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Factors affecting emergency department service utilization by a chronically homeless population

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Abstract

Objective—Homeless adults make extensive use of emergency department (ED) services. This study examined factors associated with moderate and high ED use in a cohort of chronically homeless individuals.

Methods—A cross-sectional analysis identified factors related to ED use in a cohort of 755 individuals at 11 sites at entry into in the Collaborative Initiative to Help End Chronic Homelessness (CICH). Bivariate analyses identified sociodemographic, housing status, health status, and service-related factors associated with moderate and high ED use. Independent risk factors were then identified using a multivariate multinomial model. Hierarchical regression was used to compare the strengths of association between ED use and blocks of factors composed of sociodemographic, housing, health, and service-related characteristics.

Results—In a 3-month period, 30% of participants visited the ED 1 or 2 times (moderate ED use) and 12% used the ED 3 or more times (high-ED use). ED use was most strongly associated with poor health status and utilization of other non-ED services, and to a lesser extent with housing status.

Conclusions—Increased ED utilization was associated with both medical and psychiatric morbidity and greater use of non-ED services. ED use is thus related to high need and acuity and is not ameliorated by use of other services. Housing instability and homelessness contribute less robustly to increased ED use. More coordinated services may better address the complex medical, housing, and psychosocial needs of chronically homeless individuals.

Introduction

Emergency department (ED) service utilization is a concern of growing importance due to increased ED overcrowding and worries that high ED use reflects inadequate treatment and access to primary care and social services(1). Homeless individuals have been shown to be

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among the highest users of ED services (2–8) and are more likely than others to be frequent ED users (2, 4, 5). While a wide range of factors have been found to be associated with high ED utilization in general homeless populations less is known about factors correlated with high ED use in chronically homeless populations—those with extended periods or frequent homelessness—and the relative contributions of such factors.

Factors associated with high ED use are diverse, however it is increasingly apparent that the high rates of medical and mental health problems (3, 9–13) in homeless populations are significant drivers of ED use (4, 8, 14–20). Homeless adults have increased rates of social isolation, unstable housing, hunger, safety concerns, and legal problems—all of which have been identified as associated with ED use (18, 21, 22). Homeless adults are less likely to have health insurance (21) and many have limited access to ambulatory services (6, 11, 23, 24). There is evidence that that lack of both insurance and ready access to ambulatory services are associated with increased ED usage (21, 25–27). However, other studies have found that frequent ED use is associated with having health insurance and with extensive use of other services (1, 4, 15–17, 28, 29). Thus, while it is apparent that poor health is associated with high ED use in homeless populations, the relationship between ED utilization and access to other services that might improve health status remains unclear.

The Collaborative Initiative to Help End Chronic Homelessness (CICH) was a multisite demonstration program that provided chronically homeless adults with permanent housing, case management, primary care, addiction and mental health services at 11 American sites (30, 31). A prior analysis of CICH data found that having health insurance was associated with seeking medical help in a primary care setting as opposed to an ED (27). However, the broad range factors associated with the amount and intensity of ED use were not investigated.

In this current study, we seek to better understand factors associated with ED use by chronically homeless CICH participants prior to receipt of enriched CICH services. Guided by prior studies of ED use among homeless adults, we conceptually organize possible factors as being related to sociodemographic characteristics and psychosocial stressors (indicators of low SES, social isolation, legal problems), lack of housing, poor health status (medical, psychiatric, and substance related), and poor access to other services. We then attempt to identify independent correlates of increased ED use and weigh the relative contributions of these four broad classes of factors.

