

Health Service Utilization and Costs at the Outset of a Permanent Supportive Housing Program

Baseline Evaluation Report

RYAN K. MCBAIN, SARAH B. HUNTER, ADAM SCHERLING, ALINA I.
PALIMARU, MATTHEW CEFALU, WILLIAM MCCONNELL, PRIYA BATRA



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Preface

Permanent supportive housing (PSH) is an intervention that combines a long-term housing subsidy with support services to help meet the needs of individuals experiencing homelessness. Evidence indicates that, when PSH is extended to individuals with significant health and social service needs, the model can generate cost savings to health systems and other service sectors while providing holistic care. Beginning in 2018, a large not-for-profit Medicaid and Medicare managed care plan in Southern California launched a PSH program that combines a long-term housing subsidy with intensive case management services for adult plan beneficiaries experiencing homelessness who have one or more chronic physical or behavioral health conditions and represent high utilizers of inpatient health care.

In this report, we conduct a baseline analysis of the first 164 PSH program enrollees, examining their demographic and clinical characteristics and health care service utilization and costs in the 12 months prior to program enrollment. This is intended to serve as an initial evaluation of the program—including its success in identifying and enrolling the intended target population. This baseline examination will serve as a key comparator for investigating whether and to what extent health service utilization and costs evolve over the course of the program, relative to a cohort of individuals experiencing homelessness who are not enrolled in the program over the same time frame. This report should be of interest to public and private health care organizations and other entities considering the potential of PSH programs to lower their overall costs, improve service quality, and reduce homelessness in their communities.

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Summary

Study Background and Purpose

On any given night in the United States, more than 500,000 individuals are homeless, meaning that they lack adequate, secure housing. Homelessness has the potential to catalyze and exacerbate poor health, including chronic physical and mental health problems. Against this backdrop, permanent supportive housing (PSH)—a form of integrated service delivery that combines provision of long-term housing with supportive services for physical, behavioral, and social needs—represents a promising model for addressing the complex needs of many individuals experiencing homelessness. Evidence indicates that PSH can lead to stable, long-term housing for individuals and improve health outcomes in certain populations, such as individuals with HIV/AIDS.

The Affordable Care Act (ACA) expanded the eligibility requirements for Medicaid, allowing a large number of adults who experience homelessness to become Medicaid-eligible. Also, a recent shift in health care service reimbursement from fee-for-service models to alternative payment models, such as bundled payments and capitation, have generated greater interest in health systems to adopt such interventions as PSH as a method to achieve cost savings while also addressing patients' social determinants of health. In this report, we conduct a baseline assessment of a PSH program implemented by a large not-for-profit Medicaid and Medicare managed care plan, serving more than 1 million members in inland Southern California. We describe the program's model of recruitment and care delivery and then examine the baseline characteristics of the first 164 individuals enrolled in the program—including their health care service utilization in the 12 months prior to enrollment.

Results

Between April 2018 and October 2019, 164 participants were enrolled in the PSH program. A majority of participants were male (71 percent), between the ages of 50 and 64 (63 percent), and were broadly distributed among non-Hispanic Caucasian (44 percent), African American (25 percent), and Hispanic (23 percent) populations.

All participants received services for one or more physical health conditions in the year prior to enrollment. More than half of participants (55 percent) had a documented behavioral health condition—44 percent with a mental health disorder and 30 percent with a substance use disorder. The median number of past-year health conditions recorded, using an umbrella classification of ICD-10 codes, was 17 (range: 2 to 56). This compared with a median of three past-year health conditions in a random sample of 1,000 health plan beneficiaries.

The most commonly reported health conditions pertained to type 2 diabetes (36 percent of patients), skin and bacterial infections (34 percent of patients, each), and septicemia (31 percent of patients). The most common places of service were represented by ambulance services (2,866 patient events), inpatient general hospital care (2,125 patient events), and health care received in residential settings (1,422 patient events)—not including pharmacy dispensations (5,623 patient events).

