

# Inpatient Admissions: What's the Hold Up?



Monal B. Shah, MD

Division of General Internal Medicine

January 14, 2011

This is to acknowledge that Monal Shah, M.D has not disclosed any financial interests or other relationships with commercial concerns related directly or indirectly to this program. I will not be discussing off-label uses in his presentation.

**Goal:** To determine the main factors contributing to patients' inability obtaining an inpatient bed.

**Objectives:**

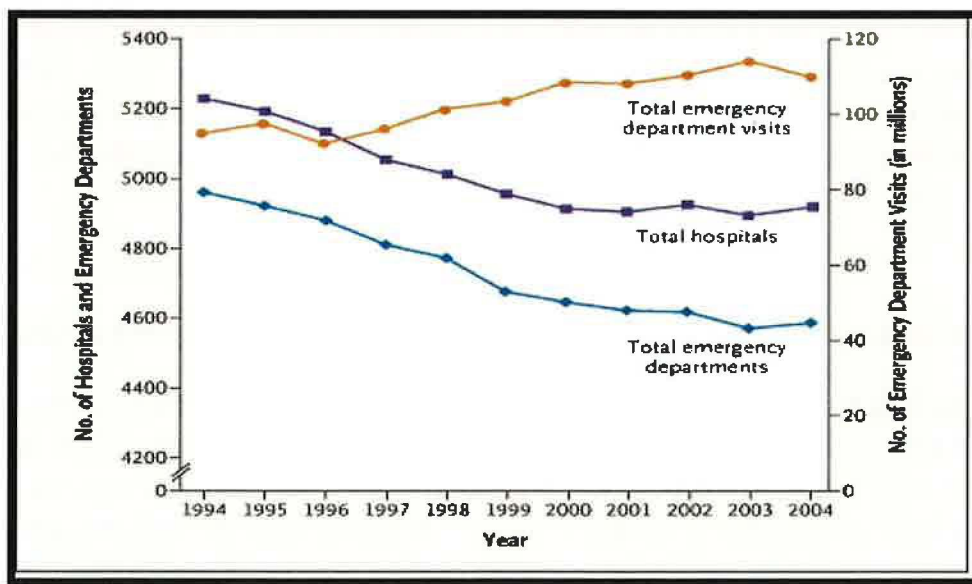
1. Understand the main causes of ED overcrowding
2. Identify ways in which overcrowding can be quantified
3. List the consequences associated with ED overcrowding
4. Recognize solutions for inpatient admission delays

Scenes of patients lying in stretchers in the hallways of Emergency Departments (ED) throughout the country have become commonplace. In addition, almost all outpatient-oriented physicians are aware of the difficulties in obtaining a hospital bed for patients requiring direct admission from clinics, resulting in patients waiting at home without treatment or being diverted to EDs in the hopes that the admission process will be expedited.

## **BACKGROUND**

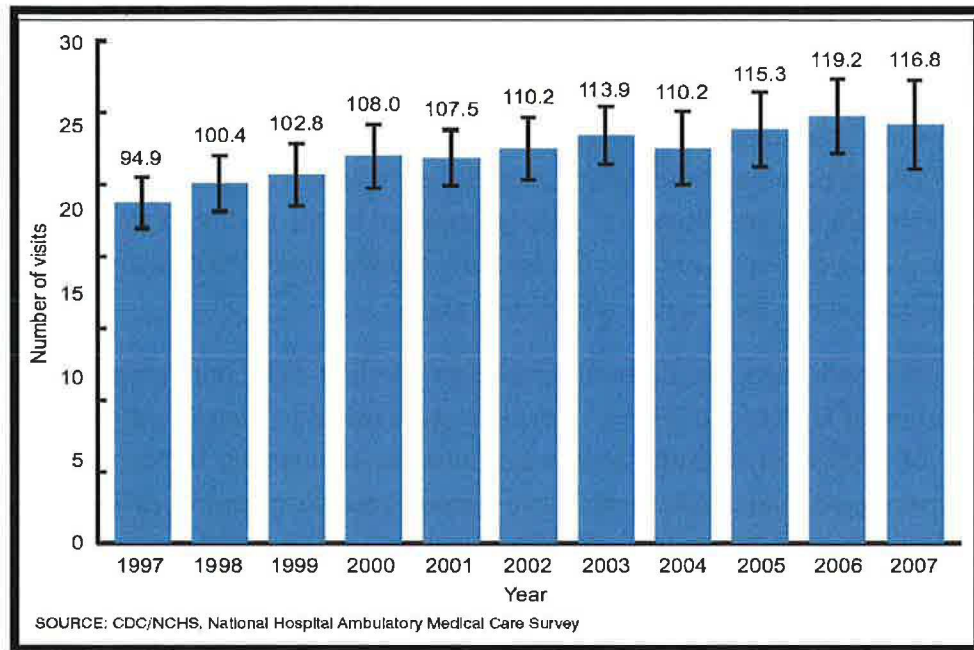
Historically, only a minority of hospitalized patients were admitted through the ED. In the mid 1990s, fewer than one-third of all admissions initiated in the ED. That number increased to 43% in 2002 and today accounts for over 50% of admissions.<sup>1</sup> At large county hospitals such as Parkland and Ben Taub in Houston that number exceeds 80%.<sup>2</sup> Since EDs are now the source of the majority of inpatient hospitalizations, it serves as the starting point for receiving timely care. However, this is tempered by the reality of an overburdened and overcrowded Emergency Care System – one that the Institute of Medicine’s 2006 study described as being “At the Breaking Point.”<sup>3</sup> Many factors have led to this current state.

