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Predictors of Emergency Department and Inpatient Readmissions among Homeless Adolescents and Young Adults

Jessica L. Mackelprang, PhD [Adjunct Faculty Member],

Department of Psychology, Seattle University, 901 12th Avenue, Seattle, WA, USA 98122

Harborview Injury Prevention & Research Center and the Department of Pediatrics, University of Washington School of Medicine, 401 Broadway, Suite 4075, Seattle, WA 98104

Qian Qiu, MBA, and

Harborview Injury Prevention & Research Center and the Department of Pediatrics, University of Washington School of Medicine, 401 Broadway, Suite 4075, Seattle, WA 98104, qqiu@uw.edu

Frederick P. Rivara, MD, MPH

Harborview Injury Prevention & Research Center and the Department of Pediatrics, University of Washington School of Medicine, 401 Broadway, Suite 4075, Seattle, WA 98104, fpr@uw.edu

Abstract

Background—Individuals under age 25 years are estimated to comprise one-third of the homeless population nationally. Understanding reasons homeless youth utilize hospitals is important for optimizing disposition planning.

Objectives—(1) Report prevalence of emergency department (ED) and inpatient admissions among homeless and unstably housed youth; (2) describe demographic characteristics of those youth who seek hospital care; (3) describe their patterns of injury, illness, psychiatric, and substance use conditions; and (4) identify demographic and diagnostic predictors of **ED visit or hospital readmission**.

Methods—Retrospective cohort study of 15-25 year-olds ($N=402$) who were admitted to the ED or inpatient floors of two urban teaching hospitals in King County, Washington between July 1, 2009 and June 30, 2012 and whose address was “homeless” or “none” or a homeless shelter or service agency (**i.e., homeless or unstably housed**), during any recorded encounter between July 1, 2009 and June 30, 2012.

Results—1151 ED visits and 227 inpatient admissions were documented. Fifty percent of patients **had an ED visit or hospital readmission** within one year, with 43.1% receiving care within 30 days of discharge. Cox regression showed females with an injury diagnosis (hazard ratio [HR]=1.74, 95% confidence interval [CI]=1.06, 2.85) and males with an acute medical condition (HR=1.59, 95% CI=1.09, 2.32) at index visit were more likely to **have an ED visit or hospital readmission** during the following year, as were patients who provided a private address at their index visit.

Conclusions—Homeless young people who seek hospital care demonstrate a high rate of **ED visits and hospital readmissions**, with unique predictors of **utilization** associated with sex and housing status. Additional research is necessary to determine how best to transition these young people from hospital- to community-based care.

Keywords

emergency department; homelessness; injury; inpatient care; readmissions

Introduction

According to the Department of Housing and Urban Development, homelessness affects nearly 200,000 children, adolescents, and young adults annually in the United States.¹

Washington ranks among the top 10 states in rate of homelessness, with 25.5 people per 100,000 experiencing homelessness.² On a single night in January 2014, 755 young people between the ages of 15 and 24 years were identified as homeless or unstably housed in King County, Washington.³

Adolescents and young adults are less likely to suffer many of the chronic illnesses that commonly precipitate hospitalization among older populations (e.g., cardiovascular disease); however, youth who become homeless are disproportionately vulnerable to violence and victimization (e.g., traumatic brain injury,⁴ assault), both before and after becoming homeless.^{5, 6} Homeless young people also experience high rates of mental health and substance use disorders.⁷ Moreover, although exposure to the elements due to inadequate housing may leave homeless youth disproportionately susceptible to injury and illness while on the street, a recent systematic review concluded that, with the exception of sexually transmitted infections, examination of the physical health of homeless adolescents has been largely neglected in the literature.⁸

Prior research has found that, compared to domiciled patients, homeless adults have elevated rates of emergency department (ED) visits and inpatient readmissions after hospital discharge, particularly in the month following disposition.⁹⁻¹² They are also more likely to use ambulance services¹³⁻¹⁵ and to experience longer lengths of stay when admitted for inpatient care. As a result, homeless persons on average experience more days in the hospital annually.¹⁰ Mortality rates in the homeless population exceed those among the general population.¹⁶⁻¹⁸

