New to Care: Demands on a Health System When Homeless Veterans Are Enrolled in a Medical Home Model

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Objectives. We compared service use among homeless and nonhomeless veterans newly enrolled in a medical home model and identified patterns of use among homeless veterans associated with reductions in emergency department (ED) use.

Methods. We used case–control matching with a nested cohort analysis to measure 6-month health services use, new diagnoses, and care use patterns in veterans at the Providence, Rhode Island, Veterans Affairs Medical Center from 2008 to 2011.

Results. We followed 127 homeless and 106 nonhomeless veterans. Both groups had similar rates of chronic medical and mental health diagnoses; 25.4% of the homeless and 18.1% of the nonhomeless group reported active substance abuse. Homeless veterans used significantly more primary, mental health, substance abuse, and ED care during the first 6 months. Homeless veterans who accessed primary care at higher rates (relative risk ratio [RRR] = 1.46; 95% confidence interval [CI] = 1.11, 1.92) or who used specialty and primary care (RRR = 10.95; 95% CI = 1.58, 75.78) had reduced ED usage. Homeless veterans in transitional housing or doubled-up at baseline (RRR = 3.41; 95% CI = 1.24, 9.42) had similar reductions in ED usage.

Conclusions. Homeless adults had substantial health needs when presenting for care. High-intensity primary care and access to specialty care services could reduce ED use. (*Am J Public Health.* 2013;103:S374–S379. doi:10.2105/AJPH.2013.301632)

Homelessness is associated with premature morbidity and mortality at much higher rates compared with those who are housed.[1,2] Exposure to the environment, trauma, challenges managing chronic diseases, mental illnesses, and addictions, as well as deferred and delayed medical needs, often define the health needs of this population.[3–5] Unfortunately, the care homeless persons receive is often based in emergency departments (EDs), and these patients do not receive chronic care management or preventative services in this setting.[6]

Passage of the Affordable Care Act by the US Congress and the potential for near-universal health care coverage with state implementation may result in improved access for many traditionally underserved and high-risk or high-need populations, including the homeless. Furthermore, implementation of Accountable Care Organizations will place greater importance on better management of these populations. In many ways, the vertically and horizontally integrated structure of the Veterans Health Administration (VA), their programmatic focus on high-risk, high-need population veteran groups, and the emphasis placed on data-driven care, can serve as a prototype for Accountable Care Organizations. An example of this is the development of the Patient Aligned Care Team (PACT) within the VA that serves as the medical home model for that care system.

We presented data from a case–control study of homeless and nonhomeless veterans newly assigned to a primary care medical home (general population or homeless-specific PACT) with a nested cohort analysis of homeless veterans accessing care within the homeless PACT care. The goal was to identify the demand for care and the use of health services among newly enrolled homeless veterans and factors associated with redirecting that use to ambulatory settings.

METHODS

Study participants were consecutive new patients to the Providence VA Medical Center (PVAMC) who enrolled in primary care and who had at least 2 visits with their primary care team within the first 6 months of enrollment. This pattern of use was intended to capture those individuals who were planning to receive their primary care principally at the VA versus enrolling strictly to receive the pharmacy benefit while maintaining care with a community provider. Case participants were identified from a review of consecutive enrollments to the Homeless PACT clinic at PVAMC between January 2008 and June 2011. Criteria for admission to this clinic were current homelessness, including unsheltered, emergency sheltered, in transitional housing, or doubled-up with family or a friend, and having difficulty accessing care in a traditional clinic setting. Control participants (nonhomeless veterans) were identified from local administrative records of all enrollees to primary care between January and July 2011 (after the general population PACT was established) and matched by age and gender to the homeless group.

Individuals were excluded if they moved out of the area, were institutionalized, or were incarcerated during the study. Individuals already established in primary care, either within PVAMC or at another facility, who then became homeless and transferred their care to the homeless PACT clinic were also excluded. This project was part of a larger VA Health Services Research and Development study that tested different interventions to enhance treatment engagement among homeless veterans.[7,8]

