Coaching for Chaos: A Qualitative Study of Instructional Methods for Multipatient Management in the Emergency Department

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ABSTRACT

Background: Busy environments, like the emergency department (ED), require teachers to develop instructional strategies for coaching trainees to function within these same environments. Few studies have documented the strategies used by emergency physician (EP)-teachers within these busy, chaotic environments, instead emphasizing teaching in more predictable environments such as the outpatient clinic, hospital wards, or operating room. The authors sought to discover what strategies EP-teachers were using and what trainees recalled experiencing when learning to handle these unpredictable, overcrowded, complex, multipatient environments.

Method: An interpretive description study was conducted at multiple teaching hospitals affiliated with McMaster University from July 2014 to May 2015. Participants (10 EP-teachers and 10 junior residents) were asked to recall teaching strategies related to handling ED patient flow. Participants were asked to describe techniques that they used, observed, or experienced as trainees. Two independent coders read through interview transcripts, analyzing these documents inductively and iteratively.

Results: Two main types of strategies to teach ED management were discovered: 1) workplace-based methods, including both observation and in situ instruction; and 2) principle-based advice. The most often described techniques were workplace-based methods, which included a variety of in situ techniques ranging from conversations to managerial coaching (e.g., collaborative problem-solving of real-life administrative dilemmas).

Conclusions: A mix of strategies are used to teach and coach trainees to handle multipatient environments. Further research is required to determine how to optimize the use of these techniques and innovate new strategies to support the learning of these crucial skills.

Emergency department (ED) crowding is a persistent international phenomenon.[1,2] Concurrent management of multiple ill patients is a vital skill in emergency medicine (EM), especially given increasing ED patient volumes[3,4] and acuity.[5,6] Recently, research has led to a proposed conceptual framework for physicians' thinking in such complex multipatient environments;[7] however, there is little formal teaching or faculty development around these skills in EM.[4] With the advent of graduated responsibility models such as

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the ACGME EM Milestone Project[8,9] and the Royal College of Physicians and Surgeons Competence By Design[10] initiative (and its new EM-entrustable professional activities), it is incumbent upon EM educators to begin research and scholarship in focal areas of care. There is also a great opportunity for educators to research and innovate around teaching and learning within multipatient environments.[3]

As with most skills acquired in training, much of the learning occurs via apprenticeship during clinical shifts. When exploring how trainees might learn in such environments, the cognitive apprenticeship model is highly applicable.[11] Although this framework was originally developed to help teachers with reading, writing, and mathematics,[11] it has been proposed previously as a faculty development technique that may help clinical teachers improve bedside teaching in the ED.[12] The Cognitive Apprenticeship Model explains how modeling, coaching, articulation, reflection, and exploration are essential components of learning via apprenticeship.[11,12] As such, we sought to explore how teachers were teaching the skill of managing multipatient environments, sensitized by this framework.

This study was the third in a planned program of research around teaching and learning within multipatient environments.[13] The aim of this study was ask how efficient EM attending faculty members (referred to as EP-teachers)—recommended for their managerial skills—were teaching EM trainees how to manage overcrowded, complex, multipatient ED environments. The hope is that this may do several things: 1) act as initial hypothesis-generating research that can be later confirmed and refined, 2) better inform curricular development, or even 3) scaffold faculty development and assessment around these crucial workplace skills.

METHODS

Study Design

We conducted an interview-based, interpretive descriptive study using an inductive analytic approach, which aimed to elicit and synthesize the teaching and learning experiences of participants with respect to handling busy, multipatient ED environments. We chose an inductive approach because we felt that the status of this burgeoning field was still nascent. Qualitative study can illuminate a new field by generating new narratives and hypotheses in an area to inform future hypotheticodeductive trials or experiments.[14]

Participant Recruitment

Attending physicians with at least five years of practice experience were nominated by the local ED chiefs at two EM physician groups within our university's affiliated academic hospitals (including six distinct EDs and urgent care centers) and subsequently approached by email. The ED chiefs were asked to nominate EP-teachers with a reputation for being efficient in our academic EDs. The participants were then asked to snowball-nominate peers respected for their efficiency in patient management; subsequent participants were also approached by e-mail. We did not specifically define "efficiency," which is consistent with early discovery research, rather leaving this to participants' interpretation. All individuals approached accepted our invitation. We also sought to sample novices who might be more sensitive to teaching or coaching around ED patient management; thus, a convenience sample of junior resident physicians was recruited via e-mail from the program administration. There was no incentive and participation was purely voluntary.

