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## Emergency Department Crowding

*Imagine a new disease strikes your community that significantly increases mortality rates, particularly in critically ill patients. This same disease causes patients to suffer more pain, greater heart damage from a myocardial infarction, and, if they are elderly, increases the chance they will be discharged to a nursing home. Such a disease clearly would grab the public's attention, and even in these difficult times, money would be diverted to find a cure. This problem exists today in many of our communities: crowding. This edition of Emergency Medicine Reports deals with the problem of emergency department (ED) crowding as a disease, one that causes complications for our patients in the areas of patient safety and delays in care. Crowding is a complex topic, with a variety of solutions, but the effects of crowding on our patients can be devastating. If your ED is crowded, this information can help you decrease the impact on your patients, or even help you find a solution. If your ED is not crowded, you need to know this information to keep your ED safe. Crowding starts innocently as single request to hold a patient until a bed is free or to cover a shortage of inpatient staff. Later another request is granted, and 1 boarder becomes 2, 2 become 4, etc.*

—Sandra M. Schneider, MD, FACEP, Editor

## Definitions

**Crowding:** A number of metrics are available to measure or identify crowding. These range from staff perception,<sup>1</sup> complex calculations that adjust for acuity and staffing patterns as well as the number of patients,<sup>2-6</sup> and indirect measurements such as ambulance diversion and the number of patients left without being seen.<sup>7</sup> Recently, there has been some consensus around a simple measurement — the occupancy of the ED.<sup>8</sup> Occupancy rates reflect the outcomes of crowding, i.e., ambulance diversion and patients who leave without being seen, with moderate accuracy. When occupancy is greater than 100%, everyone agrees it is crowded. The term crowding is preferred, as the term overcrowding implies that crowding is a normal state. **Crowding is caused most often by boarders.**

**Boarders:** Inpatients housed in the ED often are called boarders. While there is the need for some time between the decision to admit a patient and the transfer of that patient to the floor, times in excess of 1-2 hours suggest an obstruction of flow out of the ED (in some countries called access block). Patients housed in the ED beyond 1-2 hours clearly are boarders. Boarding burden is the number of hours such patients are housed in the ED.

## Epidemiology

ED crowding is not new. Early in the 1980s, reports out of New York suggested an increase in patients utilizing the ED was causing crowded conditions.<sup>9-11</sup> In 1987, the first state-wide conference on crowding was held in New York City.<sup>12</sup> This phenomenon was observed in many county hospitals that serve as a safety net for poor communities. Many projects attempted to redirect “unnecessary visits” from the ED to community health clinics, with some even transporting patients throughout the day to nearby facilities. Other EDs attempted to redirect patients by offering only urgent care visits during the day, making non-emergency

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## Executive Summary

- Crowding in the emergency department is primarily due to the boarding of inpatients.
- Crowding leads to increased mortality, increased morbidity, longer length of stay, greater cost, delays in care, decreased patient satisfaction, and an increased number of patients who leave without being seen.
- There are 3 low-cost/high-yield solutions to crowding:
  - Move admitted patients boarding in the ED to the hallway of inpatient units;
  - Discharge inpatients before noon;
  - Smooth the OR schedule over a week to avoid surges of complicated elective surgeries in the early part of the week.

patients wait long hours if they presented after hours. Most of the crowding was considered to be caused by the influx of non-urgent visits from patients unable or unwilling to access primary care.

Beginning in the late 1980s and into the 1990s, however, crowding worsened. Crowding was clearly linked to boarders<sup>13</sup> and was occurring in all types of hospitals, including those with a higher payer mix. In a national survey, Derlet reported that more than 90% of ED directors felt their EDs were crowded.<sup>14-15</sup> In 2002, Schneider, et al. performed a survey of randomly chosen EDs around the United States looking at ED occupancy on an average Monday evening at 7:00 pm local time.<sup>16</sup> At that point in time, the average census was 110%. More than 20% of the patients in the EDs were boarders waiting for inpatient beds. Crowding was present in all types of hospitals — rural, urban, and suburban, teaching and non-teaching. At the same time, 11% of hospitals were on ambulance diversion, a frequent consequence of crowding that some, but not all, hospitals can utilize. It is estimated that one-third of EDs are crowded on a daily basis. Anecdotally, crowding appears to be getting worse.

Psychiatric patients also are boarded. There are a limited number of psychiatric beds in the United States, and overflow patients are boarded in general ED space or in waiting rooms. Patients, including children, can wait 24 hours or longer

for an inpatient bed. In a recent survey of ED directors, 80% boarded psychiatric patients in their ED.<sup>17</sup> About one-third board these patients for 8-24 hours. The majority of the emergency departments lack specialized facilities for these patients.<sup>17</sup>

In 2006 the Institute of Medicine published a series of reports on the state of emergency care in the United States.<sup>18</sup> This comprehensive document highlights the fragile nature of our emergency care safety net and makes several recommendations. Most importantly, the reports call for the end of the practice of boarding inpatients in the ED.

