	.32	17.08	< .01
Any prescribed medication use at time of survey	63.83%	59.21%	-4.62	.10	2.83	.09
Barriers to medication use or adherence[d]	1.00	0.81	-0.19	.27	2.53	.01

Abbreviations: PSH, permanent supportive housing.

[a] Difference in mean or percentage from baseline to follow-up.

[b] Cohen's *d* of .20 denotes a small effect size, .50 indicates a medium effect size, and .80 indicates a large effect size.

[c] Test statistic from paired *t*-test or McNemar test.

[d] Possible mean score ranges from 0–4, with a higher value indicating a higher prevalence of the variable.

Outcome	Baseline	Follow-Up				
	M or %	*M* or %	Δ [a]	*d* [b]	Stat. [c]	*p*
Quality of life indicators						
Emergency room use in past 30 days	13.62%	11.06%	-2.55	.08	0.60	.44
Alcohol use more than once a week in past month	4.44^	3.77%	-0.67	.03	0.06	.81
Daily tobacco use	38.97%	25.96%	-13.01	.28	16.04	< .01
Drug use more than once a week in past month	28.51%	26.63%	-1.88	.04	0.26	.61
COVID-19-related health behaviors						
Fully vaccinated	28.88%	43.16%	14.29	.96	30.03	< .01
Tested for COVID-19	61.09%	77.81%	16.72	.37	50.02	< .01
Wore mask most or all the time when out in public	86.32%	76.90%	-9.42	.25	12.06	< .01
Practiced social distancing in past 7 days	60.49	56.23	4.26	.09	1.21	.27
Abbreviations: PSH, permanent supportive housing.						
[a] Difference in mean or percentage from baseline to follow-up.						
[b] Cohen's *d* of .20 denotes a small effect size, .50 indicates a medium effect size, and .80 indicates a large effect size.						
[c] Test statistic from paired *t*-test or McNemar test.						
[d] Possible mean score ranges from 0–4, with a higher value indicating a higher prevalence of the variable.						

Specifically, the proportion of participants experiencing food insecurity decreased from 77% at baseline to 70% at follow-up ($p = .01$). Further, the frequency of any unsheltered homelessness in the past 30 days decreased from 23% at baseline to 6% at follow-up ($p < .01$), and 50% of participants reported spending most of the last month at home at baseline, compared to 85% at follow-up ($p < .01$). In contrast, the mean neighborhood satisfaction score was statistically significantly lower at follow-up than baseline ($p < .01$), suggesting that satisfaction with the neighborhood decreased over time. Effect sizes of these changes ranged from small to large (Cohen's $d = .16–.82$; see Table 4 for details).

Statistically significant improvements across numerous health behavior outcomes also occurred. Participants assigned to PSH saw a statistically significant decrease from baseline to follow-up in

barriers to medication use and adherence ($p = .01$) and frequency of daily tobacco use ($p < .01$). Further, regarding COVID-19-related health behaviors, vaccination rates increased from 29% at baseline to 43% at follow-up and COVID-19 testing increased from 61% to 78% ($p < .01$ for both). However, the rate of contact with housing providers in the past week significantly decreased, from 73% to 58% ($p < .01$), and the frequency of mask wearing was nearly 10% lower at follow-up compared to baseline ($p < .01$). Again, effect sizes for these findings ranged from small to large (Cohen's $d = .25–.96$; see Table 4).

3.6. Differences from baseline to follow-up by PSH type

Results of analyses exploring differences in outcomes from baseline to follow-up by PSH type, after matching participants on key baseline characteristics and adjusting for baseline observations, are reported in Table 5. In general, no statistically significant differences in the change from baseline to follow-up across PSH type were detected in most outcomes. The odds of food insecurity at follow-up were about 2.4 times higher for participants in PB-PSH than those in SS-PSH (adjusted $OR = 2.43$, 95% CI [1.20, 4.91], $p = .02$). Participants in PB-PSH reported lower improvement in self-rated mental health at follow-up than participants in SS-PSH, although this association was only marginally significant ($\beta = -.36$, 95% CI [-.70, − .02], $p = .05$). Effect sizes for both were small, with Cohen's d ranging from .02 to .13.

Table 5
Differences in patient-centered and COVID-19-related outcomes from baseline to follow-up by PSH type, *N* = 329