In his Grand Rounds two months ago, Dr. Leach described a system of cost-containing measures that began in the 1970s with the creation of HMOs and DRGs.<sup>4</sup> Hospitals were asked to transfer patients to “preferred” facilities at the request of HMOs. As a result, there was a decrease in payments to hospitals prompting some facilities to refuse care to the un- and underinsured or to transfer patients prior to stabilization of their condition in the ED.<sup>5</sup> What became known as “dumping” of indigent patients in favor of financially more desirable ones resulted in the creation of a 1986 federal law known as EMTALA (Emergency Medical Treatment and Active Labor Act) or the Patient Anti-Dumping Act. An unfunded government mandate, this law guaranteed every ED patient an exam and medical stabilization. The cost of this “safety net” was bore by institutions as part of their participation in Medicare. This financial burden resulted in the closure of hospitals and EDs over the next two decades despite a rise in ED volume.



**Figure 1. Trends in Emergency Department Visits, Number of Hospitals, and Number of Emergency Departments in the United States, 1994-2004. (Adapted from NEJM)<sup>6</sup>**

Between 1993 and 2003, the number of ED visits increased by 24 million from 90 million annual visits to 114 million visits. During this same time, “the total number of hospitals in the United States decreased by 703, the number of hospital beds dropped by 198,000, and the number of EDs fell by 425.”<sup>7</sup> This amounted to an almost 80 percent increase in visits per ED.<sup>8</sup> The number of visits continues to rise with the most recent data from 2007 showing 117 million annual ED visits – more than one for every three people in the U.S.



**Figure 2. Annual number of emergency department visits (and 95% CI): United States 1997-2007 (Adapted from the CDC National Health Statistics Reports)<sup>9</sup>**

EMTALA served as the catalyst for a series of events that resulted in more patients being cared for at fewer facilities, causing overcrowding, increased wait times, and concerns about quality. These findings were not lost on the public. Since the early 1990s, numerous articles reporting on this have appeared in popular magazines and newspapers, including *Time*, *U.S. News & World Report*, *The Washington Post*, *The New York Times*, and *The Dallas Morning News*.<sup>10, 11, 12, 13, 14</sup>

## **CAUSES**

Many factors have contributed to the rise in ED volume and its associated bottleneck with prolonged wait times:

- a. **Aging population:** The fastest growing segment in the United States includes those aged 65 and older with a projected population increase from 18 million in 2003 to 24 million in 2013. This group not only accounts for more visits, it also is the group with faster visit rate increase over the preceding decade. In 2007, the number of annual visits per 100 persons was 48.4 for this age group and 155.7 for nursing home residents; this compared with 39.4 for the overall population.<sup>9</sup> In addition, their visits had longer lengths of ED stays, the greatest use of ED resources, and the highest admission rate when compared to those younger than 65. Based on this trajectory, the number of annual ED visits as well as the number of inpatient admissions is expected to nearly double from 6.4 million visits (in 1993) to 11.7 million (in 2013) and 2.1 million to 3.8 million, respectively.<sup>15</sup>



- b. **Un- and Underinsured patients:** Patients without access to a primary care physician will refer themselves to the ED as their sole source of care. A 1994 *JAMA* study found that 14.5% of uninsured and 22.4% of medicaid patients reported the ED as their usual source of ambulatory care.<sup>16</sup> The same study showed that those without a primary care provider had 60% fewer ED visits than those with a regular source of care, suggesting that patients without primary care access defer treatment until their condition worsens. Similar to the treatment of complex medical conditions in the elderly, waiting until a condition worsens augments utilization of ED resources.<sup>17</sup> With the doubling of the uninsured population over the past 25 years, this form of resource use is anticipated to increase. This is further exacerbated in Texas which has the highest rates of uninsured adults in the country (25.8% v. 16.7% nationally).<sup>9</sup>
- c. **Primary Care Provider (PCP) Access:** The shortage of PCPs is well-known. Current estimates by the AAMC suggest a PCP shortage of 17,000 with a projected increase to 46,000 by 2025.<sup>18</sup> Multiple factors contribute to this, including decreased job satisfaction, increased debt, more time spent on non-clinical activities, and a widening salary gap when compared with other specialties. The U.S. Health Resources Services Administration estimates that 136 additional full-time primary care providers are needed in each state to provide adequate care. In Texas, that number is almost 5 times higher at 664.4 FTEs.<sup>19</sup>

Not only has this resulted in patients without PCPs resorting to the ED as their first line of care as noted above, the lack of providers has made it difficult to provide timely follow up for patients being discharged from the ED. This perpetuates the cycle of patients being stabilized in the ED but not being seen as an outpatient until their condition worsens to the point where they re-present to the ED. A 2006 New Jersey study suggested that 50% of non-hospitalized emergency room visits could have been prevented with improved primary care availability.<sup>20</sup>