Average health expenditure per client in the year prior to enrollment was \$70,447, representing a total health expenditure across the 164 clients of roughly \$11,500,000. The average cost per individual medical event was \$593, which varied considerably by type of health condition and place of service. In the random sample of 1,000 health plan beneficiaries, average health expenditure per patient-year (i.e., year of patient enrollment) was only \$3,898.

Implications

We found that this managed care plan was successful in identifying and enrolling a cohort of high-need beneficiaries into its PSH program. The 164 individuals enrolled to date exhibited multimorbid physical and behavioral health conditions and significant health service utilization, generating a health expenditure of roughly \$70,000 per individual in the year prior to enrollment. Future evaluation reports will focus on whether PSH results in greater or less health care utilization and spending, and also the extent to which individuals remain in PSH versus exit or graduate from the program.

Acknowledgments

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This report was peer reviewed according to the RAND Corporation's standards for high-quality research and analysis. We appreciate the reviews by Elizabeth Bowen at the University at Buffalo School of Social Work and Jeanne Ringel at RAND.

Abbreviations

CCSR	Clinical Classifications Software Refined
CES	Coordinated Entry System
ICD	International Classification of Diseases
ICD-10	International Classification of Diseases, Tenth Revision
ICD-10-CM	International Classification of Diseases, Tenth Revision, Clinical Modification
ICMS	intensive case management services
PSH	permanent supportive housing
SNAP	Supplemental Nutrition Assistance Program
SSI/SSDI	Social Security Income/Social Security Disability Income
WIC	Women, Infants, and Children

1. Introduction

Homelessness and Health in the United States

Homelessness encompasses individuals without fixed, regular, and adequate nighttime residence and extends more broadly to vulnerable persons, such as those fleeing domestic violence or young persons without stable housing (HUD Exchange, 2019). On any given night, more than half a million Americans are homeless, representing 17 out of every 10,000 people in the United States (National Alliance to End Homelessness, 2020). Risk of homelessness is also higher among minorities: Lifetime prevalence of homelessness is 17 percent for African Americans and 8 percent for Hispanic Americans, compared with 5 percent for non-Hispanic Caucasians (Fusaro, Levy, and Shaefer, 2018).

The absence of secure housing can lead to or exacerbate poor health and impede social and economic functioning. Compared with the general U.S. population, persons experiencing homelessness are more likely to suffer from unmanaged chronic physical (Baggett, Liauw, and Hwang, 2018) and mental health problems (Fletcher and Reback, 2017), HIV/AIDS (Clemenzi-Allen et al., 2019), substance use disorders (Lee et al., 2017), serious mental illness (Corrigan et al., 2015; Los Angeles County Department of Public Health, 2015; Riley et al., 2007) and to face long-term unemployment (Slesnick, Zhang, and Yilmazer, 2018). Sustained multimorbidity creates long-term competing challenges that may persist even after an individual secures housing (Schick et al., 2019; Henwood et al., 2018).

The Value of Permanent Supportive Housing

Evidence suggests that integrated service delivery programs stand the best chance of addressing the complex biopsychosocial needs that many individuals experiencing homelessness face (Schick et al., 2019). Permanent supportive housing (PSH) is one particular version of an integrated service delivery program—combining the provision of housing with a broad variety of supportive services for physical, behavioral, and social needs (Tsemberis, Gulcur, and Nakae, 2004; Craig, Eby, and Whittington, 2011). Specifically, persons experiencing homelessness with multifaceted health and social needs are provided a long-term housing subsidy, assigned one or more case workers, and equipped with a broad variety of health, social, and income support services.

Several PSH programs have been evaluated, and the outcomes from these programs have varied. Systematic reviews consistently report that PSH leads to increased housing stability—that is, fewer stays in places not fit for human habitation (Rog et al., 2014; Tabol, Drebing, and Rosenheck, 2010). Although PSH programs typically serve individuals with multiple chronic

health conditions, improvements in health have not been equivocally demonstrated beyond program participants with HIV/AIDs (National Academies of Sciences, 2018). Moreover, reductions in health service utilization and associated costs as a result of the supportive housing intervention have not been consistently reported. In fact, studies using more-rigorous research designs (e.g., randomized controlled trials over pre-post designs) are less likely to report cost offsets (Kertesz et al., 2016). Also, reported program costs typically range from \$10,000 to \$30,000 per person per year (Hunter et al., 2017).