Data Collection and Analysis

The principal investigator, a graduate-trained interviewer (TC), conducted all interviews in offices or other private spaces outside of patient care areas. She was a junior faculty member who had trained within the center and had relationships as a former trainee and active teacher. She had minimal exposure with the junior trainees as a clinical teacher, since she was in the first year of her practice.

Semistructured interviews were conducted, using a series of prompts including the following three focal questions: 1) When you are working with other doctors that are less experienced than you, such as residents, how do you incorporate them into your management strategies? 2) When you are coaching junior doctors—for example, senior residents—to manage the ED, how do you teach them about these management strategies? 3) How were you taught to manage a busy ED? EP-teachers were asked all three questions while residents were only asked the third question. Prior to conducting the study, we internally piloted the interview guide for clarity and content within our research team, incorporating feedback into the final interview guide. The above interview questions were subsequently only mildly modified with clarifying content to ensure maximal variation in the data collection: specifically, participants were asked to clarify or expand upon their ideas when answering.

The interviewer was the primary investigator of the study. The full semistructured interview guide has been previously published within the lead author's thesis manuscript.[13] Interviews were recorded on an audio recorder, transcribed by a professional transcriptionist and checked by the interviewer.

We used an interpretive description technique to guide our work.[15] Originating from the nursing literature, this generic qualitative technique utilizes recollections and descriptions to generate insights, allowing clinicians to explore the world in which they work, and is well tailored to on-the-job experiences and incorporating insights by the analysis team.[15] Realizing that our analysis team was heavily weighted toward clinicians (TC—junior faculty member, KVD—senior resident, JS—midcareer faculty member) with their own personal experiences, the interpretive description approach allowed for the insider knowledge to be played as more of an advantage than in other techniques, since it was originally derived by clinician-investigators to engage in qualitative research. A constant review of the transcripts generated was completed after each interview by a single researcher (TC). After this initial interview phase, clusters of three or four transcripts at a time were analyzed in an iterative approach until thematic sufficiency was reached as determined by the analysis team (TC, KVD who coded with oversight, and reflexivity checking by ML). For the purposes of this study, we determined that sufficiency was reached when no new substantive themes or ideas seemed to be appearing in our analyses. Notes and memos were used to ensure that sufficiency was reached and to compare findings to other sensitizing conceptual frameworks, including the cognitive apprenticeship model.[11,12,16]

To determine sufficiency, we purposefully sought to interview more individuals than we thought we would need. As such, upon review of transcripts, sufficiency was noted at approximately 12 transcripts (seven EPs, five residents). For purposes of ensuring sufficiency, and to complete other aspects of the larger project, a total of 10 participants from each group (EPs and residents) were interviewed. Finally, to ensure veracity and comprehensiveness of our analysis, our final results were circulated to the study participants for review and member check. The participants agreed with the findings and did not disagree with our conceptualizations. One participant stated that he also learned new ideas from reading the analysis that he wanted to apply in the future.

Ethics

We received primary ethics approval from both the University of Illinois at Chicago Institutional Review Board and the Hamilton Integrated Research Ethics Boards.

Guidelines

We have attempted to adhere to the Standards for Reporting of Qualitative Research.[17]

RESULTS

We had a total of 20 participants (10 attending physicians and 10 residents) within our study. All attending physicians worked in academic centers and functioned as EP-teachers. The interviewer spent between 62 and 96 minutes with each participant. Our member check procedure resulted in no substantive changes from participant responses.

