

The Urban Homeless: Super-users of the Emergency Department

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Abstract

In the United States, patient usage of costly emergency departments (EDs) has been portrayed as a major factor contributing to health care expenditures. The homeless are associated with ED frequent users, a population often blamed for inappropriate ED use. This study examined the characteristics and costs associated with homeless ED frequent users. A retrospective cross-sectional review of hospital records for ED visits in 2006 at an urban academic medical center was performed. Frequent users were defined as having greater than 4 ED visits in one year. Homeless status was determined by self-report and review by an interdisciplinary team. A total of 5440 (8.9%) ED visits were made by 542 frequent users, 74 (13.7%) of whom were homeless and made 845 ED visits. Homeless frequent users had a median age of 47 years (39–56 interquartile range), were predominantly male (85.1%), and insured by Medicaid (59.5%). Most (44.2%) visits by homeless frequent users occurred between 1500–2259 hours and had an Emergency Severity Index of Level 3 (55.5%). Sixty-four percent of visits resulted in homeless patients being discharged back to the street; only 4.0% had a specific discharge plan addressing homelessness. Total charges and payments for all homeless frequent users were \$4,812,615 and \$802,600, respectively. The single top frequent user accrued charges of \$482,928. ED frequent users are disproportionately homeless and their costs are significant. ED discharge planning should address the additional risks faced by homeless individuals. ED-based interventions that specifically target the most expensive homeless frequent users may prove to be cost-effective. (*Population Health Management* 2014;xx:xxx–xxx)

Introduction

MANY HOSPITAL EMERGENCY DEPARTMENTS (EDs) have a relatively small subgroup of patients who account for a disproportionately large number of ED visits each year.¹ The increase in utilization of EDs in the United States over the past several decades has drawn considerable attention to this group of individuals, known as frequent users.^{1,2} Repeated ED use tends to be associated with socioeconomic distress, chronic illness, substance and alcohol abuse, and psychiatric disorders.³ The homeless population, in particular, is a population that tends to suffer from these underlying socio-medical risk factors. Indeed, homeless individuals were found to have a relative risk of frequent use of 4.5 times that of the non-homeless.⁴ The absence of a universal health care system in the United States leaves EDs as the safety net for its population. EDs are required by a federal mandate to provide

emergency care regardless of a patient's ability to pay for the visit. It is estimated that EDs account for 5% of total US health care expenditures.⁵

The recurrent presence of frequent users in the ED can lead providers to experience frustration and a sense of failure. Unfortunately, this can contribute to stigmatization of frequent users, missed clinical diagnoses, and reduced morale.⁶ The morbidity and mortality of these patients are higher than expected.^{7,8} Health care reform has proposed agendas (eg, initiation of comprehensive case management, housing programs, enrollment in primary care practices and patient-centered medical homes) to reduce ED overutilization as a means to improve care and decrease costs.^{9–12} Specifically, reducing use of expensive acute care services by the homeless, a group largely paid for by public dollars, could be a possible cost-saving measure, as well as offering the possibility for improved health outcomes and patient satisfaction.¹¹

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Although there is an abundance of literature on ED frequent users, few studies attempt to quantify the economic impact these individuals have on health care expenditures. As the homeless frequently are identified as a population requiring more intensive and more expensive services supported by the public, they may serve as scapegoats for concerns regarding health care costs. Indeed, initially the study team hypothesized that the costs associated with homeless frequent users would exceed costs for frequent users who were not homeless because of their sociomedical complexity, exposure to the elements, higher prevalence of mental illness and psychiatric diagnoses, and barriers to accessing ongoing primary care services. Moreover, the study team knows of no studies that have evaluated whether any differences in costs are associated with caring for homeless frequent users in the ED compared to those frequent users who are not homeless. Better understanding of differences in costs may allow policy makers to prioritize interventions toward subsets of the frequent user population. This study quantifies charges and reimbursements received for the care of homeless and non-homeless frequent users seen in an urban ED. Context for these costs is presented through (1) a detailed review of the administrative and clinical characteristics of visits by homeless frequent users, and (2) a review of the demographic characteristics of both homeless and non-homeless frequent users.

