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RESEARCH ARTICLE

Health Status and Health Care Experiences among Homeless Patients in Federally Supported Health Centers: Findings from the 2009 Patient Survey

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Objective. To examine health status and health care experiences of homeless patients in health centers and to compare them with their nonhomeless counterparts.

Data Sources/Study Setting. Nationally representative data from the 2009 Health Center Patient Survey.

Study Design. Cross-sectional analyses were limited to adults (n = 2,683). We compared sociodemographic characteristics, health conditions, access to health care, and utilization of services among homeless and nonhomeless patients. We also examined the independent effect of homelessness on health care access and utilization, as well as factors that influenced homeless patients' health care experiences.

Data Collection. Computer-assisted personal interviews were conducted with health center patients.

Principal Findings. Homeless patients had worse health status—lifetime burden of chronic conditions, mental health problems, and substance use problems—compared with housed respondents. In adjusted analyses, homeless patients had twice the odds as housed patients of having unmet medical care needs in the past year (OR = 1.98, 95 percent CI: 1.24–3.16) and twice the odds of having an ED visit in the past year (OR = 2.00, 95 percent CI: 1.37–2.92).

Conclusions. There is an ongoing need to focus on the health issues that disproportionately affect homeless populations. Among health center patients, homelessness is an independent risk factor for unmet medical needs and ED use.

Key Words. Community health centers, homeless persons, health status, health services utilization, access to care, primary care

The Health Resources and Services Administration (HRSA) funds community-based health care organizations to provide primary health care services to medically underserved communities and populations, including those

experiencing homelessness, as well as other low-income, minority, and uninsured or publicly insured individuals (Health Resources and Services Administration, Bureau of Primary Health Care 2008, 2011a). The authorizing legislation of the Health Center Program has mandatory and specific funding for health care for the homeless and defines a homeless individual as "an individual who lacks housing…including an individual whose primary residence during the night is a supervised public or private facility that provides temporary living accommodations and an individual who is a resident in transitional housing" (Health Resources and Services Administration, Bureau of Primary Health Care 2011b). HRSA has provided Health Care for the Homeless funding since 1988, and in 2010, 208 health center organizations received about $173 million in Health Care for the Homeless funding to improve access to primary health care, mental health services, and substance abuse treatment for homeless individuals and families (Health Resources and Services Administration, Bureau of Primary Health Care 2010). Health Care for the Homeless grantees recognize the complex needs of homeless persons and strive to provide a coordinated, comprehensive approach to health care. Other federally supported health centers may also serve homeless populations even if they do not receive specific Health Care for the Homeless funding.

In 2010, 1,124 federally funded health centers provided services to 19.5 million patients across the United States. This included over 1 million homeless patients and individuals who were recently homeless or at risk of homelessness. About 80 percent of homeless patients were seen by Health Care for the Homeless grantees, with the remainder seen at health centers without Health Care for the Homeless funding. Among the patients seen at Health Care for the Homeless sites, 37 percent were living in shelters, 23 percent were doubling up with family or friends, 14 percent were in transitional housing, and 10 percent were living on the street, with the remainder having some other or unknown housing status (Health Resources and Services Administration, Bureau of Primary Health Care 2010).

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Homelessness continues to be a pervasive social and public health problem in the United States, affecting rural, urban, and suburban communities. According to the U.S. Housing and Urban Development, about 650,000 individuals were homeless on a single day in 2010, and more than 1.59 million people spent at least one night in an emergency shelter or transitional housing program throughout the year (U.S. Department of Housing and Urban Development [HUD] 2010). This figure is a conservative estimate as it excludes individuals who avoided the shelter system, used only privately funded shelters, or were doubled up with friends and families to avoid the streets and shelters. Best estimates of the total number of individuals experiencing homelessness annually range from 2.3 to 3.5 million (Burt et al. 2001).

People who are homeless have high rates of morbidity and premature mortality from both chronic and episodic illnesses, compared with the general U.S. population (Hwang et al. 1997; Wiersma et al. 2010). Multiple morbidities are common, with high proportions of homeless individuals suffering some type of infectious disease or chronic health problem, such as pneumonia, tuberculosis, hepatitis C, cardiovascular disease, cancer, diabetes, HIV/AIDS, asthma, or overweight/obesity (Hwang 2001; Raoult, Foucault, and Brouqui 2001; Schanzer et al. 2007; Jones et al. 2009; U.S. Department of Health and Human Services 2011).

Estimates indicate that at least 30 percent of persons experiencing homelessness suffer from serious mental illness, and that 50 percent or more are active substance abusers, with many having comorbid mental illness and substance abuse conditions (Koegel et al. 1999; O'Toole et al. 2004; Levitt et al. 2009). Although prevalence estimates for these factors vary depending on which segments of the homeless population are sampled, it is clear that substance-related disorders, mental illness, cognitive impairment, unstable housing, unemployment, and poverty exacerbate chronic and episodic diseases, making the management of these diseases more difficult.

The poor health of homeless adults is also exacerbated by limited access to appropriate health care. Homeless individuals face many challenges in accessing, utilizing, and maintaining health care services, and report unmet health care needs for multiple types of health care (Koegel et al. 1999; O'Toole et al. 2004; Bagett et al. 2010). Past studies of people experiencing homelessness have described higher utilization rates for hospital-based care and emergency care, and lower rates for primary care compared with the general U.S. population (Weinreb, Goldberg, and Perloff 1998; O'Toole et al. 1999a,b; Kushel, Vittinghoff, and Haas 2001; Han and Wells 2003; Zlotnick and Zerger 2009; U.S. Department of Health and Human Services 2011).

