

Emergency Department Crowding: The Effect on Resident Education

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INTRODUCTION

A recent study analyzed the amount of time emergency medicine residents spend with their faculty supervisors when they work together in the emergency department (ED).¹ The authors found that attending physicians observed the resident providing direct patient care during only 3% of the resident's total work time. This is consistent with a previous report² and occurred in a setting of one resident working with one attending physician. Indirect observation, including tasks such as presenting patient information, constituted another 11% of the resident's work time. The authors questioned whether observation time could be increased by faculty education or whether faculty were already at their capacity. They recommended that administrators who develop resident assessment techniques be cognizant of the time limitations faculty have while working clinically in the ED.

We suspect that these "time limitations" are caused in part by ED crowding. Many EDs are struggling with increased patient volumes and worsened crowding; words like "gridlock," "boarded,"³ "holding time,"⁴ and "trolley waits"⁵ have become part of the lexicon of emergency medicine in a variety of countries. In the United States, ED crowding became more prominent in the early 1990s, at teaching centers; by the late 1990s, it was reported in community, suburban, and rural hospitals.⁶ ED crowding has also been documented in Canada,^{7,8} the United Kingdom,⁵ Spain,⁹ Australia,¹⁰ and Taiwan,¹¹ using a variety of techniques and definitions. Numerous causes have been postulated and investigated (Figure). As ED crowding threatens to shift from a discussion point to a part of ED practice, it is timely to examine the likely effect it has on emergency medicine residency education.

EDUCATION IN THE ED

Education may be subdivided into teaching and learning, both of which are likely to be affected by crowding. Although there is little to debate on the importance of teachers in residency education, learners also contribute to the process¹² by actively interacting with their teachers, stimulating the discussion, and propelling the exchange into new areas. In this article, we will outline the process of effective clinical teaching and the role of the learner, examining each through the lens of progressive ED crowding. Our objective is to highlight the effect of crowding on the already difficult task of clinical teaching in the ED and to provide a general framework for future studies on the effect of crowding on teachers and residents.

Research into emergency medicine teaching methods has focused mostly on specific content areas such as procedural skills,¹³⁻¹⁵ ethics,¹⁶⁻¹⁹ research,²⁰⁻²² ultrasonography,^{23,24} emergency medical services,^{25,26} and others. An 8-point teacher evaluation scale for general teaching²⁷ was validated in the 1980s in an internal medicine inpatient and outpatient setting; its domains include organization, enthusiasm, knowledge, rapport, direction and feedback, accessibility, clinical skills and procedures, and ability to involve students. In 2000, Steiner et al²⁸ created and validated an assessment tool of ED teachers consisting of 4 domains: didactic, clinical, approachability, and helpfulness. Although these tools may be used to measure and record changes in teaching quality that occur in the setting of ED crowding, they cannot tell us specifically *how* crowding affects ED education. There is one study on how emergency medicine faculty affect good teaching during ED clinical shifts.¹² This report identified 12 principles of effective ED teaching (Table). Many of these principles are echoed by studies in non-ED, ambulatory care settings, such as tailoring teaching to the learner,^{29,30} defining teacher expectations in advance,^{29,31,32} optimizing faculty-

<p>Increased patient triage severity and complexity^{6,11,36} Low hospital bed availability^{6,36,39} Increased ED volumes^{6,34,35} Avoidance of inpatient admission via intensive therapy in the ED³⁶ Consultation delays^{6,36} Difficulty in arranging follow-up care³⁶ Nursing shortage^{3,34,36} Physician and house staff shortages³⁶</p>
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Figure. Proposed causes of ED crowding.

learner interaction through questioning and by encouraging problem solving,²⁹⁻³¹ limiting the number of teaching points,²⁹⁻³¹ demonstrating a good attitude through approachability and respectfulness,³² and providing timely feedback.²⁹⁻³¹

How ED crowding affects the quality of the teacher-learner interaction is unknown. Without comparable research on ED teaching 10 to 15 years ago, it is impossible to know with certainty whether teaching has worsened since then, either overall or as a result of ED crowding. In addition, other aspects that factor into the quality of teaching have changed, complicating the effect of ED crowding; for example, 15 years ago, many EDs were run by residents during a night shift, with an attending physician on call. The key question is, if crowding went away, would ED teaching improve? Skeff et al³³ believe it would; they have recognized the pressure for clinical productivity as a threat to teaching in the ambulatory care setting. They argue that the push for efficiency may ultimately result in insufficient time for teaching, because teaching is both complex and multiphasic. Using the teaching principles identified in the ED¹² and echoed in the ambulatory care setting²⁹⁻³² as our framework, we will assess the likely effect of ED crowding on both teaching and learning capabilities.

