

REVIEW

Online Publication of Emergency Department Wait Times – Risks and Benefits

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Abstract

Canadian emergency departments are increasingly publishing live wait time estimates on the Internet in an attempt to reduce ED crowding. We conclude that while there is no evidence that the strategy reduces crowding, theoretical patient safety and legal liability concerns are likely overstated.

In the last two years an increasing number of Canadian emergency departments (EDs) have begun to publish live estimates of their waiting times on the Internet. EDs in Calgary pioneered the practice in Canada in July 2011, with EDs in Edmonton and Kitchener both following suit in 2012.^{1,2,3} Vancouver Coastal Health recently launched a similar website.⁴ The Canadian trend follows a practice that has been in place in US cities since at least 2008.⁵

The major rationale for publishing ED wait times in Canadian cities is the hope that it will more evenly distribute patient loads. Patients with less acute injuries will avoid the ED at busy times, or travel to a less busy ED, thereby shortening overall wait times.⁶ Additionally, publishing live wait time estimates treats patients more like consumers; giving them greater autonomy over their healthcare decisions.⁷ In the US, hospital administrators also favor the practice because a short wait time attracts patients/customers to the ED in a competitive multi-payer healthcare system.⁸

Despite the purported benefits, a number of emergency physicians and physician organizations object to the practice of publishing wait times on patient safety grounds.^{9,10} They worry that seriously ill patients will delay in presenting to the ED if the website shows a long wait. These physicians hypothesize that, as a worst case scenario, a patient with chest pain could put off going to the ED, or drive to a more distant ED, because of a long posted wait time. In this scenario the chest pain is cardiac in nature and the patient dies as a result of the delay in presenting to the ED.

Methods

A literature review was conducted for studies regarding the online publication of ED waiting times. The electronic searches conducted were as follows:

- Using MEDLINE (1966 – Dec. 9, 2013) search, ("emergencies"[MeSH Terms] OR "emergencies"[All Fields] OR "emergency"[All Fields]) AND wait[All Fields]
Limits: None
Yield: 769 results
- Using WEB of SCIENCE (1993 – Dec. 9, 2013) search, (Topic=(emergency AND "wait time")
Limits: None
Yield: 113
- Using EMBASE (1974 – Dec. 9, 2013) search, 'emergency ward'/exp AND 'time to treatment'/exp
Limits: None
Yield: 27
- Using the Cochrane Library search, (Emergency AND wait)
Limits: None
Yield: 3

A single reviewer reviewed abstracts for all search results. The body of research in this area is small: any article that examined the implications, outcomes or accuracy of the online publication of ED waiting times was included in the analysis. Because of the small number of studies in this area no exclusion criteria were used, as long as the article dealt with online publication of ED waiting times, it was included in the analysis below. Once a relevant article was located, all articles listed in its reference section were also reviewed. A total of 11 articles were identified in the search and included in the review. Two articles were based on patient surveys that evaluated the importance of wait times to patients, one analyzed the effectiveness of posting wait times at reducing waits and three examined the accuracy of estimated wait times. The remaining five articles each examined the following issues: theoretical

patient safety risks, the trend in US hospitals to adopt these information systems and patient self-triage.

Surprisingly, despite the large number of hospitals in the US that now publish live wait time estimates, the literature review conducted for this article produced no studies that examined patient outcomes following the adoption of the practice.

Patien Self-Triage

Despite the lack of direct evidence regarding patient outcomes there is a body of research on a related issue, which is the ability of patients to accurately triage themselves. Patient self-triage behavior is relevant to this topic because an argument made in favor of publishing ED wait times is that patients have an accurate sense of how sick they are. The theory is that since patients have a sense of when they are seriously ill, they are unlikely to delay in presenting to an ED, even if the posted wait time is a long one.⁷

However, in the case of myocardial infarction and stroke, two medical emergencies where “time is muscle” and “time is brain”, several studies have shown that patients are in fact poor at self-triaging.¹¹⁻¹⁴ These patients delayed in presenting to hospital, or calling emergency medical services, at least in part, because they did not recognize the symptoms of the medical emergency they were suffering from.

