

Comparison of Actual and Predicted Emergency Department Wait Times

LouAnn H. Woodward, MD

Jason Zimmerman, BSN

Kristen C. Isom, RN

Richard L. Summers, MD

Abstract

Objective: Patient dissatisfaction and elopements from overcrowded emergency department (ED) waiting rooms are becoming increasingly common. Previous studies suggest that patients leaving an ED before being seen by a physician presents a legitimate safety concern. Predicted wait times are often communicated to patients in ED waiting rooms as a customer service function and in an attempt to reduce elopements. Common methodologies used by the restaurant industry have been adopted to make these wait predictions. In this study, we compare these predicted wait times to actual wait times experienced by patients.

Methods: The actual wait times experienced by patients presenting to the ED of a large academic hospital were determined for a two-week period. These actual times were correlated with the times predicted by a formula typically used to estimate restaurant seating wait times. This wait time was determined as the longest time for a patient already in the waiting room at the moment of the arrival of the new patient to the ED. Pearson's correlation coefficient (r) was calculated in the comparison analysis.

Results: A total of 2051 patient visits were analyzed. Only 33% of the predicted times were within ± 30 minutes of the actual time and 66% of the predicted times underestimated the actual wait times. The correlation between the actual and predicted wait times was $r = 0.18$. Though none of these patients were informed of their predicted wait time, a total of 4.6% of the patients left before being seen by a physician.

Conclusions: Providing patients in ED waiting rooms with an estimated wait time by means commonly used by the restaurant industry has been shown to significantly decrease the rate of elopements. In this study, we found a poor correlation between the times estimated by this methodology and the actual wait times experienced by patients. In fact, only about a third of the patients received somewhat accurate estimations of their potential wait. These findings suggest that the dynamics of triage and prioritizations in a busy ED are complex and may require a more sophisticated formula for the prediction of wait times. While elopements may diminish when patients are provided with estimated wait times, it is uncertain what impact this practice would have on patient satisfaction.

Introduction

Hospitals have become increasingly aware of the importance of patient satisfaction to financial success and often model themselves after other consumer-driven industries. As a result, hospitals have adopted some of the same service strategies these businesses use to cater to their customers. One such strategy that has become progressively more common is the practice of providing emergency department (ED) patients with prospective wait times before being seen by a physician.¹ In fact, some hospitals advertise these wait times on billboards, websites, or even cell phone apps.^{2,3,4} The most commonly employed methodology for providing these predictions of ED wait times is a technique frequently used by restaurants in their estimation of how long it will take to seat guests who arrive without a reservation.⁵ With this technique, the hostess is able to inform the

customers of their expected wait times. As consumers, we have become accustomed to this service and it often influences our decision making. Restaurateurs know that if they are unable to tell guests how long their prospective wait will be, they will probably leave. Likewise, a declaration of a specific expectant waiting period also prevents repeated questioning by frustrated guests about the status of their service.

Eloperments from ED waiting rooms are commonplace and are considered both a customer service and a liability problem for hospitals.^{6,7,8,9} Therefore, any methodology that can inform patients about the length of time they are expected to wait before seeing a physician could be valuable. However, emergency care is a complex process and the triage procedure is not based on a first come, first served algorithm such as with other service industries. If predicted wait times are wildly erroneous, this could lead to greater frustration and dissatisfaction among patients. In this study, we compared actual ED wait times to those times predicted for patients presenting to a large academic medical center.

Methods

In a retrospective analysis, the actual wait times experienced by patients presenting to the adult ED of an inner-city academic hospital and Level 1 trauma center with a yearly volume of around 70,000 patient visits were determined for a two-week period. The times of arrival to the ED and times the patient were brought into a room were captured in an electronic tracking system. Excluded from the analysis were patients arriving by ambulance or helicopter and those brought immediately (< 10 minutes) from triage to a room because of the severity of their illness. The actual wait time for each individual patient was inserted in a database that also contained the wait time that would be predicted by a formula typically used to estimate restaurant seating times.⁵ This wait time was determined as the longest time for a patient already in the waiting room at the moment of the arrival of the new patient to the ED.