Methods

The study team performed a retrospective cross-sectional study of hospital and financial records for ED visits from January 1 through December 31, 2006 at an urban academic medical center with a level 1 trauma center and an annual census of greater than 60,000 visits. The study was approved by the Institutional Review Board at Thomas Jefferson University. Most of the literature addressing frequent users defines these individuals based on their total number of visits to the ED over the course of a year. Therefore, the study population for this study was comprised of patients who made 5 or more visits to the ED during the study period. A team comprising physicians, social workers, and research assistants performed a coordinated chart review to identify homeless individuals from the study population. Patients were identified as homeless if they self-reported as "homeless" or "undomiciled," listed a known homeless shelter as their "home address," or if any member of the study team had specific knowledge that an individual suffered from homelessness during the study period. Patients who were identified as homeless at any point during the year were classified as "homeless" for the purposes of this study. Patients were excluded from the study if they walked out of the ED prior to triage, were sent to another institution, or went directly to the labor and delivery floor after triage.

Measured demographic characteristics were all extracted by a single individual and included age, sex, and race. Insurance status was obtained from financial records and grouped into the following classifications: private, Medicare, Medicaid, and uninsured. Medicare is a federal insurance program primarily for persons older than 65 years of age. Medicaid is another public sector program that provides insurance to low-income persons. Analysis of clinical variables included the following: ambulance usage, time of presenta-

tion by shift, triage level using the Emergency Severity Index (ESI), linkage to primary care provider, ED length of stay, social services consult, and disposition status. In the United States, the ESI is utilized in the initial ED assessment to triage patients into the following categories: 1—resuscitation, 2—emergent, 3—urgent, 4—less urgent, 5—nonurgent. ESI assigned by ED personnel were abstracted for this study. *International Classification of Diseases, Ninth Revision* codes associated with specific diagnoses were consolidated under broader categories. Additionally each medical record of homeless frequent users was reviewed for the mention of a specific discharge plan addressing homelessness.

Hospital charge data and reimbursement rates were obtained for each user visit from financial records. In the United States, charges represent what the hospital bills the payer while reimbursements are the payments that are actually received from the payer by the hospital for its services. Cost data included both ED and inpatient hospital costs if the user was admitted from the ED as costs were only available to the researchers for each complete episode of care. This method permits better estimation of total costs associated with frequent emergency visits as costs are not limited to those incurred in the ED. Costs were recorded in 2006 United States dollars (US\$).

Data were analyzed using Stata statistical software, release 11. (StataCorp LP, College Station, TX) and reported as means with standard deviations, medians with interquartile range, or frequencies, where appropriate. *P* values and 95% confidence intervals also were computed for comparison of results between the homeless and non-homeless frequent user groups. Results were compared using 2-tailed chi-square test and the Wilcoxon rank sum test.

The STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist of items for cross-sectional studies was addressed throughout this study.¹³

Results

In 2006, a total of 61,124 ED visits were made to the study institution. In all, 5440 (8.9%) of the visits were made by 542 frequent users; 468 (86.3%) of the frequent users were identified as non-homeless while 74 (13.7%) were homeless. Of the total number of ED visits by frequent users, 845 (15.5%) were made by homeless frequent users; 11 (14.9%) homeless persons self-reported as homeless, 43 (58.1%) identified a known shelter as their primary address, and 20 (27.0%) were identified as homeless by social work staff or ED providers personally familiar with the individuals and their housing status.

The descriptive results of the demographic characteristics of both homeless and non-homeless frequent users are shown in Table 1. Although the median age and standard deviation were similar between the homeless and non-homeless, homeless users were more likely to be male and white.

The clinical characteristics of homeless frequent users are displayed in Table 2. The 2nd shift (1500–2259 hours) was the most popular time for arrival to the ED. The majority (55.5%) of homeless users were triaged with a level 3 ESI. The most frequent group diagnosis involved the musculoskeletal system followed by substance abuse. Notably, trauma was identified as the chief diagnosis 8.3% and psychiatric disorders were identified 3.3% of the time. Social services were rarely

TABLE 1. DEMOGRAPHIC CHARACTERISTICS OF FREQUENT USERS OF THE EMERGENCY DEPARTMENT

	Homeless (N = 74)	Non-Homeless (N = 468)
Age, median yr (IQR)	47 (39–56)	45 (34–55)
Male (%)	63 (85.1%)*	260 (55.6%)*
White (%)	29 (39.2%) ^α	132 (28.2%) ^α
Insurance (%)		
Private	0 (0%)	β
Medicare	8 (10.8%)	β
Medicaid	44 (59.5%)	β
Uninsured	18 (24.3%)	β
Unknown	4 (%)	β

*Statistically significant at the $P < 0.001$ level.

