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Identifying and Transmitting the Culture of Emergency Medicine Through Simulation

Eve Purdy, MD, Charlotte Alexander, MD, Melissa Caughley, MD, Shane Bassett, and Victoria Brazil, MD, MBA

ABSTRACT

Background: Simulation is commonly used in medical education. It offers the opportunity for participants to apply theoretical knowledge and practice nontechnical skills. We aimed to examine how simulation may also help to identify emergency medicine culture and serve as a tool to transmit values, beliefs, and practices to medical learners.

Methods: We undertook a focused ethnography of a simulated emergency department exercise delivered to 98 third-year medical students. This ethnography included participant observation, informal interviews, and document review. Analysis was performed using a recursive method, a simultaneous deductive and inductive approach to data interpretation.

Results: All 20 staff (100%) and 92 of 98 medical students (94%) participated in the study. We identified seven core values—identifying and treating dangerous pathology, managing uncertainty, patients and families at the center of care, balancing needs and resources at the system level, value of the team approach, education as integral, and emergency medicine as part of self-identity—and 27 related beliefs that characterized emergency medicine culture. We observed that culture was transmitted during the simulation exercise.

Conclusion: This study contributes to the characterization of the culture of emergency medicine by identifying core values and beliefs that are foundational to the specialty. Simulation facilitated cultural compression, which allowed for ready identification of values, beliefs, and practices and also facilitated transmission of culture to learners. This study expands understanding of the culture of emergency medicine and the role of simulation in the process of cultural exchange.

Simulation is common in medical education, particularly emergency medicine education. It offers the opportunity for learners to apply theoretical knowledge and to practice technical and nontechnical skills. We aimed to examine how simulation may also serve as a tool to transmit emergency medicine culture to learners, specifically, medical students.

Culture is a rather nebulous term. Even anthropologists, who are experts in the study of culture, have struggled with a unifying definition. One variation is that culture is a learned set of values, beliefs, and practices shared amongst a group of people. Since culture is learned and taught, focus on education is critical for understanding culture and cultural reproduction in medicine.

Traditionally, medical learners spend extended periods of time in a clinical department with close mentors in an apprenticeship type model. During this time, they struggle with identifying and treating dangerous pathology, managing uncertainty, patients and families at the center of care, balancing needs and resources at the system level, value of the team approach, education as integral, and emergency medicine as part of self-identity. These values and beliefs are foundational to the specialty of emergency medicine and are transmitted through the simulation experience.

Simulation is a powerful tool for cultural transmission. It provides a safe environment for learners to apply theoretical knowledge and practice nontechnical skills. This study demonstrates that simulation can serve as a tool to transmit the culture of emergency medicine to learners. The seven core values identified in this study—identifying and treating dangerous pathology, managing uncertainty, patients and families at the center of care, balancing needs and resources at the system level, value of the team approach, education as integral, and emergency medicine as part of self-identity—are foundational to the specialty.

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The study of emergency medicine culture is not a robust field. In the most overarching ethnography to date, four domains—cognitive, environmental, linguistic, and social—were found to be of particular importance when examining emergency department (ED) culture. Studying a simulation exercise through those domains affords the added opportunity to reflect on the actual culture of emergency medicine that is being transmitted. Values and beliefs of a group hold sway over actions and decision making within a group. To be aware of these values is to see the exercise through their lens.

The way that narratives are designed and the way that participants are positioned within these narratives goes far beyond teaching medical and technical skills. It reinforces ideology about the profession and transfers social values, beliefs, and practices. This makes understanding how we transmit culture, both deliberately and implicitly, in simulation activities paramount to understanding its role in medical education and enculturation.

Table 1
Key Definitions Related to Culture

<table>
<thead>
<tr>
<th>Values</th>
<th>Beliefs</th>
<th>Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td>Values and principles that a group holds to be particularly important and worthy.7</td>
<td>Assumptions that are made about the world and concepts that are held to be true whether or not they in fact are.9</td>
</tr>
</tbody>
</table>

Methods

We undertook a focused ethnography of a simulated ED exercise delivered to 98 third-year medical students over 2 days. This ethnography included participant observation, informal interviews, and document review.

The Simulation Exercise and Participants

The simulated ED took place in November 2018 at Bond University in Queensland, Australia, as a preexisting component of the curriculum. Bond University medical school program is 5 years in duration. Students were in their third year, which serves as a transition between classroom and clerkship with frequent simulations, a comprehensive case-based curriculum, and early clinical exposure. This learning activity took place about 2 months before students were scheduled to start formal clinical rotations. Students were scheduled to spend 2 hours in a simulated ED run by nurses, emergency medicine trainees, and consultants.

Students performed histories and physical examinations on simulated patients, reviewed cases with senior doctors, ordered and followed up tests, and determined disposition for patients. The simulated department, patient presentations (Table 2), and procedures were designed to be as realistic as possible to the hospital experience. There were 15 simulated patients playing multiple cases and 20 staff (nurses, emergency medicine trainees, consultants). Staff acted as ED supervisors but also played roles such as switchboard, consulting specialists, pathology, and radiology. Within these open roles they had liberty to act as they usually would or as they believe their colleagues would. Students and staff were prebriefed, participated in a 2-hour shift, and then handed over their patients to the next team of students who continued care and also were assigned new patients. Most students cared for a total of three patients in the exercise. There were two total of four 2-hour shifts per day. Students participated in a debrief after each shift. There was no assessment linked to this mandatory learning activity. More details on the design and delivery of the simulation exercise can be found in a previously published innovation report.11
Focused Ethnography

Three researchers (EP, CA, MC) conducted focused participant observation throughout the 2 days of simulation exercises for a total of 16 hours each (48 total observation hours) including time in the simulated ED, the prebrief, debriefs, and breaks. Participant observation is a common method in anthropology research whereby researchers learn about the people under study by observing and participating in a group’s activities. They focused observations on previously suggested domains to explore ED culture—cognitive, linguistic, social, and environmental. During each 2-hour block, researchers were assigned to focus specifically on one of the four domains in a rotating schedule. Researchers sought clarification and asked informal questions to participants and staff. Documents sent to students and staff in advance of the session, scripts for simulated patients, and charts and documents used throughout the simulation session were also reviewed. The three researchers primarily existed toward the observer end of the participant–observer spectrum; however, they did occasionally drift toward participant by reviewing cases and answering questions as needed in their capacity as residents (EP and CA) and a senior medical student (MC). This type of fluidity can be very helpful in the ethnographic process, allowing the research to build rapport and maintain a culturally definable role. They kept deidentified, handwritten field notes, which were then typed and completed at the end of each day.

Data Analysis

Analysis was performed using a recursive method, a simultaneous deductive and inductive approach to data interpretation. At the end of day 1, data from each domain were coded deductively by the three researchers for identified values, beliefs, and practices. This coding took place in table format in Microsoft Word. Researchers then inductively generated overarching values and identified additional beliefs—both of which can be challenging to explicitly observe—from the initial coded data through a consensus process. VB and SB were available to adjudicate any arising conflicts. On day 2 of the simulation, researchers continued to collect data in each domain but focused observations on the values identified on day 1. They were also permitted and encouraged to record unstructured observations that did not fit into the constructed framework. At the end of day 2, the observations gathered for each value were added to the evidence from day 1. Field notes were further reviewed by EP, CA, and MC to identify additional values that did not fit with the original framework. After day 2, the data, in full and associated analysis, were presented to research collaborators VB and SB for input. The findings were then presented to medical students, residents, and consultants involved in the exercise but external to the research team for member checking. Finally, the value and belief set was shared with emergency medicine personnel external to the research and exercise for more broad member checking.

Ethics

This project was approved by the Bond University Human Research Ethics Committee (VB00025). Students and staff were invited to participate prior to the simulation session, and those who consented received a sticker at the beginning of the day or session. Individuals not wishing to participate did not wear a sticker. Observations were not collected from their encounters and researchers did not approach them for clarifications or questions.

The Research Team

One of the authors, EP, is a Canadian senior emergency medicine resident who is also completing a

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29 years</td>
<td>Mild allergic reaction</td>
</tr>
<tr>
<td>2</td>
<td>61 years</td>
<td>Chest pain and STEMI</td>
</tr>
<tr>
<td>3</td>
<td>34 years</td>
<td>Food poisoning</td>
</tr>
<tr>
<td>4</td>
<td>54 years</td>
<td>Distal radius fracture</td>
</tr>
<tr>
<td>5</td>
<td>51 years</td>
<td>Benzodiazepine overdose and alcohol intoxication</td>
</tr>
<tr>
<td>6</td>
<td>54 years</td>
<td>Forearm laceration</td>
</tr>
<tr>
<td>7</td>
<td>49 years</td>
<td>Severe headache</td>
</tr>
<tr>
<td>8</td>
<td>3 weeks</td>
<td>Supraventricular tachycardia</td>
</tr>
<tr>
<td>9</td>
<td>67 years</td>
<td>Delirium</td>
</tr>
<tr>
<td>10</td>
<td>70 years</td>
<td>Catastrophic hemorrhagic stroke</td>
</tr>
<tr>
<td>11</td>
<td>35 years</td>
<td>Ankle sprain</td>
</tr>
<tr>
<td>12</td>
<td>46 years</td>
<td>Esophageal food bolus</td>
</tr>
<tr>
<td>13</td>
<td>56 years</td>
<td>Pneumonia</td>
</tr>
<tr>
<td>14</td>
<td>57 years</td>
<td>Atrial fibrillation</td>
</tr>
<tr>
<td>15</td>
<td>49 years</td>
<td>Back pain</td>
</tr>
<tr>
<td>16</td>
<td>54 years</td>
<td>Motor vehicle collision—broken ribs</td>
</tr>
<tr>
<td>17</td>
<td>39 years</td>
<td>Motor vehicle collision—neck pain</td>
</tr>
<tr>
<td>18</td>
<td>48 years</td>
<td>Facial trauma in context of domestic violence</td>
</tr>
<tr>
<td>19</td>
<td>38 years</td>
<td>Ectopic pregnancy</td>
</tr>
<tr>
<td>20</td>
<td>76 years</td>
<td>Urinary retention</td>
</tr>
<tr>
<td>21</td>
<td>36 years</td>
<td>Perforated ulcer</td>
</tr>
</tbody>
</table>

STEMI = ST-elevation myocardial infarction.
master’s degree in applied anthropology. She trained
the two additional authors, CA and MC, who were
involved in data collection over a 2-week period. She
was available throughout the data-gathering process to
answer or address questions and oversee the process.
The remaining authors are Australian. CA is a junior
resident and MC a fifth-year medical student and for-
mer nurse. Authors, EP, CA, and MC who collected
the data would be considered partial insiders to both
the medical students and staff participants. SB is a
senior ED nurse and clinical skills facilitator at Bond
University. VB is conjoint Professor of Emergency
Medicine at Bond University and Gold Coast Health
Service. We specifically designed a diverse, interprofes-
sional team ranging from junior to senior in rank with
the understanding that we each bring a unique lens to
the understanding of simulation, medical education,
and emergency medicine. At research meetings before
the research was conducted and after analysis was
complete we collectively reflected on our positioning in
this project.

RESULTS

All 20 staff (100%) and 92 of 98 medical students
(94%) consented to participate in the study.

Values, Beliefs, and Practices

After day 1, nine values were identified for the initial
framework. These were “identifying dangerous pathol-
ology,” “managing uncertainty,” “patients at the center
care,” “balancing needs and resources,” “emergency
medicine as a component of self-identity,” “mainte-
nance of hierarchy,” “desired personality traits,” “team
approach,” and “any patient, any time.” After day 2,
the value set was refined to six, after the decision that
three of the values were component beliefs of others.
“Desired personality traits” and “maintenance of hier-
archy” were incorporated into “emergency medicine as
part of self-identity” while “any patient, any time” was
folded into “patients at the center of care.” No new
values were identified. After review of data and analy-

sis with VB and SB, a seventh value, “education is
integral to emergency medicine,” was created with sup-
porting component beliefs and practices. The final set
of seven values, 27 beliefs, and representative practices
are represented in Table 3. Each of these values and
beliefs were identified by each observer in their field
notes with multiple examples of related practices that
came from all four domains of culture—linguistic,
cultural, environmental, social. Some values, such as
“identifying and treating dangerous pathology is a key
role of emergency physicians,” were identified based
on the exceptionally high frequency of observation,
while others such as “education is integral to emer-
gency medicine” were based on the design of the exer-
cise and less frequent but explicit communication to
learners during prebriefs and debriefs.

Modes of Transmission

The modes through which values and beliefs were
transmitted varied in nature and subtlety, including
explicit discussion, role modeling, and structure of the
exercise. The most explicit method was discussion in
case reviews with the supervisors “on the floor” and
during the prebrief and debrief. During case reviews
the values transmitted were most often related to
“identifying and treating dangerous pathology is a key
role of emergency physicians” and “a cornerstone of
emergency medicine is managing uncertainty.” In the
prebrief and debrief “education as integral to emer-
gency medicine” was a central value, with the facilita-
tor encouraging students to develop a habit for
lifelong learning by asking direct questions of their
supervisors and discussing the purpose and value of
the simulation exercise.

Role modeling of behavior was a common mode of
transmission particularly for the value “patients and
families at the center of care” and “a team approach is
necessary to providing high quality emergency care.”
Medical students, in the member check, felt strongly
that role modeling, then mimicry, occurred frequently
and was associated with cultural transmission. Supervi-
sors actively managed patients’ symptoms and demon-
strated desired communication strategies. Students
would then copy these strategies, often borrowing
exact phrases.

The structure of the exercise, including the deliber-
ately designed key role nurses played in facilitation
and the case mix requiring input from allied health,
was a predominant signal for the value “a team
approach is necessary to providing high-quality emer-
gency care.” The values “emergency medicine is part
of self-identity” and “emergency physicians must be
expert at balancing needs and resources at the systems
level” were more subtly transmitted. This most often
occurred in the way that supervisors impersonated col-
leagues or “managed flow” behind the scenes. These
beliefs and values were sometimes, but not consist-
tently, uncovered and explored in the debrief. Certain
**Table 3**

Values, Beliefs, and Practices in Simulation and Practice

<table>
<thead>
<tr>
<th>Belief</th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value 1: Identifying and treating dangerous pathology is a key role of emergency physicians</strong></td>
<td>In the majority of case discussions that we observed there was a conversation around &quot;can’t miss diagnoses&quot; and a systematic approach to test interpretation was consistently reinforced. For example, while reviewing a patient’s ECG the resident taught the students a systematic approach (rate, rhythm, axis etc.), so as &quot;not to miss anything.&quot;</td>
</tr>
<tr>
<td>A systematic approach prevents missing dangerous diagnoses</td>
<td>Those with potential life or limb threats take priority</td>
</tr>
<tr>
<td>Facilitators were frequently triaging patients and teaching students about that process. For example, when a new shift of students entered the simulation, the facilitator triaged the patients then allocated the first group of students to the patient with chest pain because “she is the most crucial one right now.” When students were deciding which patient to sign up for next, one of the supervisors explained triage scores (listed on the board) to them.</td>
<td></td>
</tr>
<tr>
<td>Identifying nonurgent diagnoses is less important and someone else’s job</td>
<td>Supervisors avoided ordering tests that do not change ED management. While telling other staff about her experience supervising students who managed a patient with urinary retention, likely secondary to BPH, she described how the students wondered whether they should order a prostate specific antigen test then shared that “in my mind I was like %$* NO, that’s not our job… obviously I didn’t say that, but I was thinking that.”</td>
</tr>
<tr>
<td>Emergency physicians feel that other specialists don’t always share the same urgency for treating life-threatening illness</td>
<td>When impersonating colleagues (surgeons, cardiologists, nursing homes) staff were not scripted and had flexibility to behave in any way that they saw fit. We observed that they often created delays such as “being in theater” or “I’m really busy, I’ll get there when I can.” After creating delays over the phone, staff would often argue with the resident about this process. Sometimes they have “cannot get a consultant” down to see a patient or recognize urgency of a situation. In the simulation during the case of the patient with a STEMI, the cardiologist said “look, we’ve got another patient on the table, it’s going to be a while. Just stabilize her downstairs.” In discussion of this case during the debrief students expressed their frustration and the facilitator commiserated, “it feels like we’re on our own and the patient is dying in front of us and we know what they need but we can’t get it.”</td>
</tr>
<tr>
<td><strong>Value 2: A cornerstone of emergency medicine is managing uncertainty</strong></td>
<td>We can identify and manage risk to combat uncertainty</td>
</tr>
<tr>
<td>Supervisors avoided ordering tests that do not change ED management. While telling other staff about her experience supervising students who managed a patient with urinary retention, likely secondary to BPH, she described how the students wondered whether they should order a prostate specific antigen test then shared that “in my mind I was like %$* NO, that’s not our job… obviously I didn’t say that, but I was thinking that.”</td>
<td></td>
</tr>
<tr>
<td>We can manage patients without all of the information</td>
<td>Supervisors modeled an approach of simultaneous treatment and information gathering. When students presented the case of the infant with a SVT they were particularly focused on why the baby was in SVT and wanted to know the answer to that questions before proceeding with management. The supervising physician advised that while they are unsure at this point why that is the case, they could treat it without having all the facts. She guided them through using the diving reflex to terminate the arrhythmia. After the child was stabilized, they returned to a discussion that focused on “why.”</td>
</tr>
<tr>
<td>There are not always right answers</td>
<td>Each case was run at least four times over the 4 days, which allowed staff involved in the simulation exercise to see how other physicians managed the same patient. There were discrepancies in patterns of practice. At one point in the pathology room, the staff reflected on the domestic violence case and how there was a range in the tests ordered, from no investigation to CT-facial bones and CT-A of the neck. Participants felt that this reflected the fact that there are many “gray” areas in medicine, rather than that any particular management plan was wrong.</td>
</tr>
<tr>
<td>Emergency physicians feel that other specialties are less comfortable with uncertainty</td>
<td>In this simulation exercise we were able to see evidence of how emergency physicians “package” data and patients to give to consultants. One supervisor said to the student “make sure that you have all of the details straight and results organized before your phone them [surgery] because they will want all that and might get mad.” When specialists were consulted early without all available information they voiced dissatisfaction over the phone that all appropriate information was not available, again liberties taken as individuals outside the design of the simulation.</td>
</tr>
<tr>
<td>Emergency physicians feel that students are uncomfortable with uncertainty</td>
<td>In the first cases of each session students were quite hesitant to present to preceptors without all the information (bloodwork or imaging results). They described that they felt they should have the “answer before speaking with the boss.” Supervisors often directly addressed uncertainty with students. One said, “you don’t have to know exactly what is going on but you do have to have a plan.” Students noted that, “it was nice to learn phrases of reassurance and how to discuss uncertainty with patients through role-modeling. We got see lots of words around the gray.”</td>
</tr>
<tr>
<td><strong>Value 3: Patients and families are at the center of care</strong></td>
<td>Emergency physicians care for any patient, anytime</td>
</tr>
<tr>
<td>The structure of the simulation exercise was such that patients ages ranged from newborn to elderly with a spectrum of disease from minor injury to life-ending (see Table 2).</td>
<td>Social circumstances are essential to understanding illness</td>
</tr>
<tr>
<td>After students presented the case, a frequent follow-up question from supervisors would pertain to home and social circumstances. They would spend time explaining why this context was important. It was the key aspect of a number of cases including the patient with domestic violence, patient who had overdosed, and the patient with the catastrophic hemorrhagic stroke. In the debrief the facilitator stated, during student’s reflection on the importance of social circumstances, “we often are involved at the intersection of physical and social crises.”</td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
Table 3 (continued)

