

## **The impact of emergency department overcrowding on patient care and survival**

The media has recently given great attention to the “crisis” in emergency department overcrowding, as if this were a recent development. As far back as 1987, after sustained and unsolvable problems with crowding, the first statewide conference on overcrowding was held in New York City, involving NY ACEP, EMS, the NY State DOH, and legislators. At that time, the issue was clearly delineated, but no clear solutions forthcoming. Since that time, hospital and emergency department overcrowding has enjoyed cyclical media attention, but with little done to “fix” the problem. How did we get there?

Hospitals in the ‘60’s were, in large part, a place for elective admissions, with only a small percentage of patients being unscheduled, or “emergent”. There was also substantial capacity to allow for system-wide inefficiencies. During this time, hospitals were run primarily as a 9-5, Monday through Friday business, with a skeleton crew on evenings, nights, and weekends.

When one fast-forwards to 2007, a dramatic change has occurred. The majority of admissions are unscheduled. As many previously inpatient procedures shift to the ambulatory setting, what was left behind is a much sicker patient population, filling the hospital to capacity. Rather than scheduled admissions, the majority of patients enter through the emergency department, with most of these entering the hospital in the afternoon and evening. In most emergency departments, the volume of admissions varies little from day to day, or from weekday to weekend. And yet, in far too many ways, hospitals have continued to function as a 9-5, Monday through Friday, institution, with a skeleton crew on evenings, nights, and weekends. This may, in part, explain the higher death rate for strokes and heart attacks in patients admitted on weekends vs. weekdays. With this mismatch of resource vs. need, there should be little surprise that capacity issues would arise.

Contrary to conventional wisdom that emergency department volume is highly unpredictable, the number of admissions per day can be predicted with remarkable accuracy. What is most striking about this fact is the associated fact that NO hospital actually anticipates and prepares for the next day’s volume of admissions from the emergency department.

How does the institutional structure create capacity issues by design? A classic example is in surgical scheduling, which is not scheduled smoothly through the week, but rather front-loaded nearer to the beginning of the week. Why? For instance, an orthopedist knows that his or her patient undergoing hip replacement is critically dependent upon physical therapy in the days immediately following surgery, to prevent life-threatening postoperative complications. If the hospital’s physical therapy staff is small or nonexistent on weekends, then the orthopedist has little choice but to schedule as much surgery as possible at the beginning of the week. Thus, a “traffic jam” is created, where

the hospital is loaded up earlier in the week. This has a domino effect on the entire institution. In fact, when an institution in Massachusetts, which had struggled with capacity issues for years, changed to a smooth surgical schedule, their capacity issues disappeared.

## **Crowding in the Emergency Department**

Let us consider four topics as it relates to crowding of the ED. First, what is it? Second, what causes it (and what doesn't)? Third, what are the consequences to patients? Fourth, what can be done to fix it?

### **1. Emergency department crowding: what is it?**

Various studies have developed definitions of ED crowding, but in its simplest form, crowding exists when there is no space left to meet the timely needs of the next patient in need of emergency care. If the care of urgent problems is delayed due to congestion, then crowding exists.

### **2. Emergency department crowding – what causes it?**

Over the years, the list of reasons for crowding have included: unnecessary visits; the poor and uninsured; the safety net; EMTALA; and seasonal illness. More recently, there has been far greater emphasis on the boarding of admitted patients as the primary cause of ED overcrowding. That is, the practice of leaving admissions in the ED when there is no “proper” space within the institution is the source of delays in patient care. Let’s take each of these issues in turn.

#### **A. Causes of crowding: the “unnecessary visit”?**

Much of the literature on the “unnecessary” visit was published in the 1980’s and early 1990’s, and consisted of retrospective reviews based on ED diagnosis. Thus, once you knew the diagnosis, you could confidently conclude that the visit did not constitute an emergency. Based on this literature, there was a growing sense that many patients were using the emergency department frivolously, giving rise to attempts to restrict visits, increase co-pays, institute phone screening prior to visit, and other interventions.