Methods

Source of Data—CICH was a multi-site demonstration program of assistance for chronically homeless adults funded jointly by three federal departments, HUD, HHS and the VA and implemented in 11 localities: Chattanooga, TN; Chicago, IL; Columbus, OH; Denver, CO; Fort Lauderdale, FL; Los Angeles, CA; Martinez, CA; New York City, NY; Philadelphia, PA; Portland, OR; and San Francisco, CA. Each site was responsible for development and implementation of outreach efforts to contact chronically homeless adults and provide comprehensive housing, case management, primary care and mental health services. The primary entry criterion was chronic homelessness, defined as either having

been homeless continuously for more than one year or having had four or more separate episodes of homelessness in the prior three years. There were no clinical exclusion or inclusion criteria. Written informed consent was provided by each participant and approved of by the Institutional Review Boards at the 11 individual sites and the coordinating site at the VA Northeast Program Evaluation Center in Connecticut. Baseline data used in this current study were collected between February 2004 and April 2006.

Data Collection—CICH staff were trained in a two-day workshop in which all procedures and measures were reviewed. Assessments were performed through face-to-face interviews.

Measures

Emergency department use—Clients reported the number of days of receipt of services for medical, psychiatric, or substance use problems in an ED during the 90 days prior to program entry and were classified into three groups based on total ED usage: non-ED users, moderate ED users (1–2 days), and high-ED users (>2 days).

Sociodemographic measures—Interviews documented age race, gender marital status, education, employment, income, residential status, and legal history.

Residential Status—The number of days out of the prior 90 living in a shelter, outdoors, an abandoned building, or a car were documented. Clients were asked how many different places they had lived.

Social support—From a list of 10 classes of people clients reported whom they could rely for help in three situations: a $100 loan, transportation to an appointment, and suicidal thoughts producing an aggregate social support scale ranging from 0–10 (18, 32).

Community integration—Clients were asked whether they participated in 16 common community activities during the prior two weeks producing a scale from 0–16 (33).

Physical health status—The presence of 27 medical problems involving a range of body systems was evaluated by self-report. The 12 item Medical Outcomes Study Short Form (SF-12) physical component score was used to assess physical functioning and related quality of life (34). Scores ranged from 0 to 100, with higher scores reflecting increased functioning.

Mental Health Status—Participants reported whether they had ever been told they had each of the following psychiatric diagnoses: schizophrenia, another psychotic disorder, major depression, bipolar disorder, a personality disorder, PTSD, an adjustment reaction, or an anxiety disorder. The SF-12 mental health component score (34) was used to assess mental health related quality of life. Scores ranged from 0 to 100, with higher scores indicating increased functioning.

Substance Use—Items from the Addiction Severity Index (ASI) (35) were used to assess current alcohol and drug use. Scores ranged from 0 to 1, with higher scores indicate more severe use.

Healthcare and Social Services Access and Utilization—Participants reported the number of days in receipt of outpatient or inpatient medical, mental health, or substance treatment in the previous 90 days. Clients reported whether they had been insured through Medicaid, Medicare, VA, state or local sources, private insurance, other sources, or had no insurance. Medicaid, Medicare, and state or local insurances were combined in to a single measure of publically- funded health insurance.

Clients also reported whether they received seven possible services related to employment, housing, income benefits, legal assistance, education, crisis care, or childcare services. The total number of services received during the prior 90 days were summed to assess the degree of social services utilization.

Subjective service coordination was measured using answers to five questions regarding the client's perception of coordination of services (36). Possible scores ranged from 0 to 2, with higher scores indicating greater coordination.

Statistical Analysis—Statistical analyses were performed with SAS 9.3 or 9.4. Bivariate analyses of nonED, moderate-ED, and high-ED users were conducted using the Analysis of Variance (ANOVA) and chi-square tests. If ANOVA or chi-square tests were significant ($P<.05$), pairwise comparisons were made using t-tests or dichotomous chi-square tests, respectively, and the Hochberg adjustment for multiple comparisons was applied (37).

Measures that were significant in bi-variate analyses or were conceptually important were entered into a multinomial logistic regression model to identify independent factors associated with moderate and high-ED use compared to non-ED use. Multinomial regression was chosen because bivariate analysis demonstrated that the three categories of ED users did not meet the proportional odds assumption.