<table>
<thead>
<tr>
<th>Belief</th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication with patients is important to their experience</td>
<td>Supervisors spent time exploring communication strategies with students. One student was responsible for breaking the bad news to the wife of the patient with the hemorrhagic stroke. The doctor reflected that they did not use the “dying” word themselves, but spent time explaining why using direct language such as “dying” or “death” is important to avoid confusion. Supervisors role modeled challenging communication strategies, particularly for the patient with delirium showing how she could be redirected and engaged with. For example, the supervisor redirected the patient by asking a question about the doll she was carrying and was able to get her back into bed in a calm manor. About 5 minutes later the students employed a similar strategy, after initially not knowing how to interact with this patient.</td>
</tr>
<tr>
<td>Symptom management is an early priority</td>
<td>There was often early and liberal use of analgesia and antiemetics at the prompting of both nurses and supervisors. One supervisor explained, “while we are sorting out the diagnosis, we can treat what brought them in.”</td>
</tr>
<tr>
<td>The ED environment can be a less than an ideal setting for patients</td>
<td>This simulated ED faced some environmental constraints akin to an actual ED. The initial contact for the patient who was the victim of domestic violence was in the hallway, as that was the only clinical space available to see her. Both students and staff reflected during the exercise and in the debrief that this seemed inappropriate. Interestingly, supervisors were quite quick to justify this practice, while students remained adamant that there had to be a better way.</td>
</tr>
<tr>
<td>Value 4: Emergency physicians must be expert at balancing needs and resources at the systems level</td>
<td>Efficiency is necessary, and desired</td>
</tr>
<tr>
<td>Emergency physicians should actively manage patient flow</td>
<td>Despite the fact there was not actually any time pressure or need for efficiency, throughout the day, supervisors balanced student autonomy with supervisor intervention. In speaking with them about the balance, we heard comments such as, “it would just be faster if I did it.” Or “I’m getting a bit impatient and want to move on.” Some supervisors explicitly taught students how to maximize efficiency by starting a history and physical examination on a new patient while waiting for results on the first patient that they cared for. In the debrief students reflected on the fact that this was the first time that they had to “multitask” or “care for more than one patient.”</td>
</tr>
<tr>
<td>Emergency physicians should actively manage patient flow</td>
<td>Supervisors emphasized early decision making and identification of disposition. Students were frequently asked “do you think the patient is coming in or going home.” Supervisors then explained that early identification of disposition helps with planning for that patient and for the department, it creates “forward momentum.” The supervisors who were consultants would frequently “run the board” to see who they could move to the “clinical decision unit” or “short stay” to free up beds when they felt they were “bed-blocked.” All this occurred despite no actual time or patient pressure.</td>
</tr>
<tr>
<td>Emergency physicians feel that other services in the hospital prohibit efficiency and efforts to manage patient flow</td>
<td>Students brought requisitions to the simulated pathology and radiology department and also collected results from those areas. The supervisors there would send students away saying “I haven’t been long enough” or would say phrases we occasionally hear from the laboratory such as “hmmm…we seem to have lost the requisition, can you fill another one out and come back in 10 minutes, we’ll see what we can do” or “we are about to run the sample, come back in 15 minutes” or “the ESR machine is down.” After doing so the two to three supervisors would laugh and tell a story about how that happened to them recently and how it impeded their workflow in a consequential and frustrating way.</td>
</tr>
<tr>
<td>Emergency physicians must have a strong understanding of inpatient and outpatient health resources</td>
<td>Throughout the simulation exercise supervisors demonstrated tacit knowledge about navigating the health care system for specific needs of patients whether that be as inpatients or outpatients. This knowledge, and ability to deftly traverse health care domains, was necessary for patients to receive the care that they needed. For example, the supervisor for the patient with urinary retention shared information with students about the trial of void clinic which would be the most appropriate outpatient follow up. In conversations about identifying appropriate disposition and consultation supervisors often shared that “part of the role of the emergency physician is getting patients where they need to be.”</td>
</tr>
<tr>
<td>Value 5: A team approach is necessary to providing high quality emergency care</td>
<td>Emergency physicians feel that nurses are essential to the care for patients and education of junior doctors</td>
</tr>
<tr>
<td>Emergency physicians feel that allied health practitioners are valuable in caring for patients with complex needs</td>
<td>Throughout the simulation sessions the supervisors encouraged students to include allied health colleagues liberally. This included a consult to physiotherapy for a patient with back pain, consult to the social worker for the patient with domestic violence and for the patient who was dying, and contacting the coroner for the patient who died in care. When these consults were initiated the supervisors often spoke about the specific role that those professionals might play for our patients and why their role is important, particularly in more complex circumstances.</td>
</tr>
<tr>
<td>Value 6: Education is integral to emergency medicine</td>
<td>Lifelong learning is necessary to being an emergency physician</td>
</tr>
<tr>
<td>Lifelong learning is necessary to being an emergency physician</td>
<td>Throughout the simulation exercise supervisors modeled ongoing learning. Sometimes students would ask questions that they did not know the answer to and they would say, “let’s look it up together” then show the students the resources they were using to do so. Behind the scenes supervisors would collegially compare the way that they managed the same case, talking about why the ordered or didn’t order specific tests.</td>
</tr>
</tbody>
</table>
### Table 3 (continued)

<table>
<thead>
<tr>
<th>Belief</th>
<th>Practice</th>
</tr>
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<tbody>
<tr>
<td>Feedback on performance is important for ongoing growth and development</td>
<td>In the prebrief students were instructed to ask the supervisors directly for feedback and “continue to do that throughout your career.” The suggestions that they received were to ask “how’d you think that case presentation went?” or “what could I have done better in that case?” Some of the supervisors in this case were fairly junior. Built in to the exercise was the opportunity for them to receive feedback on their supervision and teaching skills.</td>
</tr>
<tr>
<td>Simulation is a valuable educational tool</td>
<td>Intrinsic to the effort required to coordinate and deliver this type of large-scale simulation is that the emergency physician coordinators believe it is a valuable educational method.</td>
</tr>
<tr>
<td>Value 7: Emergency medicine is part of self-identity</td>
<td>Certain personality traits make one well suited to emergency medicine</td>
</tr>
<tr>
<td></td>
<td>Accountability: Students described that when they had a patient assigned to them and described as “your patient” they felt like a proper doctor. One in particular said she “got excited every time a patient was assigned.” As facilitators were discussing the debrief amongst themselves after one said, “you can just tell the students that you like and that would fit in the ED. You know, the kids that say they love being assigned a patient . . .” Resourcefulness: One student was caring for the patient who died. The nurse found him and asked him to declare death. I saw him go to his resource book that he brought and look up how to do it then proceed to go through the appropriate steps. His supervisor later asked how he knew what to do. When he explained that he just figured out how to solve the problem and she was very impressed. She shared his actions with many of the other facilitators who commented that he “was great.” Collegiality: Throughout the day staff modeled collegiality. Supervisors introduced themselves to medical students by their first names. They offered support by saying phrases such as, “lots of help here for you buddy.” The prebrief and debriefs helped students explore the positive, challenging, and confronting aspects of work with their peers the day supervisors relaxed with each other in the break room where they bonded over food. Enthusiasm: Supervisors and staff shared and modeled enthusiasm with students. In the prebrief the facilitator asked students, “what are you most excited about?” and when they returned to the debrief noted, “there are more smiles when you start,” which resulted in giggles and nods from the group. Many of the supervisors were volunteering their time to be there. One supervisor, who just participated on the second day, said she, “couldn’t wait to join the fun.”</td>
</tr>
<tr>
<td>Patients’ stories become part of our own</td>
<td>As soon as students entered the debrief room, but before the debrief formally started, they began sharing patient stories and their positioning in those stories with each other. During the debrief the facilitator asked students to share their stories. In each session, this seemed to generate a significant amount of discussion that had to finally be closed with effort from the facilitator. Stories ranged from purely clinical, to reflective, to emotive.</td>
</tr>
<tr>
<td>Emergency physicians feel that they are different than their colleagues</td>
<td>An ED resident was on the phone pretending to be the consulting cardiologist. After she hung up the phone she turned and joked with another ED resident that she “wasn’t good at being mean, I should have been harsher.” This implied that she felt that in order to accurately portray her inpatient colleague she had to change her persona. I overheard the conversation and following interactions between the consultant surgeon (played by an ED resident) and medical students for a patient who had a perforated ulcer. Initially, I was sitting with the surgeon. I heard her being quite short with the students and asking for many investigations to be done before reluctantly agreeing to see the patient. “after I am done in the OR.” She got off the phone and said to me, “it’s a bit ridiculous, you know. I was consulted without any investigations or blood work for an ulcer. It could be anything. You know, I am in no hurry to help them. That’s exactly how the surgical resident would be in real life.” This brusque portrayal of a surgeon said a great deal about how emergency physicians view their colleagues and how they sometimes pride themselves in being in the trenches as opposed to on the consulting end of the phone.</td>
</tr>
<tr>
<td>Students aren’t quite “us” . . . but they could be</td>
<td>Students seemed to identify and respect a hierarchy. Students were much less likely to approach consultants than residents to review cases and noted that they got nervous before talking to the “big doctor.” The facilitator in the pathology room noted that, “the signs should have been placed on the floor because that’s where they [the students] all look when they’re here.” In their absence, facilitators sometimes joked about students. One student called the simulated switch board and talked to a facilitator pretending to be a urology nurse from the trial and void clinic. The student said that she had “inserted a catheter and evacuated the bladder.” After hanging up the facilitator burst out laughing and repeated the word “evacuate” to a room full of other physicians. They all seemed to find great pleasure in her choice of words. At times the facilitators would refer to the students and their actions as “cute” or “adorable” referencing their naivete. Despite the hierarchy and amusement with student behavior there was an obvious desire by facilitators to make the learning experience as positive a one as possible. This was evidenced in their actions with students throughout the day but also by the fact that they were volunteering time to be present to help with teaching in this capacity. In the debrief, students were asked how they felt being supervised by the senior doctors and nurses. Responses such as, “they were so nice” or “it’s nice to know that we’ll have support” were frequent. There were no negative experiences about the supervision shared during the debriefs.</td>
</tr>
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</table>

The practices throughout the exercise that allowed researchers to identify these beliefs and values are only representative examples from the data set.

BPH = benign prostatic hyperplasia; ECG = electrocardiogram; ESR = erythrocyte sedimentation rate;; STEMI = ST-elevation myocardial infarction; SVT = supraventricular tachycardia.
component beliefs were identified as important to emergency medicine culture but were unlikely to be transmitted to students in the exercise including “students aren’t quite us . . . but they could be” and “certain personality traits make one well suited to emergency medicine.”

There was agreement with the framework upon member checking with medical students, residents, and consultants who were involved with the exercise. There was no modification to the values or beliefs but a number of additional examples of practices were incorporated after consultation.

**DISCUSSION**

This ethnographic study identified seven values, 27 beliefs, and innumerable practices fundamental to the culture of emergency medicine. We observed how these components of culture were transmitted to undergraduate students through a simulation exercise.

**Identifying the Culture of Emergency Medicine Through Simulation**

The culture of emergency medicine is not well defined. In the limited studies that do exist, centrally held values are the desire to care for any patient, any time, and to provide high-quality care, as efficiently as possible.\(^{10,14-18}\) Other ethnographic studies have focused on specific patient populations or areas of tension.\(^{19-22}\) In the most overarching study of emergency medicine culture to date, four domains—cognitive, environmental, linguistic, and social—were found to be of particular importance when examining emergency medicine culture.\(^{10}\) We focused observations in these domains, during a moment of culture compression, to further illuminate the culture of emergency medicine. In doing so, we were able to create a set of values, beliefs, and practices that illustrate fundamental aspects of emergency medicine culture.

The values and beliefs that we present are in keeping with those previously identified but significantly add to the breadth and depth of understanding. Person et al.\(^{10}\) identified that within the cognitive domain, caring for critically ill patients was gratifying and that maximizing efficiency was also important. These are in keeping with our recognized values of “identifying and treating dangerous pathology is a key role of emergency physicians” and “emergency physicians must be expert at balancing needs and resources at the systems level.” Our work builds by further identifying additional component beliefs including the importance of a systemized approach and our understanding of this process in relation to specialist colleagues. Person et al.\(^{10}\) highlighted frustration and adaptation to the physical environment and to systems as a key component of ED culture by providing seven examples of environmental factors and adaptive practices. Our simulated environment did not face the same pressures as a functioning ED. Even so, we found that within the simulation, supervisors responded to pressures typical for their work, such as time and patient load, by actively managing “flow” even though these pressures were not actually present. They practiced all five work pressure strategies previously identified through ethnographic study.\(^{15}\)

In the linguistic domain, Person et al.\(^{10}\) focused on the importance of teamwork. We were able to expand on this area by highlighting linguistic structures that individuals use to uphold values—such as students presenting cases using a standardized format or the use of triage scores to help identify sick patients to “treat and identify dangerous pathology.” We further identified the centrality of strong communication as a key belief related to the value of “patients and families at the center of care.” Finally, in the social domain, Person et al. found that teamwork was vital, that there was skepticism around those new to the team, and that there were significant challenges at interdepartmental interfaces.\(^{10}\) These findings were replicated in our work with four of our component beliefs reflecting negative attitudes and underlying tensions around emergency physicians’ work with specialists. These likely represent microlevel value differences and conflicting organizational practices that have been found to be at the heart of professional conflict in emergency medicine.\(^{22}\) There is an overwhelming correlation between the culture of our simulated ED and that of more traditional ethnographic studies performed in situ. Interestingly, these similarities cross international borders, suggesting that there are likely some values and beliefs that are fundamental to the specialty at a global level.

**Sharing Cultural Knowledge: The Hidden Curriculum of Simulation**

We unequivocally found that simulation acts as a mode of cultural compression. In addition to the explicit learning objectives related to knowledge and skills, we observed that the transfer of values and beliefs and demonstration of key practices occurred with
considerable frequency in a short period of time. A reflection on cultural transmission in this activity may help simulation experts consider the cultural messages that are being shared in the exercises they develop. It also provides a potential space for further investigation and translation into practice.

Simulation exercises are designed by humans who have a specific outlook on the world. Their frame affects messages broadcasted. This simulated ED was coordinated by two emergency physicians, including author VB, who brought with them values and beliefs about their work and who are fully indoctrinated into ED culture. Certain structural components, related to the simulation design, facilitated the transmission of culture throughout the exercise. These included the wide-ranging case mix which signaled the belief that “emergency physicians care for any patient any time,” the heavy involvement of nursing staff in teaching and facilitation which signaled the value that “a team approach is necessary to providing high-quality emergency care,” and a consistent focus on lifelong learning in the prebrief and debrief, which signaled the value “education is integral to emergency medicine.”