In an observational study of stroke patients in Taiwan, Chang et al. examined the factors associated with pre-hospital delays after acute stroke.¹¹ The authors found that there were long intervals between the onset of symptoms and the patient’s decision to seek medical help. Although only limited data was collected on the reasons for the decision delay, of the patients who provided this information, 76% reported that they did not realize the urgency of seeking medical help.

The study by Chang et al. took place before the advent of thrombolysis in Taiwan. Because of this, the authors speculate that one explanation for the decision delay may have been the belief among patients that there were few benefits for early presentation.¹¹ This issue was examined in a 2012 UK study by Addo et al., which compared the delay in presentation after acute stroke before and after a mass media campaign designed to increase stroke awareness.¹² The authors demonstrated minimal changes in the response of patients to stroke symptoms (resulting in significant pre-hospital delays) despite a national mass media campaign that stressed the benefits of prompt treatment. The percentage of

ischemic stroke patients who received thrombolysis was the same in the pre and post campaign periods.

The Addo study demonstrates very clearly that even after a media campaign to raise stroke awareness, stroke patients are not good at determining when they are suffering a medical emergency and would benefit from prompt medical attention.

A similar pattern emerges with patients suffering myocardial infarction. The REACT trial, a large American study from 2004, was a randomized trial of an 18-month community intervention that targeted the public through mass media campaigns and community education. The campaign was designed to increase appropriate patient actions for acute myocardial infarction symptoms.¹³ Despite the campaign, time from symptom onset to hospital arrival for patients with chest pain did not change between the control and intervention groups. The authors noted that patient delays prevent the early application of life-saving procedures and contribute substantially to a diminished effectiveness of treatment.

A related study by Rollando et al. from 2012 evaluated the consequences of treatment delay of primary percutaneous coronary intervention after STEMI.¹⁴ It found that patient delays that increased the symptom onset to balloon time predicted higher mortality in these patients and that women delayed longer than men. The authors noted that women with STEMI are less likely than men to present with chest pain and more likely to present with atypical symptoms such as jaw pain and right arm pain. They hypothesized that women delayed longer in seeking treatment because of the under recognition of their symptoms.

The reasons why patients suffering from stroke or myocardial infarction delay in presenting to hospital are variable (the authors of the REACT trial speculate that patient fear, denial, rationalization and malattribution of symptoms all play a role).¹³ However, collectively, these four studies demonstrate that in stroke and myocardial infarction, patients are generally not good at determining when they are suffering a medical emergency and should seek medical help. Furthermore, patient delays cause negative outcomes with increased mortality and morbidity. Given this evidence, patient safety concerns when considering posting ED wait times should not be dismissed entirely on the basis that patients have a good sense of how sick they are.

Importance of Wait Times to Patients

ED Physicians concerned with the patient safety implications of posting ED wait times conceive of two possible scenarios. First, a sick patient may drive to a more distant ED to avoid a long wait at their local hospital. Second, a sick patient may simply stay at home longer if they perceive they will encounter a long wait at the ED.¹⁰

Understanding the determining factors that ambulatory ED patients use to decide which ED to attend (in cities with multiple EDs) would be helpful in determining whether the first scenario is likely to occur in reality. These factors were analyzed by Grafstein et al. in a recent cross-sectional survey of ambulatory patients presenting to six EDs in the Vancouver area. Forty-four percent of patients surveyed stated that proximity to an ED was the main reason for choosing that ED, while 9.3% claimed that perceived wait times were the most important factor. The authors concluded that in the setting of their study: "...wait times are a relatively inelastic driver of patient behavior, and there would likely need to be significant differences in time to ED care between sites for patients to change their ED preferences."¹⁵

The Grafstein study demonstrates that patients are more concerned with the travel distance to an ED than they are with the perceived waiting time. Additionally, Grafstein et al. found that the patients presenting to widely spaced peripheral hospitals, i.e. those who would have the longest distance to travel to reach a second ED, put an even higher premium on travel distance.¹⁵ Given the results of this study, concerns that posting ED wait times could cause sick patients to travel to distant EDs, and have negative outcomes as a result, are possibly overstated.