Hierarchical multivariate regression was performed to better understand the contributions of the significant factors identified in the multinomial model. Factors were grouped into 4 blocks: sociodemographic characteristics, housing status, health status, and service use. Within each block, statistically significant measures ($P<.05$) were retained. Program site, which was not considered to be a characteristic of the participants, was added first. The four blocks were then added sequentially into the multinomial model. The relative strengths of association for each block were evaluated using the Cox-Snell pseudo-R^2 statistic (38), with larger increases in R^2 indicating greater strengths of association between ED use and that block of measures. Because health status and service use are highly related, this analysis was performed twice, reversing the orders in which the blocks were entered, in order to determine if either might contribute more variance.

Bivariate analyses included the entire baseline cohort (N=755). Of these 755 participants, 5% contained missing data (N=37) in at least one measure included in multivariate analyses which were limited to participants with complete data (N=718). ED usage by the 718 participants without missing data (29% moderate use and 12% high use) was similar to that of the entire cohort (30% moderate use and 12% high use).

Results

The average age of CICH participants was 45.4±8.7 years. Of the 755 participants, 572 (76%) were male and 465 (62%) were from racial minority groups. Only 123 (16%) had been recent employed and 322 (43%) reported prior legal convictions. The majority of clients reported having problems related to physical health (N= 491, 65%), mental health (N=577, 76%), alcohol use (N=395, 52%), or drug use (N=391, 52%). Most participants (N=438, 58%) did not use the ED, while 225 (30%) spent one or two days and 92 (12%) spent three or more days in an ED during the prior three months.

Bivariate Analysis

A range of factors related to psychosocial stressors and housing instability (Table 1), poor health (Table 2), and high service use (Table 3) were associated with increased ED utilization. ED use was associated with several indicators reflecting housing instability and disadvantaged financial status, including increased number of places lived, lower rates of employment, and increased disability and public support income (Table 1). There were not significant differences in demographic factors, levels of social support, or community integration with the exception of site location.

ED use was associated with more severe medical morbidity, mental illness, and substance use (Table 2). High ED utilizers had significantly more medical diagnoses and poorer physical health than moderate ED users, who were significantly less healthy than people who did not use the ED. Moderate and high ED use were correlated with an increased number of mental health diagnoses, with higher rates of anxiety disorder and PTSD in particular. The rate of dual mental health and substance use disorders was associated with increased ED use, as were the ASI indices of more severe alcohol and drug use.

ED use was correlated with increased use of non-ED services and high ED-utilizers were less likely to be uninsured (Table 3). ED utilization was associated with more days admitted to inpatient treatment. The use of outpatient services and social services were also correlated with high ED use, with the number of outpatient providers progressively increasing with ED use. Though overall outpatient service use was increased, there was no significant association with subjective experience of service coordination.

Multivariate Analysis

In the face of the many significant bivariate relationships, multivariate multinomial regression was used to identify independent correlates of greater ED use (Table 4). Among sociodemographic factors, only younger age was associated with high ED usage. Among housing indicators, the number of places lived was associated with both moderate and high ED use and the number of days homeless was associated with moderate ED use.

Emergency department visits were associated with a number of indicators of poor health. Both moderate and high ED use were strongly correlated with increased number of reported medical problems and severity of alcohol abuse. Frequent ED use was also associated with poor physical functioning as measured by the SF-12 index.

ED use was associated with increased utilization of non-ED services. Both moderate and high ED use were strongly associated with receipt of Medicaid, Medicare, or local state insurance, as well as accessing more types of social services. Moderate and frequent ED were also correlated with increased total days admitted to inpatient units.

To better evaluate the relative contributions of sociodemographic, housing, health, and service-related factors, hierarchical multivariate analysis was performed using statistically significant factors identified in the multivariate model. Relatively substantial variance was explained by site (ΔR^2=.076), minimal by age (ΔR^2=.001), and moderate by housing status (places lived and days homeless, ΔR^2=.034). Service-related factors (social services, inpatient days, and public insurance, ΔR^2=.051) and health factors (medical problems, SF12, and ASI-alcohol, ΔR^2=.069) also contributed substantially. When the order of health and service blocks was reversed, the contribution of health status increased (ΔR^2=.082) and services decreased (ΔR^2=.038), suggesting substantial shared variance and a stronger association with health factors.