Just as a “spot” on the lung may mean nothing, or may mean a malignancy, a child with a fever may have a simple cold, or may have severe sepsis or meningitis. The “simple sore throat” may be viral, or represent impending airway obstruction from epiglottitis – what the patient experiences is the same: a sore throat.

An essential question to ask is, "How well can the patient or family distinguish critical illness from routine?" In a carefully crafted, prospective study by Franacek, patients were asked to triage to self-assess whether they felt their problem was critical, urgent, or routine. Of the patients whom the physician determined to be critical, 25% of this group believed that their problem was routine. Other studies have shown that barriers to care (phone screening, increasing co-pays, etc.) affect those with real emergencies as much as those with more minor problems.

Of course, the critical question related to "unnecessary" visits is: "Do nonemergent patients interfere with the care of urgent patients?" Or, to put it another way, are emergency departments brought to their knees because of too many sprained ankles? Recent literature has carefully studied the impact of nonurgent patients on the critically ill, and have concluded that the impact is essentially nonexistent. In summary, patients without critical problems do not give rise to the current crisis of overcrowding.

#### **B. Causes of crowding: EMTALA, the poor, and the safety net?**

EMTALA requires that patients be evaluated for the presence of an emergency, and, if necessary, receive whatever treatment is required to stabilize them, regardless of ability to pay. Thus, EMTALA, as well as issues related to the poor and the uninsured, are issues related to finance, not crowding. No evidence supports or refutes the impact of these issues on ED crowding, other than the well-documented increase in serious medical problems in patients having no insurance.

#### **C. Causes of crowding: seasonal variation?**

Obviously, a flu epidemic will bring more patients to the ED than no flu epidemic. However, this is a problem which would be layered on top of a chronic, day-to-day, month in and month out issue with crowding. Importantly, the implication from seasonal variation that crowding is a transient issue is simply untrue.

#### **D. The clearest cause of crowding: boarding of admitted patients.**

A number of recent studies have shown a direct and strong correlation between the number of admissions being boarded in the emergency department and crowding, making it clear beyond question that this is the number one culprit related to ED overcrowding. In short, it is not really the ED which is overcrowded. It is the hospital which is overcrowded.

It is important to distinguish what crowding means in the emergency department vs. the inpatient units in most hospitals. Inpatient units, when their normal patient beds are full, are considered "full" and thus not "capable" of taking more patients. Emergency departments are considered "full" when all of their rooms are full; all

of their hallway stretchers are full; and all of their chairs are full. Thus, there is striking contrast between the ED and the inpatient units in their respective views of what constitutes “at capacity”.

### **3. What are the consequences of crowding?**

A wealth of literature exists which demonstrates the consequences of crowding in the emergency department. These consequences include:

#### **A. Sick people have to wait too long to receive care**

In fact, the CDC reported that, for patients judged by the triage nurse to be critical, over 10% of this group waited more than an hour to see a physician.<sup>1</sup> Many illnesses are time dependent. Earlier intervention gives rise to better outcome. Late diagnoses may sometimes be too late, with permanent consequences of disability or death.<sup>2</sup> Waiting times can be reduced by reducing access block.<sup>3</sup>

Pines studied the complication rate of ACS patients as a function of crowded vs. noncrowded conditions, and found a significant increase in serious complications (approximately 6% vs. 3% incidence of death, cardiac arrest, heart failure, late MI, VTach or VFib, SVT, bradycardia, stroke, or hypotension) in those patients presenting during times of crowding.<sup>4</sup>

#### **B. Boarding increases TOTAL length of stay in the hospital, further worsening access.**

Some 5 + studies have documented a total hospital length of stay to be a full day longer in patients boarded in the ED vs. patients with similar illnesses promptly placed on the inpatient units.<sup>5, 6, 7</sup>