Although high utilization of healthcare services among homeless and unstably housed young people has been described, the majority of studies have relied exclusively on self-report.¹⁹⁻²¹ The same is true for studies of homeless adults as well.^{22, 23} Reliance on self-report rather than medical record data may be due in part to the absence of systematic methods for documenting homeless status among hospital patients.²⁴

Among the few studies that have utilized medical record data to describe conditions that precipitate hospitalization among homeless individuals, samples have been comprised exclusively or predominantly of adult patients. For example, a recent study utilized the

National Ambulatory Medical Care Survey (NHAMCS) to examine injury among homeless patients in a representative sample of hospitals across the US.¹³ Unfortunately, their sample included no homeless youth under age 18 years, and patients between 18-29 years were grouped together and only comprised 15% of the sample. No studies have utilized medical record data to examine ED visits and inpatient admissions among homeless adolescents and young adults specifically, and there is a paucity of research on hospital readmissions among this population.

Determining reasons for which homeless and unstably housed young people seek hospital care is important for understanding their needs and for determining how best to plan for disposition and improve aftercare. Objectives of the present study were to: (1) report the prevalence of ED and inpatient admissions among homeless and unstably housed young people at two hospitals in King County, Washington; (2) describe demographic characteristics of those youth who seek ED and inpatient care; (3) describe patterns of injury, illness, psychiatric, and substance use conditions; and (4) identify demographic and diagnostic predictors of **ED visit or hospital readmission**.

Methods

Study Design and Setting

We conducted a retrospective cohort analysis of adolescent and young adult homeless patients between the age of 15 and 25 years ($N = 402$) who were admitted to the ED or inpatient floors of two large, urban teaching hospitals (one of which is the county public hospital) in King County, Washington between July 1, 2009 and June 30, 2012. Because systematic methods of documenting homelessness were lacking, as is typical in many hospitals,²⁴ **housing** status was ascertained using methods similar to those described by Buck et al.¹¹ We identified all patients in the age range of interest who utilized the ED or were admitted to either hospital during the study period and whose address **at any encounter during the study period** was classified as “homeless” or “none” or corresponded with an address on the *transient address list*. The transient address list is a directory that includes homeless shelters or service agencies (e.g., outreach programs, local churches) that serve homeless individuals in King County.

Data were abstracted from electronic medical records using the Microsoft Amalga platform. After the data were cleaned, medical record numbers and other identifiers were removed from the database. The University of Washington Human Subjects Division approved this study.

Demographic Data and Hospital Utilization

Demographic information, including age, sex, race, address, phone number (i.e., yes or no), and insurance status were obtained. The first ED visit or inpatient admission during the study period was labeled the *index visit*. Demographic data were based on that visit. Race/ethnicity was obtained by self-report and categorized as American Indian or Native American, Asian or Pacific Islander, Hispanic, non-Hispanic Black, non-Hispanic White, or Unknown. Transient addresses were recoded as one of the following: youth shelter or center,

adult shelter or women's shelter, transitional/supportive housing, community service center/day program, substance use or mental health center, church, private address, or unknown. Addresses reported as “homeless” or “none” were coded as such. All patients who provided a private address at their index visit reported being homeless or living at a transient address at a subsequent encounter during the study period. All patients included in the cohort were considered homeless or unstably housed. Insurance was recorded into four categories: government (e.g., Medicaid), private, dual (i.e., private and government), or uninsured.

The following variables were extracted to summarize hospital utilization: level of care (i.e., ED visit without admission or inpatient admission), admission date and time, length of stay in days for inpatient admissions, and disposition location. Utilization dates were classified by season: winter (i.e., January-March), spring (i.e., April-June), summer (i.e., July-September), or fall (i.e., October-December). Visit time was recoded as daytime (i.e., 8:00 am–7:59 pm) or nighttime (8:00 pm–7:59 am). Disposition location data were missing for some visits. Patients who required inpatient care and who were admitted through the ED were coded as having an inpatient visit only in order to avoid erroneously inflating service utilization. Total counts for ED visits and inpatient admissions are reported for the study period. Physicians are more likely to admit homeless individuals to the hospital than housed patients with similar illnesses.²⁵ Because nearly all readmissions occur after patients returned to the ED (though not all ED visits resulted in readmission), we grouped return ED visits and inpatient readmissions together. High healthcare utilizers were defined as patients who had four or more hospital contacts during the year following their index visit.²⁶