Discussion

This cohort of chronically homeless adults used ED services at high rates, with nearly half reporting at least one ED visit in the prior 90 days and 12% reporting three or more visits. Similar to prior reports (4, 8, 14–20), poor health, including medical, psychiatric, and addiction problems, was the strongest correlate of frequent ED use. Significant associations were also observed with extensive use of non-ED services and to a lesser extent housing instability.

High ED utilization was correlated with poor health, but not decreased access to alternative health and social services. Individuals who used the ED were more likely to have insurance and utilized more ambulatory health and social services Frequent ED utilizers reported seeing on average 6 different outpatient providers and had nearly 20 outpatient visits in three months, which highlight the difficulty of interpreting exceptionally high service use in the face of severe illness. One interpretation might be that frequent ED users are “super users,” a term used pejoratively for indiscriminate and inappropriate service utilization. Alternatively, the strong association between ED use and both high morbidity and increased need for inpatient stabilization points towards severe illness and high acuity in spite of access to extensive outpatient services. There was a trend towards decreased sense of coordination between outpatient providers by high ED utilizers, suggesting that simply improving access to standard outpatient and social services, which generally do not include housing support, may not improve health outcomes or decrease the use of (or need for) emergency services without significant additional efforts at coordination.

These data pose the question of how to best structure outpatient services for severely ill patients that also have high degrees of housing and psychosocial instability. Engagement and care coordination through Assertive Community Treatment (ACT) teams has resulted in improved health outcomes and decreased use of acute services in severely mentally ill homeless populations (39). Also, same-day primary care in the VA system has been associated with decreased use of EDs for problems that can be managed as an outpatient and

might not necessarily require acute services (40). Perhaps most striking is the growing number of studies that have found decreased use of acute services after entry in to supportive housing with case management (41–43). In the present study of chronically homeless adults, while health and service-related factors shared the most variance with ED use, housing related factors also contributed. Why housing instability correlates with ED use is likely multifactorial. The likelihood that some ED visits might simply represent a search for shelter cannot be excluded. However, the need to look for housing could all distract individuals from attending to health needs or prevent coordination of care by providers. In addition, severe illness could prevent homeless individuals from making effective efforts to secure housing.

More research is needed to better understand the relationships between housing, the use of acute services, and overall health status. This study focuses on individuals before they received the coordinated services that were the focus of the CICH intervention. Prior studies during the follow up period have found trends towards decreased overall health expenditure among CICH participants, suggesting that housing and improved service coordination may improve the effectiveness of services (44), but the specific impact on ED use after program entry has yet to be studied and will be the subject of a future report. Further longitudinal analysis of ED use by the CICH cohort will also allow investigation of how ED use relates to key health outcomes such as mortality or future inpatient hospitalizations.

Limitations

The importance of study location should not be underestimated but could not be thoroughly studied. Service environment accounted for significant variance in our model. Unfortunately, analysis of ED use at individual sites, was not possible because there were too few participants to properly power such an investigation. Models were adjusted for site to minimize the idiosyncrasies between sites that might bias findings. Second, although selected from a broad diversity of sites, CICH participants may not be representative of the chronic homeless population. Furthermore, direct comparison of ED use in the sample to that of comparable domiciled individuals cannot be made as there was no domiciled control group. Multivariate analyses used only subjects with complete data, which could have introduced section bias. However, only a small number of participants were excluded (N=37, 5%) and ED use by those included in the multivariate analysis was similar to that of the entire CICH cohort. Finally, since this was a cross-sectional study the causal effects of various factors on ED use over time could not be studied.

Conclusions

Within this cohort of chronically homeless individuals, there is significant evidence that high ED use in this population is most robustly associated with severe health problems and high need. It also appears that standard outpatient and non-housing social services accessed by this cohort were not sufficient to manage their clinical and social service needs. Simply increasing access to insurance or other services without concomitant efforts to coordinate and enrich care may not go far enough to improve outcomes and reduce suffering.