Although it is generally expected that homeless individuals suffer from a higher burden of disease than nonhomeless individuals, direct comparisons between the two groups are rare because most datasets do not include both groups. In addition, it is difficult to survey homeless populations, partly due to the challenges of randomly sampling and locating individuals as well as behavioral health issues which hinder interactions with such individuals. Besides surveys conducted by HRSA, there are no other nationally representative studies examining the health status and health care experiences of homeless populations in the United States. HRSA's last nationwide study of homeless health center patients was conducted in 2003, and there have been no updated data since that time (Zlotnick and Zerger 2009).

We addressed this gap in the literature by employing the most recent, nationally representative survey of health center patients, HRSA's 2009 Health Center Patient Survey, which uniquely included both homeless and nonhomeless individuals. Whereas homeless individuals who frequent health centers do not represent all homeless individuals throughout the United States, the sampling frame is very large: Health centers serve over 1 million homeless patients each year, which is between 30 percent and 45 percent of the total estimated homeless population across the country (Burt et al. 2001; Health Resources and Services Administration, Bureau of Primary Health Care 2010). We obtained updated estimates of the sociodemographic characteristics, health status, and health care experiences of homeless and nonhomeless patients. The dataset represents the first national survey to include both homeless and housed patients; thus, it allowed us to examine whether homelessness was an independent risk factor for poor access to health care after accounting for various sociodemographic and health characteristics. The nonhomeless patients in this dataset are also indigent: 93 percent of health center patients are low income (less than 200 percent of the federal poverty level), 38 percent are uninsured, and 39 percent are Medicaid insured (Health Resources and Services Administration, Bureau of Primary Health Care 2010). Therefore, nonhomeless patients provide a more appropriate comparison group than the general U.S. population, and the independent influence of homelessness can be more accurately isolated. The analyses reinforce previous findings by quantifying the magnitude of the differences in health and health care between homeless and housed patients, as well as testing the statistical significance of those differences. The results will assist in assessing how well HRSA-supported health centers are able to meet the health needs of this vulnerable population, and support HRSA to improve the health of the nation's underserved communities and vulnerable populations by assuring

access to comprehensive, culturally competent, quality primary health care services.

METHODS

Data Source and Study Sample

We conducted analyses utilizing data from the 2009 Patient Survey sponsored by HRSA. The survey produced cross-sectional, nationally representative data on patients served by health centers who are funded through Section 330 of the Public Health Service Act. The survey included a module on living arrangements, which allowed us to identify patients currently experiencing homelessness.

The sampling frame consisted of a three-stage sampling design. First-stage sampling units were health center grantees, second-stage sampling units were eligible sites, and third-stage sampling units were eligible patients with at least one visit in the past year to eligible sites. First-stage sampling was stratified by funding stream (including Health Care for the Homeless funding), patient volume, census region, urban/rural location, and number of sites per grantee. Overall, 188 grantees were sampled with probability proportional to health center patient volume (91 percent response rate). The second stage selected up to three sites per grantee. Data were collected from a total of 432 sites (97 percent response rate). The third stage selected individual patients within service sites, and a consecutive sample was selected from patients who entered the site and consented to participate in the survey. Among 8,275 patients who were initially identified by site receptionists as potential participants for an interview, 5,965 (72 percent) agreed to participate. Of these, 1,323 (16 percent) were deemed ineligible to participate because they did not have at least one prior visit to the health center in the past year, and another 80 (1.0 percent) did not complete the interviews. Thus, the response rate among the total patients initially identified was 55 percent, and the response rate among patients confirmed to be eligible was 98 percent. A total of 4,562 patient interviews was completed between September and December 2009. Upon interview completion, respondents received $25 in cash or gift card. Institutional Review Board (IRB) approval was obtained from Research Triangle International (RTI), the organization in charge of data collection. Local IRB or other committee approvals were obtained where necessary.

For the current study, we included data from patients served through the Community Health Center Program and the Health Care for the Homeless

Program; we excluded data from the Migrant Health Center Program and the Public Housing Primary Care Program. We also excluded children under the age of 18 years and individuals with missing housing status from the analyses. After these exclusions, the final sample size was 2,683 patients.

Survey Instrument

Computer-assisted personal interviews with health center patients were conducted by trained field interviews and lasted about 50 minutes. Interview questions were replicated after surveys from the National Health Interview Survey, National Ambulatory Medical Care Survey, Medical Expenditure Panel Survey, and National Health and Nutrition Examination Survey. Items focused on are sociodemographic characteristics, health conditions, health behaviors, access to health care, and utilization of services.

Study Variables

Homelessness. The primary independent variable of interest was current homelessness. Patients were asked, "Do you or your family currently have your own place to live, such as a house, apartment, or room?" and "How would you describe the kind of place where you live now?" In accordance with previous work, we used the answers to these questions to categorize respondents as homeless if they reported not currently having their own place to live, or currently living in an emergency shelter, transitional shelter, or hotel/motel (O'Toole et al. 1999b). We categorized respondents as housed (or not homeless) if they reported currently living in a house, apartment/condominium, or room (other than hotel). Using this definition, our sample included 618 currently homeless patients and 2,065 currently not homeless patients.

Sociodemographic Characteristics. Sociodemographic variables of interest included self-reported age, gender, marital status, race/ethnicity, education level, language of survey, veteran status, current employment (working for pay), federal poverty level, health insurance type, and number of homeless episodes in lifetime (lasting at least 30 days). We grouped race/ethnicity into Hispanic/Latino, non-Hispanic White, non-Hispanic Black/African American, non-Hispanic American Indian/Alaska Native, and non-Hispanic Other (including Native Hawaiian or other Pacific Islander, Asian, and "other"). We coded education level into three categories: less than a high school diploma,

high school diploma or GED, and more than a high school diploma. Federal poverty level (FPL) categories included less than 100 percent of FPL, 100–200 percent of FPL, and more than 200 percent of FPL. We categorized health insurance as uninsured, Medicaid, Medicare, other state plan, private, and other.