Crowding is not limited to the United States. Although the root cause may vary, crowding has been reported around the world including Canada, Europe, Asia, and Australia.<sup>19-23</sup> As will be discussed later, some of these countries have taken action to decrease or eliminate crowding.

### Pathophysiology

**The Myth of the Unnecessary Visit.** A common misperception is that crowding today is caused by the influx of patients using the ED for primary care. Hospitals and some consultants pressure the ED to divert these patients to other (often absent) resources. Some believe the “cure” for crowding is simply improving throughput time for these minor care patients. While improving throughput time is a laudable and achievable goal, it likely will not impact crowding

caused by boarders. A simple calculation illustrates the faulty thinking. If a single boarder occupies a bed for 24 hours, the ED will have to improve throughput time by 30 minutes on 48 treat-and-release patients to make up for the occupancy of a single boarder. If the ED has 10 boarders, it would need to improve throughput times on 480 treat-and-release patients per day. An easier solution is to move the boarder(s).

### The Causes of Crowding.

Boarding is the major cause of crowding. Some EDs have not maximized their own internal processes. In some cases this is due to staffing shortages or inefficient care. In others, ancillary testing may increase throughput time. However, these are rare, as most EDs that experience serious crowding have already optimized these processes.

One area of increased concern is the absence of on-call specialists.

Increasingly, specialists are reluctant to take emergency call.<sup>24</sup> Financially they not only incur greater malpractice costs, but a late-night response to the ED may cause them to cancel office hours or surgical procedures the following day.<sup>25</sup> Further, the emergency patients they see are more litigious and less likely to be insured. EMTALA no longer requires a specialist on the hospital staff to provide emergency services to the ED.

The major cause of crowding is boarders; however, the cause of boarding is complex. There is a general shortage of nurses to staff hospitals. When shortages occur, beds are “browned out” and become unavailable for use. This allows the hospital to maintain a set ratio of RN:bed, which it believes helps in recruitment and retention of staff, improves patient satisfaction scores, and contains the “chaos” of an influx of patients in the ED. Some hospitals even go so far as to transfer post-op or inpatients in need of a critical bed to the ED when there are no inpatient staff to cover. The shortage of nurses is predicted to increase in the next decade.

In addition to a shortage of floor nurses, there is a growing shortage of other support personnel such as radi-

ology technicians, physical therapists, etc. The shortage of primary care providers is particularly worrisome. Fewer medical school graduates are entering primary care and, as the baby boomer physicians become patients themselves, the shortage of primary care physicians will worsen. When patients lack access to a primary care physician, they resort to using the ED. Primary care providers may refer patients when their practices cannot accommodate them in a timely manner.

Demand for services also is increasing. Not only are people living longer, but the baby boomers are in their 60s, a time when health care utilization begins to increase. Other factors that increase utilization of health services include an increase in immigrant population, entitlement programs, increased technology, and new procedures such as joint replacement. The problem of the 47 million Americans who lack health insurance contributes to the issue in two ways. First, these individuals (largely working) may find access to care particularly difficult. Few physicians, even those who serve as a “medical home,” will care long term for a non-paying patient. Even if a resource is available, taking a day off work to keep a doctor’s appointment may jeopardize a patient’s job. Secondly, patients without insurance will delay care or forego treatment because of cost. Some of these patients present with advanced disease, requiring more costly inpatient treatment. However the increase in demand for services cannot be blamed entirely on the uninsured. Two-thirds of the increase in ED visits between 1996-1997 and 2000-2001 was by patients with private insurance or Medicare.<sup>26</sup>

Supply of hospital beds is decreasing. Hospital closures due to economic factors or perceived oversupply of beds has driven up hospital occupancy rates. Hospital closure has a double effect on emergency departments.<sup>27</sup> When hospitals close, so do their emergency departments, and patients are distributed to the remaining open facilities. Between 1992 and 2003, ED visits rose 27%, while the

number of EDs fell 22%.<sup>28</sup> Likewise, hospital occupancy increases, thereby decreasing the ability of the ED to find a bed for its patient.

Hospital financing plays a particularly critical role. Reimbursement is quite complex, and a full explanation is beyond the scope of this paper, but a few general points are important. Hospitals often are paid on a DRG (diagnostic-related group) basis for each inpatient. A DRG is a flat rate paid based upon the diagnosis regardless of the length of stay, resource utilization, or cost of care. The DRG system originally was devised for Medicare, but a large number of insurance companies have adopted the process so that most hospitals work as if all patients are paid by DRG. DRG payments favor certain types of patients, particularly those procedurally based such as elective surgical cases. Hospitals are aware of the profit or “contribution margin” of each DRG. When possible, it is financially beneficial to admit more patients with diseases that have a high contribution margin. Patients who are admitted through the emergency department tend to have diagnoses with lower contribution margins.<sup>29</sup> Further, when comparing the cost of care for patients with the same DRG, those who are admitted through the ED have higher cost (i.e., lower contribution margin) than those admitted electively.<sup>30</sup> Hospitals with a high occupancy have a financial incentive to give preference to elective patients, medical or surgical. Some hospitals create geographic units to guarantee a bed is available for patients who have conditions with high contribution margins. The consequence of this is that patients with diagnoses that have a lower contribution margin back up in the ED. This, coupled with the fact that the uninsured and those with marginal insurance are more likely to use the ED as their entry point for admission, makes crowding financially favorable for some institutions.

