

Frequent users of an inner-city emergency department

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ABSTRACT

Background: Within the emergency department (ED) patient population there is a subset of patients who make frequent visits. This chart review sought to characterize this population and identify strategies to reduce frequent ED visits.

Methods: Frequent use at an urban tertiary care centre was defined as 15 or more visits over 1 year. The details of each visit—demographics, entrance complaint, discharge diagnosis, arrival method, Canadian Triage and Acuity Scale (CTAS) score, and length of stay—were analyzed and compared to data from the entire ED population for the same period.

Results: Ninety-two patients generated 2,390 ED visits (of 25,523 patients and 44,204 visits). This population was predominantly male (66%) and middle-aged (median 42 years), with no fixed address (27.2%). Patients arrived by ambulance in 59.3% of visits with less acute CTAS scores than the general population. Substance use accounted for 26.9% of entrance complaints. Increased lengths of stay were associated with female gender and abnormal vital signs, whereas shorter stays were associated with no fixed address and substance use ($p < 0.05$). Admissions were lower than the general population, and women were twice as likely as men to be admitted ($p < 0.05$). Patients left without being seen in 15.8% of visits.

Conclusions: High-frequency ED users are more likely to be male, younger, and marginally housed and to present secondary to substance use. Although admissions among this population are low, the costs associated with these presentations are high. Interventions designed to decrease visits and improve the health of this population appear warranted.

RÉSUMÉ

Contexte: Parmi les personnes qui se présentent aux services des urgences, un sous-groupe de patients consultent souvent. Le présent examen de dossiers visait à caractériser le groupe en question et à établir des stratégies dans le but de diminuer le nombre élevé de consultations à l'urgence.

Méthodes: Le recours fréquent à l'urgence, dans un centre urbain de soins tertiaires, a été défini comme 15 consultations ou plus sur une période de 1 an. Nous avons recueilli des renseignements sur chacune des consultations: données démographiques, motif de consultation, diagnostic au moment du congé, moyen de transport à l'arrivée à l'urgence, résultat sur l'Échelle canadienne de triage et de gravité (ECTG) et durée du séjour; ces données ont ensuite été analysées, puis comparées avec celles concernant la population générale de patients qui s'est présentée à l'urgence durant la même période.

Résultats: Quatre-vingt-deux patients totalisaient à eux seuls 2390 consultations à l'urgence (sur 25 523 patients et 44 204 consultations). Le groupe était composé en grande partie d'hommes (66%), d'âge moyen (âge médian 42 ans), sans domicile fixe (27.2%). Les patients sont arrivés en ambulance dans 59.3% des consultations; pourtant, ils obtenaient un résultat sur l'ECTG moins élevé que la population en général. La consommation d'alcool ou de drogues représentait 26.9% des motifs de consultation. Les séjours prolongés étaient associés au sexe féminin et à des signes vitaux anormaux, tandis que les courts séjours étaient associés à l'absence de domicile fixe et à la consommation d'alcool ou de drogues ($p < 0.05$). Les hospitalisations étaient moins fréquentes dans ce groupe que dans la population en général, et les femmes étaient deux fois plus susceptibles d'être hospitalisées que les hommes ($p < 0.05$). Dans 15.8% des consultations, les patients sont partis sans être vus par un médecin.

Conclusions: Les grands utilisateurs de services d'urgence sont généralement de jeunes hommes, demeurant dans des lieux précaires et consultant pour des troubles secondaires à la consommation d'alcool ou de drogues. Le taux d'hospitalisation est faible dans ce groupe de patients, mais les coûts associés aux consultations fréquentes sont élevés. Le recours à des interventions visant à diminuer le nombre de consultations et à améliorer l'état de santé de ces personnes semble justifié.