Health Status, Medical Conditions, Access to Care, and Utilization of Services. We examined several variables regarding health status and medical conditions, including self-reported fair/poor health status, any activity restrictions in the past 3 months, food insufficiency, obesity, chronic conditions, vision impairment, dental health, mental health, and substance use. We defined activity restrictions as needing help for routine needs, such as household chores, necessary business, shopping, or getting around for other purposes.

Chronic conditions included lifetime history of hypertension, diabetes, obstructive lung disease (i.e., asthma, emphysema, or chronic bronchitis), heart problems (i.e., congestive heart failure, coronary heart disease, angina pectoris, or myocardial infarction) or stroke, any liver condition, weak or failing kidneys, cancer, and HIV/AIDS. We also tallied the total number of chronic conditions to create a summary measure of medical comorbidity.

The vision measure referred to reports of having trouble seeing, even with contact lenses or glasses. Dental problems in the past 6 months included toothache/sensitive teeth, bleeding gums, crooked teeth, broking/missing teeth, stained/discolored teeth, broken/missing fillings, loose teeth, jaw pain, mouth sores, difficulty eating/chewing, bad breath, or dry mouth.

Mental health measures included psychological distress in the past month, as measured by a score of 6 or greater on the Kessler scale (K6) (administered during the patient interview) (Kessler et al. 2002, 2003; Furukawa et al. 2003; Strine et al. 2005; National Comorbidity Survey 2011; Sorkin, Nguyen, and Ngo-Metzger 2011); lifetime history of depression, generalized anxiety, or panic disorder; and receipt of any mental health treatment or counseling in the past year, including treatment with medication, group/individual counseling with a mental health provider (e.g., social worker, psychologist, psychiatrist, psychiatric nurse, other mental health professional), and inpatient treatment.

Substance use measures included current smoking; any binge drinking in the past year (5 or more drinks per day); high risk of alcohol dependence, based on scores of 27 or greater on the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) (Humeniuk et al. 2010); high risk of

any drug dependence (based on ASSIST scores of 27 or greater), including marijuana, cocaine, amphetamines, inhalants, hallucinogens, opioids (nonmedical use), sedatives (nonmedical use), and other substances; lifetime history of injection drug use; and any treatment for alcohol or drug use in the past year.

We also included several measures of health care access and utilization. For access measures, we examined inability to get needed health care or delays in getting care among respondents who reported needing medical care in the past year; we also developed similar measures for access to prescription medication, dental care, and mental health care. In addition, we coded usual source of care as follows: reference health center (i.e., center where survey respondent was interviewed); other clinic/health center, doctor's office/HMO, or other source; hospital outpatient department; hospital emergency department (ED); or none. For utilization measures, we examined rates of ED visits and hospitalizations. We categorized the number of ED visits in the past year into none, 1–3, and 4 or more visits, and we dichotomized the number of overnight hospitalizations in the past year into any versus none.

We also examined patients' utilization of preventive and enabling services. Preventive services included receipt of influenza vaccination in the past year, Pap test in the past 3 years (among women 21–65 years), mammogram in the past 2 years (among women 50–74 years), colorectal cancer screening (either sigmoidoscopy, colonoscopy, or proctoscopy in the past 10 years or fecal occult blood test in the past year, among adults 50–75 years), cholesterol testing in the past 5 years, and HIV test in one's lifetime. Patients also responded about whether the health center ever assisted them with various enabling services, including arranging medical appointments elsewhere, applying for government benefits, transportation, basic needs (i.e., finding place to live, job, child care, food, etc.), obtaining free medication, or assistance with other problems.

Analysis

Our analysis proceeded in three phases. First, we made unadjusted comparisons between homeless and nonhomeless patients with respect to sociodemographics, health status and behaviors, and health care. We compared these two groups using χ^2 tests for categorical variables and *t*-tests for continuous variables. Next, we used multiple logistic regressions to assess the independent effect of homelessness on access to care and utilization among health center patients, accounting for differences in health status and other potential

sociodemographic confounders. Finally, we conducted a separate set of multiple logistic regression models to examine several sociodemographic and health factors which were associated with access and utilization specifically among homeless patients. Some variables from the descriptive analyses were recoded to reduce the number of categorical variables.

Our regression analyses were informed by the Andersen model of health care utilization which organizes key determinants into predisposing, enabling, and need factors that influence health services use, in addition to other similar frameworks which specifically incorporate factors influencing access to care among individuals experiencing homelessness (Andersen 1995; Gelberg, Andersen, and Leake 2000; Andersen and Davidson 2007; Humeniuk et al. 2010). Predisposing determinants include biological and social factors that influence the likelihood of seeking care, such as age, ethnicity, education, and occupation. Enabling factors include the means available to help individuals access health services (e.g., health insurance, income) as well as community attributes related to the availability of health care, including travel time or providers' hours of operation. Need factors refer to specific conditions or health needs, assessed through professional judgment and objective measurement, and patient perceptions of need for care, which drive the use of health care.

To select our model covariates and create parsimonious models, we began by conducting bivariate analyses to identify and confirm relationships between key predisposing, enabling, and need variables with the access and utilization measures. Specifically, we examined the roles of age, gender, race/ethnicity, and education as predisposing factors; health insurance coverage and having a usual source of care as enabling factors; and general health status, number of chronic conditions, mental health problems, and substance use problems as need factors associated with health care access and utilization. We carried over statistically significant variables at the $p < .05$ level from the bivariate analyses into subsequent multivariable analyses and also forced several demographic variables into the adjusted models, regardless of their significance in bivariate analyses (i.e., age, gender, race/ethnicity, education) to ensure adequate control for potential confounding. We employed multiple logistic regression modeling to determine the relationship between homelessness and the following measures of access to and utilization of care: (1) any unmet medical needs in the past year (being unable to get or delayed in getting care among those who reported needing medical care); (2) usual source of care when sick or in need of advice; (3) any ED visit in the past year; and (4) any hospitalization in the past year. We coded individuals reporting no usual

source of care, more than one usual source of care, or the ED as their usual source of care as having no usual source of care; we coded all others as having a usual source of care. We repeated the models using the same predisposing, enabling, and need factors, this time restricting the sample to homeless patients to identify which of those factors were associated with the dependent measures of interest, specifically within homeless patients.