- d. **Subspecialty and Mental Health Providers:** In addition to the lack of primary care access, a 2006 IOM survey found that 75% of hospitals had a shortage of on-call specialists for the ED. Multiple reasons have been cited for this including difficulty getting paid for ED services due to the high numbers of uninsured, increased liability risk due to a lack of a pre-existing relationship with ED patients, higher insurance premiums for those taking ED call, increasing number of specialists whose practice is limited to specialty hospitals and surgical centers, disruptions in day-to-day practice, and disruptions in personal schedules.<sup>3,19</sup> The latter is of particular concern as almost two-thirds of all ED visits occur during non-business hours on weekdays or on weekends.<sup>9</sup> Due to these concerns as well as lack of specialist availability in smaller, community-based hospitals, patients are often transferred to other facilities resulting in further delays in care. A 2002 JCAHO finding noted that “21 percent of patient deaths or permanent injuries related to emergency department treatment delays are attributed to lack of availability of physician specialists.”<sup>19</sup>

Mental health specialists are particularly in short supply with a national shortage of 30 FTEs per state. In Texas that number exceeds 139 FTEs.<sup>19</sup> A 2008 survey reported 40% of ED physicians saying psychiatric patients waited for an inpatient bed for more than 8 hours after the decision was made to admit them.<sup>21</sup>

- e. **Nursing:** The American Hospital Association reported having 116,000 hospital vacancies for nurses in July 2008. That number is expected to increase to 260,000 by 2025 partly driven by an aging work force approaching retirement. In 2006, the average RN age was 43.7, and that number is expected to reach 44.5 in 2012 with those in their 50s comprising the largest workforce.<sup>22</sup> New, inexperienced, part-time or “float” nurses are asked to fill this deficit and the care provided by these nurses may be less efficient due to “the complex learning curve and fast-paced ED care.”<sup>23</sup>

Although ED care was not examined specifically, a 2002 JCAHO survey found low nursing staffing to be a contributing factor for ¼ of patient deaths and injuries.<sup>24</sup> This was echoed by a NEJM study where the nursing shortage was cited by physicians as the second leading cause of preventable medical errors.<sup>25</sup>

- f. **Beds:** A 2002 survey found that over 90% of level 1 trauma centers, academic medical centers, and hospitals with 300 or more beds were operating at or above capacity.<sup>6, 26</sup> Multiple articles have cited this as the number one factor contributing to ED crowding.<sup>17</sup> The most recent data from 1993 to 2003 shows a decrease of nearly 200,000 staffed hospital beds despite a more than 10% population increase.<sup>7</sup> The problem is further compounded by shortages in ICU and telemetry-capable beds, leaving the emergency room as the only location with a comparable level of monitoring when these beds are filled. One study done at an academic ED in 1993 reported providing 154 patient-days of care to critically ill patients annually.<sup>27</sup> By now the number has certainly increased.

Despite the anecdotal findings, it is unclear if there is a direct correlation between overcrowded EDs and total hospital beds. Some experts have noted that increasing the number of inpatient beds is only a temporary solution, as additional beds are filled almost immediately and a repeating cycle ensues.<sup>28</sup>

- g. **Elective Admits:** A corollary to the lack of inpatient beds for ED patients is competition with elective admits. In 2006, the IOM reported that these elective admissions were for surgical conditions and insured patients which were more profitable and thus preferred over ED admissions for less profitable medical conditions. All of the top 20 DRGs associated with ED admissions in 2006 represented medical rather than surgical conditions. By contrast, only 13 of the top 20 DRGs for non-ED admits were for medical conditions according to a AHRQ study.<sup>17</sup>

- h. **Testing:** The ease of obtaining diagnostic testing has allowed physicians to obtain more studies. It is estimated that the following tests are now ordered for ED patients: 35.4% CBC, x-rays 33.8%, UA 22.5%, CT 13.9%.<sup>9</sup> Beyond these ubiquitous tests, more advanced diagnostic imaging such as MRIs, non-invasive cardiac studies, and nuclear medicine scans are not uncommonly done in many EDs.

Numerous other factors have been cited as causes for ED overcrowding and prolonged wait times including a growing non-English speaking population requiring the more frequent use of translators, an increase in the number of more complicated and chronic problems with an aging population, and an increased requirement for additional documentation.<sup>23, 29</sup>

## MEASURES

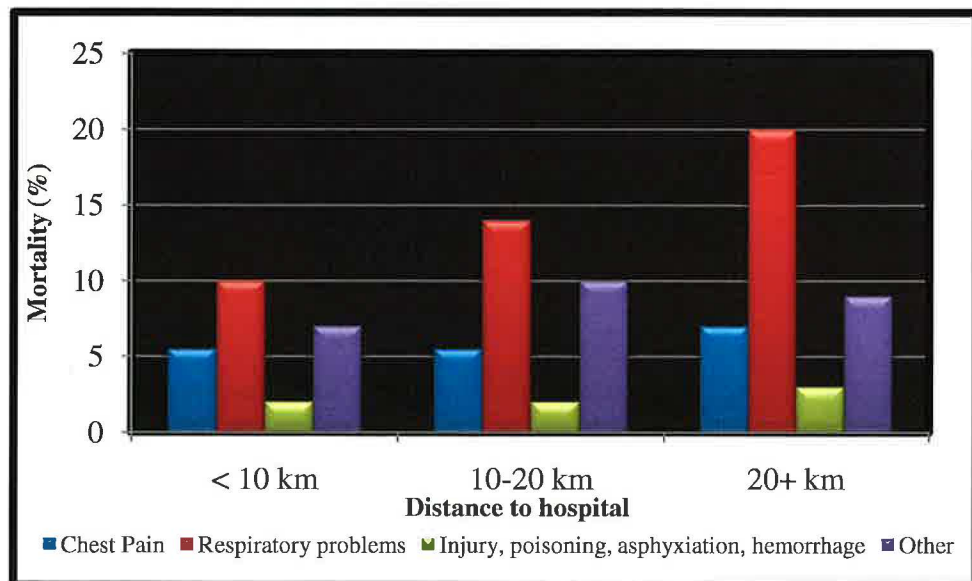
A GAO report issued in 2006 quantified overcrowding by using three metrics: ambulance diversion, boarding time, and patients who left without being seen (LWBS) prior to a medical evaluation. In addition, wait times are assessed by both quality measurement groups as well as the lay public.

