Patients who leave the emergency department without being seen and their follow-up behavior: a retrospective descriptive analysis

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Abstract

Background: Past studies suggest that patients who leave without being seen by a physician (LWBS) from a hospital's emergency department (ED) represent a quality and safety concern, and thus LWBS rates have often been used as an ED performance metric. There are few recent studies, however, that have examined the characteristics of the LWBS population at hospitals in the United States.

Objectives: This study describes the LWBS population at a multi-hospital academic health system.

Methods: This was a retrospective study of electronic medical record data from EDs at two academic hospitals with a shared patient population that analyzed all LWBS visits over the 45-month period between July 2012 and March 2016. Demographic and clinical variables including patient characteristics, chief complaint, acuity, and evidence of ongoing medical care were assessed.

Results: Over the study period, 2.4% of patients presenting to the study EDs left without being seen. This population tended to have lower-acuity chief complaints and nearly triple the number of ED visits as the general ED patient. 7.8% sought follow-up care from outpatient clinics and 24.8% returned to the ED within 7 days. Of this latter group, 11.5% were subsequently admitted for inpatient care, representing 0.068% of the total ED census during the study period.

Conclusions: LWBS patients are high ED utilizers who may be effectively targeted by "hotspotting." Our 11.5% admission rate at return after LWBS compares favorably with the overall 20.9% admission rate at the study EDs and represents a small minority of all LWBS visits. Given the paucity of return ED visits after interval clinic encounters, our

data suggests that patients who were seen in clinic had their medical complaint adequately resolved on a non-emergent outpatient basis, and that increased LWBS rates may reflect poor access to timely clinic-based care rather than intrinsic systemic issues within the ED.

Introduction

Patients presenting to a hospital's emergency department (ED) who are triaged but leave without being seen by a physician (LWBS) are a major concern for healthcare providers and hospitals. The LWBS population, ranging from less than 1% of all triaged patients at some EDs to greater than 10% at others, has been suggested in the literature to represent a shortfall in healthcare access, as these patients do not receive the care they originally sought [1–6]. Some studies suggest that LWBS rates may also reflect patient safety issues, as some patients who did not receive medical care when originally sought consequently experienced avoidable outcomes [7]. Conversely, it may also be hypothesized that the decision to LWBS reflects a lower-acuity complaint that has resolved or will resolve without medical intervention.

In response to the published literature, however, multiple organizations including the Centers for Medicare and Medicaid Services (CMS) and The Joint Commission (TJC) currently use or plan to use LWBS rate as a key ED quality indicator, with potential to be used in future pay-for-quality initiatives [1,8–10]. The CMS Hospital Outpatient Quality Reporting Program (HOQRP), mandated by the Tax Relief and Health Care Act of 2006, adopted key measure "OP-22: Left Without Being Seen" in 2011 per the recommendations of the National Quality Forum's National Voluntary Consensus Standards for Emergency Care [11,12]. CMS has since tied the

reporting of LWBS rates to Medicare reimbursement, via a 2% reimbursement rate reduction if reporting requirements for OP-22 and other key measures are not met. This value, reported without contextual information on hospitals' patient populations, is compared with that of other hospitals across the nation. As of 2018, the mean nationwide hospital LWBS rate in the HOQRP data set is 2% [13].

Despite the attention placed on LWBS rates as an ED metric, however, there are few recent studies on the demographic and clinical characteristics of the LWBS population at hospitals in the United States. Further, few studies have examined either the subset of patients with multiple LWBS ED visits or the follow-up behavior and outcome of those patients who leave prior to seeing a physician, and thus there exists little data describing the incidence of adverse outcomes after LWBS.

The purpose of this study, therefore, was to describe the LWBS population and its subsequent follow-up encounters at a multicenter academic health system, as a first step in determining whether the population constitutes a major safety, quality, and access shortfall, and in suggesting systemic changes if indicated.

Methods

Study design

This study consisted of a retrospective review of electronic medical record data for all LWBS visits from the two EDs in the University of California San Diego (UCSD) Health System during

a 45-month period (July 1, 2012—March 31, 2016). The study was approved by the UCSD institutional review board.