Respondents with missing data, who refused or provided "don't know" responses to questions used in the analyses were not included. We conducted all analyses using Stata version 10.0 and accounted for the complex sampling design by incorporating weights and variables identifying strata and clusters. Statistics reported in this study are weighted and sample sizes are unweighted. Bonferroni corrections were used to account for multiple comparisons between the homeless and nonhomeless groups. To ensure that the total error did not exceed a level of .05, tests of statistical significance in unadjusted analyses were conducted at the .0008 level.

RESULTS

Sociodemographic Characteristics

Table 1 presents a summary of the sociodemographic characteristics of the sample. There were several significant differences between health center patients who were homeless and those who were not homeless. About 57 percent of homeless individuals were male, compared with 37 percent among housed individuals. The majority of homeless respondents were not married (93 percent), significantly higher than the proportion of housed individuals who were unmarried (70 percent).

A smaller proportion of homeless respondents reported being employed (6 percent), compared with housed respondents (37 percent). About 84 percent of homeless individuals were below 100 percent FPL, versus 50 percent of housed individuals. Among homeless individuals, 72 percent reported that they had experienced homelessness at least twice in their lifetime; among currently housed individuals, only 7.6 percent reported experiencing at least two episodes of homelessness.

Substance Use, Health Status, and Medical Conditions

Table 2 summarizes the substance use, health status, and medical conditions reported by homeless and nonhomeless health center patients. Homeless

Table 1: Sociodemographic Characteristics of Homeless and Housed Health Center Patients*

	Homeless† *(n = 618)*		*Not Homeless (n = 2,065)*		*Significance (Homeless vs. Not Homeless)*
	Weighted%	*Obs*	*Weighted%*	*Obs*	
Age (years)					
60+	3.7	33	11.2	342	$p = .0616$
50–59	23.4	189	15.8	499	
40–49	30.7	216	21.7	501	
30–39	22.9	91	21.2	311	
18–29	19.4	89	30.2	412	
Gender					
Female	42.9	242	63.2	1,462	$p < .0001$
Male	57.1	376	36.9	603	
Marital status					
Married	7.2	33	30.0	647	$p < .0001$
Not married	92.8	583	70.0	1,416	
Race/ethnicity					
Hispanic/Latino	13.4	97	28.0	692	$p = .0077$
Af Am/Black (NH)	37.2	209	21.0	471	
AIAN (NH)	7.8	49	4.0	100	
Other (NH)	5.6	27	4.3	59	
White (NH)	36.1	236	42.7	743	
Education					
More than HS diploma	22.5	142	29.3	636	$p = .2777$
HS diploma/GED	32.9	202	30.1	538	
Less than HS diploma	44.6	271	40.6	886	
Language of survey					
English	93.2	587	81.9	1,630	$p = .0971$
Spanish	6.8	31	18.2	435	
Veteran					
Yes	6.7	60	4.0	87	$p = .0617$
No	93.3	556	96.0	1,977	
Current employment					
Working for pay	6.2	39	37.4	651	$p < .0001$
Not working for pay	93.8	576	62.6	1,409	
Federal poverty level					
>200% FPL	5.6	23	17.3	245	$p < .0001$
100–200% FPL	10.3	59	32.9	539	
<100% FPL	84.2	462	49.5	913	

continued

Table 1. *Continued*

	Homeless † *(n = 618)*		*Not Homeless (n = 2,065)*		*Significance (Homeless vs. Not Homeless)*
	Weighted%	*Obs*	*Weighted%*	*Obs*	
Insurance type					
Uninsured	54.1	315	40.4	789	$p = .0231$
Private	1.0	3	8.9	188	
Medicare	2.0	21	7.9	212	
Medicaid	22.4	137	27.2	542	
Other state plan	14.7	77	6.8	118	
Other	5.7	55	8.8	194	
Number of homeless episodes, ever ‡					
≥ 2	71.5	419	7.6	223	$p < .0001$
1	28.5	199	3.5	133	
0	0.0	0	89.0	1,704	

*Migrant Health Center and Public Housing Primary Care patients were excluded from analyses.
†Homeless patients are those who report not currently having their own place to live, or living in an emergency shelter, transitional shelter, hotel/motel, or other accommodation; patients who report currently living in a house, apartment/condominium, or room are considered to be housed.
‡Without own place to live for at least 30 days.
Af Am, African American; AIAN, American Indian/Alaska Native; FPL, federal poverty level; HS, high school; NH, Non-Hispanicr.

individuals reported more substance use problems than nonhomeless individuals, including currently smoking (59 percent vs. 30 percent), binge drinking in the past year (40 percent vs. 20 percent), being at high risk of alcohol dependence (12 percent vs. 1.1 percent), being at high risk of drug dependence (15 percent vs. 1.2 percent), ever injecting drugs (14 percent vs. 3 percent), and receiving treatment for alcohol or drug use in the past year (31 percent vs. 4 percent).

In general, homeless patients had worse health status than their housed counterparts. For instance, half of homeless patients reported having fair or poor general health status, compared with one third of housed patients. One quarter of homeless individuals said they experienced food insufficiency (i.e., sometimes or often not getting enough to eat), compared with about 10 percent of housed individuals. On the other hand, a smaller proportion of homeless individuals were obese compared with housed individuals (37 percent vs. 48 percent). A larger proportion of homeless individuals reported ever having a liver condition compared with housed individuals (17 percent vs. 6 percent).