- a. **Ambulance Diversion:** Over 14% of ED visits are from patients who arrive by ambulance. This equates to 31 ambulance arrivals every minute in the United States. In ideal circumstances, patients are taken to the closest facility. However, many EDs are unable to accept any additional patients that arrive by ambulance (usually due to overwhelming capacity), resulting in further ambulance diversion.

Ambulance diversion is the practice of rerouting ambulances from a pre-determined hospital to an alternate facility. There may be many causes for this, but ED overcrowding is felt to be the most important.<sup>30</sup> A 2002 study in Los Angeles County supported this finding by showing a 7-fold increase in ambulance diversion during the peak influenza outbreaks in 1997-98.<sup>31</sup>

In 2006, ¼ of all hospitals reported going on diversion for an average time of 473 hours (~19 days), which equates to 1 diversion per minute. Almost two-thirds of urban hospitals reported being on diversion at some point in the preceding year.<sup>17</sup> A point prevalence of 90 EDs in 2003 showed that 11% were simultaneously diverting ambulances.<sup>32</sup>

Ambulances are inevitably diverted to hospitals that are farther away, resulting in delays in diagnosis and treatment. A 2007 UK study found a 1% increase in mortality for every 10-km increase in hospital distance after adjusting for age, sex, clinical condition and illness severity.<sup>33</sup>

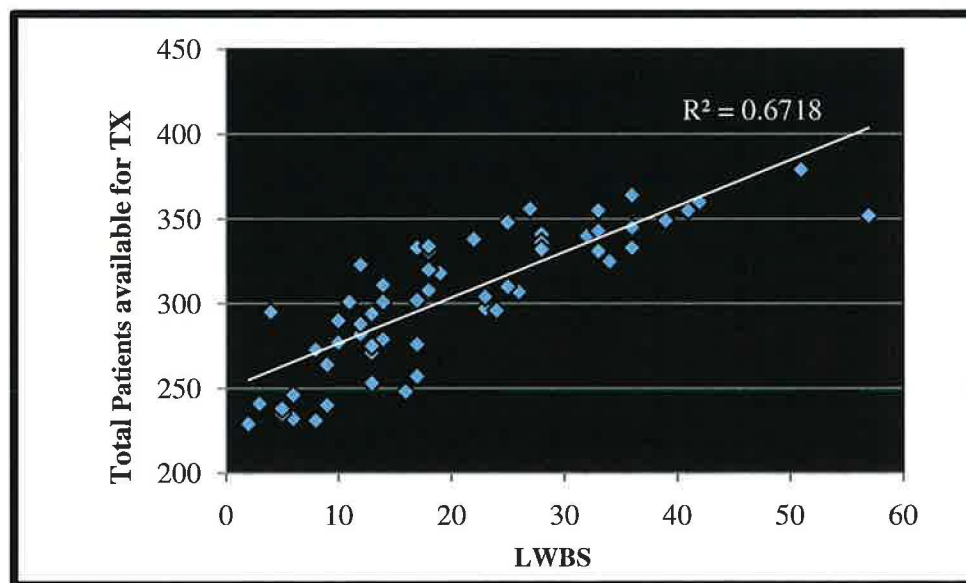


**Figure 3. Mortality associated with distance to hospital**

When one hospital in the city decides to go on diversion, other hospitals tend to follow as overcrowding is generally not limited to one facility. This, in effect, creates what one author described as “the health care equivalent of a ‘rolling blackout.’”<sup>6</sup>

- b. **Boarding Time:** The amount of time that admitted patients wait in the ED for an inpatient bed is referred to as the boarding time. Overburdened EDs are associated with inpatient units also being at maximum capacity. This is a particular concern for ICU beds since they are in short supply. The backlog that is created perpetuates a cycle of ED overcrowding with patients boarded in hallways, doubling in exam rooms or using nonclinical space, preventing the evaluation of those in waiting rooms. The same point prevalence study cited above found that 22% of ED patients had already been admitted and were awaiting transfer with almost  $\frac{3}{4}$  of the EDs boarding two or more patients. Similar to national trends, an average of 17.2% of ED beds at Parkland were occupied by patients who had already been admitted in the 6 months reviewed in 2010. Often that number exceeded 30% and on rare occasions was over 50%.<sup>34</sup>
- c. **Left Without Being Seen (LWBS):** The rate at which patients leave the ED without being seen, which was estimated at 1.5% in 2001, correlates well with wait time and has been used as a surrogate marker for ED overcrowding.<sup>35</sup> A 1991 *JAMA* study reported an average wait time of 6.4 hours for patients who left prior to evaluation.<sup>36</sup> Another study found that 86% of patients who LWBS selected a lengthy wait time as their reason for leaving; no other reason was reported by a  $\frac{1}{4}$  of those surveyed.<sup>37</sup>

A 2005 study using The National ED Overcrowding Scale (NEDOCS), a subjective but validated scoring system based on providers' assessment of overcrowding, showed a statistically significant correlation with the LWBS rate. As wait times increased so did the LWBS rate (Spearman correlation = 0.665).<sup>38</sup> Additional studies have confirmed a proportional increase in the LWBS rate as wait times increased.<sup>39</sup> Data from the Parkland ED the shows similar findings.



