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VA Health Service Utilization for Homeless and Low-income Veterans:

A Spotlight on the VA Supportive Housing (VASH) Program in Greater Los Angeles

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Abstract

Background—The US Department of Housing and Urban Development (HUD)-VA Supportive Housing (VASH) program—the VA’s Housing First effort—is central to efforts to end Veteran homelessness. Yet, little is known about health care utilization patterns associated with achieving HUD-VASH housing.

Objectives—We compare health service utilization at the VA Greater Los Angeles among: (1) formerly homeless Veterans housed through HUD-VASH (HUD-VASH Veterans); (2) currently homeless Veterans; (3) housed, low-income Veterans not in HUD-VASH; and (4) housed, not low-income Veterans.

Research Design—We performed a secondary database analysis of Veterans (n = 62,459) who received VA Greater Los Angeles care between October 1, 2010 and September 30, 2011. We described medical/surgical and mental health utilization [inpatient, outpatient, and emergency department (ED)]. We controlled for demographics, need, and primary care use in regression analyses of utilization data by housing and income status.

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Results—HUD-VASH Veterans had more inpatient, outpatient, and ED use than currently homeless Veterans. Adjusting for demographics and need, HUD-VASH Veterans and the low-income housed Veterans had similar likelihoods of medical/surgical inpatient and outpatient utilization, compared with the housed, not low-income group. Adjusting first for demographics and need (model 1), then also for primary care use (model 2), HUD-VASH Veterans had the greatest decrease in incident rates of specialty medical/surgical, mental health, and ED care from models 1 to 2, becoming similar to the currently homeless, compared with the housed, not low-income group.

Conclusions—Our findings suggest that currently homeless Veterans underuse health care relative to housed Veterans. HUD-VASH may address this disparity by providing housing and linkages to primary care.

Keywords

veterans; homelessness; supportive housing

Housing is widely recognized as a critical determinant of health.^{1–6} Substandard housing is associated with chronic illnesses and psychiatric problems,¹ and homeless persons have poor health,^{3,7,8} limited primary and preventive care,^{9,10} and fragmented health care utilization.^{7,10–12}

The US Department of Housing and Urban Development (HUD) directly influences health through its housing services.⁵ HUD promotes “mobility” for homeless persons, using Housing Choice vouchers to mobilize individuals into “mainstream communities.”^{5,13} The Housing First model—that offers independent housing (often using vouchers) and supportive services, linking individuals to health services without mandating service receipt—is an evidence-based practice to improve health and housing for homeless persons.^{14–17} Housing First differs from the “housing readiness” approach, which requires treatment of potential causes of homelessness, for example, substance abuse, before permanent housing.^{14–17}

Veterans are overrepresented among homeless adults^{18–20} and ending homelessness is a VA priority.⁷ Veterans have experiences that increase their risk for housing problems¹⁸ and the ~62,619 Veterans who are homeless on any given night²¹ have an age-adjusted mortality that is nearly 3 times higher than their housed peers.⁹

The HUD-VA Supportive Housing (VASH) program is the linchpin of the VA’s plan to improve homeless Veterans’ health and housing.²² HUD-VASH is a Housing First program that offers vouchers and supportive services to mobilize homeless Veterans into community rental units.^{5,13} Serving Veterans who meet HUD-specific income requirements for a voucher, are homeless or at-risk for homelessness, and have a need and willingness for case management,^{23,24} HUD-VASH requires 30%–40% of participants’ monthly incomes (often disability payments) as rent.¹⁵ Through HUD-VASH case managers, Veterans are referred to primary and mental health care. Though these referrals aim to facilitate sustained housing and decreased service fragmentation, treatment and sobriety are not mandated.

Though research suggests that Housing First programs improve health,^{25,26} little is known about health care utilization patterns associated with HUD-VASH housing. These patterns are important for VA planning—particularly as HUD-VASH expands²⁷—and hold widespread relevance with growing Housing First efforts that may influence health care utilization more generally for homeless persons.