Diagnoses

Medical, psychiatric, and substance use diagnoses from inpatient admissions and ED visits were identified using International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes. Diagnostic codes and descriptions were reviewed by two authors (FPR and JLM) to classify diagnoses into six meaningful domains: injury, psychiatric illness (including suicidal ideation), substance use, acute medical condition (e.g., conjunctivitis, diarrhea, pneumonia), chronic medical condition or aftercare (e.g., cerebral palsy, hepatitis C, chronic pain, aftercare for healing traumatic fracture), and pregnancy-related diagnoses (e.g., hypertension complicating pregnancy, intrauterine death). For descriptive purposes, poisoning was classified in the substance use domain. To examine intent of injury, ICD-9 E-codes were utilized (i.e., unintentional [E800-869, E880-E929] or undetermined [E983-E989] injury, self-directed violence [E950-959], assault [E960-E969, E979, E999.1]), where relevant, and were designated in accordance with recommendations by the Web-based Injury Statistics Query and Reporting System.²⁷ Poisoning diagnoses were included in cause of injury analyses. Blood alcohol level, if assessed, was abstracted. Toxicology reports were not available for abstraction.

Data Analyses

We conducted descriptive statistics for patient characteristics and hospital utilization variables, which are presented at the visit- or patient-level, as appropriate. Exposures of interest included patient demographic characteristics, utilization variables, and index visit

diagnostic classifications. We examined within-patient burden of injury and illness by calculating the proportion of patients who presented with comorbid diagnostic classifications among those who were in the study for least one year. To examine our main outcome, we conducted survival analysis to identify predictors of time to ED visit or hospital readmission within one year of the index visit. Patients who entered the study late and were followed less than one year without **an ED visit or hospital readmission** were right-censored at the study end date. Patients who were followed for more than one year but whose first **ED visit or hospital readmission** occurred after one year were right-censored at 365 days (i.e., considered as having no **ED visits or hospital readmissions**). We used Cox proportional hazard regression models to identify the hazard ratio of time to first **ED visit or hospital readmission**. For these analyses, address was re-categorized to represent housing status (i.e., homeless, **transitional/supportive housing**, private address). Log-rank tests and Cox regression were used to examine the univariate relationships between categorical (i.e., race and ethnicity, housing status, insurance status, index visit type [i.e., ED visit, inpatient admission], index visit diagnostic classification) and continuous (i.e., age) variables of interest and the outcome, respectively. Variables with a *p*-value less than 0.25 in univariate analyses were retained in final multivariate Cox model. The proportional hazards assumption for the multivariate Cox model, as well as the individual covariates in the model, were verified by tests based on Schoenfeld residuals. Stratified analyses were performed for females and males to determine whether diagnostic factors (e.g., pregnancy) contribute uniquely to risk for **ED visit or hospital readmission**. Although one variable, housing status, violated that assumption for females, we elected to retain it in the model based on prior research.²⁸ The full sample was included in descriptive analyses; however, two patients who died during their index hospitalization were excluded from survival analyses because death confounded the outcome of interest. All analyses were conducted using Stata version 12.0 (StataCorp LP, College Station, TX).

Results

Characteristics of the Study Population

During the study period, 402 unique adolescents and young adults who sought care at either of two study hospitals in King County, WA experienced homelessness (Table 1). On average, patients were 22.5 (*standard deviation [SD]* = 2.0) years old, and the majority were male (61.9%). Most patients identified as non-Hispanic White (59.5%) or non-Hispanic Black (21.6%). At the time of their index visit, most patients' address was documented as "homeless" or "none" (28.9%), was not included on the transient address list (21.1%; i.e., private address), or was a youth shelter or center (14.9%). Seventy-one percent provided a telephone number, and 64.4% reported being uninsured.

Hospital Utilization

The cohort amassed a total of 1151 ED visits (*mean [M]* = 2.9, *SD* = 4.1; *median [Mdn]* = 2) and 227 inpatient admissions during the study period (*M* = 0.6, *SD* = 1.9; see Table 2). Seventeen percent of ED visits resulted in inpatient admission; mean length of inpatient stay was 6.8 days (*SD* = 11.1). Most patients were discharged to self-care. Hospital utilization did not vary by insurance status.