A correlation comparison of the actual and predicted wait time was performed using Pearson's correlation coefficient (r). The patients were also divided into groups according to their deviation from the predicted time in ± 30 minute increments. The percent of patients for which the prediction was considered relatively accurate (within ± 30 minutes of the predicted time) was calculated. The investigational protocol for this study was approved by the Institutional Review Board of the University of Mississippi Medical Center.

Results

Data extracted from the tracking system meeting our criteria resulted in a total of 2051 patient visits for analysis. From this database, only 33% of the predicted times were within ± 30 minutes of the actual time and 66% of the predicted times underestimated the actual wait times (Figure 1). The correlation

between the actual and predicted wait times was $r = 0.18$ (Figure 2). Though none of these patients were informed of their predicted wait time, a total of 4.6% of the patients left before being seen by a physician.

Figure 1: This bar graph represents the numbers of patients (frequency) in blocks of 30 minute time increments that waited to be seen either longer or less than the estimated time.

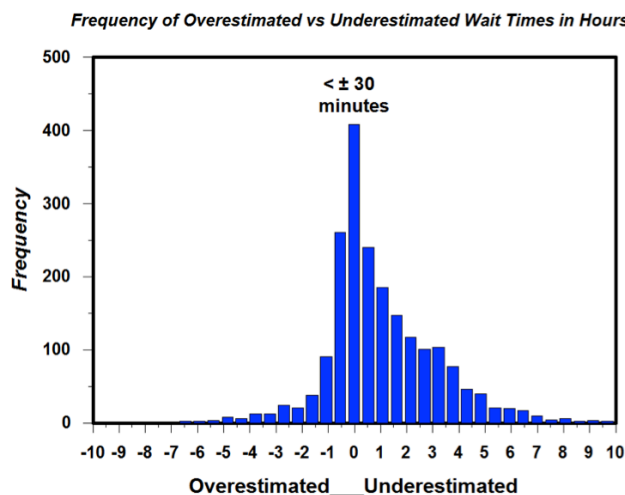
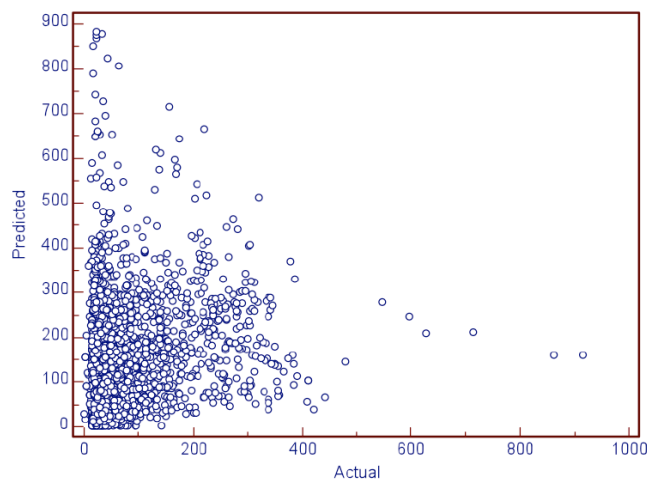


Figure 2: This graph compares the actual to estimated wait times for patients presenting to the ED to be seen. The Pearson's correlation coefficient for this comparison is $r = 0.18$

Correlation Between Predicted and Actual Times



Conclusions

Providing patients in ED waiting rooms with an estimated wait time has been shown to significantly decrease the rate of elopements and is thought to be an important customer service initiative.^{6,10} In this study, we found a very poor correlation between the times estimated by the commonly used methodology and the actual wait times experienced by patients. In fact, only a third of the patients received estimations that were within 30 minutes of their actual times.