This paper explores rates of VA health service utilization for Veterans by housing and income status at the VA Greater Los Angeles (VAGLA). We describe 1-year of in-patient and outpatient VA service use for 4 mutually exclusive groups: (1) formerly homeless Veterans housed through HUD-VASH (HUD-VASH Veterans) (n = 1997); (2) currently homeless Veterans (n = 1760); (3) housed, low-income Veterans not in HUD-VASH (n = 21,682); and (4) housed, not low-income Veterans (n = 37,020). Adjusting for demographics, need, and primary care use, we focus on comparing utilization among HUD-VASH Veterans with utilization among Veterans in the other groups.

CONCEPTUAL FRAMEWORK

We used the framework of the Behavioral Model for Vulnerable Populations,¹¹ an adaptation of the Andersen model^{28–30} that models health care utilization for vulnerable populations.^{9,31–34} This adapted model includes domains aligned with the health and psychosocial circumstances of vulnerable persons, identifying factors that predispose individuals to access services (demographics, housing status), which interact with organizational and patient-level factors that enable use (medical home enrollment, income, case management), and needs (perceived/evaluated health) to influence behavior (health service utilization).¹¹

Hypotheses

Our analyses grew from 5 hypotheses. First, HUD-VASH Veterans and currently homeless Veterans were anticipated to have greater health care needs than their housed peers, given their history of substandard housing (predisposing characteristic).^{1,11} Second, due to high need and the enabling characteristic of HUD-VASH case management, we hypothesized that HUD-VASH Veterans had the greatest primary and other ambulatory care utilization among the groups. Third, while currently homeless Veterans also have high need, we expected that competing needs, for example, for shelter, and lesser abilities to negotiate the VA system (without case managers), result in preferential acute [emergency department (ED) and inpatient] over outpatient (especially primary care) care utilization. Specifically, we anticipated that currently homeless Veterans—compared with HUD-VASH Veterans—had more hospitalizations that could be prevented with better access to primary and other outpatient care.³⁵

Fourth, in multivariate analyses, the vulnerable groups (HUD-VASH, currently homeless, and the housed, low-income) were expected to have more utilization than the reference group (housed, not low-income). This differential utilization was expected because of parallel differentials in need and predisposing characteristics that convey vulnerability. Last, when adjusted for need and primary care use within the 3 vulnerable groups, the differences in utilization versus the reference group were expected to decline, particularly for acute care.

Notably, though we analyze utilization, not health outcomes, fragmented service use is suggested to be partially responsible for homeless persons' poorer health.^{9,36}

METHODS

Setting and Ethics

The 2012 Point-in-Time Annual Homeless Assessment Report estimates that 6371 Veterans are homeless in Los Angeles on any night—more than any US city and equivalent to >10% of homeless Veterans nationwide.²¹ VAGLA serves this area and cares for the most homeless Veterans (> 11,000/y)³⁷ of any VA facility, including >3000 formerly homeless HUD-VASH Veterans.

This paper describes one portion of a secondary database analysis performed by the VISN22 Veterans Assessment and Improvement Laboratory (VAIL), a demonstration project that aims to enhance VA patient-centered medical home (PCMH) implementation. VAIL's homelessness workgroup aims to improve PCMH access for homeless Veterans. The VAGLA Institutional Review Board (IRB) administrator formally designated this analysis a quality improvement activity and not subject to formal IRB review.

Participants

We used the Veterans Health Administration Medical SAS Data, a national administrative dataset of VA inpatient/outpatient visits. Data were restricted to Veterans with at least one VAGLA outpatient (including ED) visit and/or inpatient admission between October 1, 2010 and September 30, 2011. To incorporate a surrogate measure of need in our analyses, we excluded Veterans without a Diagnostic Cost Group (DCG) score, a diagnosis-based medical complexity measure derived from demographic data and diagnoses associated with patient visits over the prior fiscal year that aims to predict future costs of care.^{38,39} The final analytic sample consisted of Veterans (n = 62,459) who used VAGLA at least once over the specified time frame.

