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Abstract—Boarding of admitted patients in the Emergency Department (ED), rather than in inpatient care areas, is widespread. We surveyed boarded patients, patients without a disposition, and visitors at a county hospital ED serving a mixed urban and rural population. Subjects were asked “If you needed to be admitted to the hospital but no inpatient bed is available, would you prefer to be kept in an ER hallway or a hallway on an inpatient ward?” Boarded patients said they would prefer ward to ED boarding, 117/213 (54.9%; 95% confidence interval [CI] 48.0%–61.7%). Patients without a disposition 314/477 (65.8%; 95% CI 61.4%–70.0%) and visitors 370/532 (69.5%; 95% CI 65.4%–73.4%) stated a preference for ward boarding in 314/477 (65.8%; 95% CI 61.4%–70.0%) and in 370/532 (69.5%; 95% CI 65.4%–73.4%), respectively. Common reasons for preferring inpatient ward boarding were privacy concerns and reduced noise levels. Those preferring ED boarding valued easy access to a doctor. © 2008 Elsevier Inc.

Keywords—boarding; overcrowding; Emergency Department

INTRODUCTION

The practice of holding admitted patients in the Emergency Department (ED) until an inpatient bed becomes available (commonly called “boarding”) is widespread (1,2). It is highly disruptive to ED operations, has been implicated in medical error, delayed care, and even the hospital-to-community spread of severe acute respiratory syndrome (3–5). An alternative is to board these admitted patients in the hallways of inpatient wards. We performed a survey to determine patients’ preferences in the matter.

MATERIALS AND METHODS

The study was approved by our Institutional Review Board.

Setting

This study was conducted in a county hospital ED with an Emergency Medicine residency program serving a mixed urban and rural population. Our ED has 38 beds, sees 54,000 patients annually, and is supported by a 160-bed hospital. Twenty-one percent of all ED patients are admitted and the ED accounts for 65% of hospital admissions.

Design

This was a cross-sectional survey.

Measurements

A survey tool was designed asking the subject, “If you needed to be admitted to the hospital but no inpatient bed...”
is available, would you prefer to be kept in the ER hallway, or a hallway on an inpatient ward?” Subjects were given the option of giving reasons for their answers. Additional questions assessed demographics to allow validation of the use of convenience sampling. Opinions of reasonable waiting times to see a doctor, and to be placed in an inpatient bed once admitted, were also obtained.

Subjects

We sampled three distinct populations. These were convenience samples (dependent on research assistant [RA] availability) of 1) patients waiting to be seen without a disposition, 2) visitors of patients, and 3) admitted patients who were being held in the ED while awaiting an inpatient bed. The visitors were an entirely heterogeneous group consisting of visitors to both admitted and non-admitted patients, family members and non-family members, and individuals with and without experience of being a patient themselves. We did not measure these variables within this group. Those “patients waiting to be seen” were registered and waiting to see a physician. Their disposition had not been decided at the time of interview. Admitted patients had a decision decided upon, but did not necessarily have admission orders written when surveyed. The purpose of sampling these three groups was to determine the opinion of members of the general public with an immediate interest in the subject (visitors), non-boarding patients, and those patients who were actually being boarded in the ED.

Intubated patients, those with altered mental status, prisoners, and patients on involuntary psychiatric holds were excluded.

RAs trained in research methodology, ethics, and HIPAA (Health Insurance Portability and Accountability Act) laws performed the survey as a brief face-to-face interview. Subjects were presented with “information in lieu of consent” and the survey tool before verbally agreeing to participate. The interviews occurred at the patient’s bedside or chair. Visitors were not asked to leave the patient care area while the survey was being conducted. Most of the data collection was carried out between the hours of noon and midnight, as this is when RA coverage is maximal. A sub-sample was collected between the hours of midnight and noon, and the results of this compared with the findings of the main sample. Data collection occurred from to September 2003 to July 2004.

Double data entry was performed using a FileMaker-Pro (FileMaker Inc., Santa Clara, CA) database customized for the purpose. Statistical analysis was performed using STATA 9.1 (StataCorp LP, College Station, TX).

Proportions of subjects’ stated preferences were compared among RAs to check consistency. Ninety-five percent confidence intervals (CI) were calculated for subject preferences for location of boarding and proportions compared using Fisher’s exact test. Medians of perceived “reasonable waiting time to see a physician,” and time from “decision to admit” to being brought to a ward were compared between groups by analysis of variance. We employed the Sidak correction for multiple comparisons. A multivariate model using backward stepwise logistic regression was constructed to determine if subjects’ preferences were influenced by specific ED circumstances, the number of other patients waiting, level of nursing staffing, ambulance traffic, and whether or not the ED was on ambulance diversion either during the 4-h period when the subject participated or in the preceding 4-h period.