Study Setting and Data Collection

Study participants were all assigned to a primary care provider (PCP) and team and had

at least 1 face-to-face appointment with the team PCP or clinic nurse in addition to their initial history and physical examination. The PVAMC had a total of 28 PCPs assigned to 1 of 8 general medicine teams (PACTs) or 4 special population PACTs (geriatrics, women's health, serious mental illness, and homeless). The homeless PACT provided on-demand or walk-in care with no appointments needed on designated clinic days, with only limited scheduled appointments based on patient preference. Additionally, homeless services (housing assistance, vocational services, benefits, social work) were colocated in the homeless PACT, as well as other support services (clothes pantry, meals) to provide a one-stop place to address competing needs within the clinical encounter. The general population PACTs also maintained same-day access, but through an appointment process. In both models, efforts were made to redirect patients to another team or available provider should that PACT not have any availability to avoid a referral to the ED for a nonurgent need. Additionally, both the general medicine and homeless teams had assigned nurse case managers, ancillary team support, and used the same clinical reminders and electronic note templates with diagnostic prompts. They also received monthly clinical performance reports and participated in departmental quality improvement initiatives.[9] American College of Physician Practice Biopsy scores[10] were used to establish comparability across key measures between care teams.

We used the electronic medical record to retrieve encounter data for each enrollee. We based diagnoses associated with primary care, specialty, or mental health care episodes on the *International Classification of Diseases, Ninth Edition* (*ICD-9*)[11]–coded primary diagnosis for that encounter. We only abstracted data from the actual care visit (as opposed to a referral to care where the appointment may not have been kept). Housing status was determined based on social worker or housing coordinator notes. Primary care encounters included both nurse case manager face-to-face visits and PCP visits. Addiction treatment and vocational services were considered to be dichotomous variables, given the high frequency of visits in these settings. Specialty care included all outpatient medicine service subspecialties (cardiology, endocrinology, pulmonary, etc.) as well as podiatry, optometry, general surgery, and surgery subspecialties. New diagnoses were defined as a new *ICD-9* diagnosis category listed in the clinical encounter compared with the problem list recorded at the initial history and physical examination visit. Variant diagnoses of an existing *ICD-9*–coded condition were not included because this was considered in the same parent diagnosis grouping. For analysis purposes, new diagnoses were then reviewed (by T. P. O.) and categorized as acute or episodic, chronic disease–based, mental health–related, or addiction-related to avoid grouping a 1-time or episodic care with the diagnosis of a new chronic disease. Data were collected and organized temporally as (1) initial visit services, diagnoses, and referrals and (2) care received, diagnoses, and referrals during the first month of enrollment, during months 2 and 3, and during months 4, 5, and 6 to capture and distinguish between preexisting (and potentially deferred) care needs and new issues and problem identified in the course of treatment engagement. Additionally, for the homeless cohort, sheltering status was recorded during each time period.

Data Analysis

Abstracted data were entered into an Excel (Microsoft Office 2007, Redmond, WA) database and subsequently analyzed using Stata 8.0 software (StataCorp, College Station, TX). Proportionate analyses (*z* test) were used to compare the homeless with the nonhomeless cohorts with regard to medical, mental health, and substance abuse conditions identified during their course of care, and the χ^2 test was used to compare rates of use within each of the care use categories. New diagnoses made during the first 6 months were presented as descriptive data for the 3 different time intervals. We created a unique delta variable to capture those homeless participants who had a net decrease in ED use in the latter 3 months compared with the first months of primary care enrollment. This was to determine if the care offsets noted in earlier research that occurred later in enrollment might occur earlier within this care model.[12–14] This was then considered to be the dependent variable in multiple logistic regression modeling with the independent variables of patient demographic characteristics; sheltering status at baseline and at the end of 6 months; comorbid medical, mental health, and substance abuse conditions at baseline; new diagnoses in these categories during the 6 months; and health service utilization patterns (primary care, specialty care, mental health, and addiction services) considered as any use and high volume use (> 5 visits). Interactions among the 4 different health services used were also tested in the model.

RESULTS

We studied 127 homeless and 106 nonhomeless veterans. The mean ages were 51.2 years (SD = 8.2 years) in the homeless cohort and 50.1 years (SD = 7.8 years) in the nonhomeless group. The majority in both groups was male, and more participants in the nonhomeless group were White. Almost all of the veterans in both groups had a chronic medical condition (92.1% homeless vs 96.2% in nonhomeless; $P = .19$), with the homeless group having more conditions per person (2.0 vs 1.6). Comparable proportions in both groups had a mental health diagnosis at their initial visit (59.1% homeless vs 52.8% nonhomeless; $P = .33$). The most common conditions in both homeless and nonhomeless groups were depression, anxiety disorder, posttraumatic stress disorder, and bipolar disorder. Overall, 25.4% of the homeless group and 18.1% of the nonhomeless reported active substance abuse at the time of their intake ($P = .18$; Table 1).