Given the recent state Medicaid expansion and the growing use of alternative payment models, health care providers are assuming greater financial risk, thus fostering interest in supportive housing programs—particularly health systems that provide care to large populations experiencing homelessness and multimorbid medical needs (Kuehn, 2019; Wilkins, 2015). Against this backdrop of increased financial incentives to address social determinants of health (California Department of Health Care Services, 2020), limited research has been conducted to understand the participant population served by health plans that may use PSH, and the challenges and opportunities that arise when health plans implement such housing programs (Kuehn, 2019).

Program Overview

This report presents a baseline assessment of an innovative PSH program, implemented by a large not-for-profit Medicaid and Medicare managed care plan serving more than 1 million members in inland Southern California. The health plan has established an algorithm to identify high utilizers of their health system who are dealing with chronic housing insecurity, and the plan sought to enroll several of these individuals in PSH. In the following chapters, this baseline assessment describes the plan's PSH program, including recruitment (Chapter 2), and lists characteristics of an initial cohort of 164 participants with regard to their demographics, service utilization and health care costs generated in the 12 months prior to program enrollment (Chapter 3). In the final chapter (Chapter 4), we offer several takeaway messages about program efforts to date and delineate next steps in program evaluation efforts. This study contributes to a body of evidence regarding PSH programs that could inform enhancements of models elsewhere, particularly in the context of health systems considering PSH as a mechanism to address the social determinants of health and generate potential cost savings.

2. Methods

Study Setting

The PSH program is operated by a large not-for-profit Medicaid and Medicare managed care plan serving more than 1 million members in inland Southern California. In 2018, the plan created an internal housing team composed of a medical director, registered nurse, social workers, and a housing coordinator. To establish the PSH program, the plan contracted with four social service agencies to provide intensive case management services (ICMS) and contracted with an additional not-for-profit organization to provide tenancy support services. This not-for-profit organization was also assigned to manage a “flexible housing subsidy pool” used to cover housing-related services outside the scope of case management and health plan benefits, such as moving costs, rent subsidies, and utility assistance. These contracted entities work closely with the health plan housing teams and other staff (e.g., health plan care managers, behavioral health coordinators, community health workers) to support PSH participants.

Recruitment and Enrollment

Since the program launch in April 2018, referral sources included the plan’s own member-facing departments and the health plan’s delivery network. Referrals could also come from county Coordinated Entry System (CES) (U.S. Department of Housing and Urban Development, 2015), law enforcement, ICMS providers, and other community-based organizations. The health plan’s internal PSH team created informational trainings about the program that were shared with the care network, community partners, and internal department staff.

Referrals were assessed for eligibility by the health care plan’s housing team. Program eligibility criteria included (1) at least one chronic physical or behavioral health condition stable enough to be managed in the community; (2) a confirmed need for help with activities of daily living; (3) at least six months of active eligibility for plan benefits in the member’s lifetime; (4) at least seven inpatient days in an acute care facility in the past 12 months; (5) self-reported homelessness, that is, not having a fixed, regular, or adequate residence in which to sleep, and (6) age of at least 18 years. Participant eligibility was first determined by a review of administrative and clinical records regarding health plan eligibility, clinical history, and health care utilization. A subsequent assessment by the housing team nurse and social worker was performed to confirm these findings. Lastly, cases were reviewed for inclusion by the housing team and medical director. Once enrolled, each participant was assigned to an ICMS provider that completed an intake process.

Program Service Delivery Model

The program uses a hybrid service coordination and delivery approach. Case management and housing services were provided in parallel. Once a participant was enrolled and assigned to an ICMS provider, an application was submitted to a tenancy support services organization, and a housing coordinator was then assigned to the participant. Following this, ICMS staff and housing providers coordinated care to meet participants' needs, including housing options. Rather than locating participants at a single residential site, housing providers helped participants locate housing options throughout their local communities, a framework commonly known as “scattered site” housing (Hogan, 1996).