TEACHING PRINCIPLES

Optimize the Teacher-Learner Interaction

Optimizing the teacher-learner interaction entails listening to the learner, asking questions, and leading the learner to conclusions rather than supplying them. This principle may be threatened by crowding for several related reasons. First, increasing ED volumes associated with crowding^{6,34,35} limit the time faculty have to engage the resident in these ways. We postulate that with so many patients needing evaluation and treatment, the attending physician may not have time to question the resident's line of thinking or to wait for the answers. In addition, some authors believe that formal bedside teaching will be the first casualty in a busy ED.³⁶ Second, another cause of crowding is physician shortage,^{36,37} which means a teacher shortage for the resident; the attending physician must devote time to ED flow, bed management, and patient relations, instead of teaching.³⁷ Similarly, the increased stress of managing an understaffed ED may hinder faculty's opportunities and desire to teach. This often leads to more

resident autonomy,³⁷ which is probably desirable for graduating residents or for junior residents working on low-severity cases. However, in higher-severity cases, junior residents may not know how to proceed and instead may flounder, repeat the same mistakes they always make, or make potentially harmful treatment choices.³⁸ Formal study is required to determine exactly how resident supervision changes with increased patient load and complexity.

Demonstrate a Good Teacher Attitude/Be a Role Model

The effect of ED crowding on job satisfaction is of fundamental importance to several principles of good teaching. Derlet and Richards³⁶ surmised that increased patient risk, compromised clinical care, prolonged pain and suffering, and long waits and dissatisfaction of patients all detract from the joy of working in the ED. This negatively impacts the faculty's ability to demonstrate a good teacher attitude, such as being approachable and respectful, and being a role model for the resident, particularly in their interactions with patients and other staff.¹² In addition, there is even the possibility that faculty may abandon ED practice as a result of the stress of the demands placed on them,³⁶ and residents too may question their choice of careers.³⁷ Other effects of ED crowding that detract from job satisfaction are decreased clinical productivity and effectiveness, medicolegal sequelae, and the increased potential for violence in a crowded ED.³⁶

Actively Involve the Learner

Actively involving the learner means encouraging the resident to manage his or her own patients, thereby allowing the learner the autonomy to make patient care decisions. Unfortunately, the high patient severity and complexity,^{6,11,36} increased patient volumes,^{6,34,35} and physician shortages³⁶ that cause ED crowding may obliterate the time required to give residents this autonomy. Although junior residents may initially be given greater autonomy because the attending physician is busy, without the knowledge of how to proceed the resident may delay or order inappropriate tests, creating a delay in the patient's care such that the faculty, once aware of the situation, may seek to alleviate the delay by simply "taking over" that patient for the sake of efficiency and safety. In addition, the junior resident may not want autonomy if they are feeling overwhelmed and anxious to improve patient flow. The burden will be on the teacher to schedule his or her interactions with the resident to create an environment that is oblivious to these stresses, if possible.

Tailor Teaching to the Situation/Provide Feedback

Tailoring teaching to the situation refers to adjusting teaching time on the basis of workload and time of day, focusing on brief, important points when busy and deferring discussion of broad subjects until a slower period.¹² This is not a new strategy, although we propose that what *is* new is that there may not *be* slow periods during a shift. Although off-peak hours may provide more educational opportunities for the ED resident than 10 years ago, by providing more patients as a result of increased ED volumes,^{6,34,35} during an evening shift

Table. Twelve principles of effective ED teaching.

General Principle	Examples of Specific Strategies
1. Optimize faculty-learner interaction	a. Encourage problem solving b. Teach concise, important points
2. Demonstrate a good teacher attitude	a. Maintain a level of mutual respect b. Be approachable
3. Be a role model	a. Life-long learning b. Interactions
4. Actively involve learner	a. Give responsibility and control b. Encourage self-insight
5. Tailor teaching to the situation	a. Be flexible in your approach b. Recognize and respect time constraints
6. Provide and encourage feedback	a. Provide feedback on performance b. Review cases and provide patient follow-up
7. Tailor teaching to learner	a. Address specific desired skills b. Tailor amount of supervision
8. Agree on expectations	a. Challenge the learner b. Clearly explain what you expect the learner to do
9. Make use of additional learning resources	a. Hard copy b. Prepared cases
10. Use teaching methods beyond the patient case	a. Practice examinations b. Homework c. Procedural skills
11. Actively seek opportunities to teach	a. Seek out teaching points b. Select high-yield cases for teaching
12. Improve the environment	a. Staffing b. Physical

there may not be a slow period, and the deferred teaching will either not take place or occur during the faculty's after-hours. Because of increased patient loads, this situation may occur during more shifts than in the past, limiting overall teaching time during an ED rotation. Providing feedback in a timely way¹² is likely to occur in a similar pattern. Adding to the limitations is the proposal that good teachers avoid excessive teaching during the hours when learners are least receptive, such as at late hours or the early morning hours of a night shift,¹² when slow periods are the most likely to occur.