Instructional Strategies for Handling Busy Multipatient EDs

One of the most interesting observations was the gap between the EP-teacher and the junior residents. Whereas the residents were usually able to describe ways in which they had been taught or coached at the bedside, EP-teachers were more hard-pressed to recall any methods from their training. The instructional method that was most readily recalled by the EP-teachers was purely experiential. One participant remarked: "I was not taught to manage a busy emergency department. It's something that I learned over the course of my clinical practice … by observing other people, and …, by looking at what worked best for me." (Attending 1) Another stated: "Frankly, most of it happened on the job. It was one of the big transitions points between staff and residency." (Attending 2)

There were two main types of strategies that the EP-teachers use to teach others. These strategies fell mainly into the following thematic areas:

1. Workplace-based methods (with subthemes observation, in situ ED instruction via conversations and coaching).
2. Principle-based advice (e.g., rules of the road).

Of note, there was very little in the way of formal teaching. The only formal teaching strategy that was noted by our participants was didactic teaching during medical school around the Canadian Triage Acuity

Score (CTAS), used to stratify patients by severity of illness and acuity when they arrive in the ED.

Workplace-based Methods. The bulk of our participants noted that the strategies for learning about managing multipatient environments were based in the clinical work environment. There were two main subthemes that emerged within this format of teaching and learning: observational methods and in situ instruction.

Observational teaching methods. Many participants noted that the process was largely learned by intuition. Some stated that it was part of the implicit curriculum of residency—that it was implied that you should know how to do this eventually, but never explicitly taught formally.

One resident reflected: "Well to be honest we haven't had much explicit teaching in how to manage a busy ED. I think a lot of it comes from the hidden curriculum or just the background kind of implicit things that you learn from different staff." (Resident 1) Similarly an EP-teacher recalled: "... after [we] finish no one feels that they had a lot of as much hands-on training as they want to feel ready to run a department. So really, most of it was taught from a sort of modeling ... throughout residency." (Attending 3)

Because these skills were thought to be part of the implicit curriculum, some residents noted that they tended to watch EP-teachers, observing them to determine what was expected of them. Congruent with this finding was the sentiment within the EP-teacher population with regard to the need to role model efficient and effective clinical care within busy departments. The following quote is from an EP-teacher who suggested that he actively invited trainees to see multiple patients in an effort to demonstrate clinical efficiency via role modeling (this was dubbed the "ride-along" method of role modeling):

> I think direct conversations, here's experience that I've used, here's techniques that I've used that have allowed me to go through I think, you know, behaviour modelling so they will see how I manage quick patients, see the little cheats that I could do to get through quicker patients, um, while maintaining patient's safety. (Attending 4)

Beyond simply role modeling their actions, EP-teachers also suggested that attitudinal role modeling was of crucial importance. This was evidenced by a faculty-participant (Attending 5) who stated the following:

> [L]ead by example so that they can see how you function. And, I think that's important. ... [J]ust in terms of running the department is you have to work hard. I think that I work hard when I'm there, so ... hopefully they will see that to run the department you have to work hard...

Instructing in Situ: Conversations and Coaching. There were three categories of explicit instructional methods that teachers used in the clinical environment: 1) Conversational methods, which hinged more on discussions where EP-teachers tended to impart their hard-learned wisdom prompted by the current clinical environment; 2) managerial coaching, which consisted of more participatory dyadic interactions between EP-teachers and residents wherein discussions are prompted by real or anticipated scenarios, and the resident is being coached into managing the ED (fully or in part); and 3) experiential learning, in which the resident participates in leadership and management of the actual department (in part or in full) with a range of supervisory support. A graded progression through training was noted to be of importance, and the various instructional methods reflected graduated responsibility. Our previous work in this area described this phenomenon.[4] Participants recalled either experiencing or using all three subtypes of in situ instruction, often to complement each other. One participant stated:

> It is usually on shift while we are talking, we will talk about it with the staff, if we have got a bunch of patients piling up they will just give me a stack of charts and tell me to prioritize and go and see them all as efficiently as I can and then after we will talk about how it went. (Resident 2)

Above all else, EP-teachers noted that it was crucial for residents to eventually move toward experience, since that seemed the only way to develop a gestalt or clinical acumen for dealing with the complexities of multiple patient environments. Near the end of training, more minimalist supervisory strategies were employed. Senior residents were more frequently given the reins and faculty were less likely to act as safety

nets. With junior- or intermediate-level trainees, the responsibilities were more often shared, and more coaching/direction were given.

