

HEALTH CARE UTILIZATION AMONG HOMELESS ADULTS PRIOR TO DEATH

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Abstract: This study characterizes health care utilization prior to death in a group of 558 homeless adults in Boston. In the year before death, 27 percent of decedents had no outpatient visits, emergency department visits, or hospitalizations except those during which death occurred. However, 21 percent of homeless decedents had a health care contact within one month of death, and 21 percent had six or more outpatient visits in the year before death. Injection drug users and persons with HIV infection were more likely to have had contact with the health care system. This study concludes that homeless persons may be underusing health care services even when they are at high risk of death. Because a subset of homeless persons had extensive health care contacts prior to death, opportunities to prevent deaths may have been missed, and some deaths may not have been preventable through medical intervention.

Key words: Homeless persons, death, delivery of health care, health services accessibility

Homeless adults experience high mortality rates and often die at an early age.¹⁻⁵ Homeless persons with HIV infection, renal disease, liver disease, a history of cold-related injury, and arrhythmias are at particularly high risk of

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death.⁶ Medical interventions targeted at high-risk homeless persons might reduce mortality rates but would be ineffective if individuals have minimal contact with the health care system. Unfortunately, homeless persons face numerous obstacles in obtaining health care and often do not obtain the services they need.⁷⁻¹¹ This study characterizes health care utilization in the year prior to death in a group of 558 homeless adults in Boston. The goals of this study were to assess the extent to which homeless persons may underuse health care services even when they are at high risk of death and examine potential opportunities for intervention in this population

Method

Study population. Deaths among homeless adults seen by the Boston Health Care for the Homeless Program between July 1988 and December 1993 were identified. The program delivered health care at more than 40 sites, including homeless shelters, drop-in centers, outpatient clinics, a recuperative residential facility for the homeless, and on the street. Deaths were ascertained by comparing the Boston Health Care for the Homeless Program patient database with the Massachusetts death registry from 1988 to 1993, using methods described in a previous report.⁵

Data collection. This study assessed demographic information, medical diagnoses, substance abuse history, and psychiatric history using standardized criteria and data collection forms.^{6,12} Health care contacts were determined in the year before death by retrospective review of medical records. Records were examined at Boston Health Care for the Homeless Program, Boston City Hospital (Boston Medical Center), Tufts-New England Medical Center, and Massachusetts General Hospital. These institutions are in close proximity to the largest homeless shelters in Boston and are the predominant providers of health care for the city's homeless population.

Physicians abstracted information from medical records on hospitalizations, emergency department visits, and outpatient visits in the year prior to death. Emergency department encounters that resulted in admissions to hospitals were considered part of the hospital stay and were not included in the count of emergency department visits. Hospital stays during which death occurred were excluded from our analyses to better assess patterns of health care utilization in the year before death rather than the circumstances of the death itself. Causes of death were obtained from death certificates.

Statistical analysis. The study identified those homeless persons who had any health care contacts in the year before death, excluding hospitalizations during which death occurred. Associations between demographic and clinical characteristics and health care contact were examined using logistic regression models. Characteristics associated with contact in univariate models at the $p < 0.05$ level were candidates for entry into a multivariate logistic regression model using forward selection. Alternative model-building strategies

TABLE 1
DEMOGRAPHIC AND CLINICAL CHARACTERISTICS OF 558
HOMELESS ADULTS IN BOSTON WHO DIED IN 1988 TO 1993

<i>CHARACTERISTIC</i>	<i>NUMBER</i>	<i>PERCENTAGE</i>
Age at first contact (in years)		
18 to 24	18	3
25 to 44	312	56
45 to 64	188	34
> 65	40	7
Sex		
Male	478	86
Female	80	14
Race/ethnicity		
White	330	59
Black	169	30
Hispanic	45	8
Other	14	3
Substance abuse history		
Alcohol abuse	426	76
Cocaine abuse	139	25
Injection drug use	206	37
Clinical conditions		
HIV infection	129	23
Mental illness	155	28

including stepwise and backward selection were also tested. All statistical analyses were performed using SAS (SAS Institute, Cary, NC).