All participants became lease signatories and contributed 30 percent of income toward rent in alignment with federal PSH programs (California Department of Housing and Community Development, undated). The ICMS and tenancy support staff assisted with health and other social service needs, including facilitation of relationships with property management. ICMS providers, tenancy support staff, the health plan's internal housing team, and relevant health plan staff met fortnightly as part of an interdisciplinary care team to discuss new enrollees and progress of existing PSH participants.

Analytic Framework

This study includes administrative data collected on 164 program participants enrolled through October 2019. The program continues to enroll participants; currently, more than 200 are participating. The health plan shared demographic information (age, gender, and race/ethnicity), program enrollment dates, and participant health care service utilization for the 12 months prior to program enrollment. Health care utilization data comprised service dates, location of service, International Classification of Diseases, Tenth Revision (ICD-10) diagnostic codes, and payment amounts associated with each service and diagnosis. These data were documented at the event level for each patient—meaning that each row of data documented a service charge for an event (typically a medical service provided) at a specified location for a set of diagnoses on a given date.

We conducted a series of descriptive analyses to summarize participant characteristics in the 12 months prior to PSH enrollment, including sociodemographic information, health care service utilization, and cost of services—according to health condition and location of service. Analyses were conducted at the programmatic and patient levels. At the programmatic level, we assessed total patient events and total expenditures over the 12-month period prior to enrollment, across all 164 participants. In this context, patient events were characterized as unique places of service on a given date. Thus, a patient who received care at a higher-level facility, such as a hospital, might generate multiple patient events over the course of a single visit. At the patient level, we examined the average number of diagnoses and patient events and the average expenditure

generated per patient-year in the 12 months prior to enrollment. As a comparison, we also drew a random sample of $n = 1,000$ beneficiaries of the health system who received care over the same period, and then calculated average number of diagnoses, patient events, and expenditure per patient-year. All study procedures were approved by the RAND Corporation's Human Subjects Protection Committee, an institutional review board.

3. Results

Participants: Demographics and Clinical Characteristics

Between April 2018 and October 2019, 980 beneficiaries were screened for program eligibility. Of the 288 deemed eligible, 124 declined or deferred enrollment, while 164 were enrolled in the PSH program during the analytic period. High levels of declined or deferred enrollment were due, in part, to situations in which a beneficiary moved out of the program’s geographic region or identified an alternative housing situation that the person deemed preferable—such as moving in with a family member. This final enrollment level ($n = 164$) was consistent with the targeted enrollment level, although the program was delayed in its initiation because of the need to sort out contractual arrangements with vendors. A majority of participants were male (71 percent), between the ages of 50–64 (63 percent), and were broadly distributed among non-Hispanic Caucasian (44 percent), African American (25 percent), and Hispanic (23 percent) populations, with a small minority representing other racial/ethnic groups (see Table 3.1).