During the study period, 201 patients had an **ED visit or hospital readmission** (Table 3); of those, 44.3% ($n = 89$) had an **ED visit or hospital readmission** within 30 days of their index visit. Twenty-six percent ($n = 105$) of the cohort was admitted for inpatient care on one or more occasions. Among patients who were followed for at least one year, 21.1% were high healthcare utilizers (Mdn visits = 5)²⁶ during the year following their index visit. Two patients died during their index visit, both as a result of injuries that were the sequelae of suicide attempts.

Injury, Illness, and Comorbidity

Chronic medical conditions or aftercare and acute medical conditions were the most common diagnostic classifications for patients who presented for ED care or who were admitted to the inpatient floors, followed by injuries and psychiatric diagnoses among patients in the ED and inpatient floors, respectively. Blood alcohol level was assessed infrequently; it was positive in 32.3% and 19.2% of ED visits and inpatient admissions when assessed. Being diagnosed with conditions from multiple diagnostic categories was common, particularly among patients who were admitted for inpatient care (Table 2). This was especially true for acute and chronic medical conditions (Supplemental Tables 1 and 2), though it was evident in other diagnostic categories as well. For example, 78.9% of males who were followed for at least one year and who were diagnosed with an alcohol use disorder were also treated for an injury. The proportion of females who were treated for an assault-related injury and who were also diagnosed with a psychiatric disorder was nearly twice that of males (37% and 71%, respectively). Twenty percent of females had a pregnancy-related diagnosis at during the study period. Of those patients, 37.5% were treated for assault-related injuries, 62.5% had a psychiatric diagnosis, and nearly one-third had a substance use disorder (Supplemental Table 1).

Predictors of Time to Subsequent ED Visit or Hospital Readmission

Of the demographic predictor variables we examined, age, race, and housing status demonstrated significant relationships with time to **ED visit or hospital readmission** in univariate analyses. Index visit type (i.e., ED visit vs. inpatient admission), a proxy for severity of injury or illness, was not associated significantly with time to **ED visit or hospital readmission**. Being diagnosed with an injury or acute medical condition was significantly related to **ED visit or hospital readmission** among males, while injury was associated with **ED visit or hospital readmission** among females. In our multivariate Cox regression model (Table 4), females with an injury diagnosis at the time of their index visit experienced an increased **ED visit or hospital readmission rate** (hazard ratio [HR] = 1.74, 95% confidence interval [CI] = 1.06, 2.85) during the subsequent year compared to those without an index visit injury, as did male patients with an acute medical condition at their index visit compared to those without (HR = 1.59, 95% CI = 1.09, 2.32). Relative to patients who were homeless at the time of their index visit, males (HR = 2.64, 95% CI = 1.73, 4.01) and females (HR = 2.34, 95% CI = 1.42, 3.83) who provided a private address were significantly more likely to experience an **ED visit or hospital readmission** during the subsequent year. Age and race were not significant, nor was injury among males.

Discussion

To our knowledge, this is the first study to utilize medical record data to describe characteristics of homeless and unstably housed young people who received ED or inpatient care. Our findings emphasize that these individuals experience a considerable burden of health difficulties. Sixty-four percent of our sample denied having health insurance, a rate that surpasses national samples of homeless adults.²⁹ Moreover, utilization patterns did not differ regardless of insurance. Although the mean age of our sample was 30 years younger than that reported by Kessell and colleagues,³⁰ rates of ED visits that resulted in inpatient admission were nearly identical (16.5% vs. 17.0%). Comorbidity was the rule rather than the exception, and unique combinations of comorbidities were evident by sex.

Repeat **ED visits or hospital readmissions** were common, a finding that echoes the adult homeless literature.⁹⁻¹¹ Similar to homeless adults, our results suggest that homeless and unstably housed young people experience a high rate of **ED visit or hospital readmission** soon after discharge from ED or inpatient floors.⁹ Fifty percent of patients **had an ED visit or hospital readmission** within the first year after their index visit, with nearly half of those occurring during the subsequent month. The greatest risk for **ED visit or hospital readmission** was among males treated for acute medical conditions and females treated for injuries. These findings suggest it may be important to take diagnosis into consideration in discharge planning for youth who are homeless or unstably housed.