Study setting and population

Data were obtained through a Structured Query Language (SQL) query and manual chart review of the Epic® electronic medical record from EDs at the UCSD Medical Center in Hillcrest and UCSD Thornton Hospital in La Jolla. UCSD Medical Center is an urban academic teaching hospital and Level I trauma center with an annual ED census of approximately 40,000 visits. Thornton Hospital is a suburban academic teaching hospital with an annual census of approximately 24,000 visits. The two hospitals serve a shared patient population and share an electronic medical record as part of the UCSD Health System.

The LWBS ED visit, defined as an encounter in which a patient was evaluated and charted by a triage nurse but left the hospital before being seen by a physician, was chosen as the unit of analysis. The study included all LWBS visits at the two EDs over the 45-month period. Visits in which patients were directly triaged to the separate trauma resuscitation suite, labor and delivery, or burn clinic were excluded from the LWBS dataset.

Data were also collected for re-presentations to UCSD EDs, visits to outpatient clinics within the UCSD Health System, and phone encounters with UCSD within 7 days of LWBS. ED returns were treated as the endpoint: further clinic or phone encounters after an ED return were excluded from the dataset. Clinic visits were defined as in-person encounters in which patients were seen by a physician or advanced practice provider, excluding procedure-only or labs-only visits.

Phone encounters included both calls and electronic Epic MyChart® communications, and both those made by and to patients. Follow-up calls made from the ED, however, were excluded.

Measures

Demographic measures included patient age, sex, and time of encounter. Clinical measures included visit chief complaint, acuity at triage (as stratified by Emergency Severity Index, ESI), and episodes of ongoing medical care within the UCSD Health System in the 12 months prior to and after LWBS. Ongoing medical care was defined as any outpatient visit to a UCSD clinic where the patient was seen by a health professional, excluding ED and procedure-only or labs-only visits.

Data Analysis

Descriptive univariate analyses were performed on the demographic and clinical measures of the entire set of LWBS visits. Aggregate descriptive statistics were also collected for all general ED visits—including admits, discharges, discharges against medical advice (AMAs), etc—during the same 45-month time period to provide a qualitative comparison.

Demographic measures were also analyzed on a per-patient basis to control for outlier patients with multiple LWBS ED visits during the study period.

All analyses were conducted using the IBM SPSS Statistics 23.0 software package (IBM Corp., Armonk, NY) and Microsoft Excel 2016 (Microsoft Corp., Redmond, WA).