Most of the homeless veterans (72.6%) had been homeless less than 6 months consistent with the literature in this area.[15] Overall, 44.0% were in an unstable sheltering arrangement at the time of intake, spending their nights outside, in a car or abandoned building, or staying in an emergency shelter. The remainder was either in a time-limited transitional housing program (29.9%) or staying temporarily doubled-up with a family member or friend (22.8%); 2.4% had just moved into permanent supportive housing (Housing and Urban Development-Veteran Administration Supportive Housing [HUD-VASH]).

Health Care Use During Initial 6 Months of Treatment Engagement

During the first 6 months of primary care enrollment, 88.2% of homeless veterans

TABLE 1—Demographics Characteristics on Initial Presentation to Primary Care: Veterans Enrolled in a Medical Home Model, VA Medical Center, Providence, RI, 2008–2011

Demographic Characteristics	Homeless (n = 127)	Nonhomeless (n = 106)	*P*
Mean age, y	51.2	50.1	.81
% White race	76.4	93.4	< .001
% male	94.5	96.2	.54
Mean no. comorbidities/person	2.0	1.6	.24
% with medical comorbidities	92.1	96.2	0.19
Hypertension, %	28.3	32.1	0.52
COPD/emphysema, %	9.4	17.9	0.06
Diabetes, %	9.4	13.2	0.36
Arthritis, %	58.3	63.2	0.45
HCV, %	11.8	3.8	0.03
% with mental health comorbidities	59.1	52.8	0.33
Depression, %	37.8	30.2	0.22
Anxiety, %	21.3	20.8	0.93
PTSD, %	18.1	10.4	0.1
Bipolar, %	10.2	5.7	0.21
Active substance abuse, %	25.4	18.1	0.18

Note. COPD = chronic obstructive pulmonary disease; HCV = hepatitis C virus; PTSD = posttraumatic stress disorder; VA = Veterans Affairs.

accessed mental health services, averaging 12.0 visits per person; 86.6% accessed specialty care, averaging 6.9 visits per person; and 37.8% accessed substance abuse treatment services. At the same time, 92.9% received housing assistance and 48.0% received vocational rehabilitation services. Slightly less than half of the cohort (48.0%) went to the ED during this time, and 23.6% had an overnight hospital admission. Overall decreases in care use per month were observed for primary care, mental health, ED visits, and hospitalizations, whereas increases were noted for specialty care and vocational rehabilitation services.

TABLE 2—Homeless Versus Nonhomeless Health Services Utilization During First 6 Months of Primary Care Enrollment: Veterans Enrolled in a Medical Home Model, VA Medical Center, Providence, RI, 2008–2011

6-Month Health Service Use	Homeless (n = 127)	Nonhomeless (n = 106)	*P*
Primary care			≥.999
% using service	100	100	
No. visits/person (to PCP)	8.4 (5.0)	2.5 (2.1)	
Mental health care			< .001
% using service	88.2	43.4	
No. visits/person	12.0	3.4	
% using substance abuse treatment service	37.8	7.5	< .001
Specialty care			≥.999
% using service	86.6	86.8	
No. visits/person	6.9	3.9	
Emergency department visits			< .001
% using service	48.0	26.4	
No. visits/person	1.0	0.4	

Note. PCP = primary care provider.

Nonhomeless veterans new to primary care had substantially fewer primary care visits (2.5 vs 8.4 visits per patient), and a smaller proportion accessed substance abuse treatment (7.5% vs 37.8%; $P<.001$) and mental health services (43.4% vs 88.2%; $P<.001$), with substantially fewer visits by those who did access this service (3.4 vs 12.0 visits per patient). However, compared with the homeless cohort, 86.8% of new nonhomeless patients accessed specialty care services, although with fewer visits per patient (3.9 vs 6.9). Finally, 26.4% of the nonhomeless cohort went to the ED during the first 6 months of their enrollment, which was also significantly less than the homeless group ($P<.001$; Table 2).

During the first 6 months of primary care enrollment, homeless veterans had an average of 4.1 new clinical diagnoses, most occurring in the first 3 months of care. Almost three quarters of the sample had a new acute or episodic care diagnosis (e.g., trauma, upper respiratory illness), averaging 1.5 diagnoses per person. Similarly, 67.7% had a new chronic disease condition diagnosed (e.g., hypertension, diabetes, chronic obstructive pulmonary disease; 1.4 diagnoses per person), and almost one-half (45.7%) had a new mental health condition diagnosed; 63.0% of those with a new mental health diagnosis also had a previously diagnosed mental health condition. In addition, 28.3% had a new substance abuse diagnosis (e.g., a new drug of abuse or addiction identified), with all of these diagnoses occurring in individuals with a previous substance use diagnosis (Table 3). The nonhomeless group averaged 0.9 new diagnoses per patient. Most (78.1%) were for medical conditions (acute or chronic), whereas 17.7% were for new mental health conditions, and 4.2% were for a new substance abuse condition (not shown in Table 3).