#### **C. Boarding increases walkouts, some needing admission**

The longer the wait, the greater the number of people who leave prior to care.<sup>8</sup> Unfortunately, the percent of patients with serious illness differs little in the group who left vs. the group which awaited care. A number of these walkouts will require subsequent admission.<sup>9</sup>

#### **D. Overcrowding increases medical errors**

A number of articles document the increase in medical errors associated with boarding of admissions and crowding.<sup>10</sup> Many of these are errors of omission, as the emergency staff must focus on the new emergencies coming in the door.<sup>11</sup> According to JCAHO, 50% of sentinel events occur in the ED, and approximately 1/3 of these are related to overcrowding.<sup>12</sup> Boarded admissions are at risk of adverse event or error. For example, a review of 162 boarded admissions noted a total of 43 medical errors (4 upgrades, 2 poorly controlled BP, 1 hypoxic event, 9 missed medications, 31 missed home medications, 4 missed laboratory tests, 2 arrhythmias) during the period of boarding.<sup>13</sup>

### **E. Overcrowding causes deaths**

The emergency medicine community has long been aware of the dangers of overcrowding and delays in care, but have an understandable reluctance to publish bad outcomes. Several recent articles, looking at large databases which compare mortality rates in patients presenting during times of crowding vs. times of no crowding, conclude that the rate of death is higher during times of crowding. This effect (hazard ratio for death of approximately 1.3)<sup>14, 15</sup> is larger than the risk of other initiatives given great importance, such as the administration of antibiotics to pneumonia patients within 4 hours. Compliance with this initiative is estimated to reduce the number per 100 who would have died from 100 to 93. Overcrowding studies estimate that the reduction of deaths would be reduced from 100 to a range estimated between 75 and 83. These are substantial numbers, and apply to a very large population. As such, it may be a far more important issue to resolve.

Chalfin and colleagues looked at the outcomes of ICU patients subjected to a delay of >6 hours in transfer to an ICU, and found increased hospital length of stay (7 vs. 6 days) and higher mortality rates (10.7% vs. 8.4%) for these patients.<sup>16</sup>

### **F. Overcrowding causes ambulance diversion**

According to the CDC, approximately 50 percent of EDs experience crowding, and 1/3 of US hospitals have experienced ambulance diversion.<sup>17</sup> Ninety percent of ED directors report overcrowding as a recurrent problem,<sup>18</sup> and other studies have reported diversion in up to 50% of emergency departments.<sup>19</sup> Such crowding and diversion have raised an alarm regarding the ability of the health care system to respond to catastrophe.<sup>20</sup>

Interestingly, there is scant evidence that ambulance diversion actually works,<sup>21</sup> although evidence exists for delayed care in the face of ambulance diversion.<sup>22</sup> In this regard, Nicholl demonstrated an increased mortality rate with prolonged transport times.<sup>23</sup>

What should be clear is that ambulance diversion is driven by the boarding of admitted patients, and not otherwise related to issues of staffing or space within the ED itself.<sup>24</sup>

### **G. Overcrowding harms physicians**

The frequency of malpractice suits filed against an emergency physician is increased by a factor of 5, simply based on whether the patient waited more than, rather than less than, 30 minutes to be seen by the physician.

In summary, boarding increases harm to patients in the following ways:

- Waiting times
- Diversions
- Length of stay

- Medical errors
- Sentinel events
- MORTALITY
- Boarding increases harm to hospitals and doctors in the following ways:
  - Financial losses to hospital and MD
  - Malpractice claims

#### **4. What can be done to reduce crowding of hospitals and emergency departments?**

##### **A. Why not divert ambulances?**

It is increasingly evident that, in most circumstances, it simply doesn't work. Also, a growing amount of literature supports the harm to patients whose care is delayed because of ambulance diversion. As a practice the literature suggests is both unsafe and ineffective, it should be abandoned as an option for addressing the problems of hospital crowding.