Keywords: emergency department, frequent users, heavy use, recidivism, repeat users, substance use

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Within the population of emergency department (ED) users there exists a subset of patients who present frequently to the ED. Despite their low numbers, these individuals comprise an inordinately high number of all ED visits and consume a disproportionate amount of health care resources.^{1,2}

Previous studies have had widely discrepant definitions of frequent use, from 4 to more than 20 visits per year.¹⁻⁹ Despite varying definitions, high-frequency ED users have been described together as typically poor, male, members of minority groups, chronically ill, socially isolated, and frequently presenting with psychiatric or substance abuse problems.^{2,5,10,11} The literature suggests, however, that characteristics differ between frequent users with less than 20 visits per year and those with more than 20 visits.^{12,13}

Frequent ED use places an economic burden on the health care system and may also indicate that basic needs have gone unmet. In one study, 70% of frequent ED users were homeless or qualified for public assistance and often visited the ED for shelter, safety, food, clothing, and social interaction.¹⁴ Health care provision appears to be inadequate as well, with the morbidity and mortality of these frequent users exceeding that of the general population.^{4,5,15} Furthermore, although this subset of individuals does frequently present with acute intoxication as their sole diagnosis, their lifestyles may also pose significant health risks. Injury secondary to assault or accidents, complications of unmanaged chronic medical conditions, and long-term drug and alcohol abuse are all potential reasons for ED visits.

Although previous studies have characterized these populations in other North American centres, the few Canadian studies describing frequent ED use have focused on specific subsets of patients rather than the recidivist population as a whole.¹⁶⁻¹⁹ One Canadian study, by Ovens and Chan, reviewed patterns of heavy ED use across Ontario; however, visit details and outcomes were not analyzed.⁹

The purpose of this study was to identify and characterize the recidivist population in an effort to better assess their health care needs. We conducted a retrospective chart review of individuals who made 15 or more visits to the ED over 1 year. We sought to identify demographic information of this population, reasons for ED visits, triage information for each visit, and visit outcome.

METHODS

Setting

This study was a retrospective chart review of individuals who visited the Health Sciences Centre (HSC) Emergency Department ≥ 15 times between January 1, 2005, and December 31, 2005. The HSC in Winnipeg is a 745-bed urban teaching hospital serving adult residents of Manitoba, Nunavut, and north-western Ontario. It is the designated trauma centre for the province, and the ED also sees high numbers of dialysis and transplant, neurosurgical, cardiac, and burn patients, as well as patients with complex medical or surgical issues. Due to its location in the inner city, the HSC is a major care provider for underprivileged inner-city populations.

Patients

Although there is no consensus in the literature regarding the number of visits per year that defines frequent ED use, studies have found significantly different population characteristics in patients with more than 20 visits.¹² To ensure complete capture of the highly recidivist population, "frequent" was defined as 15 or more visits in 1 year for this study. Individuals with 15 or more visits from January 1 to December 31, 2005, were identified via the electronic triage system for inclusion. Patients were excluded if they were less than 18 years of age or had expired between January 1 and December 31, 2005. As a control, select variables were reviewed and compared for all ED patients at the HSC in 2005.

Data collection

Data were extracted using a previously defined and standardized abstraction tool. Specific variables were identified by a panel of emergency physicians at the outset of data collection and included demographic information, triage details, and emergency physician assessment details. Patients were classified as having "no fixed address" if their address was listed as "no fixed address," or its abbreviated form, "NFA," the postal code was nonexistent, or multiple postal codes were provided over the course of the year. The triage document was used to collect information on mode of arrival, entrance complaint, Canadian Triage and Acuity Scale (CTAS) score, triage time, day of the week, day of the month, and vital signs at the time of

triage. Subjects were identified by a study number to maintain confidentiality. A single trained abstractor reviewed all original cases, and a second blinded abstractor reviewed a random sample of the study population to assess the reliability of abstraction.