Nested Cohort Analysis of Homeless Veterans

At the beginning of the study, 44.0% of homeless veterans were unsheltered or staying in emergency (dusk-to-dawn) shelters (unstable sheltering). By the end of the 6-month study period, 19.4% of the sample remained in or

TABLE 3—Homeless Patient New Diagnoses During First 6 Months of Primary Care Enrollment: Veterans Enrolled in a Medical Home Model, VA Medical Center, Providence, RI, 2008–2011

New Diagnosis	Mean Diagnoses/Person	% Cohort
New diagnoses in entire 6 mo	4.1	96.8
New diagnoses in 1st 30 d	1.6	71.6
New diagnoses in days 31–90	1.5	70.1
New diagnoses in days 91–180	1.0	63.8
New acute/episodic care diagnoses	1.5	74.8
New chronic disease/chronic medical condition diagnosis	1.4	67.7
New mental health diagnosis	0.6	45.7
New substance abuse diagnosis	0.4	28.3

had moved into this type of sheltering arrangement, whereas 80.6% were in transitional housing, doubled-up with a family or friend, or in permanent supportive housing (HUD-VASH). Those individuals who remained or moved into unstable sheltering arrangements were more likely to have more than 5 primary care encounters compared with those in more stable arrangements at the end of the 6-month study (87.5% vs 63.0%; $P = .02$).

Emergency Department Use

Overall, 48.0% of the homeless cohort accessed the ED, averaging 2.0 visits per person during the 6-month study. Going to the ED was associated with high-volume use of primary care (> 5 visits; $P = .05$), mental health care ($P = .01$), specialty care ($P = .01$), or any substance abuse treatment ($P = .01$); however, it was not associated with age, race, gender, length of time homeless, sheltering status, or medical, mental health, or substance abuse comorbidities.

When we analyzed care patterns among those homeless veterans who went to the ED at least once upon enrolling in the VA, those individuals who had more than 5 primary care visits were almost 1.5 times more likely to have had no ED use in the latter 3 months of the study (relative risk ratio [RRR] = 1.46; 95% confidence interval [CI] = 1.11, 1.92), and those with more than 5 specialty clinic visits in combination with primary care visits were more than 10 times more likely to have no ED use (RRR = 10.95; 95% CI = 1.58, 75.78). In addition, those individuals in transitional housing or doubled-up at baseline were almost 3.5 times more likely to have no ED use during the latter 3 months of the study (RRR = 3.41; 95% CI = 1.24, 9.42; Table 4).

DISCUSSION

With the advent of health care reform, there will be an increased focus on how traditionally disenfranchised population groups access and receive care. Our findings suggested a significant demand would occur for all health services when system-naïve veterans are introduced to primary care. In this study, the effect of a primary care assignment on subsequent health services use was significantly greater for the homeless cohort, suggesting a greater degree of deferred, delayed, and not-yet-diagnosed medical and mental health conditions in this disadvantaged and disenfranchised cohort.[9,16,17] These data further underscored the importance of considering the unmet health needs of disadvantaged populations in health systems planning. Almost all of the homeless study participants had at least 1 newly diagnosed condition during the first 6 months of enrollment and averaged 4.1 diagnoses per person; two thirds of participants were diagnosed with a new chronic medical condition, 45.7% had a new mental health diagnosis, and 28.3% had a new substance abuse diagnosis. These findings were in contrast to commonly held expectations that homeless health care is defined by high no-show rates and poor continuity of care.

Earlier studies aimed at reducing homeless persons' use of ED services were typically either ED-based or triggered by an ED visit, and comprised targeted case management or facilitated referrals.[18,19] The positive findings in our study occurred in the context of providing an alternative setting for care that provided enhanced access, population-tailored care, and high-intensity treatment engagement. Notably, 26% of the cohort stopped going to the ED after 3 months of primary care enrollment, which was consistent with earlier studies that linked homeless persons to primary care,[14,20,21] although our findings occurred much earlier in the course of the intervention. More directed research is needed to better understand the role of treatment engagement in this process. Stable housing was also associated with reductions in ED-based care, supporting the role of housing on health service use. This was consistent with research that identified competing sustenance needs and their mediating role in health access,[22] and the potential benefits of Housing First strategies that do not create treatment contingencies on receipt of permanent supportive housing.[23]