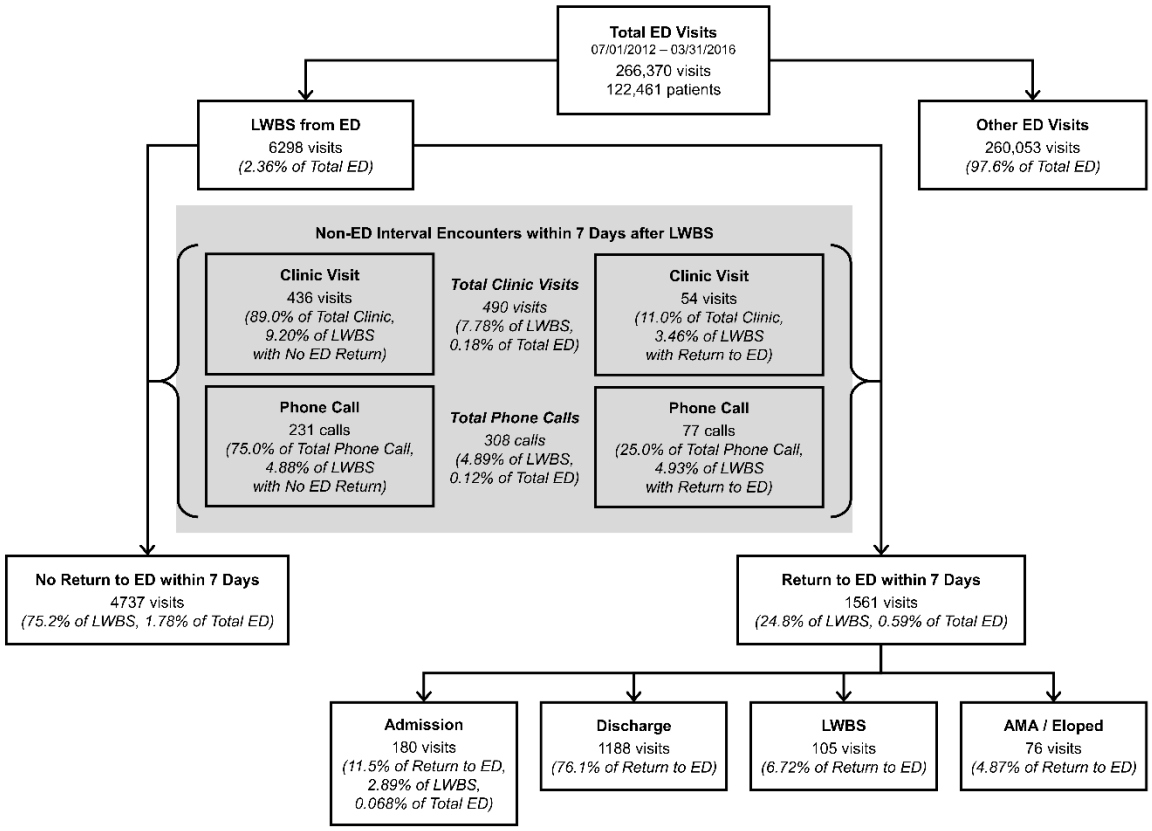

Figure 1. Summary of ED visits and LWBS visits included in this study.

Results

Over the 45-month study period, there were 6298 LWBS visits at the two UCSD Health System EDs out of a total of 266,370 ED visits (2.4% LWBS rate), excluding 14 direct trauma, labor and delivery, or burn admits that were erroneously-coded as LWBS (Figure 1). The UCSD Medical Center in Hillcrest had both a greater ED volume and a higher 3.1% LWBS rate, while Thornton Hospital in La Jolla had a lower volume and 1.0% LWBS rate (Table 1).

57.4% of LWBS visits and 63.2% of all ED visits occurred during daytime (Table 1), with the greatest volume of LWBS encounters in the early afternoon. LWBS visits tended to be of slightly lower acuities than general ED visits, predominantly of ESI categories 3 or 4 ("Urgent" or "Less Urgent," respectively), with a mean acuity at triage of ESI 3.42 ± 0.59. This compares with a general ED ESI of 3.16 ± 0.63 at triage. LWBS visit chief complaints were largely pain-related, with a similar distribution to the general population ED visit.

Index Visit Characteristics	LWBS Study Population		Total ED Population	
	N	*%*	*N*	*%*
ED of Presentation	6298	--	266,359	--
UCSD Medical Center	5310	84.3	169,937	63.8
Thornton Hospital	988	15.7	96,422	36.2
Arrival Time				
Day (06:00-17:59)	3613	57.4	168,328	63.2
Night (18:00-05:59)	2685	42.6	98,031	36.8
Acuity				
ESI 1	0	0.0	1250	0.5
ESI 2	66	1.0	24,892	9.3
ESI 3	3743	59.4	173,163	65.0
ESI 4	2170	34.5	59,303	22.3
ESI 5	241	3.8	6229	2.3
Missing/Unknown	78	1.2	1533	0.6
Top 5 Chief Complaints				
Abdominal Pain	708	11.2	29,520	11.1
Back Pain	220	3.5	7049	2.6
Chest Pain	177	2.8	--	--
Cough	165	2.6	--	--
Alcohol Problem	113	1.8	7138	2.7
Altered Mental Status	--	--	4585	1.7
Ankle Pain	--	--	2309	0.9

Table 1. Summary of visit characteristics for LWBS index encounters.

Patients who LWBS tended to be middle-aged and slightly younger than the average patient of the general ED population (Table 2). The median age in the LWBS population was 41 (IQR 28, 54), with an overall bimodal age distribution peaking at approximately 30 and 50 years old. The

sex makeup of the LWBS population, at 52.2% male, was similar to that of the general ED population, at 51.5% male.

Approximately a third of LWBS patients had ongoing outpatient medical care within the UCSD Health System both before and after the LWBS encounter.

The 6298 LWBS visits in the study dataset included 5396 unique patients, for a mean of 1.17 LWBS visits per patient. Patients in this population, however, made an average of 6.21 visits to UCSD EDs during the study timeframe. This compares to a total of 266,370 ED visits during the study period by 122,461 patients, for a mean of 2.18 ED visits per patient.