Outcome	SS-PSH (*n* = 215)		PB-PSH (*n* = 114)					
	Baseline	Follow-Up	Baseline	Follow-Up	Difference [a]			
	M or %	M or %	M or %	M or %	β or aOR[b]	95% CI	p	d[c]
Quality of life indicators								
Quality of life [d]	2.35	2.40	2.26	2.38	-0.07	-0.29, 0.15	.51	.08
Self-rated physical health [d]	2.15	2.16	2.18	2.13	-0.07	-0.37, 0.24	.68	.06
Difficulty sleeping	27.37%	24.74%	33.02%	29.67%	0.69	0.36, 1.42	.32	.02
Self-rated mental health [d]	1.91	1.96	1.86	1.89	-0.36	-0.70, -0.02	.05	.02
Satisfaction with social relationships [d]	2.36	2.41	2.18	2.32	-0.06	-0.38, 0.26	.73	.08
Food insecurity	77.19%	65.26%	77.58%	72.00%	2.43	1.20, 4.91	.02	.13
Neighborhood satisfaction [d]	2.10	1.96	2.02	1.91	-0.14	-0.33, 0.05	.15	.05
Unsheltered any of the time in past 30 days	14.91%	8.95%	27.44%	4.19%	1.13	0.39, 3.25	.82	.39
Housed most of the time in past month	54.39%	80.53%	47.16%	87.63%	1.10	0.49, 2.44	.83	.24
Health care use and need								
Unmet health care need in past 30 days	17.19%	21.93%	21.02%	16.37%	0.76	0.31, 1.91	.58	.18
Case management contact in past week	57.54%	42.81%	81.40%	66.05%	2.12	1.00, 4.48	.08	.02

Outcome	SS-PSH (*n* = 215)		PB-PSH (*n* = 114)					
	Baseline	Follow-Up	Baseline	Follow-Up	Difference [a]			
Any prescribed medication use at time of survey	51.75%	48.95%	70.23%	64.65%	0.86	0.38, 1.99	.74	.06
Barriers to medication use or adherence score[d]	0.95	0.71	1.02	0.85	0.21	-0.10, 0.32	.31	.06
Emergency room use in past 30 days	13.33%	11.05%	13.77%	11.07%	0.48	0.13, 1.76	.29	.02
Alcohol use more than once a week in past month	3.16%	4.39%	5.12%	3.44%	0.17	0.02, 1.24	.09	.22
Daily tobacco use	37.72%	17.72%	39.63%	30.33%	1.52	0.70, 3.30	.30	.22
Drug use more than once a week in past month	21.40%	25.26%	39.63%	30.33%	0.80	0.29, 2.21	.68	.20
COVID-19-related health behaviors								
Fully vaccinated	40.35%	54.39%	22.79%	37.21%	0.69	0.19, 2.53	.59	.16
Tested for COVID-19	47.37%	68.42%	68.37%	82.79%	1.22	0.57, 2.63	.62	.19
Wore mask most or all the time when in public	78.95%	70.18%	90.23%	80.47%	0.70	0.36, 1.36	.31	.03
Practiced social distancing in past 7 days	60.53%	57.02%	60.47%	55.81%	0.55	0.22, 1.34	.22	.05

Outcome	SS-PSH (*n* = 215)		PB-PSH (*n* = 114)		
	Baseline	Follow-Up	Baseline	Follow-Up	Difference [a]
Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; PB-PSH, placed-based permanent supportive housing; SS-PSH, scattered-site permanent supportive housing.					
[a] Regression coefficients (β) are presented for continuous outcome variables and odds ratios are presented for binary outcome variables. Participants assigned to SS-PSH and PB-PSH matched on key baseline characteristics and adjusted for baseline observations.					
[b] Reference group is SS-PSH.					
[c] A Cohen's *d* of .20 denotes a small effect size, .50 indicates a medium effect size, and .80 reflects a large effect size.					
[d] Possible mean score ranges from 0–4, with a higher value indicating a higher prevalence of the variable.					

4. Discussion

This study examined changes in patient-centered outcomes among people experiencing homelessness following placement into permanent supportive housing and explored whether outcomes differed between project-based and scattered-site housing configurations. Overall, placement into supportive housing was associated with meaningful improvements in housing stability and several health-related behaviors during the first six months following move-in. At the same time, improvements in broader health and well-being were more modest, and persistent challenges such as food insecurity and unmet health needs remained common. Comparisons between housing configurations revealed relatively small differences in outcomes, suggesting that both project-based and scattered-site models may support similar short-term outcomes for individuals exiting homelessness.

Across the full sample, participants experienced substantial improvements in housing stability during the study period. The proportion of participants who reported spending most of the previous month housed increased markedly, while reports of unsheltered homelessness declined. Participants also reported improvements in several health-related behaviors, including reduced daily tobacco use and fewer barriers to medication adherence. These findings are consistent with a large body of research demonstrating that permanent supportive housing can rapidly stabilize housing situations for individuals experiencing chronic homelessness and may improve certain aspects of health-related functioning.[8–10]

Despite these improvements, broader indicators of health and well-being showed more limited change over the study period. Self-rated physical and mental health remained relatively low, and food insecurity remained highly prevalent at follow-up. These findings are consistent with prior research suggesting that although supportive housing improves housing stability and quality of life, improvements in health outcomes may be slower to emerge or may require additional service integration beyond housing alone.[7]

One possible explanation is that housing stability allows individuals to begin addressing longstanding health conditions that may have been difficult to manage while experiencing homelessness. Addressing these conditions often requires sustained engagement with health care and social service systems, which may take time to develop after housing placement. In this sense, housing may create the conditions necessary for health improvement, but measurable improvements in health status may occur over a longer time horizon.