Other instructional methods used in the clinical environment ranged from collaborative problem solving of real clinical situations through to ED simulations where trainees would be asked to triage current patients and think about how they would reallocate patients to free up a resuscitation bed, given that a new patient might be anticipated in the next 10 minutes. Table 1 lists key in situ teaching strategies, which were described by our participants as useful for teaching or learning about how to navigate busy, multipatient environments. Table 2 details coaching strategies. Table 3 describes some experiential strategies that may allow trainees to gain skills required of them in ED management as EP-teachers. Table 4 displays how our findings map to the cognitive apprenticeship conceptual framework.[11,12]

Principle-based Advice (e.g., "Rules of the Road"). Since we have already described how conversational and coaching methods were prevalent ideas within the described in situ teaching, it is unsurprising the participants repeatedly described various rules that they had derived from their experiences. These emerged as a separate theme.

The advice could largely be grouped into two main groups of ideas:

1. "Lessons learned" to be passed on to individual physicians—i.e., advice regarding how to conduct one's actions.
2. Team-/systems-level advice—i.e., advice on how best to run the team and/or function within the ED.

Some examples of advice for individual physicians included utilizing parallel processes, using effective organizational systems, and seeing the sickest patients first. Meanwhile, some examples of team/system-based advice were to diagnose the problem in department flow, be wary of triage notes (as they are not always accurate), call for help when needed, and maintain geographic awareness. A complete listing of these rules is listed in Data Supplement S1 (available as supporting information in the online version of this paper, which is available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10312/full).

Emergency physician-teachers felt it important to highlight the necessity of initiating parallel processes

Table 1
In Situ Teaching Strategies Described by Participants for Teaching About ED Management

Method	Description	Exemplar Quote
Conversational Methods (Discussion-based, etc.) Discussions in the clinical sphere where EP-teachers tended to impart their hard-learned wisdom, which were largely prompted by the current clinical environment.		
Informal conversations with staff	Informal conversations involving trainee and faculty member, but usually initiated by the trainee. May include a resident asking about specific tips, tricks, and wisdom from a supervising faculty member.	*[You learn] more from experience talking to staff on shifts or you have patients come in and then they say which ones you see first and why. (Resident 3)*
Teacher provides clinical pearls, tips, pointers	Supervising physician acts as a teacher, providing clinical pearls that can enhance performance based on observed behaviors by the trainee. These can take the form of tips and tricks and allows the trainee to understand some of the nuances of departmental management.	*I offer my pearls and especially with the more senior residents I make that a part of every post patient encounter to offer something in terms of department management that adds to their learning because certainly when you reach four or five level your knowledge base is exceptional. (Attending 6)*
Storytelling—tells learners about recalled difficult situations (cautionary tales)	EP-teachers share stories of situations that perplexed or challenged them. This technique was described to be especially useful to "humanize" the EP-teacher physician and show that imperfections and build rapport.	*I retell a story and maybe not of one of my successes, because no one wants to hear about how great someone did, that might actually be intimidating, I will let them know I learned something through a mistake and then that usually humanizes myself and gives them a good opportunity. (Attending 6)*
Cheerleading	EP-teachers explain how they would highlight their support role within the department and encourage those senior trainees seeking to encourage. They might engage in positive reinforcement or encouragement and/or debrief to normalize imperfection if a trainee felt inadequate in their managerial performance.	*I say, "I've got your back and I want you to pick up as many as possible and I will keep re-asking, you know are you comfortable?" And try to make it a comfortable environment. (Attending 3)*