Measures

Covariates—The primary covariates of interest were housing status (predisposing variable) and income (enabling variable) that were jointly coded as 4 mutually exclusive groups. From our analytic sample, we identified formerly homeless HUD-VASH Veterans using the program's roster (n = 1997). Next, we used the currently accepted protocol to identify currently homeless Veterans, a proxy measure including Veterans with a V60.0 (homeless) ICD-9 code or who accessed VAGLA homeless services during our study period.⁴⁰ These Veterans were coded as currently homeless (n = 1760). Low-income Veterans were identified using the VA's means test indicator, which uses a patient's prior year income and net worth to determine if he/she must make copayments for health service utilization. Housed, low-income Veterans (not in HUD-VASH) did not receive VA monies for military-related disabilities and were copay exempt, with an annual income of \$29,402 and net worth \$80,000 (n = 21,682). The remaining Veterans were coded as housed, not low-income (n = 37,020).

Predisposing, Enabling, and Need Variables—Included in analyses were additional predisposing characteristics, including demographics (age, sex, race/ethnicity, and marital status, with older age, female sex, minority race/ethnicity, and single individuals, respectively, conveying vulnerability). Though additional enabling characteristics were of interest, such as insurance or medical home enrollment, these variables were unavailable in our dataset. We used the number of primary care visits over the study time frame as a proxy for a regular source of care (enabling characteristic).

Traditional need measures, for example, perceived health, were unavailable. Need was instead approximated by the DCG. As described above, DCG scores are correlated with medical complexity, modeling age, sex, and diagnoses generated in outpatient/inpatient visits over the course of a fiscal year to predict costs in the following year.^{38,39} DCG scores were conceptualized to match managed care payments to the health needs of plan enrollees.³⁹ Though developed for a Medicare population, the DCG has external validity within the VA³⁸ and was the best available surrogate for evaluated need.

Health Behavior Variables—Outcomes of interest were the behavior of health service utilization across inpatient admissions, outpatient visits, and ED use. Hospitalization data were subdivided into medical/surgical (including potentially preventable hospitalizations for ambulatory care sensitive conditions)³⁵ and psychiatric admissions. To calculate potentially preventable hospitalization rates, we compared the primary discharge diagnoses for all medical/surgical admissions with the Agency for Healthcare Research and Quality's Prevention Quality Indicators (PQI). The PQI includes diagnoses like urinary tract infections—conditions for which hospitalizations might be avoided with increased ambulatory care access.³⁵

Ambulatory care data were collapsed into discrete categories, including primary care, specialty medicine, surgery, mental health, and ED. Outpatient primary care was conceptualized as individual visits with primary care providers. Specialty medicine included all VAGLA medical subspecialties: allergy/immunology, cardiology, dermatology, endocrinology, gastroenterology, hematology/oncology, hepatology, infectious disease, nephrology, neurology, pain medicine, palliative care, pulmonology, rheumatology, and sleep medicine. Outpatient surgery encompassed all VAGLA surgical subspecialties: cardiac, general, hand, neuro, plastic, thoracic, and vascular surgeries; as well as gynecology, ophthalmology, otolaryngology, proctology, and urology. Mental health visits were divided into individual encounters, that is, visits between a single patient and provider, and group visits, which generally offer evidence-based psychotherapies. Given the public health importance of opioid misuse among vulnerable populations,⁴¹ we studied the opioid maintenance clinic separately. This clinic offers methadone and buprenorphine detoxification/maintenance and psychosocial rehabilitation.

We calculated utilization rates for Veterans by housing and income status, including inpatient (medical/surgical, preventable, and mental health) hospitalization rates for Veterans with at least one admission and Veterans with multiple admissions. We also calculated the mean/SD of outpatient visit counts, by clinic, and the percentage of patients

who used each clinic at least once. For ED visits, we also identified the percentage of Veterans with high utilization (≥ 4 visits/y).^{42–44}

Statistical Analyses

We used the χ^2 test and analysis of variance to determine how predisposing characteristics (demographics), need (DCG), and behaviors (health service use) varied across the 4 groups by housing/income status. We performed multivariate logistic regression analyses, adjusting for predisposing and need variables, to determine whether housing (predisposing variable) and income status (enabling variable) were significantly associated with the likelihood of the behavior of health service use. Adjusted odds ratios are presented. To determine the influence of housing and income status on the number of ambulatory care visits over the year of interest, adjusting stepwise for predisposing and need variables, then for these variables and the number of primary care visits, the decision to use a negative binomial model over a Poisson was based on a likelihood ratio test of overdispersion in the distribution of visit counts.⁴⁵ Incident rate ratios (IRR) are presented. Of note, Veterans do not require primary care before mental health care and can be referred to specialists by any VA provider. Primary care and other ambulatory care (specialty medicine, surgery, mental health, and ED) were poorly correlated (0.11–0.31). Analyses were conducted in Stata/SE 12.1.⁴⁶