**Figure 4. The number of patients available for treatment and those LWBS increase proportionally at Parkland Hospital**

- d. **Wait Time:** All three of the above factors are a consequence of or a contributing factor to increasing ED wait times. “Between 1997 and 2004, the median ED wait time increased 36%.



Patients needing emergent attention waited 40% longer, while median waits for AMI patients increased 150%”. This increase corresponded to an additional 1,550 years spent in EDs in 2004.<sup>8</sup>

The average wait time in 2006 was less than one hour (55.8 minutes) including all patients requiring immediate attention as well as those triaged as non-urgent. Time frames within which a patient should be seen have been developed by the National Center for Health Statistics (NCHS) based on a five-level acuity index recommended by the Emergency Nurses Association. In the most acute categories (immediate and emergent), the average wait time exceeded the recommended time:

**Table 1.**

<b>Average Wait Time to See a Physician and Percentage of Visits in Which Wait Time to See a Physician Exceeded Recommended Time Frames by Acuity Level, 2006</b>		
<b>Patient acuity level<sup>a</sup> (recommended time frame)</b>	<b>Average wait time in minutes</b>	<b>Percentage of visits in which wait time exceeded recommended time frames</b>
Immediate (less than 1 minute)	28	73.9
Emergent (1 to 14 minutes)	37	50.4
Urgent (15 to 60 minutes)	50	20.7
Semiurgent (greater than 1 to 2 hours)	68	13.3
Nonurgent (greater than 2 to 24 hours)	76	— <sup>b</sup>

Source: GAO analysis of data from HHS's National Center for Health Statistics (NCHS).

<sup>a</sup>In 2006, no emergency departments reported visits with wait times in excess of 24 hours.

In all 5 categories, the time has increased when compared with 2003.

Other than expected variability in wait times based on acuity of illness, additional unanticipated factors such as income may play a role. A study examining California's Emergency Departments found an increase in wait time by 10.1 minutes (when adjusted for patient severity) “for each \$10,000 decrease in the per capita income of residents within the hospital zip code ( $p = .02$ ).”<sup>40</sup>

A corollary to prolonged wait times is poor patient satisfaction. In an effort to keep patients informed of the degree of overcrowding, many institutions have made visible their wait times through the use of electronic media. Billboards and smartphone technology have allowed patients minute-by-minute updates on wait times in nearby ERs. Other hospitals, including the Hospital at Craig Ranch in McKinney, have guaranteed “door to doc” times as short as 15 minutes or the visit is free of charge.

## **CONSEQUENCES**

Technological improvements have made it easier to identify and measure the causes of overcrowding. Although this topic was not comprehensive in its scope outside of those 2 items noted above, the discussion would be incomplete without mention of the consequences of overcrowding. Multiple studies have found negative effects on patient morbidity and mortality with prolonged wait times and ED overcrowding:

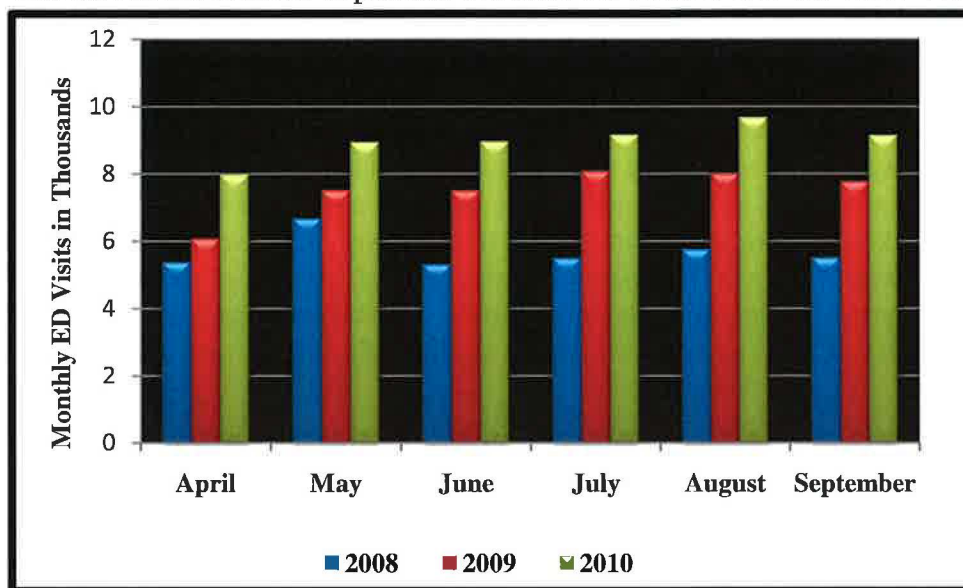
- Increased mortality: Two studies have shown a statistically significant increase in mortality with a greater the degree of overcrowding.<sup>41, 42</sup> One study of critically ill emergency room patients found a statistically significant increase in ICU and in-hospital mortality for those critically ill patients who were not transferred to the ICU within 6 hours of arrival.<sup>43</sup> A trend towards increased mortality was seen in trauma patients admitted on days with high rates of ambulance diversion.<sup>44</sup>
- Increased Length of Stay (LOS): The same study that noted increasing mortality with longer boarding times for critically ill patients also found a longer LOS for those boarded for more than 6 hours.<sup>43</sup> 2 Australian studies confirmed longer inpatient stays for those with higher ED boarding times.<sup>45, 46</sup>
- Poor Pain Control: In a study of over 5,000 patients treated with pain medication in the emergency room, there was a delay in receiving medication when the ED volume increased.<sup>47</sup>
- Decrease in JCAHO core measures: One article which looked at antibiotic administration within 4 hours for patients being treated for pneumonia found a failure of the measure more often in those patients with longer ED wait times.<sup>48</sup> A Canadian study found a statistically increase in time to thrombolytic therapy for acute MI patients as ED overcrowding increased.<sup>49</sup>