Table 3.1. Demographic Characteristics of PSH Participants

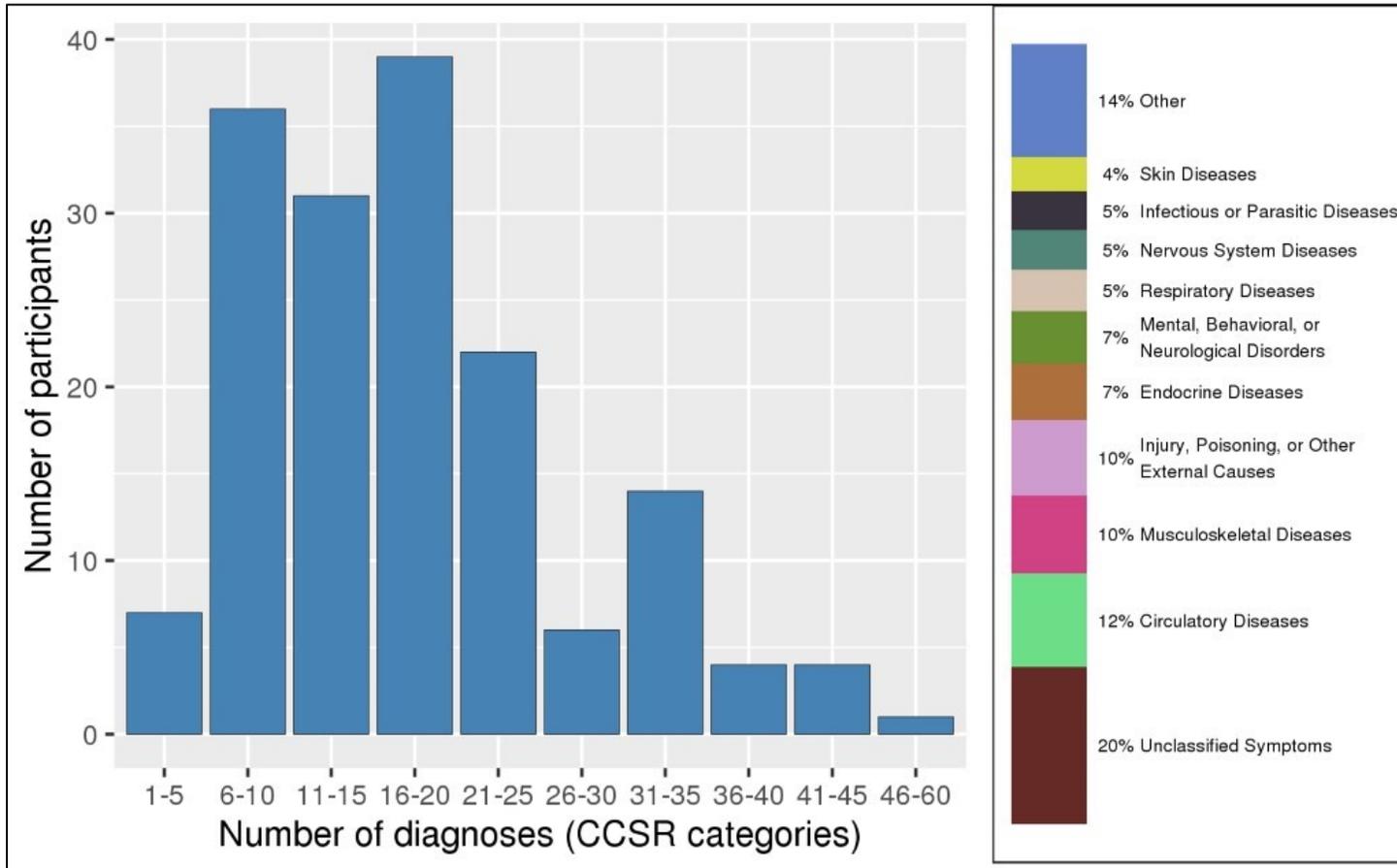
Demographic Characteristic	Sample (n)	Percentage
Age		
18–34	15	9%
35–49	45	27%
50–64	103	63%
65+	1	1%
Sex		
Female	48	29%
Male	116	71%
Race		
White	72	44%
African American	41	25%
Hispanic	38	23%
American Indian/Alaska Native	1	<1%
Other	3	2%
Missing	9	6%
Health conditions, past 12 months		
Physical health conditions	164	100%

Demographic Characteristic	Sample (n)	Percentage
Behavioral health conditions	91	55%
Mental health conditions	72	44%
Substance use disorders	50	30%

NOTE: Behavioral health conditions comprise both mental health conditions and substance use disorders; these subdomains are chronicled in this overarching category.

