



## Boarding of Older Adults: A Concerning Trend in the Emergency Department

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### ABSTRACT

<b>Introduction</b>	Emergency department (ED) boarding (EDB) is the practice of holding admitted patients in the ED due to a lack of hospital beds. We identified one ED in our health system with a high rate of EDB. We sought to identify factors associated with EDB by comparing this ED to another ED with a similar patient profile.
<b>Methods</b>	We conducted a retrospective study comparing two similar EDs associated with 2 community hospitals in our healthcare system. Boarding was defined as a patient waiting $\geq 8$ hours in ED for disposition. One ED located in a rural area within a 55-bed hospital was chosen as it was identified by the healthcare system as having a much higher percentage of boarders, particularly older adults. Another ED located in an urban setting within a 275-bed hospital was chosen for comparison due to a similarity in age demographics. Both EDs have geriatric ED accreditation. Deidentified, aggregate data was obtained. The acuity of patient illness was determined using the Emergency Severity Index (ESI) which is calculated on a scale of 1-5, with lower scores indicating a higher complexity.
<b>Results</b>	The total number of patients seen in the rural ED was 21,167; 33% were $\geq 65$ years; 98% were white. In the urban ED, 23,814 patients were seen; 27% were $\geq 65$ years; 96% were white. The rural ED had a slightly higher (lower complexity) mean acuity score (2.83) compared to the urban ED (2.62). Overall, the rural ED had a proportionately higher number of boarders compared to the urban ED (8% vs 2% of all patients). Of these boarders, a much higher percentage were older compared to the urban ED (65% vs 39%.)
<b>Conclusion</b>	When compared with the urban ED, the rural ED had a larger proportion of boarders, particularly older adults. EDB does not appear to be related to patient characteristics but may instead be influenced by system and community factors like the number of inpatient and nursing home beds. In the future, we plan to work with leadership to further determine these factors.

### INTRODUCTION

Emergency department (ED) boarding (EDB) is the practice of holding admitted patients in the ED due to a lack of inpatient beds. American College of Emergency Physicians (ACEP) defines EDB as “a patient who remains in the emergency department after the patient has been admitted or placed into observation status at the facility but has not been transferred to an inpatient or observation unit.” Unfortunately, patients who are boarding in the ED may have to lay on an uncomfortable gurney or possibly in the hallway for hours or days leading to discomfort, delay in inpatient care, possibly lack of appropriate/timely nutrition and water, and disrupted sleep. In older adults, this may lead to an increased risk of falls, delirium,<sup>1,2</sup> and reduced satisfaction. Furthermore, longer EDB time is associated with higher inpatient mortality.<sup>3</sup> In critically ill patients, EDB is common (2-88%), associated with prolonged duration of ventilation, longer intensive care (ICU) and hospital length of stay, and higher mortality.<sup>4</sup> A systematic review that included both ICU and non-ICU patients did not show overall

increased mortality associated with prolonged EDB.<sup>5</sup> Long wait time in the ED is associated with a compromise on patient safety and quality of care.<sup>6</sup> Unfortunately, EDB time increased and worsened during the COVID-19 pandemic.<sup>7</sup>

Despite the increased prevalence and associated adverse effects of prolonged EDB, the time frame for EDB is not well defined in the literature. There is a wide range in the number of acceptable hours spent in the ED. Some experts cite appropriate time to transfer as low as two hours from admission order while the Joint Commission recommends that EDB of less than four hours be used as a guideline for optimal patient safety and quality of care.<sup>8</sup> Regardless of the time frame, EDB is an important quality indicator and needs to be monitored. In critically ill patients time from intubation to ICU transfer is another important quality indicator. The boarding time (time-zero) starts when a decision is made to admit the patient.

It should be noted that the terms EDB and crowding are not interchangeable. ACEP defines crowding as “a situation that occurs when the identified need for emergency services exceeds available resources for patient care in ED, hospital, or both.”<sup>9</sup> Crowding is associated with poor outcomes such as higher mortality and delay in treatment.<sup>6</sup> There are many causes of overcrowding, but EDB is critical in causing overcrowding and it can be avoided.

We noted one ED in our 13-hospital healthcare system to have high EDB. There is a paucity of literature on older adults and EDB. To investigate possible contributing factors to EDB we chose to compare two EDs within our 13-hospital systems.