This data suggests that those patients requiring admission benefit from shorter ED stays and quicker disposition to the floors. What is not clear, however, is the best solution to achieve this.

Although a bed shortage was cited by the majority of those polled as the leading cause of ED overcrowding, limited resources and an ensuing cycle of beds filling as quickly as new ones open preclude this from being the only fix. Tailored solutions, such as the creation of a bed czar<sup>50</sup>, increasing staffing, and/or adding more telemetry monitors can target areas that will provide the greatest return.

## **THE PARKLAND EXPERIENCE**

As seen nationally, the volume in the Parkland ED has increased. Between 2008 and 2010, there was a 58% increase in the number of patients available for treatment in the main ED.



**Figure 5. Increase in ED visits in the Parkland ED over a 6-month time frame from 2008 through 2010**

Multiple steps were taken to address this rising volume:

1. A four-phase intervention that included creating transition order sets, defining clearer roles, and setting clinical boundaries for the ED and admitting services resulted in a decrease in the number of steps required to admit a patient from 50 to 10. This change decreased the number of emergency department days over the course of a single year by 1161.<sup>51</sup>
2. To improve patient flow, five ED “pods” comprising medical, nursing, and support staff care for 12 beds each. The number of providers was also increased. These changes improved wait times from 11 hours to less than 6 ½ hours, and decreased the LWBS rate from 15-16% to less than 4%.<sup>52</sup> This improvement in the LWBS rate coupled with an unchanged admission percentage led to an absolute increase in the number of patients who were hospitalized. Although patient disposition had improved, the limited number of beds and inpatient providers made moving patients out of the ED difficult and effected boarding times.
3. A 16 bed observation unit was created to divert patients who otherwise would have been admitted to a separate unit outside of the main ED while still under the care of the emergency room providers. This unit sees more than 300 visits monthly and opens ED (and floor) beds that would otherwise have been occupied with these lower acuity patients.<sup>53</sup>
4. Patients are divided into five acuity levels. Those within the three highest levels of acuity are seen in the ED while those in the lowest two categories are seen in the urgent care clinic. This area is separate from the ED and thus helps decrease overcrowding.

5. Thirty-eight new inpatient beds were added to the medical and surgical floors through the acquisition of space formerly leased by Childrens Hospital.
6. The number of telemetry monitors is anticipated to double from 44 to 88 by the beginning of February, 2011.
7. A unique position that is often seen in large county hospitals is that of an admitting physician or admitting officer of the day (AOD). At Parkland, that role was traditionally handled by an upper level Internal Medicine resident who triaged all patients from the clinics and the ED for whom inpatient admission was felt to be needed. This created an additional step in the admission process – one that was felt by some to be time consuming and unnecessary. After several modifications the role was ultimately eliminated in July 2009. Concomitantly, the high volume of admissions in the setting of limited inpatient providers required placing a cap on the number of patients assigned to the hospitalist services (ACGME rules had already limited the number of admits to teaching services).

Between July and October 2009, a bottleneck of patients waiting in the ED for team assignments remained, perpetuating the crisis of overcrowding. In an effort to decrease holdovers and provide timely care, a “hospitalist of the day” (HOD) shift was established to triage all non-critical care medicine patients consulted for admission. The HOD performed the following: answered all calls for IM admissions and triaged them to appropriate IM services (diabetes, hematology-oncology, teaching general medicine wards, transplant or hospitalist), evaluated and assisted with discharging patients who were deemed not to require admission, wrote consult/preoperative notes for patients better served on a surgical service, assigned unstable patients to critical care teams, arranged elective admissions for non-emergent patients on alternate days based on bed capacity, performed diagnostic or therapeutic interventions (e.g. large volume paracenteses) on patients whose sole indication for admission was the procedure.