^αStatistically significant at the $P = 0.049$ level.

^βInsurance data not captured for non-homeless population. IQR, interquartile range.

TABLE 2. CLINICAL CHARACTERISTICS OF HOMELESS FREQUENT USERS OF THE EMERGENCY DEPARTMENT (ED)

	N = 845 visits (%)
Arrive by ambulance	170 (20.1%)
Time of arrival	
1st Shift (0700–1459)	272 (32.2%)
2nd Shift (1500–2259)	374 (44.2%)
3rd Shift (2300–0659)	200 (23.6%)
Emergency Severity Index Scale*	
Level 1	2 (0.3%)
Level 2	86 (11.5%)
Level 3	416 (55.5%)
Level 4	218 (29.1%)
Level 5	27 (3.6%)
Primary care provider identified	253 (32.5%)
ED length of stay, hours (SD)	7.1 (5.4)
Group diagnoses	
Musculoskeletal system	119 (14.1%)
Substance abuse	109 (12.9%)
Nervous system	92 (10.9%)
Respiratory system	75 (8.9%)
Traumatic disorders	70 (8.3%)
Cardiovascular system	60 (7.1%)
Hematology	59 (7.0%)
Gastroenterology	48 (5.7%)
Infectious disease	32 (3.8%)
Dermatology	31 (3.7%)
Psychiatry	28 (3.3%)
Endocrinology	26 (3.1%)
Genitourinary	13 (1.5%)
Otolaryngology	10 (1.2%)
Other	63 (7.5%)
Missing diagnosis	10 (1.2%)
Social services consult	38 (4.9%)
Plan addressing homelessness	34 (4.4%)
Disposition	
Admitted to hospital	102 (12.1%)
Discharged to street	542 (64.1%)
Left prior to treatment	201 (23.8%)

*ESI score missing for 97 visits.

SD, standard deviation; ESI, Emergency Severity Index.

consulted and discharge plans addressing homelessness were seldom identified. Patients were most often discharged from the ED back to the street.

Total charges and payments for all homeless frequent users were \$4,812,615 and \$802,600, respectively. Sixteen out of the 74 (21.6%) homeless patients had hospital charges at the institution exceeding \$100,000 in 2006 alone (Figure 1). The top user accrued charges of \$482,928. Data on total charges and total reimbursements for frequent users were obtained directly from hospital billing office. Breakdown of charges and reimbursements for specific elements of care during each care episode were not made available to the research team.

Discussion

This study sought to better define the subpopulation most commonly associated with frequent ED use: the homeless. More specifically the study analyzed the most concerning feature of frequent utilization to policy makers: high cost. A total of 74 homeless frequent users who visited an urban academic ED 845 times in 1 year were identified. Although the homeless only represent approximately 0.25% of the population in the United States, homeless individuals comprised 13.7% of all frequent users identified in this study. Further, homeless frequent users averaged more visits than their non-homeless counterparts (11.4 vs. 9.8 visits in the study year). This high level of utilization was associated with high costs. The charges associated with homeless frequent users exceeded \$4.8 million in 1 year, an average of more than \$64,000 in charges per homeless frequent user during the study year. Homeless frequent users were mostly male (85.1%) and over half (59.5%) were insured by Medicaid.

The problem of repeated ED use is common and widespread. Health care workers often stereotype frequent users as “frequent fliers” or “repeat offenders.”¹⁴ Their usage of the ED is seen as inappropriate and illegitimate and colors the quality of care they receive.¹⁵ However, a systemic review of the frequent user literature has challenged these assumptions.¹ The landscape of frequent users is complex and varies considerably between its subpopulations. Thus, it is important to avoid overgeneralizations about this population on the whole, or to imagine that a single intervention might address the needs of all frequent users.²

Compared to the share of total ED visits attributed to homeless individuals based on a national data set (0.5% from 2005–2006),¹⁶ the study team found that homeless frequent users made a higher proportion of visits among frequent users (15.5%). Capturing the housing status of patients is difficult and many studies grossly underestimate the true numbers of the homeless. Patients are not routinely asked about their housing status, and the homeless do not readily reveal their lack of housing. In this study, only 15% of the homeless frequent users identified themselves as homeless; therefore, 85% of this population would not have been identified as being homeless if the study team had not undertaken supplementary efforts to more accurately identify housing status of frequent users. Similar efforts may be required to properly target any future interventions to address frequent users.