Unfortunately, the Grafstein study is less helpful in addressing the second scenario. Although distance to travel was more important than wait times, 65.3% of patients surveyed still said that wait times were either "extremely important" or "very important" to them.¹⁵ However, these patients were not asked if they would delay seeking treatment if they anticipated a long wait time. At least for the time being there is a plausible argument that if ED waiting times are publicized certain sick patients may try to stay home and "wait it out" if they perceive that they will have a long wait in the ED.

Effectiveness of Posting Wait Times at Reducing Waits

One of the goals of posting live ED wait times is to more evenly distribute the patient load and therefore shorten overall average wait times.⁶ An initial question is whether posted wait times are actually accurate. If posted waiting times do not accurately reflect actual waiting times, the goals of the program may be undercut as patients learn not to trust the information provided to them. Accuracy of posted wait times was examined by Jouriles et al., who performed a cross-sectional observational analysis of posted ED wait times compared to actual patient wait times at a hospital system in Akron, Ohio.¹² The authors found that posted waiting times were generally accurate in small EDs with only a single ED physician. However, in a larger ED connected to a teaching hospital and a catheterization lab, posted wait times differed significantly from actual times. In this large ED (5,000 patients per month) mean actual wait times (time from triage until seen by a physician) were approximately 50% longer than posted estimated wait times. Interestingly, similar inaccuracy between predicted and actual wait times was found in a 2012 study from the UK.¹³ However, in a Canadian study the situation was reversed; actual wait times at Calgary EDs were found to be 36% shorter than the posted wait times.¹⁴

Despite the varying degrees of accuracy regarding estimated wait times there is some evidence that "smoothing" actually occurs when EDs begin publishing this information. In Calgary's case, after an online estimated wait time program was activated, patient volumes shifted from urgent care centers to EDs when the estimated waits at the EDs were consistently shorter than those at the urgent care centers.¹⁸ The authors hypothesized that because there were no changes seen in (i) EMS arrival rates, (ii) ED or urgent care center acuity mix, (iii) low-acuity patient distribution, or (iv) hospital admission rates over the study period, the volume shift could be a result of patients seeking shorter waits. This is consistent with research demonstrating that patients value short wait times. In a survey by Yip et al. of 1,211 patients at an ED in London, Ontario, 44% indicated that they were more likely to go to the ED with a shorter wait time.⁶

This makes intuitive sense: if hospitals are relatively close together, patient preference for the ED with the shorter wait should translate into a more even distribution of patients between EDs and overall shorter waits.

Patient Acuity Level and Calculation of Estimated Wait Times

The specific algorithms used by various EDs to produce estimated wait times vary from one hospital system to another. However, the data points used by Alberta Health Services in their algorithm: recent wait times, new registrations, physician staffing, and EMS arrivals expected, give some idea of the common factors used.¹⁸ Importantly, the estimated wait times do not apply to critically ill patients, who will be seen immediately. The estimated wait times provided by Alberta Health Services apply to patients with CTAS scores of 3 or above and those at St. Mary's Hospital in Ontario apply to only CTAS 4 and 5 patients.¹⁵ Similarly, the estimated ED wait times in Vancouver do not include "critically ill patients."¹⁶ However, as will be discussed, at least some patients do not understand the distinction between the waiting time they will receive if they are very sick and the average estimated waiting time. This misunderstanding is the basis for the patient safety concerns of posting estimated wait times.

Hospital Legal Liability

Most ED websites that display live wait times include a disclaimer that instructs patients suffering from medical emergencies to ignore the wait time and call 911 or go directly to the nearest ED.¹⁷ However, media coverage on this topic demonstrates that some patients do not follow these instructions.¹⁸ Could a hospital authority be found negligent if a patient has a negative outcome because they put off going to the ED, or drove to a more distant ED, because of a posted wait time?