**Table 2. Data pre and post HOD implementation**

	<b>Jul 09</b>	<b>Aug 09</b>	<b>Sep 09</b>	<b>Oct 1 - 25</b>	<b>Oct 26 - Nov 1*</b>	<b>Nov 2 – 30**</b>	<b>Dec 1 - 31</b>
<b>Daily Patients in Main ED</b>	313	315	323	313	304	325	307.2
<b>Hospitalists Capped – Total</b>	58.1%	61.3%	53.3%	64%	0.0%	3.3%	6.5%
<b>Hospitalists Capped – Weekdays</b>	78.2%	90.0%	68.2%	94.1%	0.0%	5.0%	10.0%

\*HOD began on 10/26/2009

\*\*Observation unit opened 11/02/2009

The effect on the number of hospitalist/Internal Medicine admissions has been sustained. Data from July through October 2010 was compared with a historical control over a similar time frame in 2009. The HOD was contacted an average of 42.9 times/day over the 4 month study period. Of those, the HOD discharged an average of 2.3 (5.3%) patients /day, triaged 2.2 (5.1%) patients/day to non-medicine services (e.g. ED observation service, Neurology, Surgery), and triaged 2.2 (5.0%) patients/day to non-general medicine ward/hospitalist services (e.g. cardiology, hematology). Overall, the HOD altered the



disposition of 6.7 patients per day which accounted for 15.4% fewer admissions that would have otherwise been admitted to the general IM/hospitalist services. In addition, there was a 47.6% decrease in the number of holdovers (81.7% vs. 34.1%,  $p < 0.0001$ ; RR 0.42 (CI 0.31 – 0.57)).

8. Lastly, the building of a new hospital will result in a 38% increase in bed capacity as well as an ED expansion by 55,000 square feet.

These findings support the idea of solving the problem of ER overcrowding through a multi-pronged intervention utilizing various interventions.

## **CONCLUSION**

ER overcrowding is occurring with increasing frequency to the point that ED and inpatient hospital capacity cannot keep up with patient demands. The result of this is quantifiable through measurements of ambulance diversion, boarding times, left without being seen rates and increasing wait times. The causes of this are numerous and the potential impact on patient care is profound. These findings are not a surprise to ER practitioners or those clinicians who interact with the Emergency Department. Finding an optimal solution will require resources and efforts at multiple levels.

## **BIBLIOGRAPHY**

1. [www.ahrq.gov/data/hcup/factbk6/factbk6b.htm](http://www.ahrq.gov/data/hcup/factbk6/factbk6b.htm)
2. [www.hchdonline.com/about/facilities/bentaubgh.htm](http://www.hchdonline.com/about/facilities/bentaubgh.htm)
3. Institute of Medicine of the National Academies. Future of emergency care: Hospital-based emergency care at the breaking point. Washington DC: National Academies Press 2007.
4. Leach SL Healthcare Reform: The "Freakonommics" of Medicine. November 12, 2010. Internal Medicine Grand Rounds. UTSW Medical Center.
5. [www.acep.org/content.aspx?id=45944](http://www.acep.org/content.aspx?id=45944)
6. Kellermann AL. Crisis in the emergency department. N Engl J Med 2006;355:1300-3.
7. National Academy of Sciences. Future of Emergency Care: Dissemination Workshop Summaries. [www.nap.edu/catalog/11926.htm](http://www.nap.edu/catalog/11926.htm)
8. Wilper AP, et al. Waits To See An Emergency Department Physician: U.S. Trends And Predictors, 1997-2004. Health Affairs 2008; 27:84-95.
9. Niska R, Bhuiya F, Xu J. National Hospital Ambulatory Medical Care Survey: 2007 emergency department summary. Natl Health Stat Report 2010:1-31.
10. Gibbs N. "Do you want to die?" The crisis in emergency care is taking its toll on doctors, nurses--and patients. Time 1990;135:58-60, 2-5.
11. Crisis in the ER: Turnaways and Delays are a Surefire Recipe for Disaster. US News & World Report 2001 September 10, 2001.
12. Orenstein J. State of Emergency. The Washington Post 2001 April 22, 2001.
13. Goldberg C. Emergency Crews Worry as Hospitals Say "No Vacancy.". The New York Times 2000 December 17, 2000.
14. Thompson S. Long wait time in Parkland hospital ER may have cost ex-restaurantier his life. The Dallas Morning News 2008 October 5, 2008.
15. Roberts DC, McKay MP, Shaffer A. Increasing rates of emergency department visits for elderly patients in the United States, 1993 to 2003. Ann Emerg Med 2008;51:769-74.
16. Baker DW, Stevens CD, Brook RH. Regular source of ambulatory care and medical care utilization by patients presenting to a public hospital emergency department. JAMA 1994;271:1909-12.
17. Government Accounting Office. Hospital Emergency Departments: Crowding Continues to Occur and Some Patients Wait Longer than Recommended Time Frames. April 2009.
18. Dill MJ and Salsberg ES. The Complexities of Physician Supply and Demand: Projections Through 2025. American Association of Medical Colleges. November, 2008.
19. Epstein SK, Burstein JL, Case RB, et al. The National Report Card on the State of Emergency Medicine: evaluating the emergency care environment state by state 2009 edition. Ann Emerg Med 2009;53:4-148.
20. DeLia D. Potentially Avoidable Use of Hospital Emergency Departments in New Jersey. Rutgers Center for State Health Policy, 2006.
21. American College of Emergency Physicians, ACEP Psychiatric and Substance Abuse Survey 2008.
22. Buerhaus PJ. Current and future state of the US nursing workforce. JAMA 2008;300:2422-4.
23. Derlet RW, Richards JR. Overcrowding in the nation's emergency departments: complex causes and disturbing effects. Ann Emerg Med 2000;35:63-8.
24. [www.jcaho.org](http://www.jcaho.org)
25. Blendon RJ, DesRoches CM, Brodie M, et al. Views of practicing physicians and the public on medical errors. N Engl J Med 2002;347:1933-40.
26. Derlet RW, Richards JR. Overcrowding in academic emergency departments. Acad Emerg Med 1999; 6: 404-05.
27. Gromm RE, et al. Critical care in the emergency department: a time-based study. Critical Care Medicine. 1993; 21: 970-76.
28. Cameron PA. Hospital overcrowding: a threat to patient safety? Med J Aust 2006;184:203-4.
29. U.S. Census Bureau. Language Use and English-Speaking Ability: 2000. Issued October 2003.