Medicare rules regarding nursing homes add to this situation. Medicare will only pay for long-term care if the patient has been an inpatient for a period of 3 days. The rule, intended

to demonstrate that a patient has a significant medical condition, has an unintended consequence. Many patients who require long-term care now are admitted for 3 days simply to qualify for payment. Incentives, such as these originally developed by Medicare, place pressure on inpatient capacity, and the ED becomes the “pop-off valve.”

## Complications

There now is extensive literature suggesting that crowding is a serious patient safety concern, and it is associated with increased morbidity and mortality.<sup>31,32</sup> The Joint Commission reports that roughly 50% of “sentinel events” occur in the ED.<sup>33</sup> Of these, one-third are directly related to crowding. There is an increase in the frequency of adverse events and errors among patients boarding in the ED.<sup>34</sup> Physicians who work in crowded EDs perceive this increase. In a recent survey of more than 1000 ED physicians,<sup>35</sup> crowding ranked first in a list of concerns about patient safety. (See Table 1.) In a survey of ED physicians in New York State,<sup>36</sup> 70% responded that they personally knew of a patient harmed by crowding; 30% personally knew of a death directly related to crowding.

A secondary analysis of the CRUSADE data examined outcomes of patients with non-STEMI events and showed that patients who had prolonged ED stays were more likely women, non-white, and less likely to have HMO or private insurance.<sup>37</sup> These patients were less likely to receive the recommended treatment for their conditions. They also were more likely (OR 1.23) to have a recurrent MI during the study period. In another study focused on cardiac care, the complication rate among patients with acute coronary syndrome (death, cardiac arrest, heart failure, recurrent MI, dysrhythmias, hypotension) was increased (6% vs 3%) by crowding.<sup>38</sup>

**Delays in Care.** Crowding leads to increased wait time to be seen. In the past decade, ED wait times have increased 33%.<sup>39</sup> The CDC recently reported more than 10% of patients

**Table 1: Factors Influencing Patient Safety**

The most important factors influencing patient safety according to a survey of emergency physicians.<sup>35</sup> Factors are listed in order of *increasing* importance.

- Timeout procedures
- MD order entry
- Ambulance diversion
- Medication errors
- Antibiotics for pneumonia
- Handwashing
- Interpreters
- Low acuity patients
- Shift handoffs
- Aspirin for MIs
- IT data sharing
- Lab/x-ray times
- Nursing shortage
- Availability of consultants
- Inpatient crowding

identified at triage as critical waited more than 1 hour to see a physician.<sup>40</sup> Crowding often leads to back up in triage as beds are not immediately available for newly arriving patients. Such delays may negatively impact the EMS system as turnaround time in the ED increases, and fewer ambulances are available for new calls. The literature documents an increase in transport time for chest pain patients (even though on-scene time was lower) during times of ED crowding.<sup>41</sup> Such delays obviously are critical in patients with acute infarction. Once in the hospital, crowding is associated with prolonged time to fibrinolytic therapy in patients with STEMI.<sup>42</sup>

Crowding causes patients to suffer longer with pain.<sup>43</sup> Crowding at > 120% capacity was associated with less documentation of pain scores and longer waits for pain medication in one study of elders with hip fractures.<sup>44</sup> Pines, et al, looked at delays in receiving pain medication for any condition.<sup>45</sup> In his study, when occupancy was highest, patients were 3.4 times more likely to wait more than 1 hour for medication compared to low occupancy times.

Crowding also is associated with delays in antibiotic administration in

patients with pneumonia.<sup>46</sup> Time to antibiotic administration is considered a quality indicator for hospitals.

Patients who wait for long hours to be seen are more likely to leave before receiving care (left without being seen).<sup>47-49</sup> In addition, there is some suggestion that many patients take one look at a crowded ED and choose to leave before even registering.<sup>50</sup> This may explain why some EDs see a decrease in ambulatory patients when they are crowded and on ambulance diversion. Patients who choose to leave without being seen often have significant conditions, and delays in care for these patients can be serious.<sup>51</sup> It has been reported that 46-49% of those who left without being seen had a condition that required prompt medical attention.<sup>52,53</sup> In a more recent study, only 1 of 19 patients who left the ED improved without further care, and 1 week later, 42% of patients were still experiencing the problem that brought them to the ED.<sup>54</sup> Not surprisingly, this study also showed that long waits were associated with decreased patient satisfaction.

**Cost of Care.** An interesting set of literature suggests that boarding a patient increases the length of stay by roughly 1 day.<sup>55-57</sup> An interesting verification of this data came from Innes, et al. who studied the effects on length of stay when boarding was eliminated at their institution. Interestingly, their length of stay fell by 1.0 days.<sup>58</sup> Dolcourt, et al. showed a dramatic increase in length of stay (and cost) in 2 subsets of patients boarded in the ED.<sup>59</sup> Patients with congestive heart failure who stayed in the ED fewer than 8 hours had a length of stay of 5.3 days compared to 8.5 days for those who stayed more than 8 hours. The average charge was \$23,572 compared to \$39,345. In patients with altered mental status, length of stay was 4.8 days when the ED length of stay was fewer than 8 hours, compared to 6.8 days when the ED length of stay was more than 8 hours. Costs rose from an average of \$20,215 to \$40,725.