Conditions associated with homelessness and housing instability (e.g., lack of warm, dry shelter) may exacerbate acute medical conditions (e.g., pneumonia) or preclude recovery from injury, which may lead to **subsequent ED visit or hospital readmission**. Programs aimed at connecting adult homeless patients to respite and housing programs have addressed patients' psychosocial needs, while simultaneously reducing readmissions.³¹ However, the literature on transitioning homeless and unstably housed young people from acute, hospital-based care to outpatient follow-up is limited. Such programs warrant consideration in this population. Likewise, because the ED is commonly a "first stop" among newly homeless individuals,³² proactive case management may reduce **ED visits or hospital readmission** by channeling patients to community-based clinics, thereby preventing the ED from becoming a de facto source of primary care.²²

Although the rate of pregnancy among adolescent and young adult females in the general population has declined, with 4.95% of women ages 15 to 24 giving birth in 2012,³³ our data demonstrate that pregnancy is prevalent among young women who experience homelessness.³⁴ One in five females were diagnosed with a pregnancy-related condition during the study period. The proportion with a pregnancy-related diagnosis and comorbid injury, psychiatric condition, or substance use difficulty was high. These findings may have implications for disposition planning, particularly given that unmet healthcare needs are especially common among homeless women.³⁵ Our findings raise questions about access to contraception and outpatient prenatal care and highlight the importance of addressing factors associated with adverse effects on the fetus (e.g., in-utero alcohol/drug exposure, poor nutrition). Hospital providers might consider integrating counseling about these topics into ED and inpatient care and developing pathways to link homeless and unstably housed young

women to outpatient reproductive healthcare, regardless of the diagnosis that precipitated hospital utilization. In order for disposition procedures to be strengthened, however, systematic methods to identify young people who are homeless or precariously housed must first be implemented. Prior studies have documented the reasons why homeless youth, minors in particular, may be reluctant to seek healthcare, including feelings of embarrassment and prior experiences of being denied care due to being underage.^{19, 36} These factors should be considered when determining discharge planning procedures and when training the staff who will be interacting with homeless youth.

One avenue for promoting healthcare engagement and care continuity may be via technology. Most patients (70.9%) endorsed having a phone number. Although we were unable to discern whether patients' phone numbers were associated with a mobile or landline, these data add to the burgeoning literature that proposes providers use technology as a conduit to engage homeless individuals by offering diagnostic information, providing referrals, and delivering reminders about appointments and medication.³⁷⁻³⁹

At the time of their index visit, over 20% of patients provided an address that was not on the transient address list and was, therefore, presumably a private residence. Unexpectedly, we found that having a private address at the index visit was a robust predictor of **ED visit or hospital readmission**. We propose several possible explanations. First, providing various addresses during the study period may be a manifestation of housing instability and of varied trajectories toward obtaining housing, which is typical among homeless young people.^{40, 41} Given that all patients who initially gave a private address were homeless at one or more **ED visit or hospital readmission** during the study period may suggest that the time close to the initial hospitalization was particularly chaotic and either preceded or coincided with onset of homelessness. Alternatively, some young people may have provided a private address when they were, in fact, homeless. Perhaps those individuals preferred not to disclose their housing status (e.g., embarrassment, fear of being denied care) or were "couchsurfing." Couchsurfing is common among homeless young people, and it is possible the address they provided belonged to a friend or was a residence where they were no longer living (e.g., family member's home). Finally, the index visit may have occurred at a point of temporary housing stability, wherein patients were able to shift their focus away from immediate survival needs in favor of addressing concurrent health problems. The latter aligns with research that indicated increased healthcare utilization tends to coincide with efforts to get off the streets.⁴²

Limitations

Several limitations should be considered. First, our sample was identified using one hospital system's transient address list. Patients may have provided an address where they were couchsurfing or no longer living. As a result, we presume that our study underestimates the number of homeless youth who are seeking care at the study hospitals. Stereotypes about the appearance or age of homeless individuals (e.g., middle-aged, disheveled) may have biased the depth to which admitting staff chose to inquire about housing stability. Regarding diagnoses, although medical conditions were categorized as being either acute or chronic, our analyses precluded us from determining whether care seeking was prompted by an acute

exacerbation of a chronic condition. Moreover, our finding that patients with inpatient admissions had a greater number of comorbid diagnoses may owe to better documentation associated with in-depth history gathering during inpatient admissions relative to ED visits. This study examined data from only two hospitals in the Seattle area; patients may have accessed care at other local hospitals or moved out of the area. Thus, our findings may underestimate readmission rates among this population. Finally, this study was undertaken in a single city in the western United States, and results may not generalize to rural areas or to cities in other regions.