RESULTS

Table 1 describes the 4 groups across predisposing and need factors. HUD-VASH and currently homeless Veterans were nearly a decade younger than their housed peers. Most Veterans were male. Approximately half the HUD-VASH and currently homeless Veterans were single, more than the housed, low-income and the housed, not low-income. Need, conceptualized by mean DCG, was highest among HUD-VASH Veterans (0.84), followed by the currently homeless (0.65), the housed, low-income (0.63), and the housed, not low-income (0.52).

Table 2 presents inpatient and outpatient health service utilization. Among HUD-VASH Veterans, the percentage of patients with medical/surgical admissions during the observation year (9.7%) was higher than the other groups. The housed, low-income Veterans had the second highest percentage of admissions (7.4%), followed by the currently homeless (6.3%), and the housed, not low-income group (4.2%). Rates of preventable admissions among Veterans were not significantly different between groups (22%–25%).

In comparison, 3.5% of Veterans in each of the HUD-VASH and currently homeless groups had one or more psychiatric admission, higher than the housed, low-income (1.2%) and the housed, not low-income (0.8%). Among patients with psychiatric hospitalizations, readmissions were most likely among currently homeless Veterans (38.8%) and least likely among HUD-VASH Veterans (15.7%).

High rates of primary care were seen across the 3 vulnerable groups, though HUD-VASH Veterans had the highest rates (mean of 7.1 visits/y). In sum, HUD-VASH Veterans used the most outpatient specialty medicine services (1.6 visits/person). In 13 of 15 subspecialties

(excluding dermatology and hematology/oncology, in which the housed, not low-income had higher rates), HUD-VASH Veterans had the highest utilization. Parallel to the high rates of hepatitis C, HIV/AIDS, and chronic pain^{47,48} among homeless adults, HUD-VASH Veterans had significantly higher rates of visits for liver disease (4.5% with visit(s) compared with 2.1% of the currently homeless, 1.8% of the housed, low-income, and 0.8% of the housed, not low-income); infectious disease (2.4% with visit(s) compared with 1.1%/1.5%/0.9%); and pain medicine (6.7% with visit(s) compared with 3.0%/2.8%/2.6%) utilization. For outpatient surgery visits, HUD-VASH and the housed, low-income groups had the highest proportions of patients with one or more visits (31.9%/33.0%, respectively). Data by medical and surgical subspecialty are available from the authors.

As anticipated, different utilization patterns were seen within mental health. For individual mental health visits, both HUD-VASH (86.6% with at least one visit) and currently homeless Veterans (78.4%) had markedly higher utilization than their low-income (29.2%) and other housed peers (28.4%). HUD-VASH Veterans had the most individual mental health visits (mean 10.7 visits/y). Among group visits, HUD-VASH and currently homeless Veterans again had the highest utilization rates, at 36.5% and 27.8%, respectively. HUD-VASH Veterans also had the highest percentage of patients (4.4%) with at least one visit to the opioid maintenance clinic.

HUD-VASH Veterans and currently homeless Veterans also had the highest ED utilization, averaging 2.9 visits/patient and 2.8 visits/patient, respectively, among individuals with visits. Both HUD-VASH and currently homeless Veterans had high rates of frequent ED utilization (7.3% and 5.7%, respectively, with 4 visits/y), compared with their housed peers.

Table 3 shows these data adjusted for predisposing characteristics (age, sex, race/ethnicity, and marital status) and need (DCG). HUD-VASH and the housed, low-income Veterans had similar likelihoods [conveyed as adjusted odds ratios (AOR)] of medical/surgical admissions (1.5/1.5), primary care (1.0/1.3), specialty medicine (1.1/1.2), and surgical visits (1.1/1.3), compared with the housed, not low-income reference group. For these visit types, the currently homeless stood distinct with low AORs, particularly an AOR = 0.3 for primary care. The likelihood of preventable hospitalizations was similar for the 3 vulnerable groups, compared with the reference group.