In order for a patient to be successful in a claim of negligence against a hospital, the patient must prove each of the following five elements: (i) the hospital owed the patient a duty of care; (ii) the hospital breached the requisite standard of care; (iii) the patient was actually injured; (iv) the hospital's action caused the patient's injury; and (v) the injury was not too remote.¹⁹

The initial question is whether a hospital-patient relationship is established simply by the patient viewing the hospital's wait time website (before the patient ever sets foot inside the hospital). This step is necessary in order to establish the first element of negligence – the duty of care. While this particular set of factual circumstances has not been litigated to date, it is likely that such a duty would be found to exist. Courts have imposed a duty of care between hospitals and their patients in the vast majority of medical negligence cases.²³

Negligence would likely be determined on the issue of causation – by posting the estimated waiting times, did the hospital cause the patient to become injured? Although the standard of causation is lower in medical negligence cases, and need not be proven with scientific precision, it still requires that the hospital's negligence materially contributed to the patient's injury.²⁰ However, it is likely that the patient's own decision to delay in presenting to the ED would be found to be the material cause of the patient's injury, not the hospital's actions.

Patients have certain duties and responsibilities when they seek medical care, including a duty to follow instructions and to act in their own best interests.²³ Even if a hospital is found to be negligent (i.e. the patient has proven all five of the elements of negligence), if a patient fails to meet the standards imposed on them they can be held contributorily negligent. As a result, the damages awarded to the patient are reduced in proportion to their degree of fault.²¹ If a patient ignores the disclaimer mentioned above and puts off going to the ED, or drives to a more distant ED, resulting in a negative health outcome, a Court would likely apportion most of the fault to the patient.

Risks and Benefits

An increasing number of studies now demonstrate the dangers associated with ED overcrowding and long length of stay in the ED. Two studies from 2006 showed increased mortality resulting from ED overcrowding in high acuity patients.^{22,23} A recent study also demonstrated that even low acuity patients who were treated and discharged from the ED show increased short-term mortality if they presented during shifts with long wait times.²⁴ In this study the authors concluded that reducing mean length of stay by an average of only one hour could have potentially decreased the number of study deaths in higher acuity patients by 6.5% and in lower acuity patients by 12.7%. For older patients who are subsequently admitted to hospital, a prolonged ED stay is associated with an increased risk of an in-hospital adverse event.²⁵ The authors of this study found that for every hour spent in the ED, the odds of an in hospital adverse event increased 3% for any single adverse event, 4% for medication-related adverse events and 5% for multiple adverse events. An earlier study by these authors demonstrated that adverse events in acute inpatient units were independently associated with a significant increase in hospital length of stay for older patients.²⁶ This means that the longer hospital stay associated with the adverse events further reduces the availability of acute care beds, thus setting up a vicious cycle that exacerbates ED crowding.²⁷

Given the very small litigation risk and only a small theoretical patient safety risk of publishing live estimates of ED waiting times, the possibility of reducing ED waiting times may be worth the risk. Interestingly, the disclaimer on the Vancouver Coastal Health wait time website specifically directs patients to the warning signs of stroke and heart attack.²⁷ Presumably this is designed to reduce the patient safety risks of posting ED wait times even further.

Conclusion

The online publication of live estimates of ED waiting times is becoming increasingly common across Canada. The stated rationale for the practice is to decrease ED waiting times and to increase patient satisfaction. Some emergency physicians have criticized the practice on the grounds that there is a theoretical risk to patients. Although these concerns may be overstated in some respects (patients are unlikely to put themselves at risk by commuting significant distances to try and avoid a long wait) there is no evidence that these risks can be dismissed entirely.

Although patient risks are purely theoretical at this point, the benefits of posting live estimates of ED waiting times are largely unproven. To date, only a single study from Calgary has demonstrated that patient volumes will shift between urgent care centers and EDs based on live wait time estimates. Furthermore, there is no evidence that average ED wait times decrease in cities where these information systems have been adopted. However, the small theoretical patient safety risks and almost negligible litigation risk may be worth the possibility that ED waiting times could decrease.

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