Conclusions

Homeless or unstably housed youth who seek hospital care have a high rate of repeat ED visits or hospital readmissions

Hospitalization opens a brief window of opportunity for interaction with healthcare professionals that has the potential to be life altering.^{43, 44} Further research is necessary to determine how to most effectively identify young patients who are homeless or unstably housed and how to transition them from hospital- to community-based care.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Demographic Characteristics of Adolescent and Young Adult Hospital Patients Who Experienced Homelessness during the Study Period ($N = 402$)

Variable	<i>n</i> (%)
Age, mean (<i>SD</i>)	22.50 (1.98)
Sex	
Male	249 (61.94)
Female	153 (38.06)
Race and ethnicity	
American Indian or Native American	13 (3.23)
Asian or Pacific Islander	16 (3.98)
Hispanic	26 (6.47)
Non-Hispanic Black	87 (21.64)
Non-Hispanic White	239 (59.45)
Unknown	21 (5.22)
Address	
“Homeless” or “none” ^a	116 (28.86)
Youth shelter or center	60 (14.93)
Adult shelter or women’s shelter	15 (3.73)
Transitional/supportive housing	35 (8.71)
Community service center/Day program	32 (7.96)
Substance use or mental health center	30 (7.46)
Church	15 (3.73)
Private address ^b	85 (21.14)
Unknown ^c	14 (3.48)
Phone number available	285 (70.90)
Insurance status	
Government ^d	122 (30.35)
Private	14 (3.48)
Dual (government + private)	7 (1.74)
Uninsured	259 (64.43)

SD = standard deviation

Note. Percentages may not equal 100% due to rounding. Information contained in this table is based on patients’ index visit.

^aVerbatim per medical record; “homeless” ($n = 24$), “none” ($n = 92$).

^bAddress was not listed on the transient address list.

^cPatient stated that s/he did not know address.

^dIncludes Medicaid, Medicare, Department of Immigration, Department of Labor and Industries, and transportation coverage under Washington Involuntary Treatment Act.

Table 2

Utilization Characteristics of 402 Adolescent and Young Adult Patients Who Were Treated in the Emergency Department or Admitted for Inpatient Hospital Care

Variable	Emergency Department Visits (<i>n</i> = 1151)	Inpatient Admissions (<i>n</i> = 227)
	<i>n</i> (%)	<i>n</i> (%)
Season of admission		
Spring	291 (25.28)	62 (27.31)
Summer	262 (22.76)	43 (18.94)
Fall	308 (26.76)	50 (22.03)
Winter	290 (25.20)	72 (31.72)
Time of admission		
Nighttime	409 (35.53)	84 (37.00)
Daytime	742 (64.47)	143 (63.00)
Disposition		
Self-care ^b	978 (84.97)	183 (80.62)
Transfer to other healthcare facility ^c	5 (0.43)	4 (1.76)
Substance use or psychiatric facility	2 (0.17)	9 (3.96)
Other facility or institution ^d	56 (4.87)	3 (1.32)
Jail or law enforcement	38 (3.30)	8 (3.52)
Left without being seen	10 (0.87)	0 (0.0)
Against medical advice	13 (1.13)	17 (7.49)
Deceased	0 (0.0)	2 (0.88)
Not specified	49 (4.26)	1 (0.44)
Diagnostic classification		
Injury	346 (30.06)	79 (34.80)
Psychiatric illness, including SI	268 (23.28)	127 (55.95)
Substance use ^e		
Alcohol	92 (7.99)	49 (21.59)
Drug	245 (21.29)	124 (54.63)
Tobacco	59 (5.13)	72 (31.72)
Acute medical condition	545 (47.35)	156 (68.72)
Chronic medical condition or aftercare	660 (57.34)	194 (85.46)
Pregnancy-related diagnosis	36 (6.44)	30 (26.09)
Blood alcohol		
Positive	62 (5.39)	14 (6.17)
Negative	130 (11.29)	59 (25.99)
Not assessed	959 (83.32)	154 (67.84)
Cause of injury ^f		
No injury	792 (68.81)	146 (64.32)
Unintentional	188 (52.37)	36 (44.44)