90.3% (N = 4871) of patients who LWBS did so only once during the study period, 6.9% (N = 371) did so twice, 1.6% (N = 86) did so on three occasions, and 1.3% (N = 68) did so on four or more occasions (range = 4 to 24 encounters). Patients with 10 or more LWBS visits during the study period generally presented with similar chief complaints at the majority of their LWBS encounters. These chief complaints were nearly exclusively pain-related and were often additionally complicated by psychiatric and psychosomatic complaints.

	LWBS Study Population		Total ED Population	
Patient Characteristics	***N***	***%***	***N***	***%***
Age (yrs) *Median (IQR)*	41 (28, 54)		42 (27, 58)	
<18	214	4.0	5779	4.7
18-24	698	12.9	18,013	14.7
25-44	2140	39.7	41,459	33.9
45-64	1859	34.5	37,647	30.7
≥65	484	9.0	19,444	15.9
Sex				
Female	2578	47.8	59,329	48.4
Male	2816	52.2	63,079	51.5
Ongoing Care at UCSD				
Prior to LWBS	2067	32.8	--	--
After LWBS	2182	34.6	--	--
Either Before or After	2573	40.9	--	--
Mean ED Visits / Patient	6.2		2.2	

Table 2. Summary of patient characteristics for the total UCSD ED population and the LWBS subset. N = patient count.

Return Encounters (within 7 Days)	***N***
ED Return Visit	1561
Within 24 hrs	930 (59.6%)
24-48 hrs	208 (13.3%)
48-72 hrs	124 (7.9%)
Time between LWBS & Return (hrs) *Median (IQR)*	20 (8, 58)
Outpatient Clinic Visit	490
Preceding ED Return	54
Phone Encounter	308 (237 patient-initiated)
Preceding ED Return	77
Disposition of ED Return Visits (%)	
Admit	180 (11.5%)
AMA/Eloped	76 (4.8%)
Discharge	1188 (76.1%)
LWBS	105 (6.7%)
Transfer	10 (0.6%)
Other/Missing/Unknown	2 (0.1%)

Table 3. Summary of return encounters within 7 days after LWBS from the ED.

Within 7 days after LWBS, there were 1561 return visits to UCSD EDs for a rate of 24.8%, 490 visits to UCSD outpatient clinics for a rate of 7.8%, and 308 phone contacts with the UCSD Health System for a rate of 4.9%. 54 (11.0%) of the clinic visits and 77 (25.0%) of the phone encounters preceded an ED return within 7 days of the initial LWBS encounter. The time between the index LWBS visit and a return to the ED was right-skewed, with a median of 20 hours (IQR 8, 58) (Figure 2).

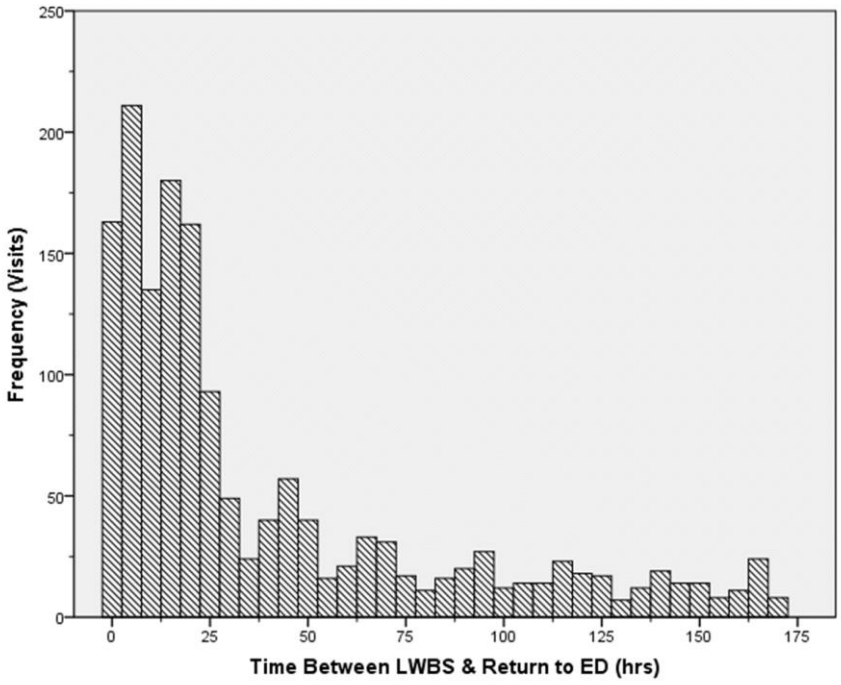

Figure 2. Time between initial index ED visit and return visit, for 1561 ED returns in study population.