All participants had received services for a physical health condition in the past year. More than half of participants (55 percent) had a documented behavioral health condition—including 44 percent with a mental health disorder and 30 percent with a substance use disorder. Figure 3.1 depicts multimorbidity within the sample, classifying participant diagnoses into several higher-level clinical categories as defined by Clinical Classifications Software Refined (CCSR) for ICD-10, Clinical Modification (ICD-10-CM) codes (Healthcare Cost and Utilization Project, undated). CCSR categorization, developed by the Healthcare Cost and Utilization Project within the U.S. Agency for Healthcare Research and Quality, is intended to aggregate more than 70,000 ICD-10-CM diagnostic codes into 538 clinically meaningful categories. The total number of past-year health conditions, as indicated by CCSR categorization, ranged from two health conditions to 56 (median =17). By contrast, our comparison random sample of 1,000 beneficiaries over the same period reported a median of three health conditions (standard deviation = 4.9).

Figure 3.1. Past-Year Multimorbidity Among PSH Participants



NOTES: Past-year multimorbidity among PSH participants is represented by the number of unique diagnoses received in the 12 months prior to enrollment in PSH, according to CCSR clinical categories as defined by the U.S. Agency for Healthcare Research and Quality (x-axis). Number of participants (y-axis) represents the number of PSH participants who corresponded to the associated level of multimorbidity. The stacked bar chart to the right indicates the cumulative distribution of multimorbidity across the full cohort ($n = 164$), according to CCSR clinical categories.

Table 3.2. Past 12-Month Health Care Service Utilization: Expenditure by Place of Service

Places of Service	Patients (n)	Patient Events*	Total Expenditure	Amount Per Patient	Amount Per Patient Event
Inpatient medical care					
General hospital	155	2,125	\$6,184,681	\$39,901	\$2,910
Skilled nursing facility	99	860	\$1,800,804	\$18,190	\$2,094
Psychiatric facility	3	80	\$126,616	\$42,205	\$1,583
Outpatient medical care					
General hospital	82	497	\$196,913	\$2,401	\$396
Primary care facility	109	632	\$146,334	\$1,343	\$232
Emergent medical care					
Emergency room	154	1,368	\$383,706	\$2,492	\$280
Ambulance	160	2,866	\$280,489	\$1,753	\$98
Nonmedical location					
Residential locations**	113	1,422	\$277,131	\$2,452	\$195
Custodial care	43	389	\$680,876	\$15,834	\$1,750
Recuperative/respice care***	70	138	\$512,635	\$7,323	\$3,715
Other classifications					
All other locations	164	919	\$163,611	\$998	\$178
Pharmacy	163	5,623	\$799,458	\$4,905	\$142
Total Expenditure	164	16,919	\$11,553,254	\$70,447	\$683

NOTES: Patient visits to psychiatric facilities are underrepresented; these services are provided directly by county behavioral health systems and are not health plan benefits (claims and diagnostic data were unavailable for analyses).

* Patient events are calculated as unique places of service attended by individuals during the study period.

** The term *residential locations* refers to settings outside health facilities where individuals may receive care, often for a temporary period.

*** The term *recuperative/respice care* as a place of service refers to settings commonly used for patients who would otherwise be homeless after hospital discharge because it provides a place to recover and receive support in a less-intense medical setting than a hospital or skilled nursing facility.

Table 3.3. Past 12-Month Health Care Service Utilization: Expenditure by Health Condition (Top Ten Cost Drivers)

Health Condition	Patients (n)	Patient Events*	Total Expenditure	Amount Per Patient	Amount Per Patient Event
Infectious diseases					
Skin infection	54	590	\$958,592	\$17,752	\$1,531
Bacterial infection	54	264	\$896,058	\$16,594	\$3,394
Noncommunicable diseases					
Diabetes mellitus; complications	53	542	\$963,011	\$18,170	\$1,777
Septicemia	51	240	\$861,789	\$16,898	\$3,591
Diabetes mellitus, type 2	59	605	\$698,422	\$11,838	\$1,154
Heart failure	38	346	\$664,140	\$17,477	\$1,919
Hypertension; complications	30	113	\$481,484	\$16,049	\$4,261
Recuperative care for homelessness**	72	141	\$513,225	\$7,128	\$3,640
COPD and bronchiectasis	29	290	\$342,732	\$11,818	\$1,182
Pressure ulcer of the skin	23	246	\$267,368	\$11,625	\$1,087
Other classifications					
All other diseases	164	10,457	\$4,106,975	\$25,043	\$393
Pharmacy	163	5,623	\$799,458	\$4,905	\$142
Total Expenditure	164	19,493	\$11,553,254	\$ 70,447	\$593

NOTES: This table catalogs the top ten cost driver health conditions (ICD code groupings), according to total expenditure over the baseline period.