The likelihood of a psychiatric admission, mental health clinic visit (individual or group), and ED visit showed a different pattern when controlled for predisposing and need variables. Both formerly homeless HUD-VASH Veterans and currently homeless Veterans were over twice as likely to have a psychiatric admission than the reference group. These groups had AOR = 10.2 and 6.4, respectively, for individual outpatient mental health visits compared with the reference group. HUD-VASH Veterans were almost 3 times as likely to be high ED utilizers (AOR = 2.9) as the reference group.

Table 4 depicts the negative binomial regression IRRs for the number of ambulatory visits in each category, adjusted stepwise for predisposing and need variables (model 1), then for these variables and the number of primary care visits (model 2). Both models use the

housed, not low-income group as the reference group. HUD-VASH Veterans had 1.9 times the incident rate of primary care visits per year compared with the reference group, whereas the currently homeless and low-income housed were similar (1.2 and 1.3 times the incident rate, respectively) to the reference group.

Most striking were the IRR for individual mental health visits and ED care. For individual mental health visits, in model 1, HUD-VASH Veterans had 5.2 times the incident rate and the currently homeless had 3.3 times the incident rate of the reference group. When also adjusted for the number of primary care visits (model 2), these incident rates decline the most for HUD-VASH Veterans, becoming similar to the currently homeless (2.4/2.0, respectively). For ED care, in model 1, HUD-VASH Veterans had 4.8 times the incident rate and currently homeless had 1.4 times the incident rate of the reference group. In model 2, the IRR declines the most for HUD-VASH Veterans and becomes similar to the currently homeless (1.6/1.4, respectively), compared with the reference group.

DISCUSSION

The VA's experiences are instructive surrounding the impacts of Housing First on health care utilization for homeless patients.^{7,10–12} Our findings generally support the hypothesis that HUD-VASH and currently homeless Veterans have the highest need. Except for age (they were younger than their peers), these 2 groups had vulnerability conferred by marital status (more single individuals), race/ethnicity (more minorities), residential histories, and income. Need, measured by DCG, was highest for HUD-VASH Veterans and second highest among currently homeless Veterans.

We found resounding support for the expectation that HUD-VASH Veterans—with high need, enabled by case management—had the highest rates of VA ambulatory care, including primary and mental health care. HUD-VASH may enable health care utilization and outpatient care for formerly homeless Veterans and reverse disparities between currently homeless and housed Veterans. However, we found only partial support for the hypothesis that currently homeless Veterans preferentially use acute (inpatient/ED) versus outpatient care. Though, as anticipated, the currently homeless group underused primary care relative to housed populations and had high ED utilization, they had fewer admissions than housed, low-income and HUD-VASH Veterans. In part, we speculate that currently homeless Veterans are less VA-affiliated than HUD-VASH Veterans and more likely to use non-VA acute care. If outside hospital data were included, the ratio of acute to ambulatory care among the currently homeless might increase.

Most surprising were the findings that HUD-VASH Veterans had more ED (including high-utilizers) and inpatient utilization—and an approximately equal rate of preventable hospitalizations—compared with the other groups. We postulate that homeless Veterans may participate in HUD-VASH when their illness burden exceeds what they can manage on the streets. HUD-VASH Veterans may be sicker than their homeless counterparts and simply require more acute care. By promoting primary care, the HUD-VASH program may facilitate diagnoses of untreated medical problems that require acute interventions. Given limited availability of walk-in and/or after-hours primary care, compounded by

transportation barriers, we suspect that HUD-VASH case managers often facilitated acute care when they encountered Veterans on their caseloads with medical complaints. These figures suggest the importance of increased access to VA PCMH for homeless persons, with walk-in and after-hours appointments.⁴⁹ Future studies should include qualitative data collection from HUD-VASH patients and case managers, to better understand barriers and facilitators to VA primary and acute care.