##### **B. What about Deferred care for nonurgent patients?**

Although practiced in some areas, there is little data to support the safety of this practice. Physicians report that, in order to determine a patient is nonurgent, they have to do enough of an evaluation to make a diagnosis. Once the diagnosis is made, then what's the point of referral? Note above also the literature that nonurgent patients are NOT creating delays for urgent patients needing to be seen.

Some ED's have initiated protocols at triage, or moved a physician out to triage. These represent desperate adaptations in settings where the ED has simply been taken over by inpatient boarders. The real solution is to restore the ED to its functional status.

##### **C. Why not distribute admitted, boarded patients to the inpatient units?**

The full capacity protocol, adopted by a number of institutions, and supported by the NY State DOH, has been shown to substantially relieve congestion related to boarding of admitted patients in the ED. In ED's where this protocol is not in use, and there is no opportunity to relieve congestion, each boarded admission adds 15 minutes to the wait-to-be-seen time. Over a review of 190,000 visits in an institution using the FCP, each boarder added 2 minutes to the wait-to-be-seen time.<sup>25</sup>

To explain the FCP, it is best to contrast how patients are distributed. Imagine there are 10 identical medical units, all of which are full. There are now 20 additional patients now in need of a medical unit. How are they to be distributed?

Without the FCP, ***the current hospital practice is to load up one unit with all 20***, and leave the other 9 units untouched. Using the FCP, one would, instead, have each unit bear an additional, but much smaller, load of 1-2 patients per unit. Furthermore, based on the specialty skills of the unit, then appropriate patients can be placed where specialty care can be provided.

Why would an institution choose, instead, to load up one unit, rather than distribute the load? Why, further, would one choose to place patients in need of specialty care in a place where they couldn't get it? The answer ultimately is quite simple. It's the way it's been done. The practice has, in many institutions, not been challenged or questioned, and suggestions to consider the FCP are dismissed before serious consideration.

In practice, not all admissions can be boarded on inpatient units in hallways. Where the most data has been collect on this practice, at least 50% of all admissions would qualify for alternate placement outside of the ED in the face of unavailable inpatient beds.<sup>26</sup> ICU and step-down unit patients are not placed in hallways. Thus, the emergency department continues to bear the more difficult half of the burden, while the entire rest of the institution distributes the other half. The end effect is that each medical unit is given very little additional work, and the nurse to patient ratios (and thus the safety of the patient) is substantially improved. The emergency department is still shouldering much of the burden, but substantially less than before, and can continue to serve the community as an emergency department.

The end result of the adoption of this protocol include decreasing or elimination of ambulance diversion, fewer walkouts, less delay in care, possible reduction of sentinel events, reduction in length of stay, reduction of medical errors, a reduction in malpractice suits, and fewer deaths<sup>27</sup>. Other than the cost of call bells and privacy screens, the hospital is able to provide substantially improved care at no additional cost. The ED continues to function, and patients receive expert care in the area and by the people best suited to provide that care

### **What is being asked?**

LOTS of people are being asked to do a LITTLE extra so that a small number of people can accomplish the difficult, rather than the impossible. It is being asked because this is the safest thing to do for the most patients.

### **What is being asked? – the practical version**

If the problem is more admissions than there are beds:  
250 people take care of the easy ½ of a problem while 15 people take care of the hard ½ of a problem.

## Summary

- Emergency departments are crowded due to the practice of boarding admissions in the emergency department.
- This gives rise to delays in care, and endangers patient safety.
- Ambulance diversion and other proposed solutions will not address this problem, and may further endanger patients.
- Admitted patients need to be moved out of the emergency department and boarded in other areas of the hospital. This provides a decompression valve to crowding and its attendant risks, regardless of other system enhancements.
- The health care industry must realign itself with its patients' needs. Hospital resources have to be available 7 days a week in sufficient quantity. Surgical scheduling and other scheduled activities have to be leveled, to eliminate day to day peaks and troughs. Continuity of care for patients has to extend through the weekend.

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