There were several limitations to consider when interpreting these data. First, our study was based in 1 urban medical center in northeastern United States and might not be representative of care use elsewhere. Secondly, it was based in the VA and limited to care received in this system. Being an integrated care system allowed for greater access to specialty, mental health, and substance abuse services, and likely better reflected the degree of true need in this population. However, our data analysis was limited to care events captured in the VA electronic medical records, and it was probable that we missed some episodes of care outside the VA system. By focusing on only those persons with at least 2 primary care visits who were presumably more engaged in VA care, we attempted to limit this bias; however, this also likely caused us to omit veterans who were more casually engaged in care at the VA or who might not have had the same acuity of need. It further limited the study to a subpopulation of "activated" homeless veterans who likely did not represent all homeless subgroups. Historic health care needs and use that might have influenced care patterns were also not considered in this study. Finally, it was not clear how generalizable these findings were outside of the VA. Homeless veterans are

TABLE 4—Factors Associated With Homeless Veteran Use of Any Emergency Department (ED) Care: Veterans Enrolled in a Medical Home Model, VA Medical Center, Providence, RI, 2008–2011

	No ED Use (n = 66), No. (%) or Mean ±SD	Any ED Use (n = 61), No. (%) or Mean ±SD	*P*
Age, y	51.0 ±8.7	51.5 ±8.0	.37
Race			.15
White	47 (71.2)	50 (82.0)	
Other	19 (28.8)	11 (18.0)	
Gender			.78
Male	62 (93.9)	58 (95.1)	
Female	4 (6.1)	3 (4.9)	
Length of time homeless			.83
0–6 mo	47 (72.3)	43 (72.9)	
7–12 mo	5 (7.7)	6 (10.2)	
> 12 mo	13 (20.0)	10 (17.0)	
Shelter status at end of 6 mo			.59
Unstable	11 (17.5)	13 (21.3)	
Stable	55 (82.5)	48 (78.7)	
Medical comorbidity	60 (90.9)	57 (93.4)	.60
Mental health comorbidity	38 (57.6)	37 (60.7)	.72
Active substance abuse issues	18 (28.6)	13 (22.0)	.41
Primary care (first 6 mo)			.05
2–5 visits	27 (40.9)	15 (24.6)	
> 5 visits	39 (59.1)	46 (75.4)	
Mental health care (first 6 mo)			.01
Any	55 (83.3)	57 (93.4)	
> 5 visits	32 (48.5)	43 (70.5)	
Substance abuse treatment (first 6 mo)	18 (27.3)	30 (49.2)	.01
Specialty care			.01
Any	56 (84.9)	54 (88.5)	
> 5 visits	31 (47.0)	42 (68.9)	
Homeless program service received (first 6 mo)	61 (92.4)	67 (93.4)	.82

approximately 10 years older than nonveteran homeless individuals[8,15] and also tend to be sicker and use more acute level services. Furthermore, the VA had also recently dedicated substantial resources and programming efforts toward ending homelessness among veterans,[8] which might make it difficult to compare these findings with earlier veteran studies or to nonveteran homeless with relatively less support.

Even with these limitations, our findings added to and further validated previous research based on self-reported, qualitative, procedure-based, or service-specific data that described high rates of health services use by homeless persons.[6,17,24–27] The system-based electronic record system provided a much more detailed view of treatment engagement and service utilization by homeless participants and provided a novel comparison with matched, nonhomeless veterans.

In summary, our data suggested that homeless veterans enrolled in primary care will have substantial health service needs. High-volume primary care and medical home engagement can significantly reduce reliance on ED care and represents an opportunity to effectively engage individuals in care while reducing the overuse of ED care in the process. ■

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Contributors

T. P. O'Toole was the lead author, principal investigator on the grant, developed and designed the project, and oversaw data collection, analyses, and interpretation. C. Bourgault performed data collection, assisted in data analyses and interpretation, and assisted in reviews of draft versions of the article. E. E. Johnson oversaw and participated in project design, data collection and data analyses, and participated in the drafting of the article. S. G. Redihan assisted in data collection and entry, data analyses, and assisted in reviews and edits of draft versions of the article. M. Borgia conducted data analyses, assisted in data interpretation, and assisted in drafting of the article. R. Aiello assisted in project design and data interpretation, and assisted in reviews and edits of draft versions of the article. V. Kane assisted in project design and data interpretation, and assisted in reviews and edits of draft versions of the article.

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Human Participant Protection

Institutional review board approval was obtained from the Providence VA Medical Center for this protocol.

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