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Table 1

Sociodemographic, psychosocial, and housing characteristics.

	No use (n=438)		Moderate use (1 or 2 days, n=225)		High use (>2days, n=92)			
Characteristic	**N**	**%**	**N**	**%**	**N**	**%**	**Test statistic**	**DF**
Sociodemographic								
Age (M ± SD)	45.7 ± 8.6		45.4 ± 8.7		44.6 ±9.4		F = .6	2,752
Male gender	345	79	160	71	67	73	$\chi^2 = 5.2$	2
Race							$\chi^2 = 7.1$	6
White	151	35	95	42	37	41		
Black	222	51	103	46	41	46		
Hispanic	37	9	11	5	8	9		
Other races	24	6	15	6.7	4	4		
Location							$\chi^2 = 52.7$ ***	20
Chattanooga	23	5	21	9	9	10		
Chicago	41	9	19	8	4	4		
Columbus	54	12	19	8	7	8		
Denver	55	13	35	16	7	8		
Ft. Lauderdale	37	8	13	6	3	3	*b*	
Los Angeles	50	11	9	4	5	5		
Martinez	31	7	15	7	8	9		
NYC	39	9	9	4	4	4	*b*	
Philadelphia	31	7	24	11	14	15		
Portland	33	8	25	11	14	15		
San Francisco	44	10	36	16	17	19		
Never married	207	47	104	46	46	50		
Employment/Financial								
Employed[d]	83	19	34	15	6	7	$\chi^2 = 8.9$ *b	2
Disability/Public support income[d] (M ± SD)	311.0 ± 320		300.9 ± 305.6		417.4 ± 326.7		F = 4.9 **ab	2, 752
Legal								

	No use (n=438)		Moderate use (1 or 2 days, n=225)		High use (>2days, n=92)			
Characteristic	**N**	**%**	**N**	**%**	**N**	**%**	**Test statistic**	**DF**
Convicted of felony[e]	189	43	87	39	46	50	$\chi 2 = 3.6$	2
Housing								
Days homeless[f] (M ± SD)	56.2 ± 38.2		56.2 ± 35.8		53.5 ± 34.7		F = .2	2, 752
Number of places lived[f] (M ± SD)	1.9 ± 1.2		2.4 ± 1.7		2.6 ± 1.6		F = 15.0 ***ab	2,752

*p<.05,

**p<.01,

***p<.001

[a]Difference between no use and high use significant (P<.05)

[b]Difference between no use and moderate use significant (P<.05)

[c]Difference between moderate and high use significant (P<.05)

[d]Past 30 days

[e]Lifetime

[f]Past 90 days

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Table 2

Health characteristics.

	No use (n=438)		Moderate use (1 or 2 days, n=225)		High use (>2 days, n=92)			
Characteristic	**N**	**%**	**N**	**%**	**N**	**%**	**Test statistic**	**DF**
Physical Health								
Medical problems[d] (M ± SD)	3.6 ± 2.9		4.9 ±3.3		6.0 ±3.8		F = 28.2 ***abc	2,752
SF-12 Physical Health[e] (M ± SD)	46.4 ± 9.7		44.3 ± 10.4		40.0 ± 10.3		F = 16.2 ***abc	2, 752
Mental Health								
Mental health problems[f] (M ± SD)	1.9 ± 1.7		2.3 ±1.7		2.4 ±1.7		F = 7.2 ***ab	2,749
Schizophrenia	114	26	53	24	29	32	χ^2 = 2.3	2
Bipolar d/do	137	32	81	36	36	40	χ^2 = 2.6	2
Depression	228	53	137	61	56	62	χ^2 = 5.6	2
Other psychotic d/o	54	13	40	18	13	15	χ^2 = 4.0	2
Adjustment d/o	18	4	16	7	4	5	χ^2 = 2.9	2
Personality d/o	41	10	27	12	12	13	χ^2 = 1.6	2
PTSD	83	20	71	32	24	27	χ^2 = 13.2 **a	2
Anxiety d/o	117	27	80	36	37	41	χ^2 = 9.5 **ab	2
Dual MH and SA diagnoses	212	50	118	55	65	72	χ^2 = 15.1 ***ab	2
SF-12 mental health[g] (M ± SD)	38.6 ±8.0		39.0 ±8.4		39.8 ±8.9		F = .8	2,752
Substance use								
Dual MH and SA diagnoses	212	50	118	55	65	72	χ^2 = 15.1 ***ab	2
ASI – alcohol[h] (M ± SD)	.1 ± .2		.2 ± .2		.2 ± .3		F = 5.9 **ab	2,752
ASI – drug[h] (M ± SD)	.05 ± .1		.05 ± .1		.08 ± .1		F = 5.7 **b	2,752
Currently smoker	346	79	180	80	81	88	χ^2 = 4.0	2