* Patient events are calculated as unique places of service attended by an individual on a given date. Depending on the event, an expenditure may be allocated across multiple health conditions, meaning that patient events are not exclusive. For example, an individual could be receiving treatment for both diabetes and hypertension during the same visit to a facility.

** *Recuperative care for homelessness* as a service code encompasses a bundle of services for post-hospital discharge, including shelter (typically, a converted motel), case management, and assistance coordinating post-acute medical care (e.g., medication administration, post-hospitalization appointments).

Health Care Service Utilization and Costs

Tables 3.2 and 3.3 provide information regarding participants' health service utilization and associated costs in the year prior to program enrollment. The most frequent locations of service utilization (Table 3.2) were represented by ambulance services (2,866 patient events), inpatient general hospital care (2,125 patient events), and health care received at a residential location (1,422 patient events)—not including pharmacy dispensations (5,623 patient events). The term *residential locations* refers to settings outside health facilities where individuals may receive care, often for a temporary period based on individuals' housing instability level. Recuperative/respite care settings are commonly used for patients who would otherwise be homeless after hospital discharge as a place to recover and receive support in a less intense medical setting than hospital or skilled nursing-based facilities (National Health Care for the Homeless Council, 2017). Emergency departments (1,368 patient events), skilled nursing facilities (860 patient events), and primary care facilities (632 patient events) also represented common locations of service. Among all locations, inpatient care at a general hospital (\$6,184,681) and skilled nursing facilities (\$1,800,804) represented the largest cost drivers, followed by medicines dispensed from pharmacies (\$799,458), with the total expenditure across all patients equaling \$11,553,254, or \$70,447 per patient-year. By comparison, the average health expenditure among health plan beneficiaries more generally, using our random sample of 1,000 beneficiaries, was \$3,898 per patient-year. Table 3.3 indexes the top ten health conditions according to total health expenditure generated and includes type 2 diabetes (36 percent of patients), skin and bacterial infections (34 percent of patients, each), and septicemia (31 percent of patients). Recuperative care for homelessness—inclusive of shelter, case management, and assistance coordinating post-acute medical care—was also provided for 44 percent of patients over this period. Total expenditure by diagnostic classification over the one-year period ranged from roughly \$860,000 to \$960,000 for the top four health conditions (skin infection, bacterial infection, diabetes with complications, septicemia), with the remaining high-prevalence conditions resulting in expenditures ranging from \$270,000 to \$700,000. The expenditure per patient event among high-prevalence conditions ranged from \$1,087 per patient event for ulcers of the skin to \$4,261 per patient for hypertension with complications.

4. Key Findings and Conclusions

Key Findings

This study provides a baseline overview of a novel PSH program operated by a large Medicaid and Medicare managed care health plan. We examined participant health care service utilization and expenditures in the year prior to enrollment and the more-general demographic characteristics of program participants.

We found that the managed care plan has been successful in identifying and enrolling a cohort of high-need beneficiaries into its PSH program. The 164 individuals enrolled to date exhibited multimorbid physical and behavioral health conditions and significant health service utilization in the year prior to their enrollment. Participants received care for an average of 17 health conditions in the year prior to enrollment, representing more than 100 patient events per participant. This compared with an average of three health conditions among the typical health plan beneficiary. The conditions treated among individuals also varied significantly, with the top ten most common conditions encompassing infectious disease, such as skin infections (33 percent), noncommunicable diseases, such as diabetes (32 percent), septicemia (31 percent), and heart failure (23 percent). Many patients (44 percent) received recuperative care as a result of their homelessness status.

