

Emergency Department Crowding 2.0: Coping With a Dysfunctional System

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Since the earliest reports of the phenomenon of emergency department (ED) crowding,^{1,2} this problem has increased from what was perceived initially as a sporadic issue affecting only large, urban, academic centers to a national dilemma affecting all EDs and, by extension, threatening the national safety net of emergency care. In part, the growing appreciation of the problem of ED crowding is also a story of the changing role of the ED and its relationship to the greater US health care system. In this month's *Annals*, Pitts et al³ report on an analysis showing that ED crowding has been increasing and suggesting that the primary cause is related to a greater practice intensity on the part of emergency providers. We argue that these findings are a perfectly predictable response to a dysfunctional health care system.

Almost 10 years ago, *Annals* published a conceptual model of ED crowding that provided a framework that could be used to understand and study the phenomenon.⁴ The model suggested that patient flow through the ED can be conceived of as components of input, throughput, and output and that crowding resulted from dysfunction at points along this process. During the last decade, the specialty of emergency medicine has worked tirelessly to understand the causes and consequences of ED crowding, design solutions, and advocate for system changes to alleviate the problem. Famously now, the 2006 Institute of Medicine report *Hospital-Based Emergency Care: At the Breaking Point* described crowding as a "national epidemic."⁵ As a result, we have studies dispelling the myth that low-acuity patients contribute significantly to crowding^{6,7} or that the ED is crowded because of uninsured or frequent users.⁸⁻¹⁰ There are also reams of important work connecting crowding and boarding to negative patient outcomes¹¹⁻²² and noting its adverse effect on national preparedness planning and surge capacity.²³⁻²⁶ In addition, our specialty has explored ways to improve the efficiency of front-end operations to reduce length of stay and ameliorate the effects of crowding,^{27,28} as well as model hospital strategic responses to periods of extreme

boarding.²⁹ However, we have spent considerably less time and attention investigating the causes of crowding that may be attributable to the actions of emergency providers themselves.

The analysis by Pitts et al³ asked 2 questions: (1) have EDs been getting more crowded over time; and (2) if so, why? The answer to the first question, not surprisingly, is yes. And although the authors' answer to the second question may at first sound controversial, we contend that the findings are a response to the dysfunction found in the US health care system.

Before delving into the second question, though, it is important to appreciate the limitations of the study. Pitts et al³ analyzed a commonly used data source, the National Hospital Ambulatory Medical Care Survey. Although the survey is used frequently in health services research to study processes of care in the ED, the authors of this study were remarkably creative in their approach. The innovative conceptual leap was not to consider the available visit-level information as individual patient experiences with associated arrival time and length of stay but to aggregate these data as a sum of all visits occurring on a national scale during a 24-hour period. The authors then calculated the national mean and hourly ED occupancy, the primary outcome reported here.

In putting this study in the proper context, it is therefore critical to realize that the authors did not directly measure ED crowding, as they note in their methodology. The primary outcome, ED occupancy, is at least 2 degrees of separation away from an established crowding measure. Ideally, one would want to know the occupancy *rate* (total occupancy divided by available treatment spaces), which correlates with other more proven metrics and is a reasonable measure of ED crowding.³⁰ However, there are no national figures available on the total number of staffed ED treatment spaces with which to calculate the occupancy rate. What information is known on ED capacity is scant. Some studies suggest that the total number of EDs has been in decline recently,^{31,32} but this finding does not directly address whether the available space to care for ED patients has overall expanded or contracted. It is possible that remaining EDs have rapidly increased their capacity, consistently keeping pace with increasing occupancy. There is some evidence that this response has occurred in at least 1 state during a particular length of time³³ but may not be the case for the nation during

the years studied in this analysis. Nevertheless, because crowding is related to the number of patients residing in the ED at any one time, which is determined by the number of new patients arriving and the length of stay of those already there, occupancy is probably correlated to some extent with the degree of crowded conditions and can serve as a rough proxy for the purposes of this analysis examining large national trends over time.