Results

Participants. A total of 17,292 patients had contact with the Boston Health Care for the Homeless Program, of whom 606 died in Massachusetts in 1988 to 1993. The study excluded 48 decedents because records of their health care contacts were not available. The demographic and clinical characteristics of the remaining 558 deceased individuals are shown in Table 1. The average age at death was 47 years (range, 20 to 84 years). A history of substance abuse (alcohol abuse, cocaine abuse, or injection drug use) was documented in 84 percent of decedents. Among individuals with HIV infection, 78 percent had a history of injection drug use. Mental illness had been diagnosed in 28 percent of the cohort, most of whom had a mood disorder (52 percent of those with mental illness) or schizophrenia and other psychotic disorders (31 percent of those with mental illness). Causes of death are shown in Table 2. Cause-specific mortality rates for this cohort have been presented in a separate report.

TABLE 2
CAUSES OF DEATH IN 558 HOMELESS ADULTS
IN BOSTON WHO DIED IN 1988 TO 1993

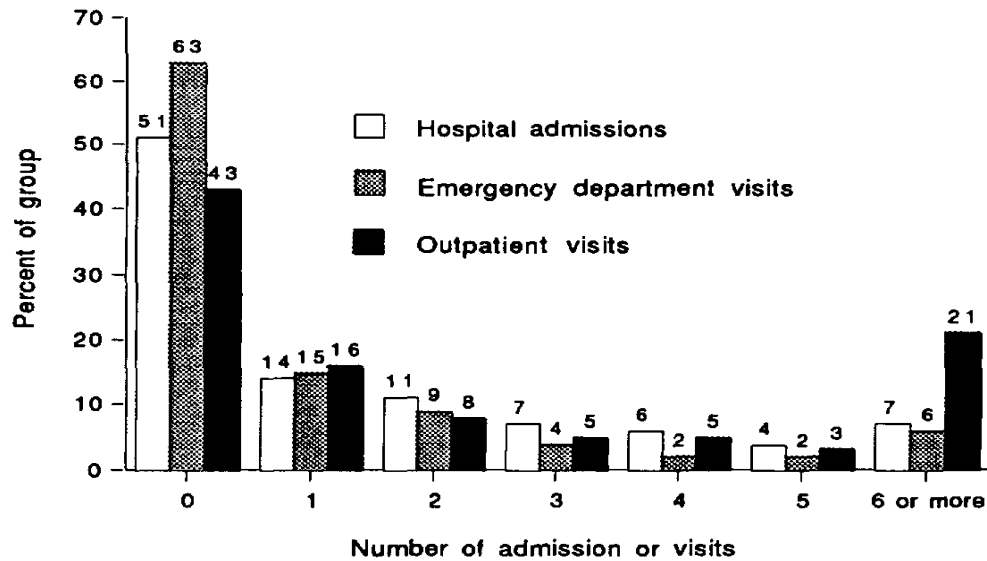
CAUSE	NUMBER	PERCENTAGE
Natural causes	451	81
AIDS and HIV-related diseases	106	19
Cancer	62	11
Heart disease	93	17
Cerebrovascular disease	14	3
Chronic liver disease	36	6
Pneumonia and influenza	18	3
COPD	13	2
All other natural causes	109	20
External causes	107	19
Homicide	21	4
Suicide	11	2
Motor-vehicle-related injuries	7	1
Poisonings and drug overdoses	35	6
All other external causes	33	6

Frequency of health care contacts. Health care contacts are shown in Figure 1 according to the site of contact. In the year before death, 51 percent of the group had no hospital admissions except those during which death occurred, 63 percent had no emergency room visits, and 43 percent had no outpatient visits. Overall, 27 percent of the group had no health care contacts in any of these settings in the year before death. The average number of hospitalizations, emergency room visits, and outpatient visits per person were 1.5, 1.1, and 3.9, respectively.