* p<.05,

** p<.01,

*** p<.001

[a] Difference between no use and high use significant (P<.05)

[b] Difference between no use and moderate use significant (P<.05)

[c] Difference between moderate and high use significant (P<.05)

[d] Possible scores ranging from 0 to 27, with higher scores indicating more medical problems.

[e] Possible scores ranging from 0 to 100, with higher scores indicating better health

[f] Possible scores ranging from 0 to 7, with higher scores indicating more mental health problems.

[g] Possible scores ranging from 0 to 100, with higher scores indicating better functioning

[h] Possible scores ranging from 0 to 1, with higher scores indicating greater addiction severity

Psychiatr Serv. Author manuscript; available in PMC 2017 December 01.

Table 3

Health and service use characteristics.

	No use (n=438)		Moderate use (1 or 2 days, n=225)		High use (>2 days, n=92)			
Characteristic	**N**	**%**	**N**	**%**	**N**	**%**	**Test statistic**	**DF**
Social support[d] (M ± SD)	1.4 ± 1.1		1.4 ± 1.2		1.6 ± 1.4		F = 2.0	2,752
Community integration[e] (M ± SD)	6.8 ± 2.9		6.9 ± 2.8		7.0 ± 2.8		F = .1	2, 752
Health insurance[p]								
Medicaid/Medicare/Local	232	54	141	64	65	71	$\chi^2 = 12.7$ ***ab*	2
VA	106	24	46	20	17	19	$\chi^2 = 2.2$	2
Private	7	2	3	1	1	1	$\chi^2 = .2$	2
Uninsured	109	25	42	19	12	13	$\chi^2 = 7.9$ **b*	2
Inpatient days[f] (M ± SD)	2.7 ± 12.5		7.4 ± 15.3		10.9 ± 18.9		$\chi^2 = 16.8$ ****ab*	2, 752
Outpatient days[f] (M ± SD)	11.4 ± 23.5		12.2 ± 21.6		19.6 ± 30.3		$\chi^2 = 4.5$ **bc*	2, 752
Case manager	381	87	208	92	80	88	$\chi^2 = 4.7$	2
Social services[g] (M ±SD)	1.6 ± .8		1.8 ±1.0		1.8 ± .9		F = 5.8 ***ab*	2,752
Number of outpatient providers[h] (M ± SD)	3.8 ± 4.2		4.9 ±5.1		6.3 ±6.4		F = 11.9 ****abc*	2,741
Services coordination[i] (M ± SD)	1.2 ± .6		1.1 ± .6		1.0 ± .6		F = 3.7 *	2,556

*p<.05,

**p<.01,

***p<.001

[a]Difference between no use and high use significant (P<.05)

[b]Difference between no use and moderate use significant (P<.05)

[c]Difference between moderate and high use significant (P<.05)

[d]Possible scores ranging from 0 to 10, with higher scores indicating greater support.

[e]Possible scores ranging from 0 to 16, with higher scores indicating greater community integration.

[f]Sum of medical, mental health, and substance use treatment days.

[g] Possible scores ranging from 0 to 7, with higher scores indicating more social services

[h] Sum of different outpatient providers.