Tailor Teaching to the Learner/Establish Expectations

Tailoring teaching to the learner encompasses finding out the learner's educational goals and background.^{12,29} This takes time, but can be done superficially as a cursory, 2-minute discussion at the beginning of a shift, something that is not affected by crowding. Determining the trainee's capabilities through his or her level of training and previous rotations, as well as establishing one's expectations of the trainee,¹² may become more crucial considering the increased patient triage severity and complexity that are frequently named as causes of ED crowding.^{6,11,36} Patient complexity may be the result of multiple medical problems and may prove overwhelming for a trainee. Clinical knowledge becomes more tightly compiled and interconnected with experience,³⁰ which the trainee does not have; he or she will try to merge several areas of relatively

new knowledge in order to care for one very ill patient. This may provide richer learning opportunities for more experienced senior residents, with the qualification that higher triage severity does not necessarily refer to patients needing resuscitation: with an increase in ambulance diversion resulting from ED crowding,^{8,10,36} some authors propose that exposure to the highest-severity patients may actually decrease.³⁷ For the junior resident, all complex patients result in the need for more staff supervision, which is less likely to happen in a setting of ED crowding. Inquiring after the resident's level of competency will establish how much supervision is going to be required, which is important in a crowded ED for safety more than teaching purposes. The other components of tailoring teaching to the learner, such as using the resident's background and learning goals to challenge him or her and to address specific skills based on the resident's learning goals, may be feasible in a crowded ED; however, we hypothesize that follow-up discussions around cases that were tailored to the resident's goals will be limited by the aforementioned time constraints of ED crowding.

Use Additional Teaching Resources/Use Teaching Methods Beyond the Patient Case

Like the ability to establish the competency and learning goals of the trainee, the use of additional teaching resources¹² is unlikely to be restricted by crowding, because it takes very little time to jot down a concept on paper during its explanation. Use

of a duplicate form if there is more than one trainee is another time-saving measure.¹² Some teaching methods beyond the patient case, such as procedure mock-ups, may prove too time-consuming in a crowded ED, whereas providing the learner with a reference to look up and summarize for the next shift is likely feasible.

Seek Out Opportunities to Teach

Actively seeking out opportunities to teach¹² will likely become more difficult as crowding worsens, not just because of increased ED volumes^{6,34,35} and physician shortages,³⁶ but also because of boarding of inpatients in the ED. A decrease in number of hospital beds^{6,36,39} means that admitted patients are more often using a bed that a new patient would otherwise occupy. As a result, there are fewer new patients available for teaching opportunities. In addition, in many institutions, new patients may spend a large part of their ED stay in the waiting room, instead of being assessed or properly observed.³ Patients are not the only ones waiting; in a gridlocked ED with beds occupied by admitted patients,³ residents may spend time waiting for a new patient to see. Several authors have postulated that this may decrease the number of new patient exposures during each shift,^{37,40} with subsequent loss of experience for the resident³⁷; we would add that it also renders the department that much less efficient.

THE ROLE OF THE LEARNER

Clearly, many of the causes of ED crowding lead to a common pathway that influences teaching: not enough time. Whether it is in the ambulatory care setting³³ or in the ED,³⁶ teaching does take some time. Another prerequisite of effective ED teaching is a receptive learner.¹² Trainees have 6 general competencies to acquire, defined in 1999 by the Accreditation Council for Graduate Medical Education (ACGME): patient care, medical knowledge, professionalism, systems-based practice, practice-based learning and improvement, and interpersonal and communication skills.⁴¹ How receptive the learner is to teaching, as well as his or her ability to acquire the competencies, may be affected in both positive and negative ways by crowding. Treating patients more intensively in the ED (such as with asthma patients) is a cause of ED crowding³⁶ that may benefit the resident's acquisition of all of the ACGME competencies. The goal of this treatment is to avoid admission, and the resident is able to complete all the diagnostic and therapeutic tasks related to treatment of the patient.⁴² He or she also learns to balance the ongoing therapy of several patients at once.

Consultation delays³⁶ are associated with ED crowding and may also mean that the emergency medicine resident has to prolong patient care. This may improve learning by allowing the resident to see the early outcomes of his or her care, at the expense of seeing a new case. In other words, resident learning may improve in quality, at the expense of quantity. Unfortunately, the resident may not gain helpful feedback if the consultant arrives after the completion of the resident's shift.