Although many homeless persons in this study had relatively few admissions or visits, a few were intensive users of health care services in the year before their death. Seven percent of the group had 6 or more hospitalizations, excluding those during which death occurred, and 6 percent of the group were seen in an emergency department 6 or more times. One-fifth of decedents had 6 or more outpatient visits: 7 percent had 6 to 10 visits, 9 percent had 11 to 20 visits, and 4 percent had 21 to 38 visits. HIV infection was more common in individuals with 6 or more outpatient visits (53 percent) than in those with 5 or fewer outpatient visits (15 percent, $p = 0.001$ by the chi-square test). Individuals in the top quartile for number of hospital admissions also accounted for a large proportion of health care use in other settings. This group was responsible for 77 percent of all hospital admissions, 40 percent of all emergency department visits, and 49 percent of all outpatient visits.

The following analyses were performed to permit comparison of the present study's findings to published data on hospital use in homeless people and in the general population. A total of 864 hospitalizations in which the patient

FIGURE 1
HEALTH CARE CONTACTS IN THE YEAR BEFORE DEATH
AMONG 558 HOMELESS ADULTS IN BOSTON,
EXCLUDING HOSPITALIZATIONS DURING
WHICH DEATH OCCURRED



was discharged alive were observed in the cohort, for a crude rate of 1,548 admissions per 1,000 person-years. The mean number of days of hospitalization in the one year prior to death was 25.5 days.

Characteristics associated with health care contact. In unadjusted univariate models, older age was associated with less health care contact before death; each additional decade of age decreased the likelihood of contact by about 20 percent (Table 3). Sex and race were not significantly associated with health care contact. Homeless people with HIV infection, mental illness, or a history of cocaine abuse or injection drug use were more likely to have had health care contacts in the year before death. No other medical diagnoses were found to significantly increase the likelihood of contact. In a multivariate model, HIV infection and injection drug use were the only factors that significantly affected the likelihood of health care contact. Forward, backward, and stepwise selection of factors yielded the same multivariate model.

The present study examined whether individuals who had no health care contacts in the year before death were simply those who died suddenly and without warning. Of 558 deaths, 19 percent were due to external causes (homicide, suicide, poisonings, or other injuries), and 81 percent were due to natural causes. Persons who died from external causes were slightly more likely to have had contact with the health care system in the year before death (78 percent) than persons who died from natural causes (71 percent), but this difference was not significant ($p = 0.20$ by the chi-square test).

TABLE 3
CHARACTERISTICS ASSOCIATED WITH HEALTH CARE CONTACT
IN THE YEAR BEFORE DEATH AMONG 558 HOMELESS ADULTS IN
BOSTON, 1988 TO 1993

CHARACTERISTIC	UNADJUSTED			ADJUSTED		
	ODDS RATIO	95% CI	p	ODDS RATIO ^a	95% CI	p
Age ^b	0.84	(0.72, 0.96)	0.01	...		
Male sex	0.86	(0.50, 1.49)	<i>ns</i>	...		
White race ^c	0.72	(0.49, 1.06)	<i>ns</i>	...		
HIV infection	2.63	(1.55, 4.46)	0.0003	2.01	(1.13, 3.60)	0.02
Cocaine abuse	2.13	(1.31, 3.47)	0.002	...		
Injection drug use	2.15	(1.41, 3.25)	0.0003	1.66	(1.05, 2.63)	0.03
Alcohol abuse	1.45	(0.95, 2.22)	<i>ns</i>	...		
Mental illness	1.57	(1.01, 2.43)	0.045	...		

Note: CI = confidence interval.

^a For those factors included in the final multivariate model.

^b For each additional decade of age at the time of initial contact.

^c Compared to nonwhite race.

Time between last contact and death. The study determined the time between each individual's last health care contact (hospital discharge, emergency department visit, or outpatient visit) and date of death. To focus on opportunities for intervention in the period leading up to death, hospitalizations during which the patient died were excluded. The time between last contact and death was less than 1 month in 21 percent of the group, between 1 and 2 months in 13 percent, between 2 and 6 months in 25 percent, and between 6 and 12 months in 13 percent. During the 1 month prior to death, 14 percent of all decedents had an outpatient visit, 6 percent had an emergency department visit, and 5 percent had a hospital discharge.