Our findings also indicate that the average health expenditure per participant was substantial: greater than \$70,000 per patient in the year prior to program enrollment, compared with \$4,000 for the average health plan beneficiary over this same period. Other supportive housing evaluation studies have documented health care costs in similar ranges. For example, a 2013 study in Los Angeles found that participants used \$58,962 on average in health care expenses in the year prior to housing (using 2012 dollars) (Flaming et al., 2013), a 2014 study in San Francisco reported \$33,537 per participant in health care costs in the year prior to housing placement (using 2012 dollars) (Bamberger and Dobbins, 2014), while a 2015 report of a San Diego program documented \$88,562 in health care costs in the pre-housing year (2010 dollars) (Reaser and Mauerman, 2015).

Service utilization included significant use of ambulances, emergency rooms, inpatient care, and recuperative care following an acute health event as a result of participants' homelessness status. When viewed from a population health perspective, it is also worth noting that certain health conditions that constituted a relatively small proportion of total diagnoses nevertheless generated a disproportionate share of health expenditures: For example, only 4 percent of all diagnoses were classified as skin diseases, but these conditions nevertheless were the second largest driver of expenditures according to ICD diagnostic codes. Additionally, it is possible that underlying conditions—such as schizophrenia and alcohol use disorders—may have been the

driving agents in generating a continued need for recuperative care, which itself was a leading cost driver. Taken together, these data suggest the potential for housing and supportive services associated with PSH to facilitate more timely and appropriate usage of health care, with the potential of cost savings in the subsequent 12 months of enrollment.

Lastly, with regard to demographic characteristics of participants, it appears that recruitment efforts to date have captured a relatively diverse group of individuals with respect to race/ethnicity, with roughly half of participants representing African American (25 percent) and Hispanic (23 percent) individuals. Forty-four percent self-identified as white, compared with an estimated 49 percent of homeless adults at the U.S. national level (National Alliance to End Homelessness, 2020). Although a preponderance of participants are male (71 percent), this is consistent with national estimates indicating that roughly 70 percent of homeless individuals are male (National Alliance to End Homelessness, 2020). The age of those enrolled also skewed to middle-aged individuals, with 63 percent falling into the age category of 50 to 64. Given that individuals in this age range are more likely to have chronic health care needs, relative to those in younger age groups, it is reasonable that the selection algorithm for identifying high utilizers of the health care system would have disproportionately identified older adults.

Several limitations should be noted. First, the representation of health conditions as reflected in service utilization and expenditures was constrained by the available resolution of diagnostic and billing categories. For example, *recuperative care for homelessness* was a leading diagnostic category recorded within the population, but it is a relatively broad term that incorporated temporary housing costs and case management services. Improved specificity could allow better disaggregation of the data and more-targeted responses according to what these data show. Second, we were not able to document care received by participants outside the scope of the health system's services. This included, for example, outpatient behavioral health services, which were predominantly provided by the county behavioral health system and, therefore, were not captured within the health system's electronic medical records or through a health information exchange. Third, and relatedly, there are liable to be various nonhealth social expenditures generated by participants in the 12 months prior to their enrollment, which have not been captured in this analysis. The perspective of this evaluation is from the vantage point of the health system rather than from a broader societal perspective that might capture such additional public services as law enforcement, temporary housing and shelter, and such social support services as unemployment, Social Security Income and Disability (SSI/SSDI), Supplemental Nutrition Assistance Program (SNAP) or Women, Infants, and Children (WIC) benefits.

Conclusions

This is one of the first studies to describe a PSH program operated by a managed care health plan. These data demonstrate the complex physical and behavioral health needs of the population served by this program, including high utilization of emergency services and hospitalizations that

result in significant health expenditures. The data also demonstrate the ability of the health care plan to efficiently identify patients who meet criteria for significant health and housing needs and enroll them in a PSH program. Future efforts will examine whether and to what extent health care utilization and expenditures evolve in the 12 months subsequent to enrollment, relative to a comparable cohort of individuals who were not enrolled in a PSH program.

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