The decision to have emergency medicine personnel impersonate specialist and allied health colleagues was a practical one, but that choice came with the consequence of potentiating negative hidden curriculum messages through the caricatures created by individuals who were afforded the creative liberty to play the role in the way they saw fit. In doing so, this delivery decision accentuated the transfer of emergency medicine specific beliefs related to strained relationships with specialist colleagues. It highlighted how we position ourselves and perceive our colleagues within the narrative of our work. It made obvious that “emergency medicine as a component of self-identity.”

The debrief is an opportunity for the transmission of explicit cultural teachings but we also found that it is key moment to gauge what values, beliefs, and practices were actually interpreted by those participating. For example, in the debrief, students reflected on specific actions and phrases they learned from their supervisors in communicating with the patient with delirium or tips they were given when trying to manage multiple patients. To those attuned to the process of cultural transmission these comments signaled that students had been exposed to and incorporated specific values, beliefs, and practices.

Overall, we show that the design and debrief of simulated activities is consequential for educators—in terms of cultural messaging. For researchers, it adds to the growing evidence that simulation may be used as a tool to further explore culture and attitudes.

**Next Steps: From Transmission Toward Understanding**

In situ and translational simulation have been proposed as tools for cultural change but with limited evidence of impact to date. This study adds weight to the exciting potential to facilitate cultural understanding within and between groups using simulation as we provide compelling evidence that the transmission of values and beliefs does, in fact, occur in the simulated environment. In this particular exercise, transmission took place most often through case discussions and through role modeling but was also evident in direct feedback and collective explorations in the debrief. Most transmission was unilateral—meaning that supervisors transmitted cultural understanding to medical students. When there is such an extreme hierarchy, cultural transmission is likely to be one-sided. However, we predict that when more even-footed colleagues engage, the cultural exchange is likely to look different and that it has the potential to be multidirectional. Conceivably, in some situations, we will be able to move away from transmission and toward understanding. Through further evaluation in a variety of settings, both educational and workplace, we may be able to reframe the potential for multidisciplinary and interdisciplinary simulation from one that simply tests systems, processes, communication, and teamwork, to one that also allows appreciation and reconciliations of differences in fundamental values, beliefs, and practices. Future research might build on simulation as a potential tool to address commonly observed, but poorly understood culturally rooted conflicts that arise in the interdependent and complex reality that is contemporary health care.

**LIMITATIONS**

There are a number of limitations to our work, the most significant being potential issues with generalizability. The study took place in Australia in the context of supervisors who work in a large, tertiary care, ED, with a significant focus on education. Both medical students and supervisors engage in simulation frequently as part of their own educational programming.
and as facilitators. Furthermore, the supervisors involved in the exercise were mostly volunteers, which may create a degree of selection bias and opens to the possibility of a unique set of values and beliefs among this specific cohort. All of these factors may affect the cultural milieu identified and manner in which that culture was transmitted to medical students.

The study was conducted with preclinical medical students as the simulated ED is a cornerstone exercise in their transition to clerkship, but the findings could be different if conducted at alternate levels of training or clinical experience. We capitalized on the opportunity to study emergency medicine at a moment of cultural compression, and when those who already belong were indoctrinating those outside of the group. At such moments, values and beliefs can be particularly evident because the unspoken may be spoken and invisible may be illuminated. This facilitated a more in-depth exploration of often hidden phenomena. While advantageous, the risk is that individuals involved in the focal enculturation process may behave differently than they would in day-to-day interactions in their usual workplace. We assessed that the benefits of capitalizing on this large-scale simulation exercise as a moment of cultural compression outweighed the risks of misrepresentation. Strong correlation with previous in situ findings and member checks of our value and beliefs set with the broader community are in keeping with that likelihood.

Finally, those involved in data collection and analysis, except for MC who is a medical student, come from a background of emergency medicine. Insider positioning has benefits including rapid identification of common emergency medicine practices and broad understanding of what was actually taking place in the exercise. However, there were also risks to our proximity including preconceived notions about emergency physicians and the possession of a preexisting beliefs set. An awareness of our positioning in this work likely guarded against, but is unlikely to have fully compensated for, the tendency to view our colleagues and our own culture in a positive light. In our future work, and as a suggestion to others considering similar research endeavors, we will seek to include a medical outsider, nonphysician anthropologist, or colleague from another department on the research team to broaden our perspective.

Overall, this work may assist individuals and departments identify areas for focused improvement such as understanding interdepartmental interfaces and conflict. It may also be of interest to individuals considering a career in emergency medicine as they reconcile their own values and beliefs with the various specialties they are considering joining. Since culture is local, the set of values, beliefs, and practices that we present may or may not resonate. It is unlikely to be entirely comprehensive given the limitations of the simulation environment and importance of external factors that we could not recreate in affecting the way that individuals and groups behave. We encourage readers to use our findings as a launch point to explore their local emergency medicine culture. We hope that it serves as an opportunity for our profession to reflect on what we hold to be important and how our values, beliefs, and practices affect the way that we do our work and educate the next generation.

CONCLUSION

This study of a large simulated ED exercise contributes to the characterization of the culture of emergency medicine by identifying seven core values and 27 beliefs that are foundational to the specialty. The simulation facilitated cultural compression, which allowed for ready identification of values, beliefs and practices and also facilitated rapid transmission of culture to learners. This study expands understanding of the culture of emergency medicine and the role of simulation in the process of cultural exchange. It has implications for educators, researchers, and clinical leaders seeking to understand and shape culture in health care environment.

We are grateful to the Bond University medical students Carla Pecoraro, Charlotte Steinberg, Katherine Clingeleffer-Woodford, and Maclain Robinson for providing valuable insights throughout our research process.

References

Attitudes, Behavior, and Comfort of Emergency Medicine Residents in Caring for LGBT Patients: What Do We Know?

Joel Moll, MD, Paul Krieger, MD, Sheryl L. Heron, MD, MPH, Cara Joyce, PhD, and Lisa Moreno-Walton, MD

ABSTRACT

Background: Although lesbian, gay, bisexual, and transgender (LGBT) patients are ubiquitous in emergency medicine (EM), little education is provided to EM physicians on LGBT health care needs and disparities. There is also limited information on EM physician behavior, comfort, and attitudes toward LGBT patients. The objective of this study was to assess EM residents behavior, comfort, and attitudes in LGBT health.

Methods: An anonymous survey link was sent to EM programs via the Council of Residency Director listserv. The primary outcome of the 24-item descriptive survey was the self-reported comfort levels and self-reported practice in LGBT health care. Secondary outcomes included individual comfort toward LGBT colleagues and patients who are LGBT, and the frequency of colleagues making discriminatory statements toward LGBT patients and staff in the emergency department setting. Associations between personal and program demographics and survey responses were also examined.

Results: There were 319 responses. The majority of respondents were male (63.4%), Caucasian (69.1%), and heterosexual (92.4%). A sizeable minority of respondents felt histories and physical examinations were more challenging for lesbian, gay, or bisexual patients (24.6%) and more so for transgender patients (42.6%). Most residents do not ask patients to identify sexual orientation when presenting with abdominal or genital complaints (63%). Discriminatory LGBT comments were reported from both fellow residents (16.6%) and faculty (10%). A total of 2.5% of respondents were uncomfortable with other LGBT physicians, and 6% did not agree that LGBT patients deserve the same quality care as others.

Conclusion: A number of residents find caring for LGBT patients more challenging than heterosexual patients. Even with professed comfort with LGBT health care, most residents report taking incomplete sexual histories that may affect patient care. Attitudes toward LGBT patients are mainly, but not completely, positive in this cohort.

It has been estimated that at least 3.5% of Americans, or 9 million people, identify as lesbian, gay, or bisexual, although identity does not always indicate sexual behavior, as 19 million Americans (8.2%) have engaged in same-sex sexual behavior. Another 0.6%, or 1.4 million people, identify as transgender. It has been well documented that significant barriers exist to providing quality and equitable care to the lesbian, gay, bisexual, and transgender (LGBT) population. Although limited, research demonstrates significant
health care disparities exist for LGBT persons with a major contributor to those disparities being a lack of provider knowledge and competency.3–7 Such disparities are known to include elevated risk of depression and suicide, increased rates of substance abuse, increased risk for some cancers, and decreased access to health care.8

Educators have been slow to respond by providing adequate education on LGBT health. In 2011, medical schools indicated that the median time dedicated to LGBT health education in undergraduate medical education was only 5 hours, and one-third of schools provided no education in during the clinical years.9 Surveys of medical students show significant gaps in LGBT health knowledge.10,11 The Association of American Medical Colleges (AAMC) first issued guidance for a curriculum in LGBT health in 2014.12 Medical schools are now beginning to implement such education.13

No formal guidance has been provided to residency programs, and currently LGBT health education is not included in the model of emergency medicine practice.14 A 2014 survey showed only 26% of EM residency programs had formal education on LGBT health, although most programs directors felt education on this topic is needed.15 Physicians are even less likely to get education on LGBT health and health care after residency. In one survey only 16% of academic practices in the United States provided training on LGBT health.16 Recent inquiry into transgender patient experience in the emergency department reported that most providers care for transgender patients but lacked basic knowledge about caring for this population.7 In another study, transgender patients avoided needed care 43.8% of the time due to such factors as provider competency and fear of discrimination.6 Little research exists on resident competency, comfort level, and attitudes when caring for LGBT patients and to our knowledge, none in emergency medicine. In this study, we sought to examine emergency medicine residents’ self-reported behaviors, attitudes, and comfort level when caring for LGBT patients.

METHODS

Study Design and Population

This study utilized an anonymous link created in Survey Monkey. The link was sent to ACGME-accredited residency programs via the Council of Residency Directors (CORD) listserv. Members of the list serve were requested to distribute the survey to their residents. Two reminders were sent the following 2 weeks via the listserv. At the time of this study, there were 167 ACGME-accredited programs in EM when the survey was distributed,17 with typically all EM programs represented on the CORD listserv. It was not possible to determine individual program director compliance with our request, and there were no incentives offered. The study was approved by the institutional review board at Louisiana State University.

Survey Content and Administration

A 24-question survey was developed based on two published surveys that collected similar information from medical students.13,18 The survey was field tested prior to general distribution at four emergency medicine residency programs (Emory University, Louisiana State University, Mount Sinai Beth Israel, and the University of Michigan) with 151 responses (response rate 71%). Respondents included those who self-identified as LGBT. The content of the survey was not changed after field testing. Respondents were provided the e-mail address of the primary author for feedback, concerns, or questions regarding survey items or study design; however, no queries were received. The complete survey is 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/aet2.10318/full).

Outcomes

Our primary outcomes were the level of comfort residents felt when caring for the needs of LGBT patients and self-reported practice on history and examinations. Secondary outcomes included frequency of discriminatory comments observed from peers and attending physicians, comfort working alongside LGBT physicians, and agreement with the statement that LGBT patients deserve the same level of care as other patients.

Data Analysis

Respondent characteristics and responses to survey questions were presented as counts and percentages.

RESULTS

A total of 319 residents responded to the survey during December 2014. Respondent mean (±SD) age
was 30 (±3) years, 63.4% (n = 201) were male, 69.1% (n = 219) were Caucasian, and 90.5% (n = 286) identified as heterosexual (Table 1).

Respondents were neutral to very uncomfortable in addressing the needs of LGBT patients 36.5% of the time (n = 116; Table 2). A minority felt it more challenging to discuss sexual behavior (9.1%, n = 29); gather history (8.8%, n = 28); conduct a physical examination (2.5%, n = 8); or conduct a genitourinary examination (3.1%, n = 10) on lesbian, gay, or bisexual patients (Table 3). More felt it challenging to discuss sexual behavior (24%, n = 76), gather history (24.7%, n = 78), conduct a physical examination (18.5%, n = 59), or conduct a genitourinary examination (31.6%, n = 100) on transgender patients (Table 3).

A minority (39.9%, n = 97) of respondents always or often ask patients if they have sex with men, women, or both when taking sexual history, and only 17.6% (n = 56) ask patients always or often to identify their sexual orientation when evaluating a patient with an abdominal or genitourinary complaint (Table 4). Residents self-report they never ask about sexual orientation 25.7% (n = 82) and another 37.3% rarely do so (n = 119).

Although most were comfortable working alongside LGBT physicians, 2.5% (n = 8) were not, and 1.3% were neutral (n = 4), 3.8% disagreed (n = 12), and 0.9% strongly disagreed (n = 3) that LGBT patients deserve the same care as other patients (Table 2). Residents observed other residents making discriminatory or inappropriate comments about LGBT patients or staff doing so more than rarely 10% of the time (n = 32).

### DISCUSSION

Our sample demographics indicate that respondents were reflective of known EM resident demographics. Specifically, female residents comprised 36.6% of respondents, compared to 35.6% nationally.19 By race, 69.1% identified as white (57.8% nationally), and
5.0% identified as African American (4.6% nationally). Sexual orientation data are not collected by the ACGME, but according to AAMC data in 2017, 92.2% of medical students identified as heterosexual, and 7.8% identified as LGBT. Our population was similar, 90.5% heterosexual and 9.5% LGBT.

The majority of respondents indicated that they were comfortable caring for LGBT patients; however, over one-third (36.5%) felt neutral to very uncomfortable addressing the needs of LGBT patients, indicating a large self-reported knowledge gap. Similarly, most felt it was not more challenging performing history and physical examinations on LGBT patients. It is interesting to note that despite professed level of comfort, residents fare poorly overall in performing basic tasks of taking sexual history by their own report. A survey of United States and Canadian allopathic medical schools found that 97% of schools taught students to ask if patients have sex with men, women, or both, but in this study only 39.9% asked that question always or often when taking a sexual history. When the chief complaint involves abdominal or genital region, only 17.8% of residents obtain sexual orientation always or often. This information may be essential in adequately diagnosing and treatment complaints related to the abdominal or genital region. Therefore, we suggest that self-reported levels of comfort with their ability to care for the needs of LGBT patients may be an overestimate of residents’ actual knowledge and competency in LGBT health. This is similar to a study that found two-thirds of active duty military physicians were comfortable discussing sexual health, but only 5% asked about same-sex sexual behavior. Both majority assumptions of heterosexual

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<tr>
<th>Table 3</th>
<th>Opinions on Challenges to Treating LGBT Patients</th>
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<tr>
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<td>No. Responded</td>
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<tr>
<td>More challenging for lesbian, gay, or bisexual patients than other patients to</td>
<td></td>
</tr>
<tr>
<td>Discuss sexual behavior</td>
<td>317</td>
</tr>
<tr>
<td>Gather an oral history</td>
<td>318</td>
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<tr>
<td>Conduct a physical examination</td>
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</tr>
<tr>
<td>Conduct a genitourinary examination</td>
<td>317</td>
</tr>
<tr>
<td>More challenging for transgender patients than other patients to</td>
<td></td>
</tr>
<tr>
<td>Discuss sexual behavior</td>
<td>317</td>
</tr>
<tr>
<td>Gather an oral history</td>
<td>316</td>
</tr>
<tr>
<td>Conduct a physical examination</td>
<td>319</td>
</tr>
<tr>
<td>Conduct a genitourinary examination</td>
<td>317</td>
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Data are reported as n (%).
LGBT = lesbian, gay, bisexual, and transgender.