Discussion

In this study of 558 homeless adults in Boston who died between 1988 and 1993, about one-quarter of the group had no contact in the year prior to death with institutions that provide the majority of health care for indigent persons in Boston's inner city. This finding indicates that a significant proportion of homeless persons may be underusing health care, even when death is imminent. At the same time, a subgroup of individuals were identified who were frequent users of the health care system, in many cases within one month before death. This pattern suggests that opportunities to prevent deaths are being missed or that deaths may be the result of events not readily amenable to medical intervention.

Lack of health care contacts before death may be largely attributable to barriers in obtaining health care. The homeless face numerous such obstacles, including lack of financial resources, health insurance, transportation, or an

established source of primary care.^{7,8,10,11} The problem of "competing priorities," in which the daily struggle to obtain the basic necessities of survival takes precedence over efforts to obtain health care, may also play a role.⁹ In addition, some homeless persons may prefer not to seek health care even in the face of serious illness. For these reasons, it is recommended that when homeless persons are hospitalized, clinicians should take advantage of these opportunities to offer health interventions that in other populations might typically take place in the primary care setting.

Homeless persons with HIV infection or a history of injection drug use were much more likely to have had contact with the health care system in the year prior to death. These groups of individuals are prone to develop acute illnesses such as opportunistic infections, bacterial pneumonia, cellulitis, and drug overdoses, all of which usually lead to emergency care or hospitalization. In addition, even clinically stable patients with HIV infection often receive frequent outpatient monitoring.

HIV infection is not only associated with increased health care use; it is also the greatest single risk factor for death in homeless adults.⁶ Clinicians should therefore seek to identify HIV-infected homeless persons and offer interventions such as antiretroviral therapy and prophylaxis against opportunistic infections.¹³⁻¹⁵ The deaths in this study occurred before highly active combination antiretroviral regimens were available. With the use of these medications, significant reductions in mortality should be attainable.^{16,17}

The rates of health care use that were observed should be compared to data from other studies. In an urban homeless population in Honolulu, Hawaii, the hospitalization rate in acute-care hospitals was 542 per 1,000 person-years, or almost six times the age- and sex-adjusted rate in the general population.¹⁸ The hospitalization rate of 1,548 per 1,000 person-years in this study is almost threefold higher than that of the Honolulu homeless cohort, in keeping with the expectation that hospitalization rates will increase in the year prior to death.

Comparable data on health care contacts during the terminal months of life in the general population are scant. Most studies have been limited to the elderly,¹⁹⁻²¹ whereas homeless persons tend to die at a much younger age.^{1,2,4,5} In a population-based study from Manitoba, Canada, men who died between the ages of 45 to 64 had a mean of 24.8 days of hospitalization in the year before death and a mean of 9.5 ambulatory care visits.²² Our group of homeless persons died at an average age of 47 years, with a mean of 25.5 days of hospitalization and 3.9 ambulatory visits in the preceding year. These data suggest that homeless persons receive less outpatient care in the year prior to death than the general population.

Certain limitations of this study should be noted. This study only identified deaths that occurred in Massachusetts; the health care utilization of patients who died out of state was not examined. Records were reviewed at the four sites that provide the majority of health care for homeless persons in inner-city Boston, but individuals may have been seen by other health care providers in

Boston or other cities. This study may therefore have underestimated the frequency of health care contacts in this group of individuals. Because this study identified deaths among homeless persons who had at least one contact with the Boston Health Care for the Homeless Program, it may have focused on a subgroup of homeless persons who were more likely than average to seek health care. Finally, while the individuals in this study were homeless when first seen, data are not available on which members of the group were still homeless at the time of death.

Conclusion

Homeless adults in America's inner cities suffer from high mortality rates. In Boston, a substantial proportion of homeless persons died without any recent contact with the health care system. Further efforts are clearly needed to reduce underutilization of health care by homeless persons at high risk of death. At the same time, many homeless people have numerous encounters with the health care system in the year prior to their death. These contacts may represent important opportunities to intervene to reduce mortality, especially among patients with HIV infection. Finally, while improved health care would likely decrease morbidity and mortality among the homeless, policy makers must also address the underlying issue of poverty in the inner city and its adverse effect on health.

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