Table 2: Substance Use, Health Status, and Medical Conditions

	Homeless (n = 618)		*Not Homeless (n = 2,065)*		*Significance (Homeless vs. Not Homeless)*
	Weighted%	*Obs*	*Weighted%*	*Obs*	
Substance use					
Current smoker	59.1	404	30.2	628	$p = .0002$
Any binge drinking (past year)[‡‡]	40.3	248	19.9	409	$p < .0001$
High risk of alcohol dependence[§§]	12.1	91	1.1	51	$p < .0001$
High risk of drug dependence[§§, ¶¶]	15.0	93	1.2	49	$p < .0001$
Any injection drug use (ever)	14.3	104	2.9	75	$p < .0001$
Treatment for alcohol or drug use (past year)	31.4	174	4.2	127	$p < .0001$
Fair/poor health status	51.8	322	35.7	878	$p < .0001$
Any activity restrictions (past 3 months)*	11.1	92	9.4	269	$p = .4401$
Food insufficiency (sometimes/often)	25.6	172	11.4	266	$p < .0001$
Obesity (BMI $\geq$ 30.0 kg/m^2)	37.0	209	48.3	933	$p = .0004$
Chronic conditions (ever)					
Hypertension	40.7	264	40.4	987	$p = .9320$
Diabetes[†]	22.0	130	19.2	520	$p = .3212$
Obstructive lung disease[‡]	40.8	227	28.1	607	$p = .0015$
Heart problems or stroke[§]	11.3	85	12.1	291	$p = .6537$
Liver condition, any kind	16.5	113	6.2	173	$p < .0001$
Weak/failing kidneys	7.7	44	4.5	129	$p = .0267$
Cancer	4.9	34	6.0	176	$p = .4096$
HIV/AIDS	1.1	10	1.0	23	$p = .8134$
Number of chronic conditions					
≥ 2	41.9	260	32.6	859	$p = .0026$
1	32.1	197	31.0	589	
0	26.0	161	36.5	617	

continued

Table 2. *Continued*

	Homeless (n = 618)		*Not Homeless (n = 2,065)*		*Significance (Homeless vs. Not Homeless)*
	Weighted%	*Obs*	*Weighted%*	*Obs*	
Vision and dental health					
Trouble seeing	30.4	226	27.3	681	$p = .4743$
Dental problems (past 6 months)[¶]	87.5	550	81.4	1,692	$p = .0587$
Mental health					
Psychological distress (past month)**	67.8	416	41.0	968	$p < .0001$
Depression (ever)	67.4	431	50.6	1,174	$p = .0022$
Generalized anxiety (ever)	52.2	313	35.4	759	$p = .0005$
Panic disorder (ever)	28.9	183	18.8	455	$p = .0080$
Any mental health treatment/counseling (past year)[††]	40.0	267	20.7	517	$p < .0001$

*Activity restrictions include needing help for routine needs, such as household chores, necessary business, shopping, or getting around for other purposes.
[†]Excludes gestational diabetes.
[‡]Obstructive lung disease includes: asthma, emphysema, chronic bronchitis.
[§]Heart problems include congestive heart failure, coronary heart disease, angina pectoris, and myocardial infarction.
[¶]Dental problems include toothache/sensitive teeth, bleeding gums, crooked teeth, broken/missing teeth, stain/discolored teeth, broken/missing fillings, loose teeth, jaw pain, mouth sores, difficulty eating/chewing, bad breath, and dry mouth.
**Cut-off threshold is Kessler scale (K6) score ≥ 6.
[††]Includes treatment with medication, group/individual counseling with a mental health provider (e.g., social worker, psychologist, psychiatrist, psychiatric nurse, other mental health professional), and inpatient treatment.
[‡‡]Binge drinking is ever 5 or more drinks per day.
[§§]Based on ASSIST scores ≥ 27.
[¶¶]Includes marijuana, cocaine, amphetamines, inhalants, hallucinogens, opioids (nonmedical use), sedatives (nonmedical use), and other substances.
BMI, body mass index.

Homeless respondents also had a higher burden of mental health problems compared with nonhomeless respondents. Psychological distress in the past month was more prevalent among homeless patients than their nonhomeless counterparts (68 percent vs. 41 percent). A larger proportion of homeless respondents than nonhomeless respondents reported lifetime anxiety (52 percent vs. 35 percent). In addition, a larger proportion of homeless individuals reported receiving some kind of mental health treatment or counseling in the past year, compared with nonhomeless individuals (40 percent vs. 21 percent).

Access to Care and Utilization of Services

Table 3 shows the patterns of access to care and utilization of health care services between the two groups. A larger proportion of homeless health center patients than nonhomeless patients reported needing medical care (66 percent vs. 49 percent) and mental health care (48 percent vs. 20 percent) in the past year. Among those who reported needing medical care, a higher proportion of homeless patients had unmet needs (i.e., inability to get care or delay in getting care), compared with nonhomeless patients (43 percent vs. 29 percent). There were differences across the groups regarding the usual source of care. Specifically, homeless patients more frequently reported using the hospital ED as their usual source of care, compared with nonhomeless patients (20 percent vs. 7 percent). Homeless patients were heavier ED users than nonhomeless patients, with a larger proportion of homeless respondents reporting four or more ED visits in the past year (21 percent vs. 9 percent).

There were few differences between groups regarding receipt of preventive services, with the exception of lifetime HIV tests, which was reported more often among homeless patients than nonhomeless patients (89 percent vs. 65 percent). Homeless patients more often reported that their health center had provided various enabling services, compared with nonhomeless patients, including assistance with transportation (40 percent vs. 8 percent), basic needs such as finding housing, employment, child care, or food (42 percent vs. 4.6 percent), obtaining free medication (69 percent vs. 31 percent), and other types of problems (48 percent vs. 23 percent).