Costs to the larger health care system have been reported as well. When

EMS times are prolonged because of ambulance diversion or longer waits at the hospital for beds, more staff and equipment are required to meet community need.<sup>60-61</sup> This was reported to be about \$1 million per year in one community.<sup>62</sup>

Elderly patients may be particularly vulnerable to boarding. Delirium in elders is known to increase in noisy, chaotic environments and where clear day and night signaling is lost. It is not surprising, then, that elder patients boarded in the ED for more than 4 hours were 4 times more likely to be discharged to a nursing home than those who received an inpatient bed more quickly.<sup>63</sup>

**Perception of Care.** Patient satisfaction is correlated to wait times. As wait times increase, satisfaction decreases.<sup>12</sup> Further, it has been reported that the number of lawsuits filed against emergency physicians increases by a factor of 5 when wait times are greater than 30 minutes.<sup>12</sup>

**Increased Mortality.** The literature supports the emergency physician's perception that crowding is associated with increased mortality. Critically ill patients who were boarded in the ED had a higher mortality rate at 10 days (odds ratio 1.34).<sup>64</sup> A similar study in the United States showed that patients boarded in the ED had a higher mortality while in the ICU (10.7% vs 8.4%) and during the entire hospital stay (17.4% vs 12.9%).<sup>65</sup> These numbers suggest that if crowding were eliminated from the ED, deaths would be reduced from 100 to between 75-83. In comparison, the predicted decrease in death from administering antibiotics within 4 hours for pneumonia results in a reduction from 100 to only 93.<sup>12</sup>

A vivid example of this increase in mortality was reported recently in the news. A patient waiting for 24 hours for a bed in a psychiatric inpatient facility was seen collapse and die on video. The cause of death is reported to be a pulmonary embolism.<sup>66</sup> Crowding in EDs often leads to long waits to be seen. Deaths in emergency departments have been reported throughout this country and in Canada. While individual staff mem-

bers have been disciplined for these occurrences, clearly the root cause is the boarding of inpatients and crowding of the ED.

## Solutions (Treatment)

Finding solutions to complex problems such as crowding and boarding is not easy. But solutions are available. Recently, the American College of Emergency Physicians convened a task force to discuss some solutions to the problem of boarding (and, therefore, crowding). The task force was comprised of physicians who had studied the effects of crowding, those who had worked to create solutions, and those who had a knowledge of hospital finance. All were practicing physicians who had experienced crowding at some time in their career. This section will review the recent Boarding Task Force<sup>12</sup> with solutions that are low cost/high yield, those that are more costly, and those that are low yield. In addition it will review the experience of the United Kingdom, which chose a regulatory solution to the problem of crowding.

**Low Cost/High Yield.** The solutions below are proven to decrease or eliminate boarding, improve throughput and consequently are associated with decreased costs, mortality, and morbidity. Although they are low cost, they are not always easy to enact as they involve culture change within the organization, often by individuals not directly affected by boarding. The first step to implementation of any of these is organizational recognition that boarding is harmful and that the core reason for crowding is external to the ED. While the ED needs to be part of the process of change, greater change must come from outside. Strong institutional leadership concerned about patient safety is essential to success.

**Full Capacity Protocol.** Perhaps the most simplistic approach is to move the boarded patients upstairs. The basic premise is that patients can wait in the hall of an inpatient floor as well as in the hall of the ED. This approach is credited to Peter Viccellio, and details can be found on his website [\[ing.com\]\(http://www.hospitalovercrowd-ing.com\). In 2000, then New York State Commissioner of Health Antonia Novello issued a directive encouraging hospitals to use solariums and hallway beds on inpatient floors for boarders.<sup>67</sup> Initially, each floor creates a hallway spot on that floor for a patient. Once the ED becomes crowded, patients are screened against agreed upon criteria and then are transferred to the floor. When the boarded patients are distributed around the hospital, each unit gets only 1 additional patient. This frees the ED staff to concentrate on the new arrivals and unstable patients.](http://www.hospitalovercrowd-</a></p></div><div data-bbox=)

Several hospitals have adopted the full capacity protocol. In some, the ED must meet a critical number of boarders before the protocol is used. In more successful programs, boarders are immediately moved out of the ED to the floor hallway.

There are some interesting consequences of this approach. First, it has been observed that boarded patients wait for shorter periods for their beds to become ready. Clearly, the burden of having an additional patient in the hall seems to facilitate the process of getting the bed ready. Patients seem to tolerate being in the hall of the floor. When surveyed, patients actually prefer being boarded in the hall of the inpatient floor to the ED.<sup>68</sup> Boarding in the inpatient hall has been shown to be safe. Patients boarded in an inpatient hallway had a decreased in-hospital mortality compared to those admitted to a standard bed (1.1% vs 2.6%).<sup>69</sup> “Bounce ups” to the ICU from the floor were less likely to occur.<sup>69</sup> The number of adverse events, cost, and hospital length of stay decreased.