In addition, although the authors model the many input, throughput, and output factors that may contribute to ED crowding, one critical factor that is not directly measured is boarding time. By proxy, they examined the change in total dwell time of admitted patients. Although it is likely that the ED occupancy of admitted patients correlates well with boarding times, it is also possible this is not the case. The analysis also did not address whether boarding time causes crowding; rather, it determined whether recent changes in ED occupancy were associated with hospital admissions. Although there was an increase in ED occupancy for admitted patients, this increase was not statistically significant compared with other patient-level and throughput factors in the analysis. This finding does not change the fact that boarding is an important cause of ED crowding and remains a significant issue for the specialty of emergency medicine.³⁴

Nevertheless, allowing for these limitations, the finding that occupancy and, by proxy, crowding, has been annually and inexorably increasing (27% since 2001) at a rate faster than the total number of visits (15%) and US population growth (7%) suggests that we are failing in our efforts to curb the problem. The additional findings from this study indicate that the primary reason that occupancy continues to worsen is the growing intensity of interventions in the ED. Using the conceptual model of ED crowding first suggested almost a decade ago, the authors found no evidence that input factors, such as changes in the mix of lower-acuity triaged patients, affected occupancy. They also found only modest effects from changes in the proportion of patients with Medicare and age differences. Furthermore, they did not find a strong relationship between occupancy and output factors, in particular the occupancy of admitted patients, except for patients destined for the ICU. Instead, those features most related to increases in occupancy were throughput factors: blood tests, advanced imaging, intravenous fluids, procedures, and medication administration. Additional implications of these findings are outside the scope of the article by Pitts et al³ to explain.

However, it is instructive that of all the potential causes for worsening crowding, the ones that seem to have the most influence are the ones we have the most control over—the tests and treatments we order and provide for our patients. Yet the conclusion that emergency providers should stop ordering tests to solve crowding is simplistic and short sighted. In an era of greater cost and quality consciousness, emergency providers clearly need to be sensitive to the marginal benefits and risks to the tests and procedures they obtain for their patients,

particularly with the greater availability and ease in accessing testing in the ED environment.^{35,36} However, an important corollary question to ask is what factors are driving the evolution of this more intensive practice style?

The role of the ED and its relationship to the greater US health care system have changed. The practice intensity described in this analysis perfectly reflects the barriers that our system has placed in front of the most expensive resource in the system: inpatient hospital care. Given the cost of US health care, the elimination of unnecessary hospital admissions is a laudable goal. However, the pursuit of this goal has created a complex web of regulations and financial disincentives for hospitals that can trump the underlying clinical realities of the patient's condition. For example, the Recovery Audit Contractor program has placed substantial pressure on emergency providers, admitting providers, and hospitals to make an "appropriate" determination of inpatient versus observation status for patients who are being placed in the hospital setting.³⁷⁻³⁹ There are also new significant financial penalties for hospitals that have high rates of hospital readmissions.⁴⁰ It is therefore not surprising that emergency providers are conducting more interventions in the ED to determine whether a patient meets criteria for inpatient status or for avoiding hospitalization altogether. In short, the system for admitting patients in some settings is so dysfunctional that emergency providers avoid it whenever they can find a seemingly workable alternative for their patients. However, this task usually involves more time, more diagnostic tests, and more ED interventions.

For patients being discharged, an increasingly intense ED practice style is equally understandable. Once again, the dysfunction of the rest of the system is a major driver of actions in the ED. Urgent ambulatory follow-up visits are often unreliable or unavailable for ED patients, particularly for Medicaid beneficiaries and the uninsured.⁴¹ The risk of professional liability for emergency providers is also a significant driver of practice intensity, particularly for patients who are being discharged.^{42,43}

In addition to these factors, increasingly the ED is the rapid testing and diagnostic center for our health care system. The spectrum of diagnostic needs runs from patients requiring follow-up on an abnormal result for an outpatient test ordered by another provider, to caring for someone with an urgent health need that cannot be accommodated by a primary care provider, to managing those patients who independently decide to seek care in the ED. The ED has been shown to care for a significant portion of patients with acute care needs.⁴⁴ The ED is also increasingly the path patients take to hospitalization.⁴⁵ These factors all lead to greater pressure on emergency providers to test, treat, and diagnose to determine both safety for discharge and suitability for admission for an ever-increasing number of visitors.