76.1% of patients returning to the ED after LWBS were seen by a physician and discharged from the ED, while 11.5% were admitted to the hospital. A significant minority of patients returning to the ED either left AMA or eloped after being seen (4.8%) or again LWBS (6.7%).

Discussion

LWBS rates are tracked in hospitals around the world, as they are believed to represent an indirect quality measure of ED care [2]. As such, we were motivated by the dearth of recent demographic and clinical data on patients who LWBS from EDs, particularly from multi-ED health systems in the United States. Our study attempted to paint a descriptive picture of the LWBS population, including follow-up at outpatient clinics and by phone, in the hopes that doing so will improve our understanding of LWBS rate as a quality marker, and to guide improvements in the delivery of care.

Our system-wide LWBS rate of 2.4% is higher than the national average of 2% documented in the literature and in CMS data [1,8,13]. Multiple previous studies have established a direct relationship between ED crowding and LWBS rates [5,14,15]. Within our data, the prevalence of LWBS encounters during the busy afternoon encounters suggests a possible connection with our system's high ED patient volume and longer wait times, though further study is needed to determine a causal relationship. Other possible contributors include the Medical Center's challenging urban patient population and the close proximity of other EDs to which patients may elope when facing lengthy wait times. In comparison with other academic hospitals, however, UCSD Health System's 2.4% LWBS rate lies towards the lower end of a range that spans from 1.8% to 14.9% [1,2,7].

Our results show that in general, the LWBS population resembles the aggregate ED population seen by the UCSD EDs. Patients in both the LWBS and general ED population tend to be middle-aged and slightly male-predominant, although patients over 65 years old made up a much

smaller proportion of the LWBS population (9.0%) than that of the general ED population (15.9%).

There is some skew towards chief complaints that are less urgent in nature, often for conditions with chronic pain that repeatedly bring these patients back to the ED. This is a pattern that has been replicated by multiple studies nationally and internationally [2–4,16,17]. Notably—and differing from several existing studies [2,4]—alcohol-related and altered mental status chief complaints were less-represented categories within the LWBS population, likely reflecting effective triage procedures that ensure patients with reduced decision-making capacity receive a medical screening exam.

Our study reveals that as a whole, LWBS patients are high ED utilizers, accounting for nearly 3 times the number of visits per patient than the general ED patient. This could reflect a population with a persistent lack of access to reliable outpatient healthcare options or to adequate management of chronic pain and psychiatric conditions [5]. Indeed, only 7.8% of LWBS encounters were followed by a visit to an outpatient UCSD clinic within 7 days, a lower rate than similar measures in other studies [15,18]. Of these clinic visits, nearly 90% were not followed by a return to the ED in the week after LWBS, suggesting that most patients who were able to be seen in clinic had their medical complaint adequately resolved on a non-emergent outpatient basis. These data imply that LWBS rates may not necessarily be representative of poor processes or quality of care in the ED, but rather of poor access to timely clinic-based care. The relationship between limited access to clinics and LWBS rates may even be viewed as analogous to the well-researched connection between extended ED boarding times for inpatients and

decreased ED throughput. It could be hypothesized that shortening primary care scheduling lead times within the health system, potentially targeting the median duration of 20 hours between initial LWBS and return ED visits, may decrease ED LWBS rates. At that threshold, patients may perceive outpatient clinic care as a more attractive alternative to seeking care in the ED for nonemergent complaints.

Taken in combination, our data on the low acuity and high ED utilization of the LWBS population also implies that there exists—in addition to a lack of access to non-emergent outpatient care as discussed earlier—a disconnect between these patients' perceived need for medical care and the acute medical care that is actually indicated. For many of these patients, particularly the 90.3% without previous LWBS visits, this could be due to a lack of understanding of the ED's function in the health system and its triage processes. Many patients expect that by presenting to the ED, they will be seen more or less immediately, whereas in reality it may be hours before low-acuity patients are seen when the department is busy. These findings speak to the potential value of educating patients regarding the most appropriate avenues for receiving effective care for their illnesses.