In regression analyses, our findings supported the expectation that the vulnerable groups used more services than the housed, not low-income reference group. Though differences in incident rates were lessened after adjusting for predisposing and need factors, marked differences remained. When adjusted to also control for the number of primary care visits, HUD-VASH Veterans had the greatest decrease in incident rates of specialty medical/surgical, mental health, and ED care, becoming similar to the currently homeless, compared with the housed, not low-income group. That is, higher primary care utilization among HUD-VASH Veterans may explain much of utilization disparities between HUD-VASH Veterans and their currently homeless peers.

These findings have limitations. These data are from a single, urban VA site and may not extrapolate to other communities. This analysis lacks important patient-level data, including predisposing and enabling characteristics, for example, homelessness chronicity and medical home enrollment, respectively, along with organizational features that may influence care, for example, clinic wait times. Moreover, our surrogate measure of need (DCG) reflects demographics and prior VA health care utilization.^{38,39} As HUD-VASH Veterans use the VA more than their homeless peers, they may have more accurate DCG scores. Moreover, though the literature suggests differential utilization patterns among mentally ill persons,⁵⁰ we were unable to specifically adjust for psychiatric disorders. Though the DCG incorporates the prior year's mental health diagnoses, future studies could control for psychiatric diagnoses as an independent variable.

Additional limitations include the cross-sectional nature of this analysis, which does not allow attribution of causality between housing/income status and health service utilization. Though many Veterans use non-VA care, we did not include outside hospital data. Moreover, the proxy measure for current homelessness draws upon VA homeless service use and excludes homeless Veterans who do not access VA housing services. We were also unable to estimate Veterans' duration of HUD-VASH participation. Among HUD-VASH Veterans, early increases in utilization to address unmet needs acquired while homeless may be followed by improved health and lessened service use. Last, though fragmented utilization is well-documented among homeless persons and thought to contribute to poorer health,^{7,10-12} it is unclear how VA service use translates to health outcomes.

CONCLUSIONS

Clinicians and researchers who work with homeless populations may benefit from knowledge about health care utilization patterns among Housing First program participants. This study suggests that currently homeless Veterans underuse many VA services relative to housed Veterans and that HUD-VASH addresses this disparity through housing and primary

care referrals. Though we hoped that HUD-VASH case management led to less acute care (ED and inpatient) and preventable hospitalizations, we found no such effects. Future studies are needed to explore longitudinal changes in utilization with HUD-VASH participation, incorporating non-VA services. Differences in health outcomes among Veterans by housing and income status are also important for study, along with barriers and facilitators to acute, primary, and other ambulatory care use for Veterans in these groups.

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TABLE 1

Predisposing and Need Variables by Housing/Income Status

Predisposing or Need Variables	HUD-VASH Veterans (n = 1997, 3.2%)	Currently Homeless Veterans (n = 1760, 2.8%)	Housed, Low-Income Veterans (n = 21,682, 34.7%)	Housed, Not Low-Income Veterans (n = 37,020, 59.2%)	Total (n = 62,459, 100%)
Predisposing					
Age (mean, SD) *	53.3, 11.0	53.9, 12.0	62.3, 15.1	62.3, 16.9	61.7, 16.1
Sex (% M) *	91.3	94.7	95.1	94.4	94.5
Marital status* (%)					
Single	50.3	48.9	34.4	23.1	28.6
Married	10.3	12.7	24.8	51.3	39.7
Divorced/separated	36.8	35.3	34.6	20.4	26.3
Widowed	2.1	2.4	5.8	4.1	4.6
Unknown	0.6	0.7	0.4	1.1	0.9
Race/ethnicity* (%)					
Non-Hispanic white	26.0	32.8	45.7	40.8	41.8
Non-Hispanic black	57.3	46.4	23.7	14.3	19.8
Hispanic, any race	9.4	10.1	13.2	12.4	12.5
Asian/Pacific Islander	1.2	2.4	3.0	3.6	3.3
Unknown/other	6.1	8.4	14.5	28.9	22.6
Need					
Diagnostic Cost Group (DCG), concurrent Medicare model (mean, SD) *	0.84, 0.98	0.65, 1.02	0.63, 1.02	0.52, 0.90	0.57, 0.95

* $P < 0.001$.