From Figure 1, it appears that patients' wait times are more likely to be underestimated than overestimated. If patients are given wildly erroneous information regarding their expected wait, it is uncertain what impact this might have on their satisfaction with their ED experience. There is some evidence that underestimating wait predictions adversely affects patient satisfaction.¹¹ However, such a unilateral strategy might also result in a larger number of people leaving the ED without being seen by a physician because of the cited wait. Intuitively, most people would expect that underestimations of wait times would result in significant patient anguish over the delays and create animosity toward triage personnel.

Despite the potential problems associated with misrepresentations of wait times, many hospitals continue to pursue this idea. Perhaps just as the restaurant industry has tried to refine their wait estimations, hospitals could adopt more sophisticated methods that could provide for more accurate predictions. Modern digital technologies could be used in conjunction with complex algorithms that include patient acuity and flow calculations along with staffing inputs to provide better information concerning expected ED wait times.¹² However, developing such methods is more difficult for health care systems as compared to other service industries and would have to be routinely validated for accuracy.

Potential Financial Conflicts of Interest: By AJCM® policy, all authors are required to disclose any and all commercial, financial, and other relationships in any way related to the subject of this article that might create any potential conflict of interest. The authors have stated that no such relationships exist.

LouAnn H. Woodward, MD, is professor of emergency medicine at the University of Mississippi Medical Center in Jackson, MS.

Jason Zimmerman, BSN, is director of adult emergency department at the University of Mississippi Medical Center in Jackson, MS.

Kristen C. Isom, RN, is a stroke nurse administrator at Anderson Regional Medical Center in Meridian, MS.

Richard L. Summers, MD, is professor of emergency medicine at the University of Mississippi Medical Center in Jackson, MS.

References

1. Rae R, Wilson A, Higgins A, Brown J, Labriola J, O'Neill B. Setting patient expectations of waiting times improves patient satisfaction in the emergency department[abstract]. *Acad Emerg Med*. 2008;15(Suppl 1):S110.
2. Emergency departments post wait times on the web. *ED Manag*. 2010;22(1):10-1.
3. Patients can text EDs for wait times. *ED Manag*. 2010;22(6):64-5.
4. Xie B, Youash S. The effects of publishing emergency department wait time on patient utilization patterns in a community with two emergency department sites: a retrospective, quasi-experiment design. *Int J Emerg Med*. 2011;4(1):29.
5. Handel DA, Fu R, Daya M, York J, Larson E, John McConnell K. The use of scripting at triage and its impact on elopements. *Acad Emerg Med*. 2010;17(5):495-500.
6. Guttman A, Schull MJ, Vermeulen MJ, Stukel TA. Association between waiting times and short term mortality and hospital admission after departure from emergency department: population based cohort study from Ontario, Canada. *BMJ*. 2011;342:d2983
7. Bambi S, Scarlini D, Becattini G, Alloci P, Ruggeri M. Characteristics of patients who leave the ED triage area without being seen by a doctor: a descriptive study in an urban level II Italian University Hospital. *J Emerg Nurs*. 2011;37:334-40.
8. Will longer wait times mean more ED lawsuits? *ED Manag*. 2010;22(5):57-8.
9. Naumann S, Miles JA. Managing waiting patients' perceptions: the role of process control. *J Manag Med*. 2001;15(4-5):376-86.
10. Arendt KW, Sadosty AT, Weaver AL, Brent CR, Boie ET. The left-without-being-seen patients: what would keep them from leaving? *Ann Emerg Med*. 2003;42(3):317-23.
11. Rae R, Wilson AG, Brown J, Higgins A, O'Neil BJ. Does providing patients with overestimates of anticipated waiting times improve perception of wait times in the emergency department? *Ann Emerg Med*. 2008;52:S111.
12. Leet L, Taylor B. Method for accurately quoting wait time for a restaurant table. QSR Automations, Inc. Patent No. US-74,756,745-B2. 2010.