RESULTS

The survey was completed by 1222 subjects (70% participation rate). There were 477 visitors, 532 patients waiting to be seen who did not have a disposition, and 213 patients being boarded. The age and gender compositions of the patient population are shown in Figure 1. A racial, gender, and age description of the entire sample, including visitors, is shown in Figure 2. Those patients actually being boarded split fairly evenly as to preferred location for boarding. Patients waiting to be seen and visitors showed progressively decreasing tolerance for ED boarding. A similar trend was noted for subjects’ opinions of a reasonable wait time to be moved to an inpatient bed from the ED (Table 1). Combining all three groups, 801 (65.5%; 95% CI 62.8%–68.2%) stated a preference for being boarded in the hallway of an inpatient ward rather than in the ED, 406 (33.2%; 95% CI 30.6%–35.9%) would choose the ED, and 15 (1%; 95% CI 0.7%–2.0%) had no preference. There were no significant differences when evaluated by gender, season, or between daytime and nighttime participants. The commonly cited reasons among boarded patients for preferring inpatient ward boarding were privacy concerns and reduced noise levels (n = 32, n = 36). The most common reasons for preferring ED boarding are easy access to a doctor and the excitement of watching the care of other patients (n = 30, n = 5). An appropriate denominator for these reasons is difficult to select as most patient comments reflected frustration at waiting times rather than specific reasons for their preference for ED or ward boarding.

Post hoc analysis of ED staffing, patient load, ambulance traffic, and ED status (open, open to trauma cases only, or closed to all ambulance traffic) was performed for the 499 subjects for whom the data were available.
The ED was on “closure” (diverting all ambulance traffic) and on “trauma activation only” when 0.7% and 28.5% of the subjects, respectively, were surveyed. The total number of registered patients in the ED (including the waiting area) ranged from 20 to 77. The range of ED activity and staffing levels when the surveys were being conducted is shown in Figure 2. On multivariate analysis, only ED closure approached statistical significance, odds ratio 2.43 (95% CI 0.99–5.99, \(p = 0.054\)), for predicting a preference for ward boarding. Ambulance traffic, nurse

Figure 1. Demographics of population; excludes visitors.

Figure 2. Racial and gender composition of all three groups in the sample (racial data not available for the population).
staffing level, and the number and type of other patients boarding did not differ between those who preferred ED boarding and those who preferred ward boarding.

**DISCUSSION**

ED boarding is unpopular with Emergency Physicians and visitors. However, among the patients most directly affected, those actually boarding, almost half (44.6%) would choose ED over ward boarding. This result surprised us. Although the advantage of a simple survey tool such as ours is that it provides a simple answer, it cannot answer in depth questions as to why patients hold the preferences that they do. Is it possible that actually being an ED boarder is less horrid than imagining being one? That visitors were less tolerant of it than patients suggests this may be the case. ED staff do attempt to make boarders’ stays as bearable as possible, often leaving them in an examination cubicle with family members without regard to visiting hours imposed elsewhere in the hospital. Additionally, experienced patients may well value being able to gain access to a physician easily, as is the case in the ED. Although disruptive to patient flow, and creating the potential for disharmony between Emergency Physicians and the admitting services responsible for the boarded patients, ease of physician access was valued by many of our patients who stated a preference for ED boarding. As we did not anticipate these results, we had not designed our survey tool to probe these questions.

Emergency Medicine serves society much as a public utility does. Including visitors is worthwhile because the issue of ED boarding is in part a societal one. It is clear from this study that visitors are also harder to please, expecting significantly shorter wait times for an inpatient bed than either boarded or non-boarded patients.

This study contrasts with others demonstrating that ED boarding of inpatients compromises ED patients’ care and wishes (1,6). Although the majority of patients would prefer ward rather than ED boarding, for the most directly affected patients, the difference is a modest 55:45 split, with confidence intervals crossing 50%.

There is already evidence that inpatient boarding in the ED may lead to medical errors and avoidable morbidity and mortality (1,7). It is also clear that the primary cause of this is lack of inpatient beds (1,8,9). This study suggests that the rather obvious solution of boarding admitted patients in inpatient hallways rather than the ED may be the preferred solution of most patients and their visitors quite apart from potential safety and efficiency implications.

**LIMITATIONS**

We performed convenience rather than random sampling. We addressed this limitation by deliberately collecting a sub-sample during those time periods when
research assistant cover was not normally available. We could not find any differences by the time, day, or season of participation, which points to the representativeness of our overall sample. It seems unlikely, therefore, that this choice of sampling method materially affected the results.

We used a single site. There may be differences between our ED and other county hospital EDs as well as between county teaching hospitals and private community ones. However, our results are consistent with a similar small study from an urban center (6). The practice of boarding inpatients in the ED is occurring in both public and private hospitals (2).

Assessing validity of survey tools is often problematic. The question we asked was straightforward, and we include the tool as an Appendix to allow readers to judge this for themselves.