**Early Discharge.** Several studies now have demonstrated that when patients are discharged from the hospital early (before noon), throughput in the ED improves. Patients present to the ED in greater numbers in the afternoon and evening. This is the same time the ORs begin to transfer their patients to inpatient beds. If discharged patients fail to leave, beds are not ready for the newly admitted patients. Hospital occupancy often is reported as the number of patients in the hospital at

midnight. If discharges do not leave in a timely manner, occupancy at noon can be as much as 20% higher than at midnight. Getting discharges out by noon can be difficult. The process requires a change in culture and cooperation among physicians, social workers, nurses, nursing homes, pharmacy, physical therapy, and housekeeping. It may be necessary to change the time of physician rounding, housestaff conference, and the expectations of patients’ families.

**Smoothing the Schedule.** Many EDs experience crowding in mid-week, even though their own volume is flat or increases on the weekend. Surgical admissions are coordinated around the operating room (OR), which typically has a Monday through Friday schedule. In addition, other support services such as physical therapy, occupational therapy, and, in some places, social work also are limited on the weekends. Nursing homes in most areas only accept new patients on weekdays. Therefore, surgeons often admit their most complex cases early in the week so that patients can benefit from 4-5 days of services. By bunching their most difficult patients early in the week, more beds and resources are utilized on these days than on the weekends. In contrast, the number of patients admitted from the ED shows little variation.

There are several ways to smooth the OR schedule. In some cases it is a matter of shifting the operating days of particular surgeons. Adding support services and, in some cases, OR time on Saturday has been shown to improve capacity.

**Costly or Low-Yield Solutions.**  
**Bedside Registration.** When there is a large volume of patients in the ED, there may be delays in care while patients wait for registration. Theoretically, if patients are placed directly into a bed, bypassing triage and registration, length of stay can be decreased. There are some problems with this approach. More clerical workers are needed to register patients at the bedside. As most laboratory and radiology systems require system registration, their systems must be bypassed to prevent the patient

from waiting again for registration. Some patients with minor complaints may be discharged before registration occurs. Bedside registration only works if there are empty beds available in the ED.

**Fast Track.** When there are substantial numbers of non-urgent patients seen in an ED, it is possible to set up a separate area to move these patients through more quickly. While this helps throughput times and may increase patient satisfaction, duplicate staff and equipment are needed to set up a separate area. Particular care must be used when the area is staffed by less-experienced providers. Triage is not always perfect, and many patients with serious illnesses/injuries initially look benign. Not as obvious is the psychological effect of partitioning off an area of the ED. Creating silos makes it hard to develop teamwork and fairness across the ED and can have negative effects on morale and patient flow.

**Observation Units.** Adding capacity is a clear solution to boarding. If admitted patients had somewhere to go, they would not be in the ED. Adding capacity can be expensive. Further, many large hospitals have created geographic units (Pediatrics, Cardiology, Orthopedics, etc.). Such units actually decrease throughput and capacity as patients must wait until the “right” bed opens up. Observation level of care is reimbursed by Medicare and many insurance companies for patients who require up to 23 hour of care. Chest pain patients are an obvious example. Many of these patients are self-sufficient and require little nursing care. While an inpatient RN: patient ratio may be 1:4, nurses staffing an observation unit may be able to handle more patients (1:6). Chest pain units have been successful in many parts of this country, often staffed by mid-level providers (nurse practitioners and physician assistants) using protocols. However, observation units, particularly those run by emergency medicine, can care for a variety of patients including hyperemesis, concussion, low-acuity trauma, fractures, dehydration, and congestive heart fail-

ure. Some units accept short-stay, low-acuity patients who qualify for inpatient admission. Observation units add capacity but may require additional (and costly) staff and construction.

The effect of adding capacity can be substantial. Dick, et al., showed a dramatic reduction in ambulance diversion from 290 hours per month to 126 hours per month after the opening of a 24-bed unit.<sup>70</sup> A similar approach was used by Kelen, where he established an acute care unit distinct from the ED and staffed by ED attendings.<sup>71</sup> He observed a decrease in ambulance diversion and patients who left without being seen of 50%.

**Physician at Triage.** Theoretically, a physician at triage can screen, treat, and discharge very low acuity patients and, for more complex patients, can initiate the workup when there is no immediate bed available in the ED. Depending on the number of these very minor patients, this can a viable option for large departments. If there are enough very minor patients to occupy a physician during the hours of coverage, it can be cost effective. Many patients like the rapid service, although some complain that they are charged for a visit without using a room. A physician at triage can be effective at initiating workups and assisting in screening patients who must be treated promptly. Electrocardiograms performed in triage can identify patients who need monitoring.<sup>72</sup> For most EDs, the physician in triage is redundant and costly.