Table 2
Managerial Coaching Strategies Described by Participants for Facilitating Learning About ED Management

Managerial Coaching (Dyadic Interactions Between EP-Teacher and Resident) Participatory dyadic interactions between EP-teachers and residents. Discussions are prompted by real or anticipated scenarios, and the resident is being coached through the decision making of for managing the ED.		
Collaborative problem solving of simulated scenarios	EP-teachers would pose scenarios to senior trainees and then ask them to work through the case, explaining their problem solving along the way and receiving feedback on their decisions.	*So to give them an example. "It's Friday night at 11:00 pm. You have no ambulances on offload, you have 20 patients to be seen, you have 3 learners. Tell me how you are going to deploy them. What are you going to do? What are you going to tell me to do to help you move the department?" And then it's walking them through that process of how would you allocate patients, how would you allocate the resources you have to the patients that have to be seen in order to fulfill all of the available goals that you need to fulfill. (Attending 7)*
Troubleshooting problems	Senior trainee is expected to be actively engaged in troubleshooting of live problems, with the EP-teacher mainly guiding the trainee through the problem-solving process, asking for a commitment about the trainee's plan, but explaining his/her own thinking about the situation. The trainee might not participate in the actual implementation of the discussed plan. Examples might include coaching a senior trainee on ways to get help in a difficult situation or helping them to trigger systems-level procedures to improve bed-space issues.	*I will sort of walk them through what are the sorts of things you are looking for, who to talk to, who is it important to get information from. The senior residents, a similar sort of thing, . . . What you hope for though is that as they become more senior, they will come to you at the start of the shift and say: "This is what I have found and this is what I would like to do." (Attending 7)*
Collaborative problem solving of real-life scenarios	While situated in the working environment, a trainee is looped into real-life situations that the EP-teachers is facing about bed management or systems-based problems. The trainee is asked to diagnose the systems issue and then suggest management strategies which they can carry out together with the EP-teacher.	*Two days ago I said, "Okay, here's your tracking board. Tell me what the problem is." And so we make a diagnosis of the [departmental] problem together . . . (Attending 8)*
Think aloud for instruction	Looking at an ED map of patient beds and occupancy and explaining what they are thinking and what they are about to do to manage patient flow.	*She asked me to prioritize who I was going to see next and to decide how I was going to see them . . . And so essentially, I had to try as a very junior resident to take all of these into account and decide who needed to be seen most urgently and who could wait for a little bit longer and why. (Resident 1)*
"Walk-around"	EP-teacher takes learner around to department in an effort to help them gain situational awareness. Along the way, they ask the following questions: • Where is your next resuscitation bed going to come from? • Where is your, where are your outs? • Who can you call for help? • Looking at the tracker, the way it looks right now, how would you prioritize the patients that you have currently?	*So with a junior resident, what I will often do is I will take them with me (walking around the department) and explain what I'm doing. I will tell them that it is a good way to start the shift. I will walk them through what are the sorts of things you are looking for, who to talk to, who is it important to get information from. (Attending 7)*
Debriefing actions with staff (after actions, discuss and talk about how to change)	Used when situations are especially difficult or challenging, a staff physician may make decisions initially, and then cycle back to his or her decisions later in the shift to explain his or her thinking and rationale. This might include making time to address this when situation is calmer.	*But in the case were the trauma patient was sicker than you initially anticipated it is challenging to provide teaching. And so instead of doing teaching online we did a debrief afterwards and talked about management of primarily of flow . . . (Attending 3)*
Guide senior learners in deployment of junior learners	The senior trainee is asked by the EP-teacher to lead the team of trainees, deciding what to do next, and allocating patients to other more junior trainees.	*I say, "Okay now look at the board and tell me what patient you're going to see and in what order, and which patient are you going to give to the junior residents. " And so, I ask them to do that. (Attending 8)*

within the ED. In contrast, residents did not mention the use of and/or incorporation of this in their practices, but this was thought to be an important aspect of how EP-teachers described their response to busy scenarios. In fact, the inability to very quickly initiate parallel processes (i.e., moving two patients to be in the same room next to each other, eye-balling four patients within a minute, calling out orders to a trusted RN in one room while attending to another patient) was deemed a critical skill in many of their comments. One EP-teacher participant (Attending 6) describes this vividly in this passage:

Table 3
Experiential Learning Strategies Described by Participants for Facilitating Learning About ED Management

Experiential Learning The resident participates in leadership and management of the actual department (in part or in full) with a range of supervisory support, allowing them to explore the work environment and develop strategies for achieving their own goals.		
Supervised management of a smaller portfolio of patients	Trainee is asked to manage multiple patients at once with a smaller portfolio of own patients.	*Before the shift, we discuss how they are going to manage the department and what part of it they're responsible for. And I try to give them an area that, you know, these eight beds are yours or these 12 beds . . . or this part of the department. (Attending 1)*
Run the board (e.g., review the ED map of patient bed to ensure appropriate patient allocations)	Joint review of ED patients with EP-teacher to review actual care being provided, with opportunities for more supervisory.	*Almost like what you would do running a code but applied to the whole department to kind of resummarize all of that, you know people run the board multiple times and try to figure out where to put the best resources. And also look into how to activate backup resources if they are available. (Attending 3)*
Divide and conquer	Defines limits of resident's responsibility (assigns multiple "sections" to the responsibility of the trainee—e.g., resuscitation; trauma, cardiac). Using geographic zoning results in a larger portfolio of patients.	*We might strategize about finding locales to work out of. So, if the senior residents wants . . . If there is a bunch of stuff to do in critical care and they want to work in the critical care for an hour and I'm gonna work in [the intermediate zone], then I'm gonna work in [the intermediate zone] and he would work in critical care. (Attending 8)*
Safety net approach	The trainee begins the day with the goal that they should see all the patients (attempting to "replace" the EP-teacher). Over the course of the day, the EP-teacher steps in—seeing more and more patients and assisting in ED flow management, as learner gets more overwhelmed. For instance, when the ED is busy and overwhelming for the resident—then the EP-teacher would assume 100% control. However, with a fairly experienced senior resident it may require the EP-teacher to assume a more minimal role.	*Then when we get back, we will have a conversation of, "Okay, so when you saw that one sick one, I saw four quick ones, this is how I got through those four quick ones." (Attending 4)* *Where the department is really under dramatic stress, usually I run the department but bring the senior along with in the management decisions. But I usually ask them at that point to start seeing the sick patients and doing the clinical medicine. (Attending 2)*
Augmented or shared decision making about the trainee's managerial role	The trainee and EP-teacher discuss the approach for the day and determine the intended strategy for the day. Two variants: • Learner asks teacher for permission to have this experience • Learner is pushed by teacher to do it (out of comfort zone)	*What I do is I usually try to push them a little bit to go beyond their kind of assigned comfort roles or whatnot. So the juniors soon to be seniors might get pushed a little bit to be senior. (Attending 3)*
"Thrown into deep end"	Unknowingly or with little preparation, learner is asked to take the lead on "flowing" department (full experience, little coaching). Two variants of this exist depending on how the trainee interprets this experience "Trial and error"—learner repeatedly given the lead, learns through experience and making mistakes along the way. "Guided reflective practice"—Learner attempts to manage and prioritize multiple patients, reflects on how they did it. This is distinct from the above since in this scenario the learner mindfully and independently initiates a reflective component to improve.	*If they are all unwell, but not emergent I might give the resident all of the charts and say all right, you're up. You need to go and see them all and resuscitate them and tell me how you are going to do it. (Attending 7)*
"Given the reins"	Performing the actual job of live prioritization with intervention or coaching by EP-teacher only when requested. This technique is usually reserved for trainees nearing the end of their training.	*They stood back and made it very clear, like every once in a while they would look to make sure that you were on the right track, they made it very clear; do what you want to do, and I am not going to say anything unless I have to step in, just stop looking at me and just deal with it, do what you want to do and pretend this is your department tonight. (Resident 4)*