<table>
<thead>
<tr>
<th>Table 4</th>
<th>Resident Respondent Practices and Observations</th>
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<tbody>
<tr>
<td></td>
<td>No. responded</td>
</tr>
<tr>
<td>Asks patients if they have sex with men, women, or both when taking sexual history</td>
<td>318</td>
</tr>
<tr>
<td>Always</td>
<td>55 (17.3)</td>
</tr>
<tr>
<td>Often</td>
<td>72 (22.6)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>101 (31.8)</td>
</tr>
<tr>
<td>Rarely</td>
<td>73 (23.0)</td>
</tr>
<tr>
<td>Never</td>
<td>17 (5.3)</td>
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<tr>
<td>Asks patients to identify their sexual orientation when evaluating a patient for an abdominal or genital complaint</td>
<td>319</td>
</tr>
<tr>
<td>Always</td>
<td>15 (4.7)</td>
</tr>
<tr>
<td>Often</td>
<td>41 (12.9)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>62 (19.4)</td>
</tr>
<tr>
<td>Rarely</td>
<td>119 (37.3)</td>
</tr>
<tr>
<td>Never</td>
<td>82 (25.7)</td>
</tr>
<tr>
<td>Has observed residents make discriminatory or inappropriate comments about LGBT patients or staff</td>
<td>317</td>
</tr>
<tr>
<td>Always</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Often</td>
<td>3 (0.9)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>48 (15.1)</td>
</tr>
<tr>
<td>Rarely</td>
<td>106 (33.4)</td>
</tr>
<tr>
<td>Never</td>
<td>158 (49.8)</td>
</tr>
<tr>
<td>Has observed attending physicians make discriminatory or inappropriate comments about LGBT patients or staff</td>
<td>318</td>
</tr>
<tr>
<td>Always</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Often</td>
<td>3 (0.9)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>27 (8.5)</td>
</tr>
<tr>
<td>Rarely</td>
<td>91 (28.6)</td>
</tr>
<tr>
<td>Never</td>
<td>195 (61.3)</td>
</tr>
</tbody>
</table>

LGBT = lesbian, gay, bisexual, and transgender.
sexual activity and discomfort discussing same-sex sexual activity can affect the delivery of competent health care. There is also a significant portion of residents who have less comfort with caring for LGBT patients, which may among other factors reflect the minimal education described at both the undergraduate and the graduate medical education levels. Recent studies that focus on transgender health competency by physicians and the experiences of transgender patients based on provider competency and discrimination also showed the need for education of providers. However, most importantly they demonstrate a high level of discomfort among patients due to these factors that creates a barrier to their health care.6,7

A minority of residents were neutral to strongly disagreed that LGBT patients deserve the same care as all patients (69%), with 2.6% neutral to very uncomfortable working alongside LGBT physicians. Similarly, residents sometimes or more frequently observed discriminatory LGBT statements from faculty (10%) or peers (16.6%). However, a 2011 survey of LGBT physicians reported much higher rates of discriminatory comments and behaviors. Among the LGBT physicians in that study, 15% had been harassed by a colleague, 65% had heard derogatory comments about LGBT individuals, 34% had witnessed discriminatory care of an LGBT patient, and 27% had witnessed discriminatory treatment of an LGBT coworker.22 In our study of predominately heterosexual residents, discriminatory attitudes and observations were much less frequently reported. Our study was not powered to compare experiences of LGBT and heterosexual physicians or reliably analyze the experiences of LGBT respondents. It is impossible to calculate or estimate the potential harm even a small minority of unaccepting physicians may inflict inadvertently or purposefully on this vulnerable population, especially when emergency medicine is the safety net for those without other resources. Past interventions and education initiatives have been shown to increase provider knowledge and acceptance of LGBT patients at least in the short term;23–25 however, they are largely absent in emergency medicine. The 2014 survey that found limited education of residents on LGBT health reported lack of content experts (23%) as one barrier.15 Specialty-specific guidelines and available education resources that do not require content experts to administer using multiple formats would be a logical and valuable future area of development. This is clearly an area that warrants more study and intervention in medical education and training.

**LIMITATIONS**

Data were self-reported and thus subject to response bias. Because it was an anonymous survey, we had no mechanism to eliminate duplicate responses or calculate a true response rate. Recognizing the sensitivity of the survey and respecting the privacy of some respondents, no attempt to identify individual program responses by IP address or other methods was done. The survey was sent to EM programs via a program director listserv, which we relied upon for distribution to EM residents. The number of responses may be reflective of poor cooperation with the distribution request, other bias regarding willingness to respond to the subject matter, or survey fatigue due to multiple survey requests on the CORD listserv. It is possible that the survey may have been more likely to be completed by respondents with strong feelings about LGBT health, both positive and negative. It is also possible that social desirability bias affected responses, underestimating the number who feel that LGBT patients do not deserve the same care as others or underreporting discomfort with LGBT patients or colleagues.

Our sample may have been skewed toward programs in larger population centers (62.6% in areas >1 million). This compares to 45% of programs who identified as located in metropolitan areas >1 million in a survey of program directors done a year earlier.15 That survey had an excellent response rate (78%) and is likely closer to an accurate percentage of programs located where the population is >1 million. We cannot determine whether those in less urban programs would be more or less comfortable with LGBT health than our results reflect, although our bias may lead us to question whether programs in less urban areas might have less interaction with LGBT patients. If so, it would indicate that the comfort in this study expressed by residents in LGBT health may be an over estimate of the EM resident comfort with LGBT health care.

Finally, there are unique challenges to performing research on LGBT populations and subject matter. Because the majority of states do not have employment nondiscrimination laws protecting LGBT employees, respondents may have under reported or felt uncomfortable reporting their sexual identity even in this anonymous survey.

**CONCLUSION**

Despite minimal LGBT health content in undergraduate and graduate medical education, most emergency
medicine residents report some comfort in their ability to care for LGBT patients. However, self-reported practices in this survey raise questions about their overall competence, and not adhering to best practices in this population could negatively impact patient care. The vast majority of residents, but not all, support equitable care of LGBT patients and working with LGBT physicians. These findings reflect a need to educate future emergency physicians to provide quality care to this vulnerable population who have unique needs and known health disparities. This can be achieved by developing and testing unique and deliberate educational materials to increase emergency medicine physicians’ ability to provide equitable and quality care for this underserved population.

References


21. Rerucha CM, Runser LA, Ee JS, Hersey EG. Military healthcare providers’ knowledge and comfort regarding the medical care of active duty lesbian, gay, and bisexual patients. LGBT Health 2018;5:86–90.


Supporting Information

The following supporting information is available in the online version of this paper available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10318/full

Data Supplement S1. LGBT Resident Survey (electronic survey via SurveyMonkey).
Coming in Warm: Qualitative Study and Concept Map to Cultivate Patient-centered Empathy in Emergency Care

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ABSTRACT

Background: Increased empathy may improve patient perceptions and outcomes. No training tool has been derived to teach empathy to emergency care providers. Accordingly, we engaged patients to assist in creating a concept map to teach empathy to emergency care providers.

Methods: We recruited patients, patient caretakers and patient advocates with emergency department experience to participate in three separate focus groups (n = 18 participants). Facilitators guided discussion about behaviors that physicians should demonstrate to rapidly create trust; enhance patient perception that the physician understood the patient’s point of view, needs, concerns, and fears; and optimize patient/caregiver understanding of their experience. Verbatim transcripts from the three focus groups were read by the authors, and by consensus, five major themes with 10 minor themes were identified. After creating a codebook with thematic definitions, one author reviewed all transcripts to a library of verbatim excerpts coded by theme. To test for inter-rater reliability, two other authors similarly coded a random sample of 40% of the transcripts. Authors independently chose excerpts that represented consensus and strong emotional responses from participants.

Results: Approximately 90% of opinions and preferences fell within 15 themes, with five central themes: provider transparency, acknowledgment of patient’s emotions, provider disposition, trust in physician, and listening. Participants also highlighted the need for authenticity, context, and individuality to enhance empathic communication. For empathy map content, patients offered example behaviors that promote perceptions of physician warmth, respect, physical touch, knowledge of medical history, explanation of tests, transparency, and treating patients as partners. The resulting concept map was named the “Empathy Circle.”

Conclusions: Focus group participants emphasized themes and tangible behaviors to improve empathy in emergency care. These were incorporated into the Empathy Circle, a novel concept map that can serve as the framework to teach empathy to emergency care providers.

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Author contributions: KEP—study concept and design, acquisition of data, analysis and interpretation of data, and drafting of the manuscript; NAR—acquisition of data, analysis and interpretation of data, and critical revision of the manuscript for important intellectual content; HW—acquisition of data and critical revision of the manuscript for important intellectual content; SS—acquisition of data, analysis and interpretation of data, and drafting of the manuscript; DMC—acquisition of data, analysis and interpretation of data, and critical revision of the manuscript for important intellectual content; AMM—critical revision of the manuscript for important intellectual content; and JAK—study concept and design, acquisition of data, analysis and interpretation of data, drafting of the manuscript, critical revision of the manuscript for important intellectual content, and acquisition of funding.

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Empathy can be defined as the ability to understand and share the feelings of another.¹ For physicians, empathizing with their patients includes understanding the patient’s perspectives, concerns, feelings, and experiences. Empathy also requires physicians to communicate this understanding to their patients, initiating a sense of reciprocity, a key aspect of reassurance.² Empathy creates a foundation for a successful physician–patient relationship and enhances several aspects of patient care. In settings of recurrent and continuous care (e.g., primary care setting), improved empathy predicts better patient comprehension, more trust in the physicians, higher satisfaction with care, improved adherence, lower anxiety, and better clinical outcomes in chronic disease management.³–⁶ Strategies to enhance physician empathy might reduce patient thoughts of suing a physician in the event of an adverse outcome.⁷ To improve provider empathy, several tools and courses have been created and tested in the primary care setting.³,⁸ However, current literature reveals no specific method or tool that has been derived to enhance empathy in the emergency care setting. The emergency care setting and associated patient experiences imposes a different set of challenges than other health care setting. These include the nature of the single encounter between strangers, reduced information and time availability of providers, patient exposure to long wait times, isolation, overcrowding and lack of privacy,⁹ and multiple patient factors, including unpredictable disease acuity, high psychosocial stress, and anxiety.⁹,¹⁰

To ensure that the content of our concept map and ultimately empathy training contains the patient perspective, we convened three focus groups as a forum for advocates, patients, and caretakers to discuss different aspects of their experiences in the emergency department (ED). The patient perspective is important as we only have insight to the provider perspective of the relationship. We planned in advance for the facilitators to direct the dialogue toward a better understanding of specific verbal and nonverbal clinician behaviors that would improve perceptions of empathy in the patient–provider relationship.¹⁰,¹¹ Our objective was to use patient input from our focus groups to allow the construction of an empathy concept map to enhance empathic communication in the ED.

**METHODS**

**Theoretical Construct of the Work**

From a learning perspective, the authors assume that the method to create empathy contains unknown domains to learners (a “black box”) that must be broken into understandable actions, words, and behaviors (i.e., a knowledge structure).¹² Thus, we undertook a cognitivist approach, meaning that a framework in the form of a visual concept map would facilitate acquisition and recall of the behaviors that enhance empathy.¹³ This approach draws from the findings of a prior multicenter investigation of the thoughts and opinions of patients undergoing low-value computerized tomographic imaging in the ED.¹¹ In that sample, we directed patients in the ED to provide a Likert scale ranking of 11 specific phrases and to provide their own examples of words to enhance empathy, trust, and positive feelings toward their physician. The present work takes the next step to interview patients, caretakers, and advocates and allow a more personalized and detailed discussion to generate a concept map to teach empathy to emergency care providers. We hypothesized that patient-provided information would enable effective categorization and description of semantics and behaviors in a domain map as the center point to effectively teach empathy.

**Participants**

We conducted three focus groups between February 2017 and April 2018 with a goal of 18 participants, a sample size that has been found to produce 90% thematic saturation in comparable studies.¹⁴ Each group comprised six participants with experience as a patient or family member in the ED. The first focus group took place in Indianapolis, IN, with participants from California (n = 4, all African American), Pennsylvania (n = 1, white), and Texas (n = 1, White). In addition to all being patients themselves, these six were also recognized patient advocates, each associated with one or more patient advocacy organizations. The second focus group was conducted in Dallas, TX, with participants from that area, including four of Hispanic ethnicity. The third group was again conducted in Indianapolis, IN, with participants from that area, including four African American and two white participants. These locations were chosen for convenience with the primary intent to include a diverse group of patients. Participants from focus group 1 were all patient partners in the Society for Academic Emergency Medicine’s 2016 Consensus Conference on shared decision making. Participants in focus groups 2 and 3 were recruited by research coordinators through direct solicitation in the ED. The coordinators identified participants who had more than five lifetime visits
to the ED. The patients were asked if they were willing to participate in a focus group. Those that were willing received a follow-up phone call to schedule the focus group. Tables 1 and 2 show the relevant demographic and medical characteristics of the focus group members. Specific ages of our participants were not collected, but authors estimate an age range of 30 to 65 years among participants.

**Procedures**

The study was deemed exempted by the Indiana University Institutional Review Board. Each focus group was led by a different nonphysician facilitator with experience in focus group facilitation and guided by established techniques. The facilitators were made aware of our study hypothesis but were allowed the flexibility to navigate the focus group without physician interference. Focus groups lasted between 4 and 6 hours and were video and audio recorded. At the onset, participants were informed of the purpose of the study. The focus groups used a semistructured protocol that started by asking participants to share their previous experiences in the ED. The facilitator subsequently asked more directed questions to encourage the participants to reflect on important aspects of a desirable physician–patient relationship. One recurrent role of the facilitator was frequent redirection of participants toward explanation of and elaboration on positive verbal and nonverbal behaviors displayed by providers. These questions varied slightly for each focus group based on the flow of the conversation. Each focus group was also attended by at least three authors, who each created independent real-time field notes about the content of discussions with specific annotation about which discussions elicited the highest emotional reactions, and noncodable indications of nonverbal agreement from other participants (e.g., uniform head nodding, “uh huh” or “that’s right” from other members). The authors introduced themselves to the patients at the beginning of the focus group but served in an observer role unless a patient asked a direct question to them, which happened rarely. This was done so that the authors had limited influence on the conversation. Upon completion, participants were compensated with a $100 gift certificate for their time, possible lost wages, and any travel and/or parking costs.

**Data Analysis**

We used a focused coding approach to determine the themes expressed by participants and develop a concept map, which became the framework for both our teaching tool and empathy training course. The focus group sessions were transcribed verbatim and

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Table 1  
**Demographic Characteristics of Focus Group Participants**

<table>
<thead>
<tr>
<th>Focus Group Participants (n = 18)</th>
<th>Sex</th>
<th>Race</th>
<th>Ethnicity</th>
<th>Place of residence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>female</td>
<td>White</td>
<td>Non-white</td>
</tr>
<tr>
<td>Total number</td>
<td>4</td>
<td>14</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Percentage</td>
<td>22</td>
<td>78</td>
<td>56</td>
<td>44</td>
</tr>
</tbody>
</table>

Table 2  
**Medical Conditions Represented by Focus Group Participants by Report**

- **Focus group 1**
  - **BF**—History of connective tissue disease and possibly multiple sclerosis
  - **BF**—History of hypertension, diabetes, chronic anxiety; experienced patient advocate for care of urban patients with health care disparities
  - **BF**—Prior history of chronic migraine headaches, law student and participant in patient advocacy groups
  - **BF**—Chronic anemia, multiple ED visits and hospitalizations for postsurgical (hysterectomy) complications
  - **WM**—Stable heart disease of chronic medical condition, patient advocate representing a cardiovascular group
  - **WF**—Caretaker of a severely brain injured child

- **Focus group 2**
  - **FM**—Heart failure, chronic musculoskeletal pain
  - **LF**—Prior history of cholelithiasis requiring cholecystectomy, hypertension, diabetes
  - **LF**—Caretaker of child with chromosomal abnormality causing multiple organ dysfunction
  - **LF**—Multiple chronic medical conditions requiring frequent ED visits
  - **WF**—Schoolteacher with stable and minor medical problems
  - **BF**—Chronic recurring chest pain ultimately diagnosed as hypertrophic asymmetric cardiomyopathy

- **Focus group 3**
  - **BF**—Chronic recurring chest pain ultimately diagnosed as hypertrophic asymmetric cardiomyopathy
  - **BF**—Caregiver for family member with pancreatic cancer
  - **BM**—Elderly, wheelchair bound, heart failure
  - **WF**—Chronic recurring skin infections requiring frequent ED visits
  - **WF**—Chronic lung disease and heart failure requiring defibrillator

BF = black female; BM = black male; LF = Latino female; WF = white female; WM = white male.
independently reviewed by three investigators to iden-
tify major themes and subthemes for creation of a
codebook (see Data Supplement S1, available as sup-
porting information in the online version of this paper, which is available at http://onlinelibrary.wiley.c
om/doi/10.1002/aet2.10328/full). The authors then
used the codebook to code passages from the tran-
scripts for the focus groups. Authors also used this
opportunity to connect the on-site emotional strength
of each passage as documented in their real-time field
notes. Randomly selected portions of the transcripts
were coded by two authors to verify agreement. Verba-
tim phrases were tabulated under each theme and sub-
theme. Patient race strongly affects trust in medical
systems, which may in turn affect perception of provi-
der empathy; therefore, we included race of the
speaker with excerpted phrases from focus group par-
ticipants.

Initial thematic analysis of the qualitative data was
conducted utilizing the constant comparative
method. Researchers applied codes representing
the sentiment of each paragraph or data cluster and/
or developed codes identifying patterns within the data
themes. The authors also reviewed field notes
individually and then together to generate consensus
interpretations of strong and consistent observations.

Consolidation of Themes Into a Concept
Map
After the initial focus group, authors used field notes,
the preliminary codebook, and coding of the transcript
to develop an initial concept map. Near the end of
the following two focus groups, participants were
shown a preliminary, unpublished draft of the concept
map and asked to provide opinions, either verbally or
by writing on paper copies. Participants were encour-
aged to provide opinions on words, actions, and con-
tent of the figure including its overall appearance and
visual organization.

RESULTS
Transcript coding and thematic analysis revealed five
major themes (provider transparency, patient’s emo-
tional state, provider disposition, trust in physician,
and listening to patient) and 10 minor themes
(Table 3). Each of these themes are described below
and ordered by frequency.