Difficulty in arranging follow-up care³⁶ is a cause of crowding that may be detrimental to resident learning in two ways. First, while having patients follow up through the ED may allow the resident to see patient health outcomes, it is likely that patients will not see the same resident on their return visits, so this practice only increases the volume of primary care that emergency medicine residents provide. Second, the resident loses crucial learning time while making sometimes complex discharge and follow-up arrangements, which can include a string of telephone calls, forms, and faxes. Indeed, one of the causes of crowding noted by Derlet and Richards³⁶ was shortage of administrative/clerical support staff, and the resident physician may become the fallback person without a code for the photocopier.

Another aspect of crowding that impinges directly on residents is the nursing shortage.^{3,34,36} Nursing tasks that residents fulfill are done at the expense of learning time.³⁷ We speculate that the cumulative time that residents spend pouring "pink ladies," placing nasogastric tubes, taking ECGs, discharging patients, and administering oral and intravenous drugs³⁷ is not insignificant. Because waiting for the nurse to perform these duties means more patient suffering, a delay in admission with a subsequent delay in opening an ED bed, and sometimes a risk to the patient's health, residents naturally step in to help. Although some practice of these skills is useful and may contribute to improvement in the patient care and systems-based practice competencies required by the ACGME,⁴¹ ultimately it is an inefficient use of resident training time and may result in iatrogenic errors, inadequate documentation, and an overall deterioration of ED efficiency.

POTENTIAL SOLUTIONS

The solutions to ED crowding are mostly systems-based, and thus beyond the direct influence of the individual emergency medicine resident. However, there are several small steps that may be taken to mitigate the effects of crowding on resident education. Effective ED teachers often use prepared resources, such as a file of ECGs, a familiar approach-based textbook, Web-based tutorials and libraries, or visual diagrams.¹² In a gridlocked ED, residents may evaluate these resources while the staff person catches up on patient flow duties. Teachers may keep copies of key articles in a file and provide them to learners when related issues come up in a case. This can replace a formal teaching session and shows the teacher's interest in helping the student learn on their own. Finally, teaching brief key points, such as the compatibility of pyuria with acute appendicitis, can be as important as time-consuming reviews. Teachers can also take advantage of graded responsibility by having senior residents make addressing administrative issues and teaching more junior learners their learning objectives for that shift. On a larger scale, the institution of teaching shifts, where faculty are funded solely to teach the house staff, may ease the time constraints of crowding on ED teaching.^{37,43} During these shifts, the faculty have no clinical responsibilities⁴³ and are able

to choose the best teaching cases for dedicated in-depth bedside teaching.

The final principle of effective ED teaching is to improve the environment,¹² both in terms of the physical plant and ED staffing. Chisolm et al^{44,45} found that clinicians working in the ED have approximately 10 interruptions per hour. Distinguished teachers mentioned finding a private place for teaching, where the charge nurse would only bother them for something truly urgent, to avoid interruptions.¹² In addition, under the time constraints of crowding, feedback may be pushed to the staff physician's free time at the end of a shift, but a private place will maximize what is said. Having textbooks and computers nearby to facilitate learning was also noted to improve teaching efficiency.¹²

ED physician staffing needs to be increased to reflect increasing patient volumes to reduce the pressure on the attending physician to focus on ED flow and bed management.^{36,37} The use of other medical providers, such as physician assistants and nurse practitioners, could also alleviate some of the ED staffing pressures. Staffing of other personnel such as nurses, clerical staff, and social workers also needs to increase; otherwise, their work may shift to residents.^{36,37} Measures to expedite patient admissions, such as maximum wait times for consultations, predetermined consult services for certain patient presentations, and a supportive administration willing to offload the ED, may be instrumental in maximizing available resources. Involving senior residents in the development and implementation of these measures fulfills some administrative and health advocate responsibilities as well.^{46,47} Other proposed solutions to the negative effects of ED crowding on education include observation units to increase ED capacity^{3,42} and avoiding diversion to provide additional emergency medicine resident experience³⁷; but again, these are beyond the influence of the individual resident.

As a young specialty, emergency medicine might be better positioned to cope with the new challenges of medical practice. Crowding is one such challenge in emergency medicine; it has complex effects on training, and it presents threats, as well as certain opportunities, to emergency medicine resident education. Training programs first need to identify the effect of the problem and implement appropriate solutions in conjunction with ED departmental directors. Ultimately, the solution will be systems-based and variable depending on one's country of residence and health care system. The successful emergency medicine programs will be those that find ways to succeed in the midst of worsened crowding, and this could contribute to the standard by which programs are judged.

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