30. Burt CW, McCaig LF, Valverde RH. Analysis of ambulance transports and diversions among US emergency departments. *Ann Emerg Med* 2006;47:317-26.
31. Glaser CA, Gilliam S, Thompson WW, et al. Medical care capacity for influenza outbreaks, Los Angeles. *Emerg Infect Dis* 2002;8:569-74.
32. Schneider SM, Gallery ME, Schafermeyer R, Zwemer FL. Emergency department crowding: a point in time. *Ann Emerg Med* 2003;42:167-72.
33. Nicholl J, West J, Goodacre S, Turner J. The relationship between distance to hospital and patient mortality in emergencies: an observational study. *Emerg Med J* 2007;24:665-8.
34. Main ED Performance Data. July – December 2010. Parkland Health and Hospital Systems.
35. Howard MS, Davis BA, Anderson C, Cherry D, Koller P, Shelton D. Patients' perspective on choosing the emergency department for nonurgent medical care: a qualitative study exploring one reason for overcrowding. *J Emerg Nurs* 2005;31:429-35.
36. Baker DW, Stevens CD, Brook RH. Patients who leave a public hospital emergency department without being seen by a physician. Causes and consequences. *JAMA* 1991;266:1085-90.
37. Bindman AB, Grumbach K, Keane D, Rauch L, Luce JM. Consequences of queuing for care at a public hospital emergency department. *JAMA* 1991;266:1091-6.
38. Weiss SJ, Ernst AA, Derlet R, King R, Bair A, Nick TG. Relationship between the National ED Overcrowding Scale and the number of patients who leave without being seen in an academic ED. *Am J Emerg Med* 2005;23:288-94.
39. Stock LM, Bradley GE, Lewis RJ, Baker DW, Sipsey J, Stevens CD. Patients who leave emergency departments without being seen by a physician: magnitude of the problem in Los Angeles County. *Ann Emerg Med* 1994;23:294-8.
40. Lambe S, Washington DL, Fink A, et al. Waiting times in California's emergency departments. *Ann Emerg Med* 2003;41:35-44.
41. Richardson DB. Increase in patient mortality at 10 days associated with emergency department overcrowding. *Med J Aust* 2006;184:213-6.
42. Sprivulis PC, Da Silva JA, Jacobs IG, Frazer AR, Jelinek GA. The association between hospital overcrowding and mortality among patients admitted via Western Australian emergency departments. *Med J Aust* 2006;184:208-12.
43. Chalfin DB, Trzeciak S, Likourezos A, Baumann BM, Dellinger RP. Impact of delayed transfer of critically ill patients from the emergency department to the intensive care unit. *Crit Care Med* 2007;35:1477-83.
44. Begley CE, Chang Y, Wood RC, Weltge A. Emergency department diversion and trauma mortality: evidence from houston, Texas. *J Trauma* 2004;57:1260-5.
45. Richardson DB. The access-block effect: relationship between delay to reaching an inpatient bed and inpatient length of stay. *Med J Aust* 2002;177:492-5.
46. Liew D, Kennedy MP. Emergency department length of stay independently predicts excess inpatient length of stay. *Med J Aust* 2003;179:524-6.
47. Pines JM, Hollander JE. Emergency department crowding is associated with poor care for patients with severe pain. *Ann Emerg Med* 2008;51:1-5.
48. Pines JM, Hollander JE, Localio AR, Metlay JP. The association between emergency department crowding and hospital performance on antibiotic timing for pneumonia and percutaneous intervention for myocardial infarction. *Acad Emerg Med* 2006;13:873-8.
49. Schull MJ, Vermeulen M, Slaughter G, Morrison L, Daly P. Emergency department crowding and thrombolysis delays in acute myocardial infarction. *Ann Emerg Med* 2004;44:577-85.
50. Howell E, Bessman E, Kravet S, Kolodner K, Marshall R, Wright S. Active bed management by hospitalists and emergency department throughput. *Ann Intern Med* 2008;149:804-11.
51. Amarasingham R, Swanson TS, Treichler DB, Amarasingham SN, Reed WG. A rapid admission protocol to reduce emergency department boarding times. *Qual Saf Health Care* 2010;19:200-4.
52. Emergency room changes improve patient care. *Parkland News*. Spring 2010. Volume 47. No 1.
53. New Parkland inside and out. *Parkland News*. Spring 2010. Volume 47. No