## METHODS

We conducted a retrospective study comparing EDB rates from 7/1/2021 to 6/30/2022 at two EDs associated with a rural and an urban community hospital in our healthcare system. This study was part of a larger quality improvement project that investigated the boarding rate for each ED in all thirteen hospitals within our system. One ED located in a rural area was found to have the highest boarding rate in our system but the factors contributing to this issue were not clear. To identify possible contributing factors to the high boarding rate, an ED in an urban hospital was chosen as a comparison due to similarities in the number of patients seen per year, patient demographics, and acuity. Notably, both EDs have level 3 geriatric emergency department accreditation with American College of Emergency Physicians (ACEP). This accreditation ensures best practices are in place to ensure the interdisciplinary staff has geriatrics training and focus on promoting quality of care to ensure optimal transitions from ED to other care settings.<sup>10</sup> There are 3 levels of accreditation based on the availability of geriatrics best practices ranging from level 1 which is the maximum and level 3 is the minimum required.

Our health care system defines boarding as a patient waiting  $\geq 8$  hours in the ED for disposition. The rural ED (55-bed hospital) was chosen as it was identified by the healthcare system as having a much higher percentage of boarders, particularly older adults. The urban ED (275-bed hospital) was chosen for comparison due to a similarity in age demographics. Deidentified, aggregate data was obtained. Extracted aggregate data included, but was not limited to, the number of patients seen, the number of patients requiring EDB, patient acuity, initial complaints, and patient demographics (such as sex and race.) Acuity of patient illness was determined using the Emergency Severity Index (ESI) which is calculated on a scale of 1-5 with lower scores indicating higher complexity.<sup>11</sup>

## RESULTS

During the 12-month timeframe of this study, there were a total of 21,167 patients seen in the rural ED with an overall EDB rate of 7%. Of these patients, 33% (n=6,946) were  $\geq 65$  years. Of the patients  $\geq 65$  years, 98% were white. During the same time frame, the urban ED saw 23,814 patients and the EDB rate was 2%. Of these 27% (n= 6,366) were aged  $\geq 65$  years and 96% were white. **(Table 1).**

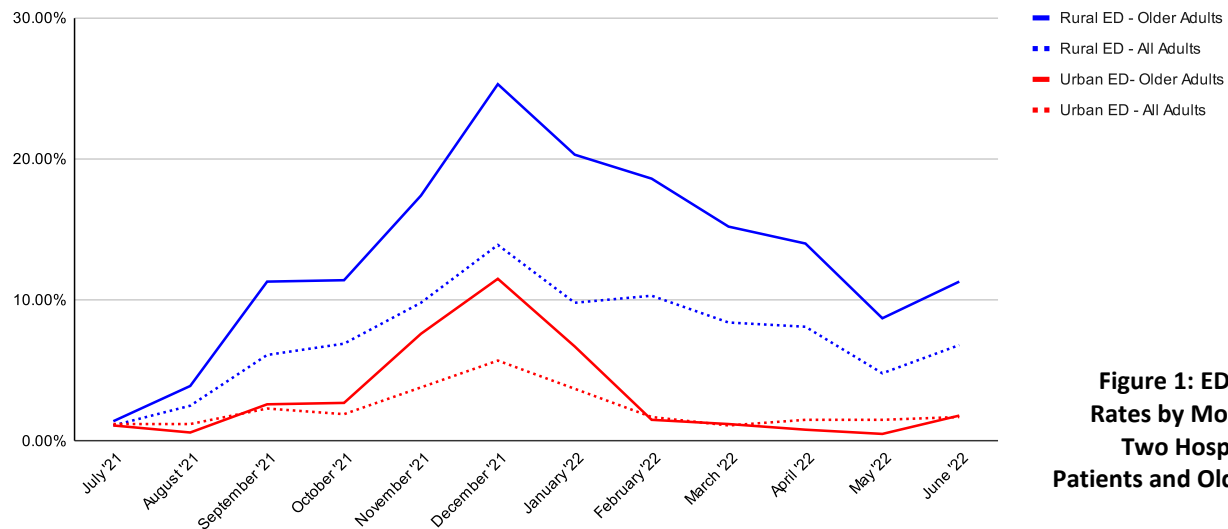
**Table 1: Baseline characteristics of patients 65 years and older in two Emergency Departments from 7/1/2022 to 6/30/2022**

	ED/Hospital 1	ED/Hospital 2
<b>Hospital Characteristics</b>		
Location	Rural	Urban
Total hospital beds, n	55	275
<b>ED: Patient Characteristics (age ≥18 years)</b>		
Total patients (all ages)	21,167	23,814
Boarders, % of all-comers to ED (n)	7.2 (1529)	2.2 (528)
Age 18-64, % of total (n)	67.2 (14,221)	73.2 (17,447)
Age ≥65, % of total (n)	32.8 (6,946)	26.8 (6,366)
<b>ED: Older Adult Patients (age ≥65 years)</b>		
Total number	6,946	6,377
Race, % white (n)	98.2 (6,821)	96.3 (6,141)
Mean Acuity Score	2.83	2.62
Boarders ≥65, % of ED visits ≥65 (n)	14.4 (997)	3.2 (205)
Boarders age ≥65 years, % of all boarders (n)	65.2 (997)	38.8 (205)

\*ED= emergency department; acuity score=lower number is consistent with higher acuity; boarders = admitted patients kept in ED ≥8 hours.