EMTALA requires that all patients with an emergency condition be seen regardless of their ability to pay. Several departments now perform a medical screening examination using the physician at the triage area. When it is determined that a patient does not have an emergency medical condition, the patient must show insurance, pay prior to service, or he is referred out of the ED. While there is no legal obligation to care for a non-emergency patient, referral out of the ED should be considered only when alternate resources are available. While deferring care may be financially attractive to some hospitals, the litera-

**Table 2: Process Changes within the ED that May Improve Flow**

Not all of these are successful in all departments. Some are very costly even if they are effective.

- Bedside registration
- Bypass triage when a bed is available
- Fast track
- Minimize silos in the department
- Observation medicine
- Establish clear turnaround times for ED processes
- Adjust staff to volume
- Scribes
- Decrease turnaround time for ancillary services
- Close the waiting room
- Use protocols and order sets
- Electronic medical records (use with scribes)
- Establish response time for consultants
- Triage protocols (advanced triage)
- Physician at triage
- Establish individual turnaround times for physicians
- Defer care from the ED
- Flex staff (swat teams)

ture suggests that diverting non-emergencies does little to decrease crowding.<sup>73</sup> Despite the data, many public hospitals are utilizing deferral of care.<sup>74</sup>

**Delay Elective Surgeries.** Most disaster plans call for elective surgeries to be cancelled. A crowded emergency department has been compared to a disaster. Of course in some areas, a disaster situation occurs daily. Cancelling elective surgical cases can provide capacity but is costly. As explained above, elective surgical cases provide greater contribution margin than emergency patients.

**Increasing Patient Flow.** In addition to the items listed above, Table 2 lists process changes that can facilitate throughput in the ED itself. Some of these require additional resources and others require cooperation between the various services. Table 3 lists process changes that can facilitate flow within the hospital. Individually these

**Table 3: Hospital-wide Processes that May Improve Flow**

Not all of these are successful in all departments. Some are very costly even if they are effective.

- Understand crowding is a hospital problem
- Match resources to the need (increase weekend and evening coverage)
- Establish a 24/7 operation
- Smooth OR and elective admissions throughout the week
- Facilitate nursing reports
- Early discharge of patients
- Inpatient management by hospitalists with incentives to decrease length of stay
- ICU management by intensivists with incentives to decrease length of stay
- Full capacity protocol – relocate boarders to the hallway of inpatient floors
- Hire a “bed czar”
- Express admission unit – short-stay unit
- Generic admission order set initiated in the ED
- Hospital-wide protocols for capacity issues
- Alert system and action plan when overcapacity occurs
- Cancel elective admissions

may be low yield in terms of saving bed space. However where there are serious flow problems, the additive effect of both ED process changes and hospital process changes can relieve some ED crowding.

#### *Redistributing EMS Patients.*

During a time of great overcrowding, physicians manned the EMS medic phone in a community and directed patients to the most appropriate and available hospital.<sup>75</sup> During this project, 14% of patients were redirected. However, ambulance diversion was reduced by 61% community wide. The physicians kept in constant contact with all the EDs in the community. At times when a particular ED was overwhelmed with admitted

patients, it still had capacity to see minor care. Conversely, when another ED was overwhelmed with minor care patients, the hospital still may have had capacity for a stable admission. Although the program was successful in managing patients, the cost of 24/7 physicians was prohibitive. However, this program is part of the disaster plan.

**Ineffective Solutions.** *Enlarging the ED.* Taken in isolation, expanding the ED can simply increase the capacity to house inpatients. With less pressure on the system, there is less need to improve flow, and it actually may worsen hospital length of stay. Adding an observation unit is different than simply adding capacity to the ED as observation units are very flow conscious (especially if run by emergency physicians used to discharging patients 24/7).

*Nursing Ratios.* California has created a fixed RN:patient ratio of 1:4 in the hospital and now in the ED. This legislation not only hampers the ability of California hospitals to institute the full capacity protocol but may compromise care in the ED. When there are more patients than the ratio permits, and no more nurses, patients are placed in the hallway with no direct nursing observation or are left in the waiting room.<sup>76</sup>

*Discharge Units.* A proven strategy to relieve crowding is to assure inpatients are discharged early. Creating an area where patients wait for discharge, therefore, should be effective. However, only a few hospitals have found this to be true. In most places, staff are reluctant to move a patient who will be discharged “very soon,” and without the pressure of a hallway patient, do not feel the urgency to do so.

*Ambulance Diversion.* When the ED has too many patients, one of the few options available is to turn off the entrance and divert patients to another hospital. The negative aspects of ambulance diversion are many. Until we have good communication of electronic medical records, vital information may be missing when the patient is taken to a “new” hospital. Continuity with the primary care

physician can be compromised. There may be longer transport times. Finally, many areas of the country suffer from diversion fatigue, and ambulances simply continue to bring in patients regardless of diversion status. While ambulance diversion is unsafe, it is often the only sense of control the ED staff has over the influx of patients. It should be regarded as a signal that the ED itself is dangerously crowded. Going on diversion should initiate a hospital-wide response to increase resources in the ED to care for the excess number of patients while expanding capacity in the hospital.