So, carrying my phone on me, probably realistically between five minutes a patient, realistically, so I would probably look at all three in thirty seconds, decide in my head who is the most critical so even though they are a [ST elevation myocardial infarction] and they need to go to the

Table 4
Mapping ED Flow Instructional Strategies to the Cognitive Apprenticeship Model

		In Situ Instruction		
Cognitive Apprenticeship Model Component	Observational Teaching Methods	Conversational Methods	Managerial Coaching	Experiential Learning
Modeling —Teacher performs task so apprentice can observe; teacher explains heuristics and/or processes along the way.	Observation of EP-teacher by trainee	Storytelling—tells learners about recalled difficult situations ("cautionary tales")	Heuristic-based advice ("rules of the road")	
Coaching —Teacher observes trainee during performance of task, providing feedback, prompting, and tips along the way.		Teacher provides clinical pearls, tips, pointers	Guide senior learners in deployment of junior learners.	
		Cheerleading —Positive encouragement —Normalization of imperfection		
Articulation —Teacher and trainee articulate their thinking processes, explaining both *what* they are thinking and *why*.		Informal conversations with staff	Collaborative problem solving of simulated managerial scenarios	"Run the board" (i.e., using the tracker board as a prompt to talk about each patient, reminding team of the case and the plan)
			Think aloud for instruction (i.e., articulating one's thinking processes out loud to a trainee)	
Reflection —Trainees are encouraged by teacher to reflect on their own progress, to identify goals or create targets for change.			Troubleshooting problems—discussions around ways to get help systems-level procedures to improve bed-space issues	
			Debriefing actions with staff (after actions, discuss and talk about how to change)	
Exploration—Trainees are encouraged to develop own goals and objectives for a given task and to develop strategies to achieve these goals.			Collaborative problem solving of real-life scenarios	Supervised management of a smaller portfolio of patients
				Augmented or shared decision-making
				"Divide and conquer"
			"Walk-around"	"Safety net approach"
				"Given the reins"
				"Thrown into deep end"

[cardiac catheterization lab] and they have had chest pain for two hours, their vitals are fine and they are, I would probably prioritize that person the least, same with the labouring patient, if the head is not at the entrance then I have some time and I can call [obstetrics] and have them here.

DISCUSSION

The skill required for managing busy and complex systems are undoubtedly important for attending emergency physicians (EPs), but these skills are currently heterogeneously taught. While there is new and intriguing evidence around EP efficiency,[18] there is still little by way of formal teaching reported within our current study. However, it is not surprising that a fair number of informal and experiential in situ instructional methods have crystallized under the increasing pressures of overcrowded ED systems.

For trainees to learn in busy workplace settings, it is worth acknowledging that the teachers within our study intuitively harnessed many of the facets of the cognitive apprenticeship model without being exposed to the concept prior. Certainly, our findings mirrored the components of the cognitive apprenticeship model,[11,12] which includes modeling, coaching, articulation, reflection, and exploration. This resonance was

noted in our analysis phase, and this conceptual framework maps quite well to how our EP-teachers instruct in multipatient environments. The cognitive apprenticeship model, therefore, may be a key framework for EM teachers to understand and use to guide their managerial training for inexperienced practitioners for busy, multipatient environments[16] Our data set shows that EP-teachers engage in a type of cognitive apprenticeship when they teach ED management skills. Our exploratory findings suggest that there are several instructional strategies that seem to have arisen out of necessity within the clinical environment, and further research can likely help to clarify other novel and innovative education practices.