ED assessment details

Data collected from ED charts included presenting complaint, diagnosis, and disposition at discharge from the ED. Entrance complaints and diagnoses were divided into categories (Figure 1). Substance use as a presenting complaint was identified on charts where the triage nurse had listed substance use, misuse, abuse, or withdrawal as the entrance complaint. No diagnosis was assigned when the diagnosis field was blank or the patient left prior to diagnosis. A diagnosis of “other” was assigned to diagnoses not fitting one category, for example, cast check or blood test results. Disposition at discharge was classified as discharged, admitted to the ward or observation unit, left without being seen (LWBS) or against medical advice (LAMA), discharged to dialysis, or transferred to another hospital. It was

also noted whether a subject was observed or discharged from the ED under the Intoxicated Persons Detention Act. This act facilitates discharge of medically cleared, intoxicated individuals in the care of police to a detention unit at a homeless shelter in Winnipeg.

Data analysis

The data were entered into Microsoft *Excel* and analyzed using *SAS* version 9.1 (SAS Institute, Cary, NC). Frequencies were compared using the chi-square test for normally distributed data. CTAS scores 1 and 2 were classified as more urgent and CTAS scores 3, 4, and 5 as less urgent. The year was divided into quartiles for comparison, with winter comprising December through February; spring, March through May; summer, June through August; and fall, September through November. Length of stay (LOS) in the ED was not normally distributed and was analyzed with the Wilcoxon rank sum test. Heart rate, respiratory rate, and temperature were correlated with LOS using Spearman rank correlation. The Cohen