TABLE 2
 VA Inpatient, Outpatient, and Emergency Department/Urgent Care Health Service Use by Housing/Income Status

	Health Behavior (Health Service Use, October 1, 2010–September 30, 2011)	HUD-VASH Veterans (n = 1997, 3.2%)	Currently Homeless Veterans (n = 1760, 2.8%)	Housed, Low-Income Veterans (n = 21,682, 34.7%)	Housed, Not Low-Income Veterans (n = 37,020, 59.2%)	Total (n = 62,459, 100%)
Inpatient						
Medical/surgical						
% With admission*		9.7	6.3	7.4	4.2	5.5
% With multiple admissions*		4.2	2.4	3.3	1.7	2.4
Preventable hospitalizations						
% Of admitted patients with 1 or more preventable hospitalization		23.3	25.0	24.8	22.7	23.8
% Of medical/surgical admissions that are preventable hospitalization		18.5	21.5	22.0	19.3	20.3
Mental health						
% With admission*		3.5	3.5	1.2	0.8	1.1
% With multiple admissions*		0.6	1.1	0.3	0.2	0.3
Outpatient						
Primary care visits						
# Visits, among all patients (mean, SD)*		7.1, 7.1	4.4, 5.2	4.7, 5.0	3.7, 4.1	4.2, 4.7
# Visits, among patients with visits (mean, SD)*		7.8, 7.1	5.8, 5.3	5.1, 5.0	4.0, 4.2	4.6, 4.7
Visit distribution, among all patients (%)						
1 or more visits*		90.9	75.9	93.0	90.8	91.1
Specialty medicine visits—any type						
# Visits, among all patients (mean, SD)*		1.6, 3.4	0.7, 1.7	1.3, 3.1	1.0, 2.9	1.1, 2.9
# Visits, among patients with visits (mean, SD)*		3.9, 4.5	2.8, 2.4	3.6, 4.2	3.4, 4.4	3.5, 4.3
Visit distribution, among all patients (%)						
1 or more visits*		41.0	25.4	36.8	29.9	32.6
Surgical visits—any type^o						
# Visits, among all patients (mean, SD)*		1.0, 2.2	0.5, 1.4	1.1, 2.4	0.7, 1.9	0.8, 2.1
# Visits, among patients with visits (mean, SD)*		3.1, 3.0	2.6, 2.1	3.3, 3.3	2.9, 2.8	3.1, 3.0

Health Behavior (Health Service Use, October 1, 2010–September 30, 2011)	HUD-VASH Veterans (n = 1997, 3.2%)	Currently Homeless Veterans (n = 1760, 2.8%)	Housed, Low-Income Veterans (n = 21,682, 34.7%)	Housed, Not Low-Income Veterans (n = 37,020, 59.2%)	Total (n = 62,459, 100%)
Visit distribution, among all patients (%)					
1 or more visits*	31.9	19.5	33.0	24.4	27.5
Specialty mental health visits—individual					
# Visits, among all patients (mean, SD)*	10.7, 13.8	7.2, 11.2	2.3, 7.2	2.0, 6.7	2.5, 7.5
# Visits, among patients with visits (mean, SD)*	12.3, 14.1	9.2, 11.9	7.8, 11.5	7.2, 11.0	8.0, 11.6
Visit distribution, among all patients (%)					
1 or more visits*	86.6	78.4	29.2	28.4	31.9
Specialty mental health visits—group					
# Visits, among all patients (mean, SD)*	7.7, 30.8	1.9, 15.2	1.7, 15.5	1.6, 14.3	1.8, 15.6
# Visits, among patients with visits (mean, SD)*	31.0, 55.6	15.6, 40.5	27.3, 56.9	28.1, 53.3	27.5, 54.2
Visit distribution, among all patients (%)					
1 or more visits*	36.5	27.8	20.2	13.2	16.8
Specialty mental health visits—Opioid Maintenance Clinic					
# Visits, among all patients (mean, SD)*	3.5, 29.3	0.7, 10.7	1.0, 13.9	0.5, 9.9	0.8, 12.5
# Visits, among patients with visits (mean, SD)*	78.9, 117.2	45.3, 77.3	68.9, 90.8	75.7, 98.3	71.7, 96.8
Visit distribution, among all patients (%)					
1 or more visits*	4.4	1.5	1.5	0.6	1.1
Emergency department/urgent care					
# Visits, among all patients (mean, SD)*	1.0, 2.8	0.8, 2.1	0.4, 1.4	0.3, 1.0	0.4, 1.3
# Visits, among patients with visits (mean, SD)*	2.9, 4.0	2.8, 3.3	2.2, 2.5	1.9, 2.2	2.1, 2.5
Visit distribution, among all patients (%)					
1 or more visits*	36.5	27.8	20.2	13.2	16.8
ED frequent flyer (4 or more ED/UC visits)* (%)	7.3	5.7	2.7	1.4	2.2