During the previous phases of this program of research,[4] attending physicians perceived that there was generally a predictable progression for managing multipatient environments. This is, of course, the great potential of competency-based medical education (CBME) movements that are being rolled out across the world.[3] Developmental progression and trajectory are key components in any CBME curriculum, and as such, ensuring that we support and operationalize the teaching and learning of key skills such as ED managerial skills is of great importance. In line with prior literature on graduated responsibility[3,4,19,20] and in the spirit of EM milestones[8,9] and entrustable professional activities,[10] this staged progression can be seen within the various in situ instructional strategies that were highlighted by our participants.

Further research will be required to stratify these various instructional methods for different levels of trainees. Formal didactic, simulated experiences, and serious games[21] may be developed to help trainees learn about handling increasing volumes of sicker patients.[4]

LIMITATIONS

There are several limitations to our findings. We chose not to define efficiency to our ED chiefs and participants—although there are multiple clinical metrics that are available to judge patient care volumes, we felt that these metrics did not capture other crucial elements of ED management in an academic environment, such as teaching and appropriate resident supervision.

Also, our study sought to identify EP-teachers with efficient clinical practice. It is possible that these experienced clinicians may not be cognizant of the skills that helped them achieve this level of efficiency. EP-teachers who are good at ED flow may, ironically, not be good at teaching this skill.[22] To counter this potential limitation we sought to triangulate their perspectives with junior trainees, who we thought would be more insightful and declarative in their observations about how EP-teachers are actively teaching and learning prioritization and efficiency in the ED. Importantly, our study might have been enhanced by the inclusion of senior residents, who may experience more flow teaching and coaching, but this population's insights were unlikely to be very different from junior faculty members who were included in the study with recent recollections of their senior resident experiences.

Although we involved participants from two disparate teaching hospitals with highly heterogeneous clinical care environments, it is always possible that since we studied only physicians and residents affiliated with one single university that our results may not be transferable to other centers, especially community hospitals occasionally staffed with learners.[23]

We took multiple steps to ensure reflexivity of our analytic team by involving external team members, but as many of our team members were faculty members or residents associated with the study group, we may not have been able to achieve full analytic reflexivity.

Finally, the retrospective methodology used to elicit responses may be prone to the limitations of recollection; other techniques such as ethnography or observed simulated teaching scenarios may be more useful in elucidating teaching techniques that EP-teachers use to train residents in various situations.

FUTURE DIRECTIONS

As with most qualitative work, the findings inspire more questions than answers. This study marks the beginning of a program of research around teaching and learning in multipatient environments. We hope that this exploratory work might begin to shed light on effective teaching strategies to improve ED flow and management.

Similar to the development of educational alliances[24,25] and signposting feedback encounters,[25,26] providing EP-teachers and trainees with a common lexicon about clinical coaching techniques is key for skill development. Notably, a recent systematic review of bedside teaching[27] did not include experiential learning. This may be because few papers actually describe techniques for incorporating such clinical teaching into ED, clinic, or ward management. Undoubtedly real,

experiential learning is paramount for the development of workplace troubleshooting activities.

Finally, the development of formal instructional methods outside of the authentic ED environments may allow for increased time to raise awareness around the cognitive,[28] ethical,[29] or social justice implications[30] of ED management decisions. It may be useful for instance to highlight pressures and prime trainees to recognize problematic situations (cf. Klein's recognition-primed decision making).[31] Formal didactic sessions, simulated experiences, and serious games[21] may be developed to help trainees learn about the complexity of multipatient management.[4] EM trainees may benefit in that same way that firefighters or military leaders benefit from tabletop exercises.[32]

CONCLUSION

With EDs facing increasing pressures, teachers are responding with innovative methods to coach trainees to handle these busy environments. Developing other novel teaching strategies (e.g., classroom-based instruction, serious games, simulations) may augment the cognitive apprenticeship trainees experience in clinical experiences. This work may assist in formalizing previously informal instructional methods that clinical emergency physician-teachers use, codify the language around crucial ED management skills, and help with signposting teachable moments.

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Supporting Information

The following supporting information is available in the online version of this paper available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10312/full

Data Supplement S1. Aggregated advice for physicians learning to manage departmental flow.