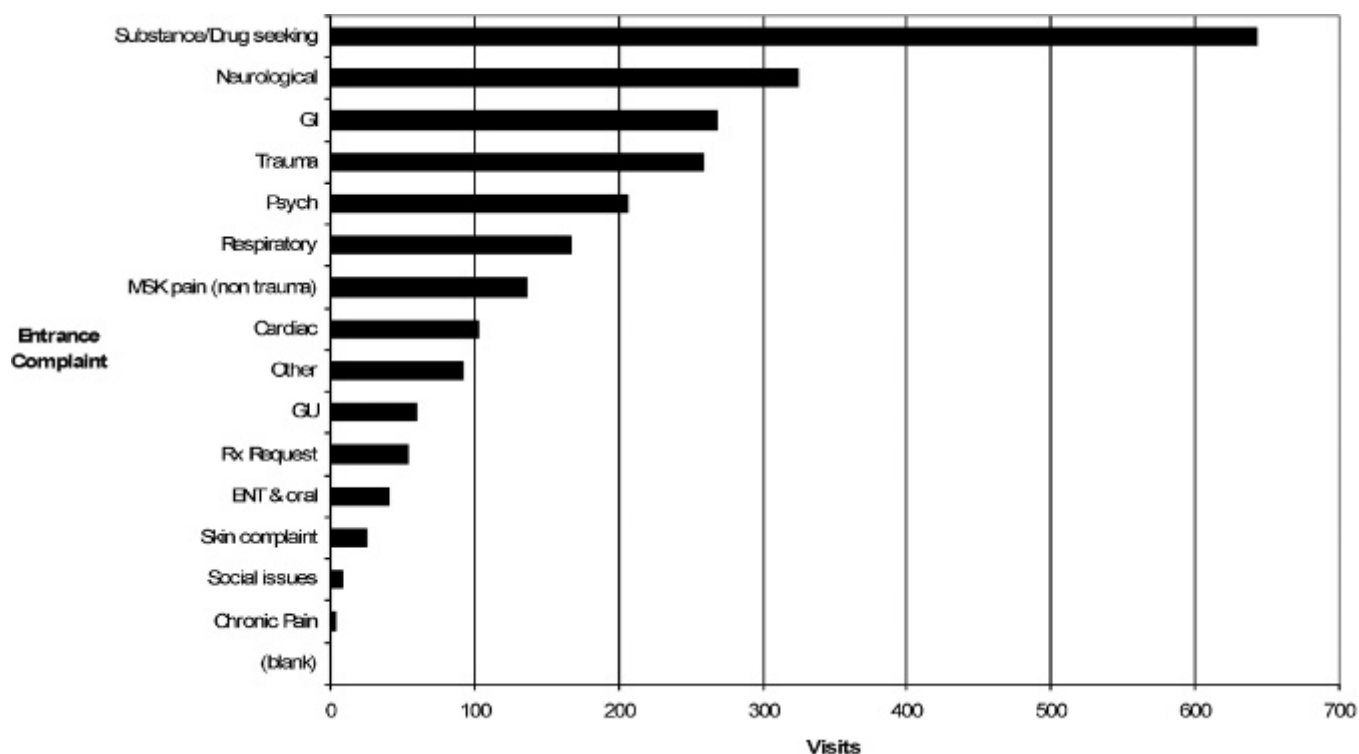


Figure 1. Emergency department (ED) visits by presenting complaint. GI = gastrointestinal; GU = genitourinary; MSK = musculoskeletal.

kappa was used to measure levels of agreement for categorical outcomes, and paired two-sample *t*-tests were used to assess agreement for continuous outcomes.

Ethics

The institutional Research Ethics Board approved the study prior to commencement.

RESULTS

Sampling

In 2005, 95 people attended the ED at least 15 times; 3 were excluded from the study as they died within the study period. The total number of patients and visits for the HSC emergency department was 25,523 and 44,204, respectively. Frequent users had a total of 2,390 visits overall, comprising 5.4% of total visits while accounting for only 0.36% of the population attending the ED. The number of visits ranged from 15 to 104, with a median of 21. Patients with no fixed address had more visits than patients with a stable address ($p = 0.006$). Demographic information is shown in Table 1.

A second abstractor reviewed a random sample of 7.3% of visits. Kappa values for interrater agreement showed excellent agreement (0.8 to 1.0) for all but one of the important variables, with the category of discharge diagnosis having a kappa value of 0.57. Calculated percent agreement for this category was 72%. *t*-Tests for continuous variables (vital signs) also showed good agreement, with no significant difference between reviewers.

Table 1. Demographic information of study population

Variable	<i>n</i> (%)
Patients	92 (0.36 total ED)
Visits	2,390 (5.4 of total visits)
Male	61 (66.3)
Age, yr (by visit)	
18–44	1,345 (56.2)
45–64	981 (41.0)
65–74	32 (1.3)
75+	32 (1.3)
No fixed address	25 (27.2)
Documented family doctor on chart	47 (51.1)

ED = emergency department.

Demographics

Males comprised 66.3% of the patients studied and accounted for 68.8% of all visits. The ages ranged from 18 to 80 years, with a median age of 42 years. The frequencies with which different age groups visited the ED were significantly different, with individuals aged 45 to 64 comprising 41% of all visits in the study group compared to 27.6% of the total population ($p < 0.0001$). Nearly one-third of individuals were classified as having no fixed address, with most of the remainder living in close proximity to the hospital.

CTAS score

The distribution of CTAS scores differed significantly between the study and control populations (Table 2). The study population had a higher proportion of less urgent visits and a lower proportion of urgent visits than the control population ($p < 0.0001$). There were no significant differences in CTAS scores based on sex or the presence or absence of a family doctor.

Mode of arrival

Ambulance was the mode of arrival 59.3% of the time (Table 3). Half (50.4%) of these involved a diagnosis related to substance use, and 16.9% had no diagnosis listed, most often due to LWBS or LAMA. Fifty percent of ambulance arrivals were CTAS 4, and 66.2% of all CTAS 4 visits arrived by ambulance ($p < .0001$). The majority of the remainder arrived independently, and small percentages arrived via police or were transferred.

Entrance complaints and discharge disposition

Figure 1 illustrates the number of ED visits by presenting complaint. The most cited presenting complaint was substance abuse/drug seeking (26.9%). Substance abuse accounted for 34.1% of all discharge diagnoses, and substance-related issues were more common in males than females, accounting for 75.4% and 38.7% of diagnoses, respectively. Discharge diagnoses closely paralleled entrance complaints, with substance abuse accounting for the highest frequency of diagnoses, followed by no diagnosis (LWBS or LAMA) and gastrointestinal, neurologic, and psychiatric complaints. Overall,

Table 2. Distribution of CTAS scores for study population and overall ED population