### **The British Answer to Crowding**

Several years ago, England had similar crowding issues to the United States. Recognizing the patient safety concerns related to crowding, in 2003 the United Kingdom adopted a series of fines and rewards for reducing wait times in the ED. Known as the four-hour rule, the regulation requires hospitals to meet the goal of processing 98% of patients through the ED (A&E) within 4 hours. Time is measured from registration to admission, discharge, or transfer. Although there have been some reports of reporting errors and an increase in short-stay admissions, nonetheless the vast majority of hospitals have met this rule. Recently in Canada, the British Columbia Medical Association has recommended that length of stay in the ED be no longer than 6 hours and that all admitted patients be transferred to an inpatient area within 2 hours following the decision to admit.<sup>77</sup>

### **Efforts in the United States**

The Joint Commission is a voluntary, not-for-profit organization with a mission “to continuously improve the safety and quality of care provided to the public through the provision of health care accreditation and related services that support performance improvement in health care organizations.”<sup>78</sup> Several years ago, it considered a standard similar to the British

program discussed above that limited the time a patient could board in the ED. The current standard introduced in 2005 requires that hospital leadership “develop and implement plans that evaluate patient flow.”<sup>79</sup>

Beginning with January 2008, surveyors are identifying problems with patient flow. The Joint Commission recognizes in its standard that “[t]reatment delays, medical errors and unsafe practices thrive during times of patient congestion and can contribute to sentinel events.”

The Robert Wood Johnson Foundation funded a series of national projects to identify solutions to ED crowding. Their program Urgent Matters ([www.urgentmatters.org](http://www.urgentmatters.org)) awarded 10 grants to diverse institutions. Solutions ranged from creating a “bed czar,” a dedicated discharge nurse, early discharge of patients, smoothing the OR schedule, and creation of a community-wide diversion protocol. While these solutions are diverse, they all involve hospital-wide initiatives and the understanding that crowding is a symptom of hospital issues.

CMS is creating a pay-for-performance program in which hospitals and physicians are rewarded financially for providing quality care as established by quality standards. Similar measures are publicly reported and used by insurance companies to reward quality care. Early measures for emergency medicine included aspirin therapy for myocardial infarction and antibiotics within 4 hours for pneumonia. Several measurements of throughput times and boarding have been suggested but have yet to be implemented.

The Residency Review Committee for Emergency Medicine oversees the quality of resident education. Their guidelines for programs include the number of procedures each resident should perform, appropriate number of scholarly publications for faculty, and throughput measures for ED patients. Crowded EDs have been shown to have a negative effect on resident education.<sup>80</sup> Although it may prepare them for the “real world,” crowding decreases the number of patients residents treat. There also is

concern that residents will accept crowded conditions as the norm. “Normalization of deviance” was first used to describe the cause of the space shuttle disaster. It was long known that the O ring on the space shuttle performed poorly at low temperatures, but there was no immediate solution to the problem. Over time, the defect was minimized and ignored until January 28, 1986 when the Challenger exploded.

The American College of Emergency Physicians has adopted crowding as one of its priority objectives. Members have lobbied, testified before Congress, and even taken their concern to the public to end the practice of boarding. It will re-introduce the Access to Emergency Care Act in the 2009 Congress. The Access to Emergency Care Act calls for: a bipartisan commission to examine factors such as crowding and on-call shortages that affect the delivery of emergency care; additional payment to all physicians who deliver EMTALA-related care; and CMS to undertake a study of boarding and develop standards and incentives to alleviate this problem.<sup>81</sup>

Several states have proposed legislation to eliminate the practice of boarding. Some of the laws submitted at the state level can be found in the advocacy section of the ACEP web site at [www.acep.org](http://www.acep.org).

## Prognosis

Without change in our health care system, boarding will undoubtedly grow worse with time. As the baby boomers age, as hospitals close, pressure on the system will worsen. The crisis in our emergency departments is really just a symptom of the crisis in our hospitals and in the system at large. In fact, some have referred to the ED as the canary in the mineshaft of health care.

As pointed out, crowding is a serious disease that affects our patients in the ED. It is also a disease that affects our community with increased cost for EMS and medical services. There is legitimate concern that crowding may hamper our ability to respond to a disaster. Short, single-point disasters

such as an explosion or fire may overload a crowded ED, but history has shown that even crowded EDs can respond in a time limited crisis. Of much greater concern is a more protracted disaster such as avian flu.

Finally, the effect of crowding eventually will take its toll on the specialty of emergency medicine. ED nurses are already scarce in some communities. Vacancy rates in the ED are the highest of all units in many hospitals. Emergency nurses often feel the effects of crowding more than other providers in the ED. Medical students exposed to crowded conditions in the teaching hospitals have difficulty dealing with chaos and choose residencies with more controlled environments.

Without change, emergency medicine will become an unpopular specialty, and our patients will be cared for in an unsafe environment. ED staff, particularly nurses and physicians, will be blamed for errors caused by the system. Until the hospitals, government, and the community at large see the need the change, crowding will continue. On the local level, crowding is a symptom of a dysfunctional hospital. On the national level, it is a symptom of a broken health care system.