The use of face-to-face interviews may have made some patients reluctant to say that they would rather be boarded elsewhere, particularly if they were already admitted and realized they were likely to be in the ED for hours or days to come. This creates a possible bias in the opposite direction to our findings, and suggests our results may underestimate the proportion of patients who would rather be boarded on inpatient floors. Alternately, it is conceivable that the participants would sense that a socially more acceptable answer would be to choose ward boarding. These potential biases could not be measured. Not separating family members from patients during the interview also raises the possibility of individual answers being influenced by the preferences of the non-questioned person.

Post hoc analysis addressing the effect of patient load was available for less than half the sample. We can only speculate as to whether larger numbers would have led to the effect of ED closure \( p = 0.054 \) to reach statistical significance. Other observations from the model are consistent with findings by Weiss et al., who found that the number of patients admitted through the ED and ambulance traffic, but not nurse staffing levels, correlate with throughput times (10). Finally, we did not address how long the subjects had been waiting, or perceived they had been waiting, before completing their interview. This could influence answers (11).

Future studies will attempt to address potential confounding variables prospectively rather than using post hoc analyses.

CONCLUSION

Boarded patients, by a narrow margin and with confidence intervals spanning 50%, stated that they would prefer to be boarded in the hallway of an inpatient ward rather than the ED while awaiting an inpatient bed.

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APPENDIX

Survey tool used. This was first handed to patients for review along with an IRB-mandated ‘information in lieu of consent.’ The survey was then administered verbally by the research assistant.

Sometimes we do not have any beds available for patients in the hospital. As a result, patients who are admitted to the hospital have to spend a long time in the Emergency Room, often in busy hallways. We would like your opinions on this. All of your answers are confidential and will not affect your care in any way. If you don’t want to answer any or some questions, that’s okay.

We value YOUR opinions and thank you for taking the time to help us improve our service planning.
What do you think is the longest delay acceptable (okay) to be kept waiting to see a doctor if you are not critically ill?
☐ 1 hour ☐ 2 hours ☐ 4 hours ☐ 6 hours ☐ 8 hours ☐ 12 hours ☐ Other __________

If you needed to be admitted to the hospital, but no inpatient bed is available, would you prefer to be kept in (please select only 1)?
☐ An ED hallway, or
☐ A hallway on an inpatient ward (upstairs)

If you want, you can write in a reason or comment here ____________________________________________________________________________

What do you think is the longest delay acceptable (okay) to be held in an ER hallway while waiting for a bed upstairs?
☐ 2 hours ☐ 4 hours ☐ 6 hours ☐ 8 hours ☐ 12 hours ☐ 24 hours ☐ 36 hours ☐ 48 hours ☐ 72 hours ☐ Other __________

For children under 10 years of age (not critically ill), what do you think is the longest delay acceptable (okay) to be kept waiting to see a doctor?
☐ 1 hour ☐ 2 hours ☐ 4 hours ☐ 6 hours ☐ 8 hours ☐ 12 hours ☐ Other __________

For children under 3 years of age (not critically ill), what do you think is the longest delay acceptable (okay) to be kept waiting to see a doctor?
☐ 1 hour ☐ 2 hours ☐ 4 hours ☐ 6 hours ☐ 8 hours ☐ 12 hours ☐ Other __________

What do you think is the longest delay acceptable (okay) for a child under 10 years of age to be held in an ER hallway while waiting for a bed upstairs?
☐ 2 hours ☐ 4 hours ☐ 6 hours ☐ 8 hours ☐ 12 hours ☐ 24 hours ☐ 36 hours ☐ 48 hours ☐ 72 hours ☐ Other __________

What do you think is the longest delay acceptable (okay) for a child under 3 years of age to be held in an ER hallway while waiting for a bed upstairs?
☐ 2 hours ☐ 4 hours ☐ 6 hours ☐ 8 hours ☐ 12 hours ☐ 24 hours ☐ 36 hours ☐ 48 hours ☐ 72 hours ☐ Other __________

Are you a ☐ patient or ☐ visitor? (Please select only 1.)
Are you a ☐ female or ☐ male? (Please select only 1.)
How old are you? ___________
Are you here with a child who is sick or hurt? ☐ Yes ☐ No
Do you have children less than 10 years old yourself? ☐ Yes ☐ No
Do you have children less than 3 years old yourself? ☐ Yes ☐ No
Have any other comments or suggestions you would like to make?
________________________________________________________________________________________________
________________________________________________________________________________________________
________________________________________________________________________________________________

Race: ☐ H ☐ W ☐ B ☐ F ☐ OA Language Used: ☐ English ☐ Spanish ☐ Tagalog ☐ Other
Research Assistant’s Name________________________________________ Entered in Data Base ☐ Yes ☐ No Date ________