CTAS score	Study population	Proportion, % (95% CI)	Overall population	Proportion, % (95% CI)
1	20	0.84 (0.47–1.20)	583	1.32 (1.21–1.43)
2	230	9.62 (8.44–10.81)	6,458	14.62 (14.29–14.95)
3	717	30.00 (28.16–31.84)	17,516	39.66 (39.20–40.12)
4	1,073	44.90 (42.9–46.89)	15,062	34.10 (33.66–34.54)
5	350	14.64 (13.23–16.06)	4,551	10.30 (10.02–10.59)
Grand total	2,390		44,170	

CTAS = Canadian Triage and Acuity Scale; ED = emergency medicine.

44.7% of patients listed as having a family physician had a substance-related diagnosis compared to 82.2% of patients without a family physician ($p = 0.0002$). Visits resulting in a patient being transferred under the Intoxicated Persons Detention Act accounted for 17.8% of all visits.

Patients were most commonly discharged (54.0%); however, an important number also LWBS (15.8%) and to the intoxicated persons detention unit (21.7%). The rates of LWBS were highest in the summer months and lowest in the winter. The overall admission proportion was significantly lower than that of the general population, with 4.2% of visits resulting in admission compared to 19.1% ($p < 0.0001$). The admission rate by CTAS score is shown in Table 4. Females were admitted more than twice as frequently as males (6.58% versus 3.04%; $p < 0.0001$). Patients were noted to have a family doctor in 60.1% of admissions.

Length of stay

The median LOS was 4.26 hours (range 0–73.2 hours) in the ED, including the observation unit for admitted patients. Fifty percent of ED visits were between 2.5 and 6.8 hours, and 10% of the attendances were longer

than 10.9 hours. Females had longer stays than males ($p < 0.006$). The mean LOS for all CTAS levels was not significantly different between the control and study groups, with CTAS 2 having the highest LOS of the acuity levels. LOS was increased if a patient was admitted, had a family physician, or was discharged to the intoxicated persons detention centre. Abnormal vital signs of increased respiratory rate, heart rate, and temperature also increased the LOS in the ED. Patients who were reported as having no fixed address were found to leave without being seen more frequently and to have shorter median LOSs in the ED. Substance use decreased the median and minimum LOS. Visit number and LOS were inversely correlated, with LOS decreasing as the number of visits increased ($p = 0.003$).

DISCUSSION

Previous studies have shown that the characteristics of frequent users differ as visits increase beyond 20 per year and that these individuals may visit the ED for issues that may be better dealt with elsewhere.¹² A review by LaCalle and Rabin described frequent users as those having a minimum of 2 to 12 visits per year and being sicker than occasional users, with a mean age

Table 3. Distribution of CTAS scores by method of arrival

CTAS score	Independent	Ambulance	Police	Stretcher/transfer	Total
1		20			20
2	93	130	6	1	230
3	305	403	8	1	717
4	348	710	12	3	1,073
5	193	155	2		350
Total	939	1,418	28	5	2,390
Visits (%)	39.29	59.33	1.17	0.21	100.00

CTAS = Canadian Triage and Acuity Scale.

Table 4. Emergency department admissions by CTAS score

CTAS score	Visits	Admissions	Visits (%)	Admissions (%)
1	20	1	0.04	1.01
2	230	27	1.13	27.27
3	717	35	1.46	35.35
4	1,073	27	1.13	27.27
5	350	9	0.38	9.09
Grand total	2,390	99	4.15	100.00

CTAS = Canadian Triage and Acuity Scale.

of approximately 40 years.¹³ Most previous studies conducted have used a lower visit number to define frequent use^{1,2,4,8,20}; however, Ruger and colleagues compared individuals with 6 to 20 visits to those with over 20 visits.¹² They found the latter to be less sick, to have lower admission rates, and to be more likely to LWBS, with a slight preponderance of females. In comparison, our definition of frequent use identified a population that was predominantly male, younger, and with lower acuities than the general ED population, most consistent with the previous description of highly frequent users. This may indicate that highly frequent users are less sick than the overall ED population because admission rates were also significantly lower; however, it may also be due to assigning frequent users a lower triage score because of familiarity.