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## Physician CME Questions

21. The major cause of crowding in U.S. emergency departments is:
- unnecessary visits.
  - nursing shortages.
  - boarding of inpatients.
  - inefficient processes in the ED.
22. Crowding causes:
- delays in care.
  - increased mortality.
  - increased need for nursing home after discharge.
  - all of the above.
23. Effective solutions to crowding include all of the following *except*:
- enlarging the ED.
  - smoothing the OR schedule.
  - moving inpatients into the hallways of inpatient floors.
  - early discharge of inpatients.
24. The United Kingdom has improved the crowding in its EDs by:
- educating physicians on efficient practice.
  - fining hospitals that keep patients in the ED more than 4 hours.
  - building more urgent care centers.
  - using nurse practitioners in the ED.
25. Observation units have been demonstrated to decrease crowding. Their major disadvantage is:
- cost.
  - patient satisfaction.
  - length of stay is usually > 23 hours.
  - they are not recognized by Medicare.
26. Some of the effects of the full capacity protocol (moving inpatients into inpatient hallways) are:
- patients get to their beds sooner.
  - care delivered is safe.
  - patients prefer the hall of the inpatient unit to the hall of the ED.
  - all of the above.
27. Crowding is predicted to increase because:
- demand for medical care is increasing.
  - hospitals are closing.
  - there is a shortage of primary care providers.
  - all of the above.
28. Hospitals may tolerate crowding in their EDs because:
- there is a financial advantage for some hospitals to fill their beds with elective admissions.
  - there are no alternatives available but to keep boarders in the ED.
  - keeping boarders in the ED reduces adverse events.
  - all of the above.
29. Patients who leave without being seen:

- generally have no acute emergency.
  - find medical elsewhere.
  - often forego medical care.
  - go to another ED.
30. Boarding of inpatients in the ED:
- reduces length of stay.
  - decreases adverse events.
  - reduces cost of care.
  - increases mortality rates in critically ill patients.

### CME Answer Key

21. C; 22. D; 23. A; 24. B; 25. A; 26. D; 27. D; 28. A; 29. C; 30. D

### In Future Issues

Hypothermia

### CME Instructions

Physicians participate in this continuing medical education program by reading the article, using the provided references for further research, and studying the questions at the end of the article. Participants should select what they believe to be the correct answers, then refer to the list of correct answers to evaluate their knowledge. To clarify confusion surrounding any questions answered incorrectly, please consult the source material. *After completing this activity, you must complete the evaluation form that will be provided at the end of the semester and return it in the reply envelope provided to receive a certificate of completion.* When your evaluation is received, a certificate will be mailed to you.

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### Factors Influencing Patient Safety

The most important factors influencing patient safety according to a survey of emergency physicians.<sup>35</sup> Factors are listed in order of *increasing* importance.

- Timeout procedures
- MD order entry
- Ambulance diversion
- Medication errors
- Antibiotics for pneumonia
- Handwashing
- Interpreters
- Low acuity patients
- Shift handoffs
- Aspirin for MIs
- IT data sharing
- Lab/x-ray times
- Nursing shortage
- Availability of consultants
- Inpatient crowding

### Process Changes within the ED that May Improve Flow

Not all of these are successful in all departments. Some are very costly even if they are effective.

- Bedside registration
- Bypass triage when a bed is available
- Fast track
- Minimize silos in the department
- Observation medicine
- Establish clear turnaround times for ED processes
- Adjust staff to volume
- Scribes
- Decrease turnaround time for ancillary services
- Close the waiting room
- Use protocols and order sets
- Electronic medical records (use with scribes)
- Establish response time for consultants
- Triage protocols (advanced triage)
- Physician at triage
- Establish individual turnaround times for physicians
- Defer care from the ED
- Flex staff (swat teams)

### Hospital-wide Processes that May Improve Flow

Not all of these are successful in all departments. Some are very costly even if they are effective.

- Understand crowding is a hospital problem
- Match resources to the need (increase weekend and evening coverage)
- Establish a 24/7 operation
- Smooth OR and elective admissions throughout the week
- Facilitate nursing reports
- Early discharge of patients
- Inpatient management by hospitalists with incentives to decrease length of stay
- ICU management by intensivists with incentives to decrease length of stay
- Full capacity protocol – relocate boarders to the hallway of inpatient floors
- Hire a "bed czar"
- Express admission unit – short-stay unit
- Generic admission order set initiated in the ED
- Hospital-wide protocols for capacity issues
- Alert system and action plan when overcapacity occurs
- Cancel elective admissions

Supplement to *Emergency Medicine Reports*, January 19, 2009: "Emergency Department Crowding." *Author: Sandra M. Schneider, MD, FACEP*, Professor, Department of Emergency Medicine, University of Rochester School of Medicine, Rochester, NY.

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# Emergency Medicine Reports

The Practical Journal for Emergency Physicians

Volume 29

SUPPLEMENT

## 2008 Subject Index: Volume 29, Numbers 1-26

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