Impact of Homelessness on Access to Care and Utilization

Table 4 presents the odds ratios (ORs) and 95 percent confidence intervals (CIs) for the adjusted associations between homelessness and access to care and utilization, measured through four outcome measures. After adjusting for

Table 3: Access to Care and Utilization of Services

	Homeless (n = 618)		*Not Homeless (n = 2,065)*		*Significance (Homeless vs. Not Homeless)*
	Weighted%	*Obs*	*Weighted%*	*Obs*	
Access to care					
Medical care (past year)*					
Needed care	66.4	412	49.4	1,133	$p = .0001$
Unmet needs†	43.3	185	29.0	357	$p = .0002$
Prescriptions (past year)					
Needed prescription	82.4	514	75.0	1,646	$p = .2117$
Unmet needs†	40.0	206	30.9	477	$p = .0576$
Dental care (past year)‡					
Needed care	52.7	333	42.3	961	$p = .0036$
Unmet needs†	61.3	207	52.9	529	$p = .2697$
Mental health care (past year)§					
Needed care	47.7	284	19.7	500	$p < .0001$
Unmet needs†	39.0	124	32.3	158	$p = .2043$
Usual source of care¶, **					
Reference health center	75.7	362	85.1	1,480	$p = .0040$
Other clinic/health center, Doctor's office/HMO, other	32.4	166	19.2	347	$p = .0143$
Hospital outpatient department	5.8	25	2.4	51	$p = .0724$
Hospital ED	20.2	79	7.0	161	$p < .0001$
None	17.4	121	19.8	328	$p = .5253$
Utilization of services					
Number of ED visits (past year)					
≥ 4	21.0	111	9.0	164	$p < .0001$
1–3	38.4	245	31.7	704	
0	40.5	261	59.3	1,194	
Any overnight hospitalization (past year)	23.2	164	17.7	422	$p = .0860$
Preventive services					
Influenza vaccination (past year)	35.5	224	40.8	794	$p = .2256$
Pap test (past 3 years)††	87.3	185	85.0	1,089	$p = .6207$
Mammogram (past 2 years)‡‡	68.6	48	75.2	392	$p = .4850$
Colorectal cancer screening§§	40.9	87	52.2	436	$p = .0087$
Cholesterol check (past 5 years)	82.2	464	80.5	1,644	$p = .5724$
HIV test (ever)	90.3	521	64.6	1,243	$p < .0001$
Health center assistance with enabling services (ever)					
Arrange medical appointment elsewhere	57.3	365	49.4	1,093	$p = .1112$
Apply for government benefits	36.2	211	22.9	496	$p = .0129$

continued

Table 3. *Continued*

	Homeless (n = 618)		*Not Homeless (n = 2,065)*		*Significance (Homeless vs. Not Homeless)*
	Weighted%	*Obs*	*Weighted%*	*Obs*	
Transportation	39.7	228	8.2	223	$p < .0001$
Basic needs[¶¶]	41.9	206	4.6	138	$p < .0001$
Obtain free medication	69.3	432	30.5	733	$p < .0001$
Other problems	47.6	267	22.6	463	$p < .0001$

*Includes medical care, tests, or treatment that patient or doctor believed was needed.
[†]Unmet needs include unable to get care and delayed in getting care among those who needed care.
[‡]Includes dental care, tests, or treatment that patient or dentist believed was needed.
[§]Includes counseling by a mental health professional that patient or doctor believed was needed.
[¶]Among patients who report having one or more usual sources of care.
**Proportions sum to more than 100 percent due to multiple selections.
[††]Among female patients 21–65 years.
[‡‡]Among female patients 50–74 years.
[§§]Among patients 50–75 years. Includes sigmoidoscopy, colonoscopy, or proctoscopy in the past 10 years or fecal occult blood test in the past year.
[¶¶]Basic needs include finding place to live, job, child care, food, etc.
ED, emergency department.

potential confounding factors, homeless patients had higher odds of reporting having an ED visit in the past year (OR = 2.00, 95 percent CI: 1.37–2.92) and having unmet medical needs (OR = 1.98, 95 percent CI: 1.24–3.16), compared with nonhomeless patients. There were no significant associations between homelessness and hospitalization in the past year or having a usual source of care.

Factors Associated with Access to Care and Utilization among Homeless Patients

Table 5 presents the effects of sociodemographic and health status factors on access to care among the subpopulation of homeless health center patients. Odds of hospitalization increased with age among homeless patients. Hispanic/Latino and non-Hispanic Black/African American homeless patients had lower odds of having an ED visit, relative to non-Hispanic White patients. Higher education was associated with lower odds of hospitalization but higher odds of unmet medical needs. Homeless patients with a usual source of care had lower odds of having an ED visit. Being in fair or poor health was associated with higher odds of ED visits, hospitalizations, and unmet medical needs, and higher burden of chronic conditions was also associated with higher odds

Table 4: Adjusted Association between Homelessness and Access to Care and Utilization among Health Center Patients, Odds Ratio (95% Confidence Interval)