The hospital admission rate for homeless ED visits was 12.1%, a percentage that is below the national admission rate

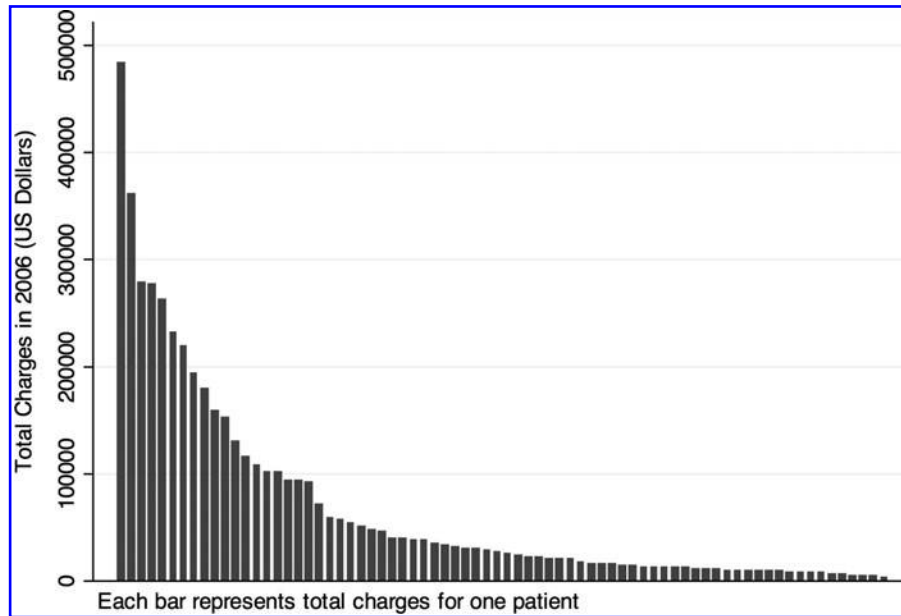


FIG. 1. Total charges for homeless frequent users in 2006.

(12.8%) for all ED visits (homeless and non-homeless) in the United States that same year.¹⁷ This finding supports the need to further evaluate the severity of conditions with which frequent users and homeless frequent users present to the ED and the appropriateness of ED usage for this population.

A comparison of the demographic and clinical characteristics of the present study population and US national data on homeless ED visits revealed several similarities.¹⁶ The present study population tended to be older (median age of 47) and mostly male (85.1%). But there also were several notable differences. A higher percentage of homeless persons in the present study were insured by Medicaid when compared to national estimates (59.5% versus 27.2%) while a smaller percentage arrived by ambulance (20.1% versus 35.7%). The specific focus on ED homeless frequent users instead of all ED homeless patients may account for these differences. In addition, regional policies where the study hospital is located make it easier for the homeless to be insured by Medicaid. Finally, a high concentration of the city's homeless population spends time within walking distance to the study hospital.

Despite the deep concern over the high expenditures of frequent users, there have been few studies analyzing the costs of this population.¹⁸ The study team calculated the hospital charges and reimbursement rates for homeless frequent users. A detailed economic analysis of true health care expenditures—including, for example, costs associated with emergency medical system services and medications—was beyond the scope of this study. Further, both hospital charges and insurance reimbursement are inexact measures of true medical costs. However, because health care providers, insurers, patients, and hospital administrators are very familiar with the language of hospital charges—particularly on a per-episode-of-care basis—the study team felt that charges were a reasonable metric to use in their efforts to begin to quantify costs.

Even though the homeless frequent user population was relatively small, they amassed nearly \$5 million in hospital charges at just a single institution for 1 year. In many cases,

the hospital was not reimbursed because a fifth of this population was uninsured. The top 5 homeless frequent users had combined total hospital charges in the amount of \$1,666,541 for 1 year; the top user alone had \$482,928 in charges.

