The Left-without-being-seen Rate: An Imperfect Measure of Emergency Department Crowding

To the Editor

I read with interest the report by Green et al. on "Using Queueing Theory to Increase the Effectiveness of Emergency Department Provider Staffing."[1] I applaud the authors' ingenuity in the application of queueing theory to practical emergency medicine administration and rational staffing techniques. I agree that the application of these techniques may be helpful to improve staffing. Their approach is quite novel; however, I would like to point out that the use of the left-without-being-seen (LWBS) rate as an outcome to define improvements in emergency department operations and reductions in emergency department crowding is problematic.

While it is true that a considerable proportion of patients who leave before being seen by an emergency physician actually do require emergency treatment[2] and LWBS rates increase as emergency department capacity saturates,[3] LWBS rates have never been shown to be associated with poorer patient care outcomes. There is also no direct evidence that a reduction in the LWBS rate improves patient satisfaction or quality of emergency care for patients who are actually seen, evaluated, and treated. Patients leave without being seen for many reasons, only one of which is prolonged waiting times.[4] An additional consideration is that the more the LWBS rate is used as an indicator for crowding, the more likely it is that organizations such as the Joint Commission on Accreditation of Healthcare Organizations and the Centers for Medicare & Medicaid Services will use the LWBS rate as an indicator of hospital quality and potentially in the new pay-for-performance program.

One potential solution is not to look at the patients who leave but to focus on the patients who stay. Waiting times for evaluation, test ordering, test results, treatments, and inpatient beds are often caused by crowding and, in the case of time-sensitive care, can directly lead to poor outcomes. Examples of these end points are antibiotic timing within four hours for pneumonia and percutaneous intervention within two hours for patients with ST-segment elevation or new left bundle branch acute myocardial infarction.[5] Timing end points are also more directly actionable than LWBS rates.

The continued use of LWBS rate as an end point for emergency department crowding and quality-of-care studies highlights the absence of a universal measure of crowding. While we all know prolonged wait times are associated with crowding and that crowding certainly causes poorer patient satisfaction, the lack of a universal crowding measure as an end point is a fundamental problem in research into alleviating this national problem.

The ideal universal measure of crowding will be one that is easily measured and easily defined across hospitals, associated with all other measures of crowding (including LWBS). It will need good face validity and need to be rigorously shown to be associated with poorer patient care outcomes such as medical errors, adverse outcomes, and patient mortality. LWBS does not meet these criteria and should not continue to be used as a sole measure for emergency department crowding in published studies.

doi: 10.1197/j.aem.2006.02.004

Jesse M. Pines, MD, MBA
(pinesjes@uphs.upenn.edu)
Department of Emergency Medicine
Center for Clinical Epidemiology and Biostatistics
University of Pennsylvania
Philadelphia, PA

References

1. Green LV, Soares J, Giglio JF, Green RA. Using queueing theory to increase the effectiveness of emergency department provider staffing. Acad Emerg Med. 2006; 13:61–8.
2. Baker DW, Stevens CD, Brook RH. Patients who leave a public hospital emergency department without being seen. JAMA. 1991; 266:1085–90.
3. Polevoi SK, Quinn JV, Kramer NR. Factors associated with patients who leave without being seen. Acad Emerg Med. 2005; 12:232–6.
4. 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; 42:317–23.
5. A comprehensive review of development and testing of hospital core measures. Joint Commission on Accreditation of Healthcare Organizations. Available at: www.jcaho.org/pms/core+measures/cr_hos_cm.htm. Accessed Jan 16, 2006.

In reply

Dr. Pines raises a number of important points. We believe that no one measure is adequate to assess emergency department crowding, particularly if the goal is to reduce congestion. Several different measures should be used to reflect the various potential sources of congestion and provide insights on actions to alleviate them.

ISSN 1069-6563
PII ISSN 1069-6563583

Our study focused on the use of queueing models to improve provider staffing. One of the best measures to evaluate effectiveness of provider staffing is the time interval from triage to the time a patient is seen by the provider. Because these delay data were not recorded during the time of our study, we used the left-without-being-seen (LWBS) rate to evaluate the effect of the queueing-based staffing changes. This is reasonable because delay in seeing a provider is a major factor in LWBS levels. In fact, the study by Arendt et al. itself substantiates this because four of the six largest factors given for LWBS involve wait time.[1]

Two very recent studies add further support to the notion that wait times are important to patients in both their decision to leave and with their satisfaction. In one study, the opening of a fast-track system decreased length of stay and the LWBS rate decreased from 5% to 2%.[2] In the second study, a decrease in time to be seen by a provider after implementation of a team assignment system resulted in a decreased LWBS rate and improved patient satisfaction.[3]

We believe that the rate of LWBS is itself an important performance measure. Just as call centers keep track of customer abandonments (i.e., those customers who hang up before being connected with a service representative), LWBS is an indicator of service not being delivered. As shown in previous studies, many of these patients do require medical care.

A universal measure such as the proposed EDWIN[4] and NEDOCS[5] scores can be very useful for comparison of crowding across different emergency departments. In addition, such measures are helpful in gaining greater understanding of important correlations of crowding with medical errors, LWBS, or patient satisfaction. They do not, however, identify the sources of emergency department delays and therefore are less helpful for alleviating congestion. Because overcrowding may be due to one or more factors such as lack of appropriate inpatient beds, waits for test results, inadequate transport, or lack of certain staff, it is critical for hospitals to collect and analyze data on all aspects of delay to identify possible remedies.

doi: 10.1197/j.aem.2006.02.003

Robert Alan Green, MD
(rag7@columbia.edu)
New York-Presbyterian Hospital/Columbia
University Medical Center
New York, NY

Linda V. Green, PhD
Graduate School of Business
Columbia University
New York, NY

James F. Giglio, MD
New York-Presbyterian Hospital/Columbia
University Medical Center
New York, NY

João Soares, PhD
University of Coimbra
Coimbra, Portugal

References

1. 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; 42:317–23.
2. Darrab AA, Fan J, Fernandes CM, et al. How does fast track affect quality of care in the emergency department? Eur J Emerg Med. 2006; 13:32–5.
3. Patel PB, Vinson DR. Team assignment system: expediting emergency department care. Ann Emerg Med. 2005; 46:499–506.
4. Bernstein SL, Verghese V, Leung W, Lunney AT, Perez I. Development and validation of a new index to measure emergency department crowding. Acad Emerg Med. 2003; 10:938–42.
5. Weiss SJ, Derlet R, Arndahl J, et al. Estimating the degree of emergency department overcrowding in academic medical centers: results of the national ED overcrowding study (NEDOCS). Acad Emerg Med. 2004; 11:38–50.