	Unmet Medical Needs, Past Year (n = 1,523)*	*Usual Source of Care† (n = 2,651)*	*ED Visit, Past Year (n = 2,647)*	*Hospitalization, Past Year (n = 2,650)*
Homeless				
Yes	1.98 (1.24–3.16)	0.74 (0.49–1.11)	2.00 (1.37–2.92)	1.18 (0.82–1.70)
No	1.00	1.00	1.00	1.00
Age (years)	0.99 (0.97–1.01)	1.02 (1.0004–1.03)	0.99 (0.98–0.997)	0.98 (0.97–0.997)
Gender				
Female	0.76 (0.47–1.23)	0.71 (0.40–1.27)	0.78 (0.55–1.11)	0.96 (0.63–1.47)
Male	1.00	1.00	1.00	1.00
Race/ethnicity				
Hispanic/Latino	1.05 (0.57–1.92)	1.14 (0.56–2.33)	0.97 (0.56–1.70)	1.05 (0.61–1.80)
Af Am/Black (NH)	0.94 (0.53–1.70)	0.59 (0.33–1.06)	0.91 (0.63–1.32)	1.21 (0.78–1.88)
AIAN (NH)	1.10 (0.53–2.27)	1.21 (0.49–3.02)	1.22 (0.63–2.34)	2.25 (0.95–5.29)
Other (NH)	1.58 (0.55–4.51)	1.10 (0.42–2.88)	0.53 (0.22–1.29)	0.43 (0.16–1.16)
White (NH)	1.00	1.00	1.00	1.00
Education				
More than HS	1.84 (1.16–2.92)	1.04 (0.63–1.71)	1.20 (0.83–1.72)	1.19 (0.80–1.76)
HS diploma/GED	0.82 (0.44–1.54)	0.69 (0.50–0.95)	1.42 (1.01–2.01)	1.07 (0.60–1.89)
Less than HS diploma	1.00	1.00	1.00	1.00
Usual source of care‡				
Yes	1.43 (0.78–2.61)	—	0.88 (0.55–1.41)	0.98 (0.60–1.61)
No	1.00	—	1.00	1.00
Health insurance				
Yes	0.29 (0.19–0.44)	1.16 (0.78–1.71)	1.97 (1.43–2.71)	2.09 (1.40–3.11)
No	1.00	1.00	1.00	1.00
General health status				

continued

Table 4. *Continued*

	Unmet Medical Needs, Past Year (n = 1,523)*	*Usual Source of Care† (n = 2,651)*	*ED Visit, Past Year (n = 2,647)*	*Hospitalization, Past Year (n = 2,650)*
Fair/poor	2.22 (1.31–3.76)	0.66 (0.46–0.94)	1.85 (1.24–2.76)	1.58 (1.11–2.25)
Excellent/very good/good	1.00	1.00	1.00	1.00
No. of chronic conditions§				
≥ 2	0.98 (0.52–1.84)	1.34 (0.87–2.07)	2.10 (1.52–2.90)	3.77 (2.23–6.37)
1	0.85 (0.44–1.64)	1.29 (0.79–2.11)	1.28 (0.91–1.80)	1.61 (0.86–3.02)
0	1.00	1.00	1.00	1.00
History of mental health problems¶				
Yes	3.63 (1.87–7.03)	1.16 (0.69–1.95)	1.58 (1.20–2.08)	1.17 (0.70–1.97)
No	1.00	1.00	1.00	1.00
Substance use problem**				
Yes	0.50 (0.29–0.86)	0.81 (0.57–1.15)	0.82 (0.55–1.23)	1.05 (0.71–1.57)
No	1.00	1.00	1.00	1.00

*Unable to get or delayed in getting medical care among those who needed it.
†Usual place to get health care when sick or in need of advice (patients using more than one place or the ED as usual source of care were coded as having no usual source of care).
‡Individuals reporting the ED or more than one place as usual source of care were coded as having no usual source of care.
§Chronic conditions include hypertension, diabetes, obstructive lung disease, heart problems or stroke, liver condition, weak/failing kidneys, cancer, HIV/AIDS.
¶Includes psychological distress in past month; lifetime depression, anxiety, panic disorder; or any mental health treatment/counseling in past year.
**Includes binge drinking in past year, risk of alcohol dependence, risk of any drug dependence, lifetime injection drug use, and treatment for alcohol or drug use in past year.
Af Am, African American; AIAN, American Indian/Alaska Native; ED, emergency department; HS, high school; NH, non-Hispanic.

of ED visits and hospitalizations. Finally, homeless patients with a history of mental health problems had higher odds of hospitalizations.

DISCUSSION

Prior to this study, the last national efforts to collect health-related data on homeless individuals dated back to 2003. This study provides updated nationally representative estimates of the health status and health care experiences of homeless health center patients as of 2009. In addition, to our knowledge this is the first national survey to directly compare homeless and nonhomeless individuals, and to assess homelessness as an independent risk factor for poor access to care.

In corroboration with previous studies (Koegel et al. 1999; Hwang 2001; Raoult, Foucault, and Brouqui 2001; O'Toole et al. 2004; Schanzer et al. 2007; Jones et al. 2009; Levitt et al. 2009; Baggett et al. 2010), our findings confirmed that homeless patients had worse health status and a higher burden of chronic disease, mental health problems, and substance use problems when compared with their housed counterparts. This study confirms that health center patients across the nation in general are medically underserved, and homeless health center patients are among the most vulnerable. Only about one in two homeless health center patients had any type of health insurance, and homeless patients reported a greater need for health care, including medical and behavioral health care. Homeless patients benefited from the enabling services provided by health centers and were more likely than nonhomeless patients to receive assistance with transportation, medication, and other needs.

There were few differences between homeless and nonhomeless patients in the receipt of preventive services, with one exception: Homeless patients were more likely to ever receive an HIV test, which is appropriate given high rates of injection drug use among this population. In adjusted analyses, homeless patients had twice the odds as housed patients of having an ED visit in the past year, and twice the odds of having unmet medical care needs. Unadjusted analyses also revealed that homeless patients were three times more likely than housed patients to report hospital EDs as their usual source of care (20 percent vs. 7 percent), and also twice as likely to be heavy ED users (four or more visits in the past year; 21 percent vs. 9 percent).