Notably the median per visit charges and reimbursements were significantly higher for the non-homeless frequent users than homeless frequent users (Table 3). This may result from homeless users presenting to the ED with symptoms of less acuity when compared to national data on ED visits; 11.8% of homeless visits required immediate or urgent action (ESI level 1 or 2), while in comparison, 15.9% of all ED visits nationally needed immediate action.¹⁷ Alternatively, fewer medical services may be provided to homeless individuals because of provider bias, insurance status, or other causes. Additional research would help clarify these issues.

Addressing homelessness in a hospital setting is complex because it is a multifaceted problem. Often the psychosocial needs of homeless patients outweigh the medical ones. Further research into this field is vitally important to better equip practitioners to better serve this population. Unfortunately, EDs are ill equipped to meet the needs of this challenging and vulnerable population, whose mortality remains high.¹⁹ One resource that many EDs do have is on-site social services. Unfortunately, the present study showed that a social worker was consulted in only 4.9% of visits by

TABLE 3. MEDIAN CHARGES AND PAYMENTS (US DOLLARS) FOR EMERGENCY DEPARTMENT VISITS BY FREQUENT USERS IN 2006

	<i>Homeless</i>	<i>Non-homeless</i>	<i>P value</i>
Charges (95% CI)	\$1478 (1364–1604)	\$2125 (2031–2212)	<0.001
Payments (95% CI)	\$272 (272–272)	\$348 (348–361)	<0.001

CI, confidence interval.

the frequent homeless user population. Based on follow-up discussions with physician providers, nursing staff, and social work staff, the study team believes that frequent presentation for care by these patients contributed to low referral to social services—many of the ED staff were resigned that nothing could be done to change future utilization patterns for these patients. It should be noted that when social services were engaged, appropriate referrals to local shelters or out-of-hospital community services were made. Developing strategies to systematically flag individuals who might benefit from social services may offer a promising area for further investigation.

There were several limitations to this study. First, because the study was a retrospective chart review, housing status was determined by either self-report, listing of a known homeless shelter as a primary address, or individual identification of a known homeless patient by social workers, nurses, or clinicians. Even with this interdisciplinary approach, it is likely that the actual number of visitors who had experiences of homelessness was underestimated. In particular, homeless patients who reported false home addresses or left the home address item blank and were not recognized by the study team were not identified as homeless. The limitations of self-reporting as it relates to homeless populations have been previously described.²⁰ Moreover, individuals with unstable housing were unlikely to be identified by the methods used in this study. Second, the quality of the data was dependent on physician and nurse documentation and inconsistencies in documentation may be reflected in the data set. Third, the study team was not able to conduct the same rigorous chart review for each non-homeless frequent user and so cannot provide direct comparisons between the clinical conditions faced by homeless and non-homeless frequent users. Therefore, the team is unable to directly compare the severity of illness or cause of visit. Both of these areas would be of interest for future investigations. Fourth, because this study was limited to 1 urban academic medical center, the results may not be generalized to other EDs. Fifth, as mentioned previously, the total costs associated with emergency service utilization were not captured. Sixth, the study team was unable to obtain a breakdown of charges and reimbursements for specific elements of care provided within the ED, and so cannot definitively identify those elements that contribute most substantively to total costs of care for homeless frequent users. Lastly, hospital charges and reimbursement rates may not accurately represent the true costs of providing health services.

Conclusions

It would be unrealistic to expect under-resourced EDs to find sustainable solutions for their entire frequent user population, but it may be feasible to target subgroups of frequent users such as the homeless who are responsible for a disproportionate amount of expenditures. The extreme medical costs associated with this “super-user” population may justify the use of funds to provide stable housing, medical respite care, or intensive case management and expanded social service support. In the long run, these measures may prove to be more cost-effective. At a minimum, it is important to develop systems to ensure improved identification of individuals experiencing homelessness or housing instability,

and to incorporate this knowledge into discharge planning. Moreover, better addressing the needs of this population may not only prove more cost-effective than continuing to provide care in the ED, but also relieve overcrowded EDs and, most importantly, reduce the morbidity and mortality of this vulnerable group of patients.

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