Variable	Emergency Department Visits (<i>n</i> = 1151)	Inpatient Admissions (<i>n</i> = 227)
	<i>n</i> (%)	<i>n</i> (%)
Self-directed ^g	31 (8.64)	16 (19.75)
Assault	88 (24.51)	16 (19.75)
Other/undetermined	12 (3.34)	10 (12.35)
Diagnostic classifications at visit		
1	440 (38.23)	16 (7.05)
2	481 (41.79)	47 (20.70)
3	178 (15.46)	77 (33.92)
4	52 (4.52)	87 (38.33)

SI = suicidal ideation, ICD-9 = International Classification of Diseases, Ninth Revision

Note. Percentages may not sum to 100 due to rounding and/or missing data.

^b Includes home/self-care, home healthcare, and shelters.

^c Includes crisis respite center, skilled nursing facility, cancer center or other hospital, and hospice.

^d Includes adult family home and unspecified institutions.

^e Poisoning was classified as substance use, with alcohol or drug specified, as appropriate.

^f Includes ED visits and inpatient admissions with injury and poisoning-related diagnoses (*n* = 359 and *n* = 81, respectively); ICD-9 E-codes were missing in some instances, so categories will not sum to 100.

^g Includes self-injurious behavior, suicide attempt, and completed suicide.

Table 3Hospital Utilization Characteristics during the Study Period ($N = 400$)^a

	Index ED Visit $n = 342$	Index Inpatient Admission $n = 58$
	n (%)	n (%)
1 or more subsequent ED visits	191 (55.85)	32 (55.17)
1 or more subsequent inpatient admissions	45 (13.16)	16 (27.59)

ED = emergency department

Note. Because some patients had subsequent visits to the ED, some to the inpatient floors, and others had no subsequent hospital encounters, columns do not sum to the total number of patients.

^aTwo patients who died by suicide during their index hospitalization were removed from these calculations.

Table 4

Cox Proportional Hazard Multivariate Regression Model for **ED Visit or Hospital Readmission** within 1 Year of Index Visit

Variable	Males (<i>n</i> = 247)		Females (<i>n</i> = 153)	
	HR	95% CI	HR	95% CI
Age	1.09	(0.97, 1.23)	1.11	(1.00, 1.22)
Race and ethnicity				
American Indian or Native American	1.17	(0.50, 2.72)	1.07	(0.37, 3.10)
Asian or Pacific Islander	2.31	(0.99, 5.39)	0	— ^a
Hispanic	0.57	(0.27, 1.21)	0.52	(0.12, 2.18)
Non-Hispanic Black	1.42	(0.90, 2.25)	1.25	(0.74, 2.13)
Non-Hispanic White		Reference		Reference
Unknown	0.63	(0.25, 1.58)	0.69	(0.21, 2.25)
Housing status				
Homeless ^b		Reference		Reference
Transitional/supportive housing	1.20	(0.59, 2.42)	0.82	(0.38, 1.75)
Private address	2.64	(1.73, 4.01) ^{**}	2.34	(1.42, 3.83) ^{**}
With injury diagnosis	0.90	(0.60, 1.34)	1.74	(1.06, 2.85) [*]
With acute medical condition diagnosis	1.59	(1.09, 2.32) [*]		—

HR = hazard ratio, CI = confidence interval, ED = emergency department

Note. Two patients who died during their index admission were not included in this model. Variables were obtained from patients' index ED visit or index hospital admission.

^a No **ED visit or hospital readmission** within 1 year for this subgroup; 95% CI not applicable.

^b Includes "homeless" or "none", youth shelter or center, adult shelter or women's shelter, community service center/day program, substance use or mental health center, church, and unknown.

^{*} $p < 0.05$

^{**} $p < 0.01$