In contrast to the vast majority of patients who LWBS from the ED only once during the study period, however, a small but significant minority did so repeatedly—as many as 24 times in one patient's case—during this timeframe. These "serial LWBS" patients account for less than 10% of the total LWBS population but for 22.7% of the LWBS visits during the study period. This statistic is concerning not only because this minority significantly balloons the system's overall LWBS rates, but also because these patients continue to slip through the cracks. This may be

because these patients tend to present repeatedly for complaints stemming from issues the ED may not be resourced to solve, including substance dependence or homelessness.

In examining the return visits to the ED within the LWBS population, we also found that nearly a quarter of LWBS visits, 24.8%, were followed by an ED return visit within 7 days, with 59.6% returning to the ED within the first 24 hours. Of those, the vast majority were seen by a physician and either discharged or left on their own accord, with 6.7% LWBS for a second time. 11.5% were admitted upon returning to the ED after LWBS, a rate towards the upper end of those found by most other single- and multi-institution studies nationally and internationally, with some exceptions [1,10,11,13,15,16]. On the other hand, this rate compares favorably to our health system's overall ED admission rate of 20.9%, meaning that the returning LWBS patient is only approximately half as likely to be admitted as the usual ED patient. Nevertheless, this subset of the LWBS population is perhaps the single most concerning statistic, as it describes a group of patients who were not assessed by a physician at first presentation but were sick enough to warrant hospitalization within the following seven days. It may be difficult to design interventions targeted towards these patients, however, as they are a vanishingly small proportion of the overall ED population, totaling 180 visits or 0.0068% of all ED patient encounters during the study period (Figure 1). Other studies have suggested interventions such as physician care at triage [5,6,21], however, it is logical to question whether this already-low rate can be further decreased without a profound redirection of limited ED resources.

Limitations

Our findings should be interpreted in the context of the study design and setting. The retrospective nature of this study limits conclusions of causality and provides hard limitations on the available data. In addition, our study dataset was limited to two EDs within the same health system, and conclusions may or may not be easily extrapolated even to other hospitals in the same county.

With our study's large sample size, it was not possible to manually collect equivalent data for the general ED population over the same study period, and thus quantitative statistical comparisons between the subset of LWBS patients and the general ED population are limited.

Given the nature of the LWBS population, detailed demographic and socioeconomic data were limited in the study institutions' electronic medical record. Housing status and primary spoken language, for example, were not reliably available in our study sample. Similar studies conducted internationally had access to more robust state and national databases that allowed for more thorough examinations of specific patient characteristics associated with increased likelihood of LWBS [2,4,17].

Data on return encounters, whether at the ED, outpatient clinic, or by phone, were limited to what was available in the UCSD Epic® electronic medical record. Thus, while it is possible that a sizeable number of patients who LWBS from the ED traveled to another local ED outside the UCSD Health System to seek treatment, we were unable to collect such data. Thus, rates of all return visits are likely somewhat underestimated.

Even with these limitations in mind, however, our data provides valuable insight into the population of patients who LWBS from two EDs within an academic multi-center health system.

Conclusions

Our study shows that the LWBS population as a whole is similar to that of the overall ED population at the UCSD EDs, but tends to be younger and more male-predominant with less urgent chief complaints that are often psychiatric or pain-related.

Our study identifies a number of possible areas for further investigation and intervention. “Serial LWBS” patients accounted for nearly a quarter of LWBS visits during the study period, and thus there may exist a ripe opportunity for “hotspotting” interventions to ensure that these individuals do not continue to leave before they are evaluated. Further, our study showed that LWBS patients who were seen in clinic within a week of their initial ED visit were unlikely to return to the ED, suggesting that increasing primary care accessibility for these high utilizers may help reduce LWBS rates. Finally, the incidence of hospital admission within one week of an LWBS visit at our health system EDs is vanishingly small at only 0.0068% of all ED patient encounters. This small number indicates that in most cases, patients who elect to LWBS are in fact accurately “self-triaging.” Although these patients’ departures convey failures to provide requested care and to capture potential revenue, the vast majority of these instances reflect visits that are more appropriate for non-emergent outpatient clinics. Moreover, the small percentage of admissions at ED return suggest that sweeping systemic changes to eliminate these hospitalizations may be unwise as they would have significant costs with clinical benefits in only an infinitesimal number of cases. Further investigation of demographic and clinical factors, such

as changes in vital signs between initial ED presentation and return after LWBS, may help better characterize this group to allow for more narrowly-targeted and effective early interventions.

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