[i] Possible scores ranging from 0 to 2, with higher scores indicating greater service coordination.

Psychiatr Serv. Author manuscript; available in PMC 2017 December 01.

Table 4

Multinomial regression of predictors of moderate and high ED use.

	Moderate use (1 or 2 days, n=419)[a]			High use (3 or more days, n=211)[a]		
Characteristic	**Odds ratio[b]**	**95% CI**	**Chi-square**	**Odds ratio[b]**	**95% CI**	**Chi-square**
Sociodemographic						
Race[c]						
White	1.07	.68 – 1.69	.09	1.04	.54 – 2.00	.01
Hispanic	1.16	.52 – 2.61	.14	.53	.14 – 1.99	.89
Other	.74	.32 – 1.70	.50	.94	.32 – 2.79	.01
Male	.84	.54– 1.33	.53	1.28	.66 – 2.47	.53
Age[d]	.94	.74 – 1.20	.24	.68	.48 – .96	4.75*
Education[e]	1.05	.97 – 1.14	1.46	.91	.82 – 1.01	2.94
Felony conviction[m]	.78	.53 – 1.16	1.52	1.10	.63 – 1.91	.11
Worked any[o]	1.02	.62 – 1.69	.01	.46	.17 – 1.2	2.54
Housing						
Number of places lived[n]	1.32	1.11 –1.57	10.13**	1.47	1.20 – 1.81	13.68***
Days homeless[n]	1.01	1.00 –1.01	5.32*	1.01	1.00 – 1.02	2.84
Health						
Medical problems[f]	1.136	1.05 –1.23	10.63**	1.20	1.08 – 1.33	12.07***
SF-12 Physical Health[g]	1.004	.98 – 1.03	.08	.95	.92 – .99	7.54**
Mental health problems[h]	1.12	.98 – 1.28	2.91	1.01	.83 – 1.23	.02
SF-12 Mental Health[g]	1.01	.98 – 1.04	.35	.99	.95 – 1.03	.15
ASI-Alcohol use[i]	3.25	1.22 –8.63	5.58*	4.08	1.12 –14.89	4.54*
ASI-Drug use[i]	1.13	.11 –11.22	.01	5.91	.37 – 94.96	1.57
Supports and Services						
Social supports[j]	.99	.83 – 1.18	.01	1.10	.86 – 1.4	.55
Public insurance[n]	1.76	1.16 –2.68	6.91**	2.35	1.26 – 4.39	7.22**

	Moderate use (1 or 2 days, n=419)[a]			High use (3 or more days, n=211)[a]		
Characteristic	**Odds ratio[b]**	**95% CI**	**Chi-square**	**Odds ratio[b]**	**95% CI**	**Chi-square**
Social services[kn]	1.27	1.03 –1.58	4.87*	1.41	1.04 – 1.92	4.88*
Outpatient days[ln]	1.00	.99 – 1.01	.10	1.01	1 – 1.02	2.84
Inpatient days[ln]	1.02	1.01 –1.04	8.56**	1.02	1.01 – 1.04	8.11**

*p<.05,

**p<.01,

***p<.001

[a]718 observations without missing data used.

[b]The reference group for all comparisons was non-ED users.

[c]Compared with black participants.

[d]OR standardized for each 10 years.

[e]Education expressed in years

[f]Possible scores ranging from 0 to 27, with higher scores indicating more medical problems.

[g]Possible scores ranging from 0 to 100, with higher scores indicating better health

[h]Possible scores ranging from 0 to 7, with higher scores indicating more mental health problems.

[i]Possible scores ranging from 0 to 1, with higher scores indicating greater addiction severity

[j]Possible scores ranging from 0 to 10, with higher scores indicating greater support

[k]Possible scores ranging from 0 to 7, with higher scores indicating more social services

[l]Sum of medical, mental health, and substance use treatment days.

[m]Lifetime

[n]Past 90 days

[o]Past 30 days

[j]Past 90 days

Psychiatr Serv. Author manuscript; available in PMC 2017 December 01.