We also examined whether outcomes differed between individuals placed in project-based versus scattered-site permanent supportive housing. After adjusting for baseline differences using propensity score methods, relatively few differences emerged between housing configurations, and those that did were generally modest in magnitude. Participants placed in project-based housing reported somewhat smaller improvements in self-rated mental health and higher odds of food insecurity at follow-up compared with those in scattered-site housing. At the same time, participants in project-based housing were less likely to report frequent alcohol use. Overall, these findings suggest that both housing configurations may produce broadly similar short-term outcomes for individuals transitioning out of homelessness.

These results align with prior research comparing supportive housing models. Project-based housing may facilitate access to onsite services, peer support, and monitoring, whereas scattered-site housing may offer greater autonomy and opportunities for community integration.[11,12,14] However, evidence regarding whether one configuration consistently produces better outcomes remains mixed.[13] Our findings similarly suggest that differences between housing models may be relatively modest in practice, particularly during the early months following housing placement. These results may also reflect the fact that supportive services, rather than housing configuration alone, play a central role in shaping outcomes among supportive housing tenants.

Importantly, housing placements in this study were not randomized and were determined through the Los Angeles County Coordinated Entry System based on housing availability, program eligibility requirements, and provider decisions. Although propensity score methods were used to account for observed baseline differences between housing groups, unobserved factors may still have influenced both housing placement and subsequent outcomes. For example, providers may prioritize individuals with particular service needs, behavioral health conditions, or program eligibility requirements for certain housing programs. These selection mechanisms are difficult to fully capture using observational data and may influence comparisons between housing configurations. As a result, the comparative analyses presented here should be interpreted as exploratory rather than causal estimates of the effects of housing configuration.

The study period overlapped with the COVID-19 pandemic, which shaped both the policy environment and several of the outcomes examined in this study. Participants experienced increases in COVID-19 vaccination and testing during the study period, reflecting broader public health efforts to expand vaccine access among vulnerable populations. However, vaccination rates remained relatively low

compared with the general population. Previous research has similarly documented structural barriers and vaccine hesitancy among people experiencing homelessness.[24–26] Although supportive housing may improve access to health services, these findings suggest that targeted outreach and service integration may still be necessary to address gaps in preventive care.

Finally, our findings highlight persistent unmet needs among individuals transitioning from homelessness to housing. Food insecurity remained common even after housing placement, affecting a majority of participants at follow-up. Similar levels of food insecurity have been documented among tenants in supportive housing programs in Los Angeles and other settings.[27] These findings underscore the importance of integrating housing interventions with broader social and health supports, including nutrition assistance, behavioral health services, and chronic disease management. Housing programs alone may not be sufficient to address the complex health and social needs of people exiting homelessness.

4.1 Limitations

Several limitations should be considered when interpreting the findings of this study. First, the study relied on a convenience sample of individuals approved for permanent supportive housing through a subset of housing providers in Los Angeles County. Although the analytic sample appeared broadly similar to the population of individuals placed into supportive housing during the study period, findings may not generalize to all supportive housing tenants or to other geographic contexts.

Second, housing placements were not randomly assigned. Although propensity score methods were used to balance observed baseline characteristics between housing groups, unmeasured factors may have influenced both housing placement and outcomes. Provider decisions regarding housing placements may reflect service needs, program capacity, or other factors that were not fully captured in the available data.

Third, the study follow-up period was relatively short. Improvements in health outcomes may take longer to emerge following housing placement, particularly for individuals managing chronic physical or behavioral health conditions. Longer-term follow-up may therefore reveal additional changes in health status and well-being that were not detectable within the timeframe of this study.

Fourth, some housing placements categorized as scattered-site housing were administratively classified as rapid rehousing programs that provided rental assistance paired with supportive services during the pandemic. Because rapid rehousing typically differs from permanent supportive housing in the duration of subsidies and program structure, inclusion of these placements may have introduced additional heterogeneity into the scattered-site group.

Finally, survey instruments related to COVID-19 behaviors were modified during the course of the pandemic as public health guidance and vaccine availability evolved. Although these modifications

allowed the study to capture emerging health behaviors, they also resulted in some variation in survey items across participants.

4.2 Conclusion

In this longitudinal study of people exiting homelessness, placement into permanent supportive housing was associated with modest improvements in housing stability and several health-related behaviors during the first six months following housing placement. Differences between project-based and scattered-site housing configurations were generally small, suggesting that both models can provide meaningful benefits for individuals transitioning out of homelessness.

At the same time, persistent challenges—including high levels of food insecurity, limited improvements in perceived health, and ongoing unmet health care needs—highlight the importance of integrating supportive housing programs with broader health and social service systems. As communities continue to expand supportive housing as a strategy for addressing homelessness, stronger coordination between housing providers, health systems, and social service agencies may be necessary to fully realize the health benefits of stable housing.

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