Overall, there was seasonal variation and EDB was higher in winter months (**Figure 1**).

**Emergency Department Boarding Rates: Urban vs Rural Hospital**



**Figure 1: ED Boarding Rates by Month in the Two Hospitals in all Patients and Older Adults**

The mean ESI score was 2.83 for the rural ED and 2.62 for the urban ED. In both EDs, the three most common reasons for older patients to visit the emergency department were shortness of breath, falls, and weakness.

The differences in boarding rates between the two EDs were more prominent at high-volume ED times during the winter months (**Figure 1**). The differences in ED boarding affected older adults (age  $\geq 65$  years) more than younger adults. Of the boarders at the rural emergency department, a staggering 65% were 65 years of age or older despite only making up 33% of the total ED population. At the urban emergency department, only 39% of boarders were 65 years or older which is similar to the proportion of older adults presenting to the emergency department (27%).

## DISCUSSION

This unique study describes the EDB rates in older adults in two EDs. The rural ED had a significantly higher boarding rate for patients of all ages and for patients 65 years of age and older throughout the year when compared to the urban ED, yet the number of patients seen over the course of the year was similar between the two EDs. Additionally, both patient race and gender distribution were similar between the two EDs while other studies have examined boarding rates in single EDs or EDs across hospital systems, there are no known studies that directly compare two EDs to assess the factors contributing to differences in boarding rate. Additionally, there is little consensus on the time to define EDB, which likely contributes to the large variance in rates of EDB noted in the literature.

The patient population at the rural ED was older with 34% of patients 65 years of age or older as opposed to 28% at the urban ED. While it may be reasonable to assume older patients have higher multimorbidity, this did not result in higher complexity of patients seen. In fact, the urban ED had a lower acuity score indicating a higher complexity of patients as opposed to the rural ED. Therefore, it is unlikely that the complexity of patients was driving the higher boarding rate at the rural ED. Supporting this, the most frequent chief complaints for older patients were similar between the two emergency departments throughout most of the study time period. The three most frequently reported chief complaints for older patients at both EDs were shortness of breath, weakness, and falls.

We note a few limitations of our study. First, this is a retrospective quality improvement study comparing only two EDs in our healthcare system. The study population reflects the communities served by the EDs and was not very diverse. Second, the outcomes associated with high EDB were not reported such as association with mortality, delirium rate, ED staffing factors, or falls. Third the original study was not designed to assess the causes of EDB. Lastly, the criteria for the time frame of EDB of 8 hours was longer than other studies.

The strengths of our study include that we have data from a large number of patients over an entire year and both EDs have geriatrics accreditation with a similar number of patients.

In the future, we will work with leadership to better understand and mitigate long EDB time. Other data that may shed light on the long EDB includes the availability of nursing homes in the community to provide ease of discharge from the ED. Also, obtain data on clinically relevant outcomes to compare EDB at different sites and effects on outcomes such as mortality. Programs may be developed in the ED like a model of care for critically ill patients that improved mortality.<sup>12, 13</sup>

Future research should explore other measures like ED and hospital staffing ratios and variability, size of the hospital admitting under observation versus inpatient status, local SNF burdens, differentiating the services patients were admitted to, available specialties length of stay, times of inpatient discharges, PCP availability, and availability of community services. It is fascinating that EDB is isolated as a problem to be faced by EDs alone with a lack of collaboration and awareness from community resources. There is a tolerance of patients stacked inches away from each other on gurneys lining hallways in EDs in very high densities while vast hallways in hospitals are left free, clear, and unencumbered.

## CONCLUSION

When compared with the urban ED, the rural ED had a larger proportion of boarders, particularly older adults. EDB does not appear to be related to patient characteristics but may instead be influenced by system and community factors like the number of inpatient and nursing home beds. In the future, we plan to work with leadership to further determine these causative factors.

## KEYWORDS

Emergency department boarding; older adults; rural health

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## CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

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