Specialty medicine includes outpatient visits to allergy/immunology, cardiology, dermatology, endocrinology, gastroenterology, hematology/oncology, hepatology, infectious disease, nephrology, neurology, pain medicine, palliative care, rheumatology, and sleep medicine.

Surgical visits include outpatient visits to cardiac surgery, general surgery, gynecology, hand surgery, neurosurgery, ophthalmology, otolaryngology, plastic surgery, proctology, thoracic surgery, urology, and vascular surgery.

* $P < 0.001$.

TABLE 3AOR[†] for Logistic Regression of VA Health Service Use on Housing and Income Status

Health Behavior (Health Service Use, October 1, 2010–September 30, 2011)	HUD-VASH Veterans (n = 1997, 3.2%) AOR	Currently Homeless Veterans (n = 1760, 2.8%) AOR	Housed, Low-Income Veterans (n = 21,682, 34.7%) AOR
Medical/surgical inpatient admissions	1.5*	1.2*	1.5*
Preventable hospitalizations among persons with medical/surgical admissions	1.0	1.1	1.1*
Mental health admissions	2.1*	2.2*	1.1
Primary care visits	1.0	0.3*	1.3*
Specialty medicine visits (any type)	1.1*	0.7*	1.2*
Surgical visits (any type)	1.1*	0.6*	1.3*
Mental health visits—individual	10.2*	6.4*	0.9*
Mental health visits—group	3.4*	1.5*	0.9*
Emergency department visits	1.8*	1.5*	1.3*
Emergency department frequent flyers (4+ visits/y)	2.9*	2.4*	1.4*

Reference group: housed, not low-income Veterans (n = 37,020, 59.2%).

[†] Adjusted for age, sex, marital status, race/ethnicity, and DCG.

AOR indicates adjusted odds ratios; DCG, diagnostic cost group; IRR, incident rate ratios; HUD-VASH, Housing and Urban Development-VA Supportive Housing.

* $P < 0.05$

IRR^{†‡} for Negative Binomial Regression of VA Health Service Use on Housing and Income Status

TABLE 4

Health Behavior (Health Service Use, October 1, 2010–September 30, 2011)	HUD-VASH Veterans (n = 1997, 3.2%)		Currently Homeless Veterans (n = 1760, 2.8%)		Housed, Low-Income Veterans (n = 21,682, 34.7%)	
	Model 1 [†] IRR	Model 2 [‡] IRR	Model 1 [†] IRR	Model 2 [‡] IRR	Model 1 [†] IRR	Model 2 [‡] IRR
# Primary care visits	1.9*	N/A	1.2*	N/A	1.3*	N/A
# Specialty medicine visits (any type)	1.6*	0.8*	0.7*	0.5*	1.3*	1.0*
# Surgical visits (any type)	1.4*	0.8*	0.7*	0.6*	1.5*	1.2*
# Mental health visits—individual	5.2*	2.4*	3.3*	2.0*	1.1*	0.8*
# Emergency department visits	4.8*	1.6*	1.4*	1.4*	1.0	1.2*

Reference group: housed, not low-income Veterans (n = 37,020, 59.2%).

[†]Model 1: Adjusted for age, sex, marital status, race/ethnicity, and DCG.

[‡]Model 2: Adjusted for age, sex, marital status, race/ethnicity, DCG, and number of primary care visits.

DCG indicates diagnostic cost group; IRR, incident rate ratios; HUD-VASH, Housing and Urban Development-VA Supportive Housing; N/A, not available.

* P < 0.05