Several limitations exist in this study. The Patient Survey used here contains cross-sectional data, and findings should only be used to infer

Table 5: Effects of Sociodemographic and Health Factors on Access to Care and Utilization among Homeless Patients, Odds Ratio (95% Confidence Interval)

	Unmet Medical Needs, Past Year (n = 405)	*Usual Source of Care (n = 609)*	*ED Visit, Past Year (n = 608)*	*Hospitalization, Past Year (n = 609)*
Age (years)	0.99 (0.97–1.01)	1.01 (0.99–1.04)	0.98 (0.95–1.02)	1.06 (1.03–1.08)
Gender				
Female	1.00 (0.57–1.76)	1.14 (0.81–1.60)	0.90 (0.62–1.32)	0.75 (0.50–1.13)
Male	1.00	1.00	1.00	1.00
Race/ethnicity				
Hispanic/Latino	2.34 (0.63–8.74)	0.95 (0.56–1.63)	0.26 (0.13–0.51)	0.75 (0.36–1.57)
Af Am/Black (NH)	0.85 (0.57–1.28)	1.18 (0.64–2.20)	0.54 (0.31–0.93)	0.45 (0.16–1.24)
AIAN (NH)	1.71 (0.85–3.45)	2.03 (0.76–5.41)	0.52 (0.24–1.14)	1.02 (0.27–3.86)
Other (NH)	1.21 (0.42–3.49)	1.56 (0.45–5.39)	1.20 (0.37–3.89)	1.91 (0.78–4.65)
White (NH)	1.00	1.00	1.00	1.00
Education				
More than HS	3.74 (1.87–7.46)	0.91 (0.60–1.37)	1.15 (0.66–2.03)	0.22 (0.08–0.60)
HS diploma/GED	0.87 (0.47–1.60)	1.23 (0.69–2.19)	1.47 (0.73–2.99)	1.40 (0.92–2.14)
Less than HS diploma	1.00	1.00	1.00	1.00
Usual source of care				
Yes	0.92 (0.46–1.80)	—	0.51 (0.29–0.90)	1.17 (0.72–1.89)
No	1.00	—	1.00	1.00
Health insurance				
Yes	0.46 (0.18–1.13)	1.35 (0.91–1.98)	1.26 (0.79–2.01)	1.16 (0.61–2.23)
No	1.00	1.00	1.00	1.00
General health status				
Fair/poor	2.66 (1.41–5.02)	0.91 (0.51–1.63)	2.11 (1.26–3.55)	1.42 (1.11–1.82)
Excellent/very good/good	1.00	1.00	1.00	1.00
No. of chronic conditions				
≥ 2	1.10 (0.60–2.03)	0.76 (0.41–1.42)	2.23 (1.31–3.78)	2.27 (1.24–4.16)
1	0.83 (0.47–1.48)	0.93 (0.49–1.77)	2.18 (1.12–4.24)	1.61 (0.70–3.69)
0	1.00	1.00	1.00	1.00
History of mental health problems				
Yes	0.92 (0.33–2.58)	1.28 (0.69–2.38)	1.54 (0.89–2.66)	2.35 (1.28–4.32)
No	1.00	1.00	1.00	1.00
Substance use problem				
Yes	1.10 (0.64–1.90)	1.11 (0.65–1.92)	1.38 (0.92–2.06)	1.39 (0.80–2.40)
No	1.00	1.00	1.00	1.00

ED, emergency department; HS, high school; NH, non-Hispanic.

associations between homelessness and various health measures, rather than causation. The survey module on living arrangements had limited questions and we had imperfect data available to operationalize homelessness. The

homeless variable used in our analyses was not an exact match with the McKinney Act's definition of homelessness (P.L. 100-77, sec 103(2)(1), 101 sat. 485, 1987); however, our operationalization was in keeping with the general spirit of the federal definition. In addition, because the survey was conducted at a single point in time, we were unable to distinguish between individuals who were temporarily homeless versus those who were chronically or persistently homeless. Furthermore, data were collected on a consecutive sample of patients who visited health center clinics between September and December 2009; therefore, this sample may not be an adequate representative of all patients who visited health centers throughout the year. However, poststratification adjustments were applied to reduce bias in the study estimates, by calibrating weights to overall patient counts from the sampling frame. Survey responses were based on self-report and therefore subject to recall and social desirability biases, especially regarding sensitive topics or stigmatized behaviors. Finally, the survey was conducted among individuals with at least one prior visit to the health center in the past year, so findings may not generalize to the homeless population at large, particularly those who do not seek medical care at health centers. These individuals may be even more vulnerable and face even greater barriers to care. However, the sampling frame for homeless patients is very large: Health centers serve over 1 million homeless patients each year, which is between 30 percent and 45 percent of the total estimated homeless population across the country (Burt et al. 2001; Health Resources and Services Administration, Bureau of Primary Health Care 2010).

With these limitations in mind, this study provides the most recent data on the health status and health care experiences among homeless individuals seen at health centers nationally. We confirmed that homeless patients experience a higher burden of disease relative to nonhomeless patients, and quantified the magnitude of these differences. Our findings are concordant with research from a variety of disciplines demonstrating that social, economic, and environmental factors, including the availability of safe and affordable housing, have profound effects on health, quality of life, and life expectancy (Cole and Fielding 2007; Hwang et al. 2011). The Patient Survey dataset also enabled unique analyses examining the contribution of homelessness itself on health care utilization after controlling for potential confounders. Findings showed that in the population of health center patients, homelessness was an independent risk factor for poor access to care. Addressing the primary and preventive care needs of homeless populations may help to curb unmet medical needs and unnecessary ED visits. The Health Center Program currently

provides targeted and tailored services to this population through the provision of Health Care for the Homeless funding; our findings indicate that there is a continued need to focus on the health issues which disproportionately affect homeless populations, including mental health concerns, substance use problems, and related chronic conditions.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.

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