Ambulance use was also disproportionately high in our study population, which was especially notable for lower-acuity presentations and those that LWBS and LAMA. Much of our population was marginally housed and suspected to be of a lower socioeconomic status, and in this population, ambulance transport may be financially covered by social assistance. Substance use has also been linked to increased ambulance use, with rates as high as 20% of transports attributable to alcohol^{21,22} and as high as 70% in repeat emergency medical services users.²² In this study, 50.4% of ambulance arrivals involved a substance diagnosis, which may be an underestimate given the high percentage of individuals arriving by ambulance who LWBS. Often an ambulance is not called by the patient but rather by passersby, who call to report a person found down on the street. These patients are often found to be intoxicated and may receive a lower triage score on arrival at the ED.

Disposition among our frequent users may contribute to their repeat use of the ED. Rates of LWBS in this population were higher than in the overall

population. High rates of LWBS and LAMA may indicate incomplete treatment of a medical condition, resulting in the need to seek care later in time. Other studies have reported lower LWBS rates between 1.4 and 4%^{23–25} and a high incidence of repeat visits within 1 week if a patient LWBS.²⁶ Frequent users are more likely to LWBS for a variety of reasons. The study population had lower-acuity triage scores and potentially longer wait times, which is a commonly cited risk factor for LWBS.^{23–25} Individuals were less likely to LWBS in the winter months, suggesting that ED visits during colder weather provide a temporary relief from the cold among marginally housed individuals.

Admissions were lower than those of the general ED population, similar to observations reported in other studies of frequent users.⁷ The low admissions may be secondary to lower-acuity presentations, familiarity with the patients, high rates of substance complaints, and the high proportion of individuals who LWBS. Furthermore, nearly a quarter of the patients were discharged to the intoxicated persons detention unit as they were too intoxicated to discharge safely. Although this addresses the immediate patient safety concerns, it does not address the underlying issue of substance abuse and contributes to perpetuating the cycle. Interestingly, women were admitted at more than double the rate of men, suggesting that women who frequent the ED at high rates are sicker than their male counterparts.

A common misconception is that frequent use of the ED for nonurgent conditions contributes significantly to overcrowding. This study serves to partially refute this claim because the LOS of highly frequent users was shorter than that of the general ED population. Although this is at least in part due to the high rate of LWBS, we noted that as a patient's number of visits increased, the LOS decreased. Many of these individuals returned repeatedly for the same complaint, and

physicians may miss diagnosing a serious illness in this setting. With more objective data, however, staff are better able to identify sicker patients and manage them accordingly, as was evidenced by increasing LOSs when any vital signs were abnormal.

Of concern in our study was the number of homeless or marginally housed individuals as nearly a third were classified with no fixed address, whereas still others had perhaps been using the address of a homeless shelter. In previous studies, homelessness has been shown to be an independent risk factor for mortality²⁷ and a factor strongly predictive of repeat use of the ED.² Interventions that have addressed homelessness have had success in decreasing ED visits,^{28,29} decreasing problem drug use,²⁹ and decreasing the costs of associated services such as detoxification centres.³⁰

Limitations

There are limitations inherent in any chart review. The data obtained were dependent on what was recorded in the medical record, and not infrequently data pieces were missing. The study population was limited to highly frequent users and is not representative of the frequent user population if defined by a lower volume of visits per year. The study site was a single urban inner-city tertiary care hospital, which may limit generalizability.

CONCLUSION

Highly frequent users comprise a unique population within patients visiting the ED. Although they comprise a small portion of the overall ED population, they account for a high proportion of visits and use a significant amount of resources, including paramedic, nursing, and physician services. They are more likely to be male, younger, and marginally housed and to present secondary to substance use. Despite their frequency, triage scores are low and admissions are uncommon. Interventions designed to decrease visits and improve the health of this population appear warranted.

Competing interests: None declared.

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