Although we considered the frequency and duration
of topic discussion as highly important, we used other
factors observed in real time to make inclusions for
Table 3. For example, our last major theme was not
one of the most frequently discussed themes; however,
the authors agreed that when it was discussed among
the group it was very impactful and felt that it needed
to be a major theme.

Provider Transparency
Transparency, defined as an open explanation of each
step by the emergency physician, was the most com-
mon theme, present in 15% of coded phrases. partici-
ants expressed the desire to hear physicians explain
their thought processes behind testing, or not testing,
and the plan of care for the visit. In addition, patients
stated the desire for education to better understand
their disease process or situation.

Participants stated strongly the desire for physicians
to communicate with them as if they were a family
member by using easily understandable language
rather than medical jargon. as one black male partici-
pant explained, “just talk to us cause we just like fam-
ily. That’s what they let me know, you know. And I
appreciate that cause it made me kind of like commu-
nicate better with them.”

Participants felt that having a physician who walked
them through his/her thought process was helpful.
Individuals shared that it was important to have the
ability to align understanding as exemplified by the fol-
lowing passage from a white female participant:

I think if he shares what he’s thinking, that puts
us more in tune so he can treat me better.
Because if he’s over here and I’m over here and
we’re never connecting, then how is he ever
going to find out exactly what’s going on with
... he knows ... with the symptom, where he
can understand the symptoms and he can under-
stand my level of pain or whatever I’m going
through at that moment. We have to be on the
same page, basically.

Patients consistently expressed a clear desire to be
involved in deciding testing or treatment options. This
desire for shared governance is illustrated by the fol-
lowing excerpt from a white female participant:

I think they should sit down and give you all the
options, cause ... I mean, you don’t have to ... there’s several things that would run through
their mind that they could do to test for this,
and to sit down instead of just throwing you through the ringer of everything—to be like this is what your options are.

Participants expressed dissatisfaction when the provider was not transparent and when they felt like they were alienated until they were able to see the information in writing on the discharge paperwork.

When you get the discharge paperwork is when you finally see everything what they’ve done and what the results were. So I guess while you’re in the ER, while all this is going on, something where I can see and go back to it and understand what’s happening, why is this happening, and what is gonna come from it. Cause you really don’t see that until you get discharged. (Black male)

Patient’s Emotional State

Participants believed that empathy could not be achieved unless physicians had concern for their patients’ emotional state. The most common emotions experienced and discussed repeatedly were fear and anxiety, present in approximately 10% of coded phrases. According to field notes taken by providers present during the focus groups, this was one of the more powerful messages. One black female participant stated, “We wait until we are almost dead to go to the emergency room.”

Participants recognized that the provider’s perception is often that the patient is healthy, but that perception discounts the fear that patients have at the time of their visit. As an example, one black female participant explains her fear during one of her visits when she took her blood pressure at home and it was elevated:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Coded Theme</th>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TRA*</td>
<td>Transparency</td>
<td>The extent to which the physician describes each step of the interaction/visit or helps a patient understand their disease process or situation</td>
</tr>
<tr>
<td>2</td>
<td>DIS*</td>
<td>Disposition</td>
<td>How the physician presents him or herself</td>
</tr>
<tr>
<td>3</td>
<td>TRU*</td>
<td>Trust</td>
<td>Refers to patients having or developing trust in their physician</td>
</tr>
<tr>
<td>4</td>
<td>EMO*</td>
<td>Emotion: fear/anxiety</td>
<td>Emotional state of the patient, specifically those emotions of fear or anxiety</td>
</tr>
<tr>
<td>5</td>
<td>NVC</td>
<td>Nonverbal communication</td>
<td>Describes all aspects of nonverbal communication</td>
</tr>
<tr>
<td>6</td>
<td>SPI</td>
<td>Spirituality</td>
<td>Patient reference to their spirituality or whether spirituality should be addressed</td>
</tr>
<tr>
<td>7</td>
<td>EXP</td>
<td>Understanding patient expectations</td>
<td>Issues that refer to physician or ED as a whole not meeting expectations that a patient had going in to the ED visit</td>
</tr>
<tr>
<td>8</td>
<td>ENV</td>
<td>Environmental issues</td>
<td>Patient perception of the physical space and their surroundings in the hospital/ED</td>
</tr>
<tr>
<td>9</td>
<td>COM</td>
<td>Communication with healthcare team</td>
<td>Alignment of physicians, nurses, techs, etc., in terms of words and instructions Also refers to the way a physician talks to the rest of the team</td>
</tr>
<tr>
<td>10</td>
<td>LIS*</td>
<td>Listen</td>
<td>Refers to the physician listening and paying attention to the patient and his/her needs</td>
</tr>
<tr>
<td>11</td>
<td>HD</td>
<td>Disparities</td>
<td>Any issue, story, example, concern that involves disparity in health care</td>
</tr>
<tr>
<td>12</td>
<td>HIS</td>
<td>History</td>
<td>Physician knowledge of the patient’s medical history</td>
</tr>
<tr>
<td>13</td>
<td>INV</td>
<td>Involve</td>
<td>Soliciting involvement of others in the patient’s health care—family in the room, health care providers in follow-up. This also refers to treating the patient as a teammate in their own health care</td>
</tr>
<tr>
<td>14</td>
<td>SPE</td>
<td>Speech</td>
<td>Physician speech volume, pattern, or tone</td>
</tr>
<tr>
<td>15</td>
<td>WHO</td>
<td>Whole person</td>
<td>Treating the patient as a whole person and not a disease process</td>
</tr>
</tbody>
</table>

*Selected as a major theme.
You guys got to figure out what’s wrong with me because I’m scared. I’m really scared.

Participants indicated that anxiety escalates with the perception of abandonment, as stated by a white female:

It makes people anxious to think they are forgotten.

Participants indicated the need for cognitive reassurance (providing facts and thought processes with transparency) to alleviate fear:

The lack of knowledge is the scariest thing when you have pain in your body. The way that they were there with me. The way that they talked to me and everything. It just put me at ease. I was not as scared. (White female)

Having answers puts you at ease. It puts your mind to ease, you know. (Hispanic female)

Provider Disposition

One participant offered the simple but strong recommendation that emergency physicians should “Come in warm.” Provider disposition was a theme in 10% of coded transcripts and underscored the importance of nonverbal and verbal greetings to set the tone for the entire encounter. Example behaviors to “Come in warm” include smiling, shaking hands and making eye contact. The location of the physician in the room (sitting or standing, at the bedside or behind a computer) while interacting with patients is also important. One white female stated, “Um, eye contact for me. You know, making eye contact for me and just kind of like, instead of just standing over me, maybe sit down maybe instead of just standing there. Being more, you know, at my level instead of just lording over me is how I feel like.” Another white female participant reiterated the importance of this by sharing, “I mean, if a doctor was to come to sit next to me and actually talk to me with eye contact, it would make a world of difference than just standing behind a computer and talking to me from across the room.”

Several participants shared how they appreciated when the physician was light-hearted and approachable. A black female participant shared the example of telling a joke, “I like when they come in, they crack a joke even though it ain’t funny, and they try to make you laugh a little bit, try to ease you a little bit more. They . . . I like . . . that’s a plus for me.”

Trust in Physician

Participants shared the sentiment that they tended to trust physicians more when they felt that their opinions and information were valued. One white female shared, “If, uh, the doctor is talking over you instead of talking to you or not listening to what I’m actually saying, which is like just talking telling me what he’s gonna do and not listening to what I’m saying, it’s one of the things that would make me feel like there’s distrust.”

Participants explained that trust was eroded if physicians appeared to be using scripts, memorized words, or other behavior that belied authenticity. A black male participant described this the following way, “And you can tell the difference when someone’s trying to make the effort and trying to understand versus them just doing it for the show.” Participants shared that they would be more willing to trust a doctor who admitted to uncertainty and expressed desire for a second opinion from a specialist.

Listening to Patient

Listening encompassed multiple themes but can be summarized as the capacity of physicians to make patients feel that their voice is heard. The simple concept of listening appeared to be another absolute prerequisite to the perception of empathy.

If they haven’t walked in your shoes, they don’t know what you’re going through, so therefore don’t act like a know-it-all. Instead, trying to sympathize and actually listen to you, and try to understand even though . . . instead of being like, ‘Oh, I’ve seen this before. Here’s what we’re gonna do. Bye.’ Instead actually have that communication and understanding or trying to understand. (white female)
The theme of listening was most strongly stated by participants who had or were caretakers of family members with chronic conditions. These participants pointed out that they believed they often have valuable information that is often ignored by physicians.

Honestly, every time I go to the ER, I say, ‘Look, I’m a special case. Ya’ll gonna want to think this way.’ And I tell them. I swear, ya’ll. I tell them this. Ya’ll gonna think this way. Please, just listen. Just listen. And they do their own thing. Then two days later, I’m back up in there. Every single time. So I’m waiting to meet that one doctor who’s actually gonna listen. (black male)

Another black female participant stated, “When we come in and we tell them what’s wrong and we’ve already been through this so many times, and then they ignore the fact that we already told them that, it ... it does happen quite a few times with me.”

Construction of the Concept Map
To create the first draft of the concept map, the authors consolidated what they had learned from the multicenter survey and the focus groups to create 8 to 10 nodes represented by visual icons and words. The icons were sequenced to temporally match the typical ED visit. The authors employed a physician with artistic ability (LKS) to draw a rough draft and then paid a professional medical illustrator to create Figure 1. The first derivation of the concept map and initial empathy teaching tool is shown. This concept map thus incorporates initial content from Lin et al., together with semantics and behaviors exemplifying themes with high frequency and emotional response from the present work. One patient participant specifically suggested the concepts be organized as a circle rather than a line and noted “Y’all can call it the empathy circle.” The sequence is meant to reflect the usual temporal set of events during an ED visit, as opposed to an order of importance. The intent of the figure is to serve as a cognitive learning aid that illuminates components of the black box of empathy and to facilitate a

![Figure 1. Empathy Circle: tool for teaching important aspects of empathy in emergency care.](image-url)
didactic session to teach empathy to emergency care providers.

**DISCUSSION**

This work provides the first empirical basis for the creation of a patient-informed concept map to teach empathy to emergency care providers. The rationale is clear because empathy benefits both patients and providers and has been tied to improved patient outcomes. Unfortunately, allopathic and osteopathic medical school and residency training appears to reduce the capacity for empathy. However, physician empathy can be enhanced through purposeful interventions.

This work addresses an unmet need in emergency care education and training. The unique challenges (patient volume and acuity, limited resources, and boarding, for example) of creating an empathic relationship in the ED setting and the lack of a published method to teach empathy to emergency care providers motivated this work. The themes in Table 3 together with the excerpts, the concept map, and precedent literature on teaching empathy in other settings allows the construction of an emergency care–specific training course for empathy. Since the physician–patient relationship is by definition dyadic, it was critical to obtain patient perspectives for the components of the concept map in Figure 1. Patient input on other measures of health care have been obtained successfully through methods of focus groups or structured interviewing.

The Empathy Circle contains the important aspects of empathic care as described by the patients in our three focus groups. We included all of the main themes as well as some of the minor themes within the circle. The Empathy Circle allows the adoption of a personalized approach to each unique patient–provider encounter. Participants were clear that an insincere attempt to connect with patients or “scripting” would not be successful.

The Empathy Circle thus represents the framework for a didactic session to improve empathic care in the ED setting. Further research can determine the best way to teach these concepts to emergency care providers achieve better patient care by enhancing the patient–provider relationship, decreasing unnecessary testing and cost, and improving patient compliance and outcomes. The authors created a 3-hour empathy training workshop using the Empathy Circle as a center point and are in the process of testing its effect on provider and patient perceptions of empathy in the ED setting.

**LIMITATIONS**

Limitations of this work include the fact that the Empathy Circle, representing the concept map for a cognitivist approach to teaching empathy, is not a one-size-fits-all tool for patients or for providers. For example, the second step of the tool recommends that providers indicate that they have knowledge of the patient’s prior medical conditions. In many encounters, emergency physicians do not have access to medical records. Additionally, our focus group was 78% female, which could limit applicability. The Empathy Circle and associated training can only give providers a cognitive framework to understand how to be empathic and cannot create caring providers. The Empathy Circle may not apply to patients with cognitive impairment, mental illness, or critical illness. We fully acknowledge that many factors affect empathy that may overwhelm training including personal stress, lack of sleep, burnout, overcrowding, and patient factors. The most important limitation is that the Empathy Circle has not yet been tested on learners and therefore both the Empathy Circle itself and the empathy training workshop may require refinement.

**CONCLUSIONS**

Thematic coding of transcripts from three focus groups representing geographic, ethnic and disease diversity revealed five major and 10 minor themes. These themes, together with field notes and information from a prior multicenter survey, allowed the construction of the Empathy Circle, a concept map and basis of a didactic to teach empathy to emergency care providers.

The authors would like to thank Dr. Lauren Stewart (LKS) for her illustration assistance in creating the empathy circle and Dr. Ashley Satorius for her assistance coding the focus group transcripts.

**References**


Supporting Information

The following supporting information is available in the online version of this paper available at [http://onlinelibrary.wiley.com/doi/10.1002/aet2.10328/full](http://onlinelibrary.wiley.com/doi/10.1002/aet2.10328/full)

Data Supplement S1. Facilitator guide.
Coaching for Chaos: A Qualitative Study of Instructional Methods for Multipatient Management in the Emergency Department

Teresa M. Chan, MD, MHPE, Kenneth Van Dewark, MD, MEd, Jonathan Sherbino, MD, MEd, and Matthew Lineberry, PhD

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.
the ACGME EM Milestone Project\textsuperscript{8,9} and the Royal College of Physicians and Surgeons Competence By Design\textsuperscript{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.\textsuperscript{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.\textsuperscript{11} Although this framework was originally developed to help teachers with reading, writing, and mathematics,\textsuperscript{11} it has been proposed previously as a faculty development technique that may help clinical teachers improve bedside teaching in the ED.\textsuperscript{12} The Cognitive Apprenticeship Model explains how modeling, coaching, articulation, reflection, and exploration are essential components of learning via apprenticeship.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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 email. 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 email 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. 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. 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. 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.

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.

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. 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](image-url)
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

<table>
<thead>
<tr>
<th>Experiential Learning</th>
<th>Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervised management of a smaller portfolio of patients</td>
<td>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.</td>
</tr>
<tr>
<td>Trainee is asked to manage multiple patients at once with a smaller portfolio of own patients.</td>
<td>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)</td>
</tr>
<tr>
<td>Run the board (e.g., review the ED map of patient bed to ensure appropriate patient allocations)</td>
<td>Joint review of ED patients with EP-teacher to review actual care being provided, with opportunities for more supervisory.</td>
</tr>
<tr>
<td>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.</td>
<td>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 I would work in critical care. (Attending 3)</td>
</tr>
<tr>
<td>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.</td>
<td>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)</td>
</tr>
<tr>
<td>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)</td>
<td>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)</td>
</tr>
<tr>
<td>“Thrown into deep end”</td>
<td>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.</td>
</tr>
<tr>
<td>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.</td>
<td>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)</td>
</tr>
<tr>
<td>“Given the reins”</td>
<td>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)</td>
</tr>
</tbody>
</table>

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
[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, 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, 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. 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, 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. 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 and in the spirit of EM milestones and entrustable professional activities, 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 may be developed to help trainees learn about handling increasing volumes of sicker patients.

**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. 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.

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 and signposting feedback encounters, 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 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, ethical, or social justice implications 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).\(^3\) Formal didactic sessions, simulated experiences, and serious games\(^2\) 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.\(^3\)

### 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.
The Impact of Video Laryngoscopy on the Clinical Learning Environment of Emergency Medicine Residents: A Report of 14,313 Intubations

Derek L. Monette, MD, Calvin A. Brown III, MD, Justin L. Benoit, MD, MS, Jason T. McMullan, MD, MS, Steven C. Carleton, MD, Michael T. Steuerwald, MD, Andrew Eyre, MD, and Daniel J. Pallin, MD, MPH on behalf of the NEAR III Investigators

ABSTRACT

Background: The introduction of video laryngoscopy (VL) may impact emergency medicine (EM) residents’ intubation practices.

Methods: We analyzed 14,313 intubations from 11 EM training sites, July 1, 2002, to December 31, 2012, assessing the likelihood of first-attempt success and likelihood of having a second attempt, by rank and device. We determined whether direct laryngoscopy (DL) first-attempt success decreased as VL became more prevalent using a logistic regression model with proportion of encounters initiated with VL at that center in the prior 90 and 365 days as predictors of DL first-attempt success.

Results: First-attempt success by PGY-1s was 71% (95% confidence interval [CI] = 63% to 78%); PGY-2s, 82% (95% CI = 78% to 86%); and PGY-3+, 89% (95% CI = 85% to 92%). Residents’ first-attempt success rate was higher with the C-MAC video laryngoscope (C-MAC) versus DL, 92% versus 84% (risk difference [RD] = 8%, 95% CI = 4% to 11%), but there was no statistical difference between the GlideScope video laryngoscope (GVL) and DL, 80% versus 84% (RD = −4%, 95% CI = −10% to 1%). PGY-1s were more likely to have a second intubation attempt after first-attempt failure with VL versus DL: 32% versus 18% (RD = 14%, 95% CI = 5% to 23%). DL first-attempt success rates did not decrease as VL became more prevalent.

Conclusions: First-attempt success increases with training. Interns are more likely to have a second attempt when using VL. The C-MAC may be associated with increased first-attempt success for EM residents compared with DL or GVL. The increasing prevalence of VL is not accompanied by a decrease in DL success.

Airway management is a fundamental component of emergency medicine (EM) resident training, and most academic emergency department (ED) intubations are performed by EM resident trainees. The largest report of resident intubations showed that trainees can safely perform endotracheal intubations.
This conclusion was made before the advent of video laryngoscopy (VL). The clinical learning environment has evolved and VL is increasingly utilized in community and academic EDs.\(^2\)\(^3\)

Some reports suggest that VL is superior to direct laryngoscopy (DL) with respect to first-attempt success, obtaining an optimal view of the airway and limiting esophageal intubations.\(^4\)\(^-\)\(^6\) VL may increase attending physician comfort when working with residents and the screen provides an opportunity to teach intubation skills in a way that cannot be done with DL. By also visualizing the airway, an attending may be more comfortable with a resident performing a second attempt if he or she fails on the initial try. This is important for developing procedural skills and building confidence. However, it is also possible that physicians learning how to intubate with VL may rely on the screen instead of directly visualizing the airway, impairing the development of DL skills, which are important because video devices can be compromised by blood or secretions in the airway. Given the increasing frequency with which EM residents learn to intubate using VL, surveillance of resident performance is important for patient safety and pedagogy.

**Objectives**

We evaluate the impact of VL on the clinical learning environment of EM residents by investigating three objectives. First, we compare the likelihood of first-attempt success of EM resident intubations performed with DL and VL. Second, we report the likelihood that a resident will have an opportunity to attempt an intubation a second time, after failing to secure the airway on the first attempt. Finally, we explore the concern that DL skills may diminish as VL becomes more prevalent. For the first two objectives, we analyze standard geometry C-MAC versus hyperangulated GlideScope intubations separately, because the hyperangulated blade of the GlideScope might impair first-attempt success by making tube passage more difficult.

**METHODS**

**Study Design**

This is a secondary analysis of a prospective multicenter cohort study of ED intubations. Institutional review board approval was obtained by all participating centers.

**Setting**

The National Emergency Airway Registry is an international network of academic and community hospitals. Each center was responsible for ensuring compliance, defined as data entry on 90% or more of ED intubations, confirmed by comparison of captured patient data with institutional coding for intubation procedures. After intubation, the operator recorded intubation details on a standardized intubation form accessed at www.near.edu, using a center-specific login and password. Data were entered with a custom-designed Web-based data entry tool and imported directly into a relational data base (Microsoft Access version 11.0) at the coordinating center. Compliance plans and criteria have been published previously.\(^7\)

**Selection of Participants**

This report represents intubation data collected from July 1, 2002, to December 31, 2012. We excluded encounters at sites without an EM training program or outside of North America and intubations initially attempted by a non-EM provider. We excluded any intubation attempt that was not performed with DL (either the Macintosh or the Miller blade), the C-MAC, or the GlideScope (Figure 1).

**Methods of Measurement**

Data collected included the type of laryngoscope chosen to perform the intubation, level of training and specialty of the operator, number of attempts, and success or failure.\(^7\) If a resident performed an intubation with a video laryngoscope, but did not use the video screen, we categorized this intubation as DL. EM residents who classified themselves as PGY-4 or PGY-5 were included with the PGY-3 residents in a group called “PGY-3+.”
**Data Analysis**

Success on the first attempt was calculated for each device and rank. We report the proportion of failed intubations for which the same operator was given a second attempt at securing the airway after failing on first attempt. We present univariate descriptive data as proportions and compare proportions with risk differences (RDs) with 95% confidence intervals (95%CIs). We round RDs to the nearest integer. Finally, we investigated whether DL first-attempt success decreased as VL became more prevalent, via logistic regression with the following predictors: proportion of encounters with VL at that center in the prior 90 or 365 days, calendar year, and rank. All analyses were adjusted for clustering by center. We performed all analyses with SAS (version 9.4).

**RESULTS**

Of 18 reporting sites, five were excluded for failing to comply with minimal enrollment requirements (capture of ≥90% of all intubations at the site). Another two were excluded for not having an EM residency program (Figure 1). In the remaining 11 sites, there were 15,280 encounters recorded from July 2002 through December 2012. A total of 14,313 encounters (13,605 adult and 708 pediatric) met inclusion criteria (Figure 1). The majority of excluded intubations were those performed by anesthesiologists or other non-EM providers or with flexible fiberoptics. EM trainees were the primary operator for 13,183 (92%) of these encounters.

Direct laryngoscopy was the most common initial device, used in 88% of cases (95% CI = 80% to 97%). A C-MAC was chosen as the first device in 1,088 cases (8%; 95% CI = 0% to 15%) and the GlideScope in 575 cases (4%; 95% CI = 2% to 6%).

Figure 2 demonstrates success on first and multiple attempts, by level of training. First-attempt success by PGY-1s was 71% (95% CI = 63% to 78%); PGY-2s, 82% (95% CI = 78% to 86%); PGY-3+, 89% (95% CI = 85% to 92%); and attendings 88% (95% CI = 86% to 89%).

Table 1 compares rates of first-attempt success for VL versus DL. There was no statistically significant difference at any level. Table 2 compares rates of first-attempt success for intubations performed with a C-MAC versus DL. Both PGY-1s and PGY-3s had a statistically significant advantage when using C-MAC versus DL. However, first-attempt success was no higher with the GlideScope than with DL (Table 3).

We also report the proportion of failed intubations for which a trainee had a second opportunity to perform an intubation, and compare VL with DL (Table 4). PGY-1s were more likely to have a second opportunity to secure the airway after failing on first attempt when the first attempt was performed with VL versus DL (32% vs. 18%, RD = 14%, 95% CI = 5% to 23%). There was no difference for PGY-2 or PGY-3+ residents.

We examined the relationship between trainees’ first-attempt success with DL and the proportion of intubations performed with VL at each site, using a multivariable logistic regression model with the following predictors: proportion of encounters with VL at that center in the prior 90 or 365 days, calendar year, and rank (Figure 3). If increasing use of VL caused a decrement in DL skills, we would expect these
regression lines to have a negative slope (i.e., an odds ratio [OR] < 1). Instead, a positive slope was observed, suggesting that increasing use of VL did not decrease DL first-attempt success. The OR for first-attempt success when the prior 90 days’ proportion of video intubations was used as the predictor was 1.24 (95% CI = 1.08 to 1.43; Figure 3) and 1.28 when the prior 365 days’ proportion was used (95% CI = 1.06 to 1.54). For both models, Stukel’s test of linearity indicated a good fit, with a chi-square p-value > 0.50.

**DISCUSSION**

We report on 14,313 ED intubations from 11 North American EM training centers. EM residents performed 92% (13,183) of intubations. To our knowledge, this is the largest sample of North American EM resident intubations to date.

The last publication from this registry evaluating EM resident intubation data reported on 7,498 ED intubations. These were performed almost exclusively with DL and residents were successful on first attempt 85% of the time. In our study, we found residents to be successful on first attempt when intubating with DL 84% of the time.

We demonstrate improvement in first-attempt success rates with increasing years of residency training. Previous analysis reported a similar trend. This has been shown for GlideScope intubations in a small sample of EM residents. Our study is the first, however, to report an increase in first-attempt success with each year of training for both GlideScope and C-MAC.

We cannot infer that the C-MAC is a superior device for EM resident intubations due to our study.
limitations, but it is plausible that overall use of VL may allow residents to be more successful when an attending can share a view of the airway and provide real-time feedback. Although our personal experience is that the mechanics of passing the endotracheal tube are different from an intubation performed with a Macintosh blade (either DL or C-MAC), our study is not designed to directly compare the first-pass success of the C-MAC with the GlideScope. Mosier et al.9 however did compare ED intubations performed with either the C-MAC or GlideScope and found no difference in first-attempt success. Similar equipoise between the C-MAC and DL has been shown in a retrospective study of pediatric ED intubations and a recent randomized trial of adult ED patients intubated with either the C-MAC or the DL.10,11 A trainee performed >97% of the intubations in both studies and neither found a statistical difference in first intubation attempt success.10,11

Our study also measured the likelihood that a resident who fails on first-attempt intubation has a second attempt. We report that when an intern fails to successfully intubate on the first attempt, he or she is more likely to have a second opportunity to intubate that patient if the first attempt was performed with a video laryngoscope (Table 4). This was not true for the PGY-2 or PGY-3+ groups. We suspect that VL helps an attending determine whether first attempt failure was related to the intubating resident or a challenge intrinsic to the patient (e.g., anatomy). If the former, then perhaps an intern is more likely to have a second attempt after the attending provides feedback. If the challenge is intrinsic to the patient, then perhaps a more experienced resident would step in for a rescue intubation. To our knowledge, we are the first study to investigate the opportunity for an EM resident to try again after first attempt failure. This topic is important because it reflects a resident’s learning opportunity to develop fine motor skills, adapt after failure, and build confidence.

Finally, we found no evidence for the theory that EM physicians may be losing DL skills in the setting of increasing utilization of VL. We found a positive association between the prevalence of VL and first-attempt success with DL, while the opposite would be expected if training with VL caused a decrement in DL skills. It is possible that residents learning how to intubate predominantly with VL are visualizing airway anatomy in a way that enhanced comfort with the procedure and ability to identify anatomical structures. This may then allow the learner to identify the same structures more easily when intubating with DL. Future regression models incorporating providers’ experience with airway management and patient characteristics will be better positioned to draw a conclusion about the relationship between VL prevalence and DL success.

**LIMITATIONS**

National Emergency Airway Registry is designed to monitor trends in airway management and provide performance expectations using a large, prospectively collected data. There are limitations to this design and
Like all self-reporting registries, NEAR is subject to possible recall bias and selective reporting of adverse events. During analysis, operators are deidentified, which should remove the desire to inflate performance through selective reporting. While we are unable to say with certainty that this did not occur, we do not know of any intentional errors. Compliance reporting and continuous monitoring across sites limit this potential impact.

Most intubations were performed at urban academic centers and may not reflect trends and practices at rural training sites. In our study period, most intubations (88%) in the registry were managed with DL. VL intubations were concentrated in the past 3 years. Although our sample is large, this concentration may limit our ability to capture an association between an increased prevalence of VL and decrease in DL success. We can extrapolate from this trend that the prevalence of VL has or may soon surpass DL. Our data may not match current practice at academic medical centers. Newer NEAR data are currently being collected but are incomplete. We believe that these data, however, reflect the period when VL was being introduced into practice. This provides a benchmark and context for future studies of ED intubation performance.

Center characteristics including annual volume have been reported previously. However, our analysis of first-attempt success, second-attempt opportunity, and regression model do not factor in patient characteristics (e.g., anatomy or indication for intubation) or provider differences (e.g., operator experience). We do not know if only one type of video laryngoscope was available at an individual site or if a particular laryngoscope was the typical device of choice for an anticipated difficulty airway. Despite our large sample size and adjustment for clustering by center, these confounders preclude us from drawing conclusions about device superiority or the relationship between the proportion of VL intubations at a training site and a resident’s performance with DL.

CONCLUSIONS

In summary, we have presented data on 14,313 ED intubations, performed with either direct laryngoscopy or video laryngoscopy. This is the largest sample of EM resident intubations published to date and provides outcomes of first-attempt success, the opportunity to try a second time after failure, and a model for the association between video laryngoscopy prevalence and direct laryngoscopy skills. Nearly all ED intubations (92%) at a hospital with an emergency medicine training program were performed by emergency medicine residents. This speaks to the acceptance across specialties that emergency intubations can be safely performed by emergency physicians. We found that interns and PGY-3+ residents were more likely to intubate successfully on the first attempt when using C-MAC versus direct laryngoscopy. Interns were more likely to have a second attempt at intubation after failing first attempt with a video laryngoscope versus direct laryngoscopy. We did not find evidence for the theory that the increasing use of video laryngoscopy is associated with a loss of direct laryngoscopy skills. These findings describe the clinical learning environment for emergency medicine residents and may provide national benchmarks for medical educators and residency program directors. Surveillance of resident intubation outcomes should be continued as video laryngoscopy overtakes direct laryngoscopy as the primary device with which emergency medicine physicians perform endotracheal intubation.

References


Development and Empirical Testing of a Novel Team Leadership Assessment Measure: A Pilot Study Using Simulated and Live Patient Encounters

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ABSTRACT

Background: Team leadership is critical to health care resuscitation team performance. There has been increased focus on competency in team leadership behaviors; however, there is still variability in how team leadership is assessed within emergency medicine. The objective of this study was to develop and pilot a novel team leadership assessment measure for emergency medicine resuscitation teams.

Methods: Team leadership dimensions and associated behaviors were identified through a systematic literature review and expert consensus. Included behaviors were used to create behaviorally anchored rating scales, which were then revised based on subject matter expert ratings. Four raters from three different academic institutions observed 30 video-recorded resuscitations (20 simulated and 10 actual patient care resuscitations). Mean leadership scores were calculated. Intraclass coefficients (ICCs) were calculated for each item and for overall leadership scores. Leader scores for the simulation-based scenarios were compared to external variables including level of training, team process, clinical performance, and team situational awareness. The study was conducted from July 2017 through June 2018.
Results: Leadership scores ranged from 2.23 to 4.30 (mean \( \pm SD = 3.18 \pm 0.50 \)). The ICC for the overall score was 0.79 for all observations, 0.87 for simulation-based observations, and 0.24 for the patient care observations. Team leadership scores on simulation-based observations did not correlate with available external variables.

Conclusions: We developed a novel team leadership assessment measure for emergency medicine resuscitation teams with supporting validity evidence, including content validity and response process. The measure demonstrated acceptable inter-rater reliability when applied to simulation-based medical resuscitations; however, this did not translate to trauma resuscitations in the actual patient care setting.

E
effective team leadership is linked to better teamwork,\(^1\) and better teamwork is thought to improve patient care.\(^2\) Leadership is especially critical in health care action teams, such as emergency medicine (EM) resuscitation teams, that function under complex, dynamic, and time-pressured conditions.\(^3\) In action teams, leadership is conceptualized as functional, defined as facilitating and coordinating individual and team efforts to accomplish shared goals.\(^4\) Isolating team leader performance is complicated, as the performance of any individual within a team is influenced by interactions with the team itself.\(^4,5\) Despite the interdependence of teams, educators are expected to assess and develop individual performance during residency training. The importance of training and assessing team leaders has been emphasized within graduate medical education as a whole\(^6,7\) and within EM specifically.\(^8,9\)

Developing competent team leaders requires robust assessment tools; however, there is variability in how leadership skills are assessed throughout medicine and very little work specific to EM.\(^10\) The majority of published assessment measures include leadership as one component of teamwork, with very few measures focused specifically on leadership. The most commonly published leadership-focused measure, the adapted leadership behavior description questionnaire (LBDQ),\(^11\) has been modified with almost every published application of the measure, preventing an aggregate understanding of its utility and evidence of validity. For example, it has been applied as a checklist, as ratings scales with frequency anchors, and as the frequency of related leadership utterances.\(^10\) Several other leadership-focused measures also utilize rating scales with minimal or no anchors, making the measure dependent on rater expertise and consistency.\(^12,13\) Other limitations of existing leadership assessment measures include application to a narrow clinical focus (e.g., trauma care),\(^12,13\) empirical testing and validation only on simulation-based care,\(^14\) and assessing leadership at the team level rather than focusing on the performance of an individual team leader.\(^15\)

Simulation is frequently recommended as a platform for assessment in graduate medical education.\(^16\) Advantages include the ability to standardize the assessment across learners and the relative ease of using dedicated observers or video recording. Transfer of performance from simulation to the bedside, however, is not guaranteed and EM educators still need the ability to accurately and reliably measure team leadership during actual patient care. The objective of this pilot study was to develop and empirically test a conceptually sound EM resuscitation team leader assessment measure that could be used in both simulated and actual patient care settings.

METHODS

Overview

We used a three-phase process to create and evaluate a novel team leader assessment measure: 1) initial measure development, 2) measure review and refinement, and 3) empirical testing of the measure (Figure 1).\(^17,18\) We collected validity evidence from four sources (content validity, internal structure, response process, and relationship to other variables)\(^19,20\) by applying the measure to medical and trauma resuscitations in simulated and actual patient care events. The University of Washington Institutional Review Board approved this study. The study occurred over a 12-month period, from July 2017 through June 2018.

Phase 1: Initial Measure Development

We created a list of leadership behaviors from two existing systematic reviews of health care team leadership.\(^10,21\) We supplemented this list using studies published since these reviews (2012–2017)\(^13,14,22–30\) and the EM Milestone Project.\(^16\) The behaviors were then organized into team leadership dimensions. An existing taxonomy of teamwork behaviors served as a conceptual framework for this process.\(^31\) A group of six subject matter experts (SMEs) independently reviewed the dimensions and the leadership behaviors for relevance and importance to EM team leadership using
the Delphi method. A sample size of six SMEs was selected based on previously reported standards for content validation. The SMEs represented five different institutions and included two organizational psychologists with an expertise in team processes and assessment design and four board-certified attending EM physicians with a collective 56 years of experience. The SMEs independently assigned each behavior to a dimension within the taxonomy or left the behavior unassigned for discussion. We calculated percent agreement among SME behavioral classifications for all behaviors. Any behavior with inadequate agreement, defined as $<75\%$ agreement, was discussed. This process was repeated three times until adequate agreement was reached for all dimensions and behaviors. The included behaviors were used to create one or more behaviorally anchored rating scales (BARS) for each leadership dimension. Each scale constitutes one item within the larger measure.

**Phase 2: Review and Refinement of the Measure**

Content validation followed best practices outlined by Haynes et al. A second group of SMEs, which included eight EM physicians from four different institutions, used a 5-point Likert scale to rate each of the items on: 1) appropriate representation of EM leadership and 2) importance to EM leadership. SMEs were provided with the highest-level behavioral anchor for each item. A rating of 1 indicated the anchor was not at all representative/important and a rating of 5 indicated that the anchor was highly representative/important. The survey also provided SMEs with the option to provide free-text comments related to the items and anchors. Behavioral anchors with a mean Likert score $<4$ in either category, and any associated SME comments, were discussed.

We collected response process validity evidence by evaluating written and verbal feedback from four EM physicians after they piloted the assessment measure on one simulated, and one actual, EM resuscitation. Items identified as confusing, difficult to score, or not representative of EM team leadership were reviewed and modified.

**Phase 3: Empirical Testing of the Measure**

We used a preexisting video library of EM resuscitations for empirical testing and the collection of additional validity evidence. Recordings include both simulated and actual patient care resuscitations. The simulated medical resuscitation scenario and supporting evidence of validity have been previously described. Briefly, it involves a patient presenting from a skilled nursing facility with altered mental status and hypoxia that progresses to respiratory distress and cardiac arrest. All teams were interprofessional, with an EM resident physician, a nurse, and a medical student, from one of two different institutions.
The scenario was standardized and included an embedded participant functioning as a nurse. This nurse role was filled by one of two different people who had prior experience as standardized participants and training specific to this scenario. The purpose of this standardized participant was to provide information at set time points (e.g., radiology images), assist with overcoming the artificial aspects of the simulation (e.g., drawing blood), and ensure participant safety (e.g., avoiding contact with the mannequin during defibrillation). Actual patient care videos included the highest-level trauma activations for field responses treated in the emergency department (ED) of a Level I trauma center. Videos were blurred to obscure patient identity.

**Data Analysis**

**Phases 1 and 2.** Agreement for initial SME categorization of leadership behaviors was determined using percent agreement to identify items that needed further discussion. For the external SME review process, the mean Likert scores and standard deviations (SDs) were calculated for the appropriate representation and the importance of each anchor.

**Phase 3.** Overall leadership scores were determined by calculating the mean of all items and thus could range from 1 to 5. If an item was scored as not applicable it was removed from the denominator. The IRR for the individual items and the overall score was determined using intraclass coefficients [ICC(C,k)]. With an ICC of >0.70 considered acceptable. Descriptive statistics were used to determine mean ICCs.

For the simulation-based scenarios, mean leadership scores were used to determine the relationship to the external variables expected to correlate with team leadership. Correlation analyses were calculated using Pearson’s (r) product-moment correlation coefficient. Analyses were performed using R Version 3.5.0 (The R Project).

**RESULTS**

**Phase 1: Initial Measure Development**

We reviewed 11 dimensions in the initial teamwork behavioral taxonomy. Based on expert consensus a new Communication dimension was added, two dimensions were removed, and three dimensions were combined. The complete list of modifications, the rationale for each modification, and the final six dimensions are provided in the Data Supplement S1 (Tables S1, available as supporting information in the online version of this paper, which is available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10321/full). After removing redundant behaviors, we started with a list of 48 team leadership behaviors. Twenty-seven behaviors were retained for measure development based on SME consensus that these behaviors were: 1) important and relevant to EM resuscitation team leadership and 2) observable. The categorization of the included behaviors and the list of unused behaviors are provided in Data Supplement S1, Tables S1 and S2.
Phase 2: Revised Team Leadership Assessment Measure

Mean SME Likert scores were at least 4 on the 5-point scale for both appropriate representation and importance for all items except Manages Workload (Table 1). The SMEs felt that this behavior was important for EM providers when providing clinical care to an entire ED, but might not be required during a single patient resuscitation. The SMEs also felt that this item would be more important in settings with fewer resources as opposed to large academic centers. Based on these SME comments, and our goal of designing an EM team leadership assessment measure that was widely applicable, we elected to retain this item for testing in Phase 3.

Based on feedback from EM raters we removed behaviors related to summarizing from the monitors progress item and create a new Summarizes Progress item. Additional edits were made to improve readability. The result was a 15-item team leader assessment measure (Data Supplement S1, Appendix S1). Each item is a BARS, and items are grouped within the dimensions identified in Phase 1.

Phase 3: Empirical Data Collection

All four raters scored all 30 observations, representing 29 different team leaders. One participant was the team leader in two different patient care observations. In 13 of the observations (43%) the team leader was female. In 18 of the observations (60%) the team leader was a junior resident (second year resident).

The overall leadership scores ranged from 2.23 to 4.30 with a mean (±SD) score of 3.18 (±0.50). The ICC for the overall team leadership score was 0.79 for all observations, 0.87 for simulation-based observations, and 0.24 for actual patient care observations (Table 2). Within the simulation-based observations, item-level ICCs ranged from 0.29 (Sets Goals) to 0.80 (Maintains Global Perspective), with a mean (±SD) of 0.64 (±0.15). Conflict management was scored as not applicable in all observations.

Of the external variables used for comparison, the team leaders’ level of training and the team process (teamwork) score showed a weak to moderate correlation with team leader performance; however, they did not rise to the level of statistical significance (Table 3). Team leader performance did not correlate with the team clinical performance or team situational awareness scores.

DISCUSSION

The IRR of our team leadership assessment measure using overall scores, across all observations, met criteria for acceptable reliability, but with a discrepancy between simulated and actual patient care observations. Within the simulation-based scenarios, there were a few items that demonstrated lower IRR (ICC < 0.7) that might benefit from revision. Rater feedback offered insight into modifications that could improve the reliability and relevance of these items. For example, adding a time component to the item Gathers Information may help differentiate excellent behavior by identifying team leaders who prioritize the most important information sources.

Reliability was much lower when applying the BARS to actual patient care observations. Only one item (Delegation: Appropriateness) demonstrated adequate IRR. Variations in leadership were more difficult to discern in these observations due to the increased complexity and variability in actual patient care, including differences in team characteristics (e.g., size), patient condition (e.g., acuity level), and environment (e.g., other patients). Raters also cited preexisting protocols related to trauma care as a potentially limiting factor, noting that in a highly resourced trauma setting, many aspects of care are routinized making it more difficult to detect subtle differences in team leader performance. Increasing the number of

Table 1

<table>
<thead>
<tr>
<th>Item*</th>
<th>Appropriate Representation</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gathers information</td>
<td>4.13 (±0.64)</td>
<td>4.13 (±0.64)</td>
</tr>
<tr>
<td>Sets goals</td>
<td>4.50 (±0.76)</td>
<td>4.50 (±0.76)</td>
</tr>
<tr>
<td>Facilitates decision making</td>
<td>4.75 (±0.71)</td>
<td>4.75 (±0.48)</td>
</tr>
<tr>
<td>Contingency planning</td>
<td>4.38 (±0.74)</td>
<td>4.50 (±0.76)</td>
</tr>
<tr>
<td>Role delegation (frequency)</td>
<td>4.63 (±0.52)</td>
<td>4.63 (±0.74)</td>
</tr>
<tr>
<td>Role delegation (quality)</td>
<td>4.00 (±0.93)</td>
<td>4.13 (±0.83)</td>
</tr>
<tr>
<td>Maintains global perspective</td>
<td>4.38 (±0.74)</td>
<td>4.38 (±0.92)</td>
</tr>
<tr>
<td>Resources utilization</td>
<td>4.63 (±0.52)</td>
<td>4.63 (±0.52)</td>
</tr>
<tr>
<td>Monitors progress</td>
<td>4.75 (±0.46)</td>
<td>4.75 (±0.46)</td>
</tr>
<tr>
<td>Manages team workload</td>
<td>3.88 (±0.83)</td>
<td>4.00 (±0.93)</td>
</tr>
<tr>
<td>Explicit communication</td>
<td>4.25 (±0.89)</td>
<td>4.38 (±0.92)</td>
</tr>
<tr>
<td>Asserts control</td>
<td>4.38 (±0.46)</td>
<td>4.88 (±0.35)</td>
</tr>
<tr>
<td>Promotes team collaboration</td>
<td>4.13 (±0.64)</td>
<td>4.13 (±1.13)</td>
</tr>
<tr>
<td>Conflict management</td>
<td>4.25 (±0.89)</td>
<td>4.25 (1.16)</td>
</tr>
</tbody>
</table>

*Only the item is listed here; however, the item and all of the highest-level behavioral anchors were provided for expert review.
### Table 2
Total and Item-specific IRR and Rater Feedback for Proposed Leadership Measure

<table>
<thead>
<tr>
<th>Item</th>
<th>IRR (ICCs)</th>
<th>Feedback From Raters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sim</td>
<td>Live</td>
</tr>
<tr>
<td>Overall leadership score</td>
<td>0.87</td>
<td>0.24</td>
</tr>
<tr>
<td>Gathers information</td>
<td>0.39</td>
<td>0.37</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sets goals</td>
<td>0.61</td>
<td>–2.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facilitates decisions</td>
<td>0.71</td>
<td>0.57</td>
</tr>
<tr>
<td>Contingency planning</td>
<td>0.64</td>
<td>0.35</td>
</tr>
<tr>
<td>Role delegation: frequency</td>
<td>0.77</td>
<td>–0.02</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role delegation: appropriateness</td>
<td>0.72</td>
<td>0.74</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global perspective</td>
<td>0.85</td>
<td>0.60</td>
</tr>
<tr>
<td>Resource utilization</td>
<td>0.81</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitors progress</td>
<td>0.63</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summarizes progress</td>
<td>0.86</td>
<td>0.64</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manages workload</td>
<td>0.74</td>
<td>–1.24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explicit communication</td>
<td>0.82</td>
<td>0.52</td>
</tr>
<tr>
<td>Asserts control</td>
<td>0.77</td>
<td>–0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychological safety</td>
<td>0.82</td>
<td>–0.71</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
observations and examining a more diverse set of resuscitations, including medical resuscitations, would provide further insight into the IRR of this measure when applied to actual patient care events.

The reliability of this measure may also be improved with more extensive rater training. Raters represented three institutions; with at least two of the raters having no knowledge of the leaders, the other team members, or the clinical environment. Rater training was intentionally limited, as the measure was intended for EM educators to use without extensive rater training. Results suggested this is feasible for the simulation-based cohort. We suspect that using raters from the same institution would result in even higher IRR, especially for the actual patient care observations, due to a shared understanding of the clinical environment, culture, and team leader expectations. More extensive rater training could also help to build this shared understanding, and this may be necessary to achieve adequate reliability in the clinical setting.

The overall team leadership scores did not significantly correlate with external variables thought to relate to leadership performance. Team leadership, teamwork, and clinical care are all complex constructs, with many confounding patient and team variables. We suspect that the relationship with leadership performance was overshadowed by other factors that contributed to team performance. Another possibility is that the team leadership measure or the external measures do not reflect the desired constructs (e.g., the team leadership measure does not accurately reflect variations in leadership performance). We think that this is less likely given the rigorous development process for these measures. Finally, the expected relationship between these constructs may not actually exist. There is adequate work supporting the link between team leadership and teamwork, but less is known about the relationship between team leadership and other constructs, such as team situational awareness. These relationships are complex and require consideration of different team and task characteristics. A larger sample size would allow us to examine the relationship between team leadership and other variables while controlling for additional team factors, including team familiarity and aggregate team experience. It is also worth considering other variables that might be expected to improve with higher-quality team leadership that we did not measure, such as team satisfaction or team cohesion.

Future research directions could include revising and reevaluating this measure on a larger sample of actual patient care observations. Specific revisions, such as the examples noted above, would require SME review prior to more widespread testing to evaluate the generalizability of the measure. Additionally, a more rigorous evaluation of the raters’ perspective on the measure might provide insight into the challenges of using this measure to assess the complex construct of team leadership. Ideally, EM educators could use this measure to assess EM resident team leaders while on shift. Video-based review allows raters to pause and replay to look for more subtle behaviors and also allows raters to focus on the team leader, without worrying about clinical care or patient safety; however, it may not be practical for resident evaluations. Comparing scores from both live and recorded observations of the same resuscitations would help determine the
appropriateness of using this measure during clinical shifts. While we intended this measure for EM resident education, the content of the measure is not specific to trainees, and we anticipate that a revised version demonstrating acceptable reliability could be used to assess any practitioner functioning as the EM team leader (e.g., attending physicians).

LIMITATIONS

There are several limitations to this study. While we used more encounters than many other observation-based measure development studies, the sample size remains a limiting factor when attempting to understand and control for confounding factors. Including actual patient care resuscitations introduced additional team, patient, and environmental variables. The standardized simulation-based scenarios limited some of these variables, but also provided less ecologic validity. We elected to include both actual and simulated patient care scenarios, as both settings are important to assessment in graduate medical education. Including both types of observations also allowed us to address the limitations of the different settings, but required conceding smaller sample sizes for each cohort. Furthermore, the simulation-based observations were all medical resuscitations and the patient care observations were all trauma resuscitations and so the difference in reliability could be attributable the clinical component (trauma vs. medical) or the setting (simulation vs. actual patient care) or both. The SMEs for the measure development process included EM physicians from four different institutions to improve generalizability; however, the team leaders evaluated during actual patient care and simulation came from one and two institutions, respectively. Finally, our actual patient care observations were limited to trauma care and may not have been reflective of all EM resuscitations as a whole.

CONCLUSION

We developed and tested a novel leadership assessment measure for EM resuscitation teams. The validity of the measure is supported by evidence of content validity and response process, as well as acceptable inter-rater reliability when applied to simulated medical resuscitations, but not to actual trauma resuscitations. More observations across a variety of clinical conditions and settings are needed to facilitate additional validity testing.

REFERENCES


Supporting Information

The following supporting information is available in the online version of this paper available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10321/full Data Supplement S1. Supplemental material.
Direct Observation Assessment of Ultrasound Competency Using a Mobile Standardized Direct Observation Tool Application With Comparison to Asynchronous Quality Assurance Evaluation

Keith S. Boniface, MD, Kat Ogle, MD, Ahmad Aalam, MBBS, Maxine LeSaux, Matt Pyle, MD, Sohaib Mandoorah, MBBS, and Hamid Shokoohi, MD, MPH

ABSTRACT

Objectives: Competency assessment is a key component of point-of-care ultrasound (POCUS) training. The purpose of this study was to design a smartphone-based standardized direct observation tool (SDOT) and to compare a faculty-observed competency assessment at the bedside with a blinded reference standard assessment in the quality assurance (QA) review of ultrasound images.

Methods: In this prospective, observational study, an SDOT was created using SurveyMonkey containing specific scoring and evaluation items based on the Council of Emergency Medicine Residency-Academy of Emergency Ultrasound: Consensus Document for the Emergency Ultrasound Milestone Project. Ultrasound faculty used the mobile phone–based data collection tool as an SDOT at the bedside when students, residents, and fellows were performing one of eight core POCUS examinations. Data recorded included demographic data, examination-specific data, and overall quality measures (on a scale of 1–5, with 3 and above being defined as adequate for clinical decision making), as well as interpretation and clinical knowledge. The POCUS examination itself was recorded and uploaded to QPath, a HIPAA-compliant ultrasound archive. Each examination was later reviewed by another faculty blinded to the result of the bedside evaluation. The agreement of examinations scored adequate (3 and above) in the two evaluation methods was the primary outcome.

Results: A total of 163 direct observation evaluations were collected from 23 EM residents (93 SDOTs [57%]), 14 students (51 SDOTs [31%]), and four fellows (19 SDOTs [12%]). The trainees were evaluated on completing cardiac (54 [33%]), focused assessment with sonography for trauma (34 [21%]), biliary (25 [15%]), aorta (18 [11%]), renal (12 [7%]), pelvis (eight [5%]), deep vein thrombosis (seven [4%]), and lung scan (5 [3%]). Overall, the number of observed agreements between bedside and QA assessments was 81 (87.1% of the observations) for evaluating the quality of images (scores 1 and 2 vs. scores 3, 4, and 5). The strength of agreement is considered to be “fair” (κ = 0.251 and 95% confidence interval [CI] = 0.02–0.48). Further agreement assessment demonstrated a fair agreement for images taken by residents and students and a “perfect” agreement in images.
taken by fellows. Overall, a “moderate” inter-rater agreement was found in 79.1% for the accuracy of interpretation of POCUS scan (e.g., true positive, false negative) during QA and bedside evaluation ($\kappa = 0.48$, 95% CI = 0.34–0.63). Faculty at the bedside and QA assessment reached a moderate agreement on interpretations noted by residents and students and a “good” agreement on fellows’ scans.

**Conclusion:** Using a bedside SDOT through a mobile SurveyMonkey platform facilitates assessment of competency in emergency ultrasound learners and correlates well with traditional competency evaluation by asynchronous weekly image review QA.

Since the introduction of point-of-care ultrasound (POCUS) in emergency departments (EDs), it has become an important tool for diagnosis, procedural guidance, and evaluation of response to therapy. In the 2013 Model of the Clinical Practice of Emergency Medicine (EM), POCUS is described as an essential skill for emergency physicians.\(^1\) It has become part of the EM curriculum for all EM residency programs, but assessment of resident competence in POCUS can be challenging. In the first model curriculum addressing emergency ultrasound training for emergency physicians,\(^2\) performance of 150 ultrasound exams was felt to be adequate to demonstrate competency. The ACEP Emergency Ultrasound Guidelines published in 2001\(^3\) and 2009\(^4\) continued to emphasize a numbers-based competency, and the 2016 guidelines turn more attention to competency assessment.\(^5\)

Assessing residents’ POCUS competency is essential to make sure that trainees complete residency with a baseline of ultrasound skills and knowledge that can be further improved upon throughout their careers and has been an ongoing area of discussion in the academic POCUS community.\(^6\)–\(^8\) The 2008 Council of Emergency Medicine Residency Directors (CORD) conference developed consensus recommendations for resident training in emergency ultrasound that included a competency assessment\(^9\) that was subsequently expanded to include a toolkit of competency assessment methods including standardized testing, self-assessment, case logs, Web-based learning, observed structured clinical examinations, standardized direct observation tool (SDOT), simulation scenarios, direct observation in clinical practice, and quality assurance (QA) review.\(^10\)

Competency assessment of ultrasound skills is one of 23 Milestones incorporated into the Emergency Medicine Milestones project,\(^11\) yet a recent survey of EM residency programs shows a wide range of assessment tools being employed, including 16% of residency programs that do not evaluate competency in this milestone at all.\(^12\) A recent multiorganizational consensus paper calling for the revision of milestone PC12 points to the fact that a minority of residency programs assess competency in POCUS at the bedside.\(^13\) In this study we set out to create and evaluate a smartphone tool to assess EM learners’ competency in POCUS at the bedside as a real-time mobile platform SDOT. We hypothesized that the results of this real-time competency assessment would correlate well with the asynchronous QA review and competency assessment currently in place at our institution.

**METHODS**

**Study Design**

The study is a prospective observational cohort study comparing two methods of POCUS competency assessments for emergency ultrasound trainees’ scans. In the first assessment, a mobile survey platform SDOT was used for a convenience sample of supervised scans. Data from the SDOT was collected electronically through an online, smartphone-based SurveyMonkey platform. For the second assessment, a blinded determination of competency by a second ultrasound section faculty member was recorded in an asynchronous QA meeting, and the findings were correlated with the SDOT assessment. The study was reviewed by the university’s institutional review board and determined to be exempt.

**Study Setting and Population**

The study took place in the ED of an urban teaching hospital with 72,000 patient visits per year, an EM residency, and an emergency ultrasound fellowship program. ED sonographer trainees include fourth-year medical students on emergency POCUS elective, EM residents on POCUS rotation, and emergency ultrasound fellows. Trainees performed ultrasound examinations on patients in the ED, under supervision of a dedicated ultrasound faculty, as is currently standard practice for learners.

**Study Protocol**

**Mobile-based Digital Survey.** The SDOT SurveyMonkey questionnaire was composed of three
sections. The first collected sonographer demographics and evaluator name, using multiple-choice and free-text responses, and selected examination type, which took the evaluator to the second page containing the examination-appropriate evaluation via smart logic. This second section contained a checklist of items that sonographers should demonstrate on the ultrasound, according to the examination type being performed. This checklist was based on the SDOTs from Council of Emergency Medicine Residency–Academy of Emergency Ultrasound (CORD-AEUS): Consensus Document for the Emergency Ultrasound Milestone Project, a frequently used assessment tool for POCUS in ED. The third section of the survey focused on questions related to quality of images, interpretation of images, and application of clinical knowledge based on image interpretation (Figure 1).

QA Meeting. Faculty from the ultrasound section in the department of emergency medicine gather weekly in an educational session with rotating residents, students, and ultrasound fellows to review scans that had been recorded by trainees during their ultrasound rotation or during EM clinical shifts. Image review sessions (“QA”) are a very common way of assessing competency in POCUS, with 82% of responding EM residency programs reporting use of QA as an assessment tool.12

The academic ED where this study was conducted uses Qpath (Telexy Healthcare). Qpath is a hospital server-based, HIPAA-compliant, password-protected image archiver used to document and store images and interpretations of studies performed by residents and attendings as well as provide feedback on image quality to users. Using the Qpath system, evaluators can see trainee’s scans and interpretations that are sent directly from the ultrasound machines in the ED and saved in the hospital server.

In this assessment, a different faculty evaluator, blinded to results from the SDOT evaluation, reviewed scans and completed the assessment of the examination-specific goal and whether all structures and points of interest were examined under the corresponding scans. In addition, the evaluator assessed trainee image quality and interpretations on the workflow sheet on Qpath (Figure 2). E-mail feedback was sent to trainees if there was a discrepancy on interpretation or a missed point of interest in their scans.

Measurements and Data Analysis
At the time of both the SDOT and the QA session, a “quality score” was determined (Figures 1 and 2). The ability to obtain images of sufficient quality to aid in clinical decision-making reflects competence in POCUS. Examinations were considered as adequate for diagnostic purposes for each of the two evaluation methods if the score was 3 or above (on the 5-point scale shown in Figure 1). In addition, the ultrasound trainees’ accuracy of interpretations of the examinations was evaluated in real time at the SDOT and in retrospect during the QA sessions as true positive, true negative, false positive, false negative, or technically limited study.

Standardized direct observation tool assessment data were exported to an Excel database (Microsoft), where they were combined with data from the blinded QA session. The quality score was analyzed as a dichotomous variable, with scores of 3, 4, and 5 being defined as competent and scores of 1 and 2 defined as not competent. The inter-rater agreement was calculated for both QA and the bedside evaluation of scans. Cohen’s kappa statistic (κ) for the inter-rater agreement was calculated. Kappa values of 0.2 to 0.4 indicated “fair” agreement, 0.4 to 0.6 “moderate” agreement, 0.6 to 0.8 “good” agreement, and greater than 0.8 “excellent” agreement. A kappa value of 1 indicated “perfect” agreement. The frequency of images with adequate quality and imaging scores were compared using chi-square test or Student t-test. Statistical significance was defined as a p-value less than 0.05.

RESULTS
A total of 165 SDOT evaluations were collected. In two cases the SDOT was incomplete; these were excluded, leaving 163 SDOTs for the final analysis. The SDOTs evaluated EM residents (93 SDOTs), medical students (51 SDOTs), and EM POCUS fellows (19 SDOTs; see Table 1 for types of POCUS examinations evaluated by SDOT. The inter-rater agreement for the interpretation of POCUS scan (e.g., true positive, false negative) during QA and bedside evaluation was 79.1% (κ = 0.486, 95% confidence interval [CI] = 0.34 to 0.63) which is considered a moderate agreement. The agreement between the two methods of competency assessment with regard to image quality is fair, with agreement in 142 of 163 (87.1%) of cases. No statistically significant differences
Figure 1. Bedside SDOT. *Column 1* in the figure refers to the first section of the survey instrument. *Column 2* highlights the second section of the survey tool and illustrates examination-specific questions. *Column 3* is the third section of the SDOT and mirrors questions used in the QA meetings based on the CORD-AEUS guidelines. CORD-AEUS = Council of Emergency Medicine Residency–Academy of Emergency Ultrasound; QA = quality assurance; SDOT = standardized direct observation tool.

<table>
<thead>
<tr>
<th>Main Page</th>
<th>Limited Cardiac</th>
<th>Final Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Evaluator</td>
<td>1. Chooses appropriate probe</td>
<td>1. Quality of Images</td>
</tr>
<tr>
<td>○ Keith Boniface</td>
<td>○ Yes</td>
<td>○ 1 - No recognizable structures, no objective data can be gathered</td>
</tr>
<tr>
<td>○ Hamid Shokoohi</td>
<td>○ No</td>
<td>○ 2 - Minimally recognizable structures but insufficient for diagnosis</td>
</tr>
<tr>
<td>○ Kat Calabrese</td>
<td>○</td>
<td>○ 3 - Minimal criteria met for diagnosis, recognizable structures but with some technical or other flaws</td>
</tr>
<tr>
<td>2. Evaluatee's level of training</td>
<td>2. Subxiphoid view with appropriate depth to visualize entire pericardium</td>
<td>○ 4 - Minimal criteria met for diagnosis, all structures imaged well and diagnosis easily supported</td>
</tr>
<tr>
<td>○ Student</td>
<td>○ Yes</td>
<td>○ 5 - Minimal criteria met for diagnosis, all structures imaged with excellent image quality and diagnosis completely supported and suitable for educational purposes.</td>
</tr>
<tr>
<td>○ R1</td>
<td>○ No</td>
<td></td>
</tr>
<tr>
<td>○ R2</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>○ R3</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>○ R4</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>○ Fellow</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>3. Evaluatee Name</td>
<td>3. Long axis view with appropriate depth to visualize descending thoracic aorta</td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ No</td>
<td></td>
</tr>
<tr>
<td>4. Survey number:</td>
<td>4. Apical 4 chamber view with adequate visualization of all 4 chambers</td>
<td>* 2. Accuracy of interpretation of images as presented*</td>
</tr>
<tr>
<td></td>
<td>○ Yes</td>
<td>○ TP</td>
</tr>
<tr>
<td></td>
<td>○ No</td>
<td>○ TN</td>
</tr>
<tr>
<td>5. Ultrasound Machine</td>
<td>5. ID presence or absence of pericardial fluid</td>
<td>○ FP</td>
</tr>
<tr>
<td>○ Zonare</td>
<td>○ Yes</td>
<td>○ FN</td>
</tr>
<tr>
<td>○ Sonosite Edge</td>
<td>○ No</td>
<td>○ TLS</td>
</tr>
<tr>
<td>○ Sonosite XPorte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Exam Goal</td>
<td>6. Assesses right ventricular chamber size</td>
<td>* 3. Applied clinical knowledge*</td>
</tr>
<tr>
<td>○ Diagnostic</td>
<td>○ Yes</td>
<td>○ Poor</td>
</tr>
<tr>
<td>○ Educational</td>
<td>○ No</td>
<td>○ Good</td>
</tr>
<tr>
<td>○ Procedural</td>
<td></td>
<td>○ Excellent</td>
</tr>
<tr>
<td>7. Exam type</td>
<td>7. Estimates global cardiac function</td>
<td>* 4. Does the exam meet criteria for overall competence?*</td>
</tr>
<tr>
<td>□</td>
<td>○ Yes</td>
<td>○ Yes</td>
</tr>
<tr>
<td></td>
<td>○ No</td>
<td>○ No</td>
</tr>
</tbody>
</table>
in overall number of images with high scores (3, 4, or 5) indicating adequate for image interpretation were found in bedside assessment of the quality of images when compared to the QA evaluation (92% vs. 90.1% \(p = 0.31\)). Considering the QA rating as the standard for this study we found no significant differences among trainees of different levels of training in acquiring adequate images (score 3, 4, or 5). The percentage of adequate images among fellows was 95%, residents 89%, and students 92% (Table 2).

**DISCUSSION**

This study demonstrates that use of a bedside SDOT, in the form of a mobile SurveyMonkey platform linked to a paid SurveyMonkey Team Advantage account), facilitates assessment of competency in POCUS by trainees. Using this tool was straightforward, mobile, easy to implement in real time at the bedside, and facilitated the collection of evaluation data for later export and review. The smartphone platform was chosen because the smartphone is ubiquitous in EDs, the collection tool as designed was easy to use with one hand, and the interface captured a significant number of important data points for later export to spreadsheet and review. It provided an opportunity to evaluate competency in person, at the bedside, at the time of the procedure. These results provide a good foundation for continued work to standardize competency evaluations (in POCUS as well as

![Figure 2. Opath image archival system examination dashboard with images to the left, record of interpretation in the center, and QA template on the right. QA = quality assurance.](image-url)
other EM competencies) for emergency ultrasound trainees. With additional technological capabilities and mobile survey tools like SurveyMonkey and systems like Qpath, the ability to generate both portable, real-time as well as asynchronous, retrospective evaluations has increased. This study highlights the fact that the methods used are feasible to implement, although further research is needed to develop a robust standard competency evaluation tool applicable to other training programs and to the assessment of other important EM competencies.

The SDOT assessment in this study correlated well with traditional assessment by asynchronous measures of competency determined in weekly image review QA. It is the standard in this training program for all resident scans to be reviewed in QA weekly, which absorbs approximately 4 hours of faculty time per week. Given the positive correlation between the bedside SDOT and QA assessments, any resident scans that have been functionally QA’d at the bedside using this tool could eliminate the need for reevaluation of the same scans during QA. This bedside evaluation by ultrasound faculty frees up time that can be redirected to further academic, clinical, and administrative responsibilities.

Finally, the educational benefits of timely feedback delivered to learners is well documented. For residents enrolled in this study, the only feedback they received regarding their performance was delivered through the standard worksheet assessment in Qpath. An improvement from a feedback perspective for the residents would be to have these evaluations immediately available for their review and reflection. Timely provision of feedback has the potential to lead to behavior change on behalf of the learner, which presumably would lead to improved performance of a skill like POCUS. It also aligns well with millennial generation learners and the use of technology to facilitate learning and professional development.

**LIMITATIONS**

This study has several limitations. It was conducted in a single academic center. There is also some heterogeneity of learners, which limits its applicability directly to the ACGME ultrasound milestone; however, the majority of SDOTs were recorded from residents, and this method may provide the foundation for a tool that can be developed for use in EM residencies for other skills central to the practice of EM. As POCUS is introduced earlier in medical education, it will also be important to develop a competency assessment tool which can be applied in undergraduate medical education as well. Similar to the entrustable professional activities developed by the Liaison Committee on Medical Education, POCUS educators will need to keep this in mind as it relates to the evaluation portion of courses. Another limitation relates to the two SDOTs that were incomplete. There were some technological limitations with wireless and mobile networks communicating to the SurveyMonkey platform that may have prevented the final page of the survey from submitting. In the future, the survey tool could include specific limitations to better illustrate these challenges. In addition, some images may have demonstrated adequate views at the bedside, but the

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**Table 2**

Comparing the Agreement Between Real-time SDOT Evaluations at the Bedside and the Evaluations Performed During Image Review at QA

<table>
<thead>
<tr>
<th>Trainees (n)</th>
<th>Agreement, n (%)</th>
<th>Kappa (95% CI)</th>
<th>Strength of agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Image quality</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>142 (87.12)</td>
<td>0.251 (0.02 to 0.48)</td>
<td>Fair</td>
</tr>
<tr>
<td>Fellows (19)</td>
<td>19 (100)</td>
<td>1.00</td>
<td>Perfect</td>
</tr>
<tr>
<td>Residents (93)</td>
<td>81 (87.10)</td>
<td>0.266 (-0.03 to 0.56)</td>
<td>Fair</td>
</tr>
<tr>
<td>Students (51)</td>
<td>42 (84.00)</td>
<td>0.254 (-0.11 to 0.61)</td>
<td>Fair</td>
</tr>
<tr>
<td><strong>Image interpretation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>129 (79.1)</td>
<td>0.486 (0.34 to 0.63)</td>
<td>Moderate</td>
</tr>
<tr>
<td>Fellows (19)</td>
<td>17 (89.47)</td>
<td>0.661 (0.29 to 1.00)</td>
<td>Good</td>
</tr>
<tr>
<td>Residents (93)</td>
<td>72 (77.42)</td>
<td>0.412 (0.22 to 0.61)</td>
<td>Moderate</td>
</tr>
<tr>
<td>Students (51)</td>
<td>40 (78.43)</td>
<td>0.513 (0.27 to 0.76)</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

QA = quality assurance; SDOT = standardized direct observation tool.
*Image quality was rated as 1 to 5 in which images that scored as inadequate for clinical decision making (1 and 2) were compared to the images scored as adequate for clinical decision making (3, 4, and 5).
trainee’s selection of views for archiving as clips may have limited the assessment of competency at the asynchronous QA session. Finally, inter-rater agreement for the SDOT was not assessed in this study, as only one faculty