Critically, we often do not know when the increasing practice intensity in the ED is beneficial for patients and when it may be harmful. Likewise, we do not understand the cost-

effectiveness of the ED's changing role in the system. This will be important work, particularly because the ED is often viewed as an expensive venue of care for our health care system^{46,47}—but expensive compared with what alternative? Compressing a traditional inpatient evaluation into an ED stay with resultant discharge as opposed to hospitalization may generate cost savings, but it may also lead to unnecessary testing.

Concentrating the management of acute care complaints that require complex diagnostic testing in one venue of care may deliver beneficial economies of scale, but it may also result in inappropriate use of the ED. We need to understand these issues more thoroughly to inform the evolving role of the ED in the health care system. We also need to be willing to rein in the intensity of our practice in situations in which patient-centered, reliable, and more cost-effective alternatives are identified.

Finally, an obvious conclusion from this study is that crowding remains a common and perhaps growing experience in our nation's EDs. After more than 10 years of work slogging at understanding the causes, consequences, and solutions to crowding, it is time to ask, "What is the crowding end game?"

The reality is that ED crowding will never disappear. We need to start thinking of crowding like diabetes and start managing it like a chronic disease. There is no long-term cure because the factors that cause it are common, potentially unpredictable at any given point, and capacity limited. Some EDs will maintain better control than others, but there will persistently be exacerbations of crowding. Crowding may also continue to worsen if the more intensive practice style and trends in the ED's role within the US health care system further evolve in the current direction.

One attempt at managing crowding will be newly formulated quality measures being developed through multiple sponsor agencies and institutions, including the Centers for Medicare & Medicare Services, The Joint Commission, and the National Quality Forum. These flow measures include reporting of wait times, median ED length of stay for both admitted and discharged patients, decision to admit to admission times, and rates of leaving without being seen.⁴⁸ Some of these measures will be voluntarily reported by hospitals to the Centers for Medicare & Medicare Services starting in 2013 in exchange for higher payments. However, there are no current plans to risk-adjust or stratify the reporting of these metrics by hospital ED characteristics such as visit volume or case mix, which could affect the interpretation of these measures. Poor-performing hospitals may be identified because of factors outside the perceived control of hospitals, such as ED visit volume, urban setting, older average age of patients, and types of presenting complaints.⁴⁹ On the other hand, adjusting for these variables may also excuse disparities across these flow standards that could disproportionately affect disadvantaged patients and communities.⁵⁰

Other countries have used national-level interventions aimed at ameliorating crowding, including the United Kingdom, New Zealand, and parts of Canada and Australia.⁵¹ The most wide-

-ranging experience comes from the United Kingdom. In 2005, the country instituted a national standard stipulating that 98% of all patients in the ED should be admitted, transferred, or discharged within 4 hours.⁵² This rule was abandoned in 2011 over concerns that an arbitrarily defined single time measure promoted a climate of dysfunction related to a "target culture" that could compromise patient safety and quality⁵² and has been replaced with a suite of quality indicators that are hoped to better promote the desired outcomes.⁵³ In addition, like many metrics, there was evidence that the 4-hour rule could be gamed.⁵⁴ However, it did highlight the plight of patients facing crowded conditions in the ED, pressured hospitals, and ultimately improved the proportion of patients meeting the deadline even as overall ED length of stay continued to increase.⁵⁴

So what will generation 2.0 of ED crowding look like? Can we simply expect progressively longer patient lengths of stay,⁵⁵⁻⁵⁸ greater occupancy, and worsening crowding? Should we embark on a systematic national ED treatment space expansion in anticipation? Ultimately, the answers to these questions will depend on the evolving role of the ED in our health care system. If the dysfunction that surrounds the ED is not addressed, the answers are "ugly," "yes," and "probably." Because much of what we do in the ED is a response to gaps in the system elsewhere, we need to describe those gaps and create the most cost-effective solutions to the challenges we face. Often those solutions will be driven by local capabilities that enable safe and reliable alternatives to intensive ED evaluations and reductions in boarding for admitted patients. Despite the uncertainty about how ED crowding will evolve, it appears obvious that it is not going away and that the practice decisions we make in the ED are becoming an increasingly important contributing factor to the conditions we and our patients face. Our approach to the next 10 years should focus on solving the dysfunction in the surrounding health care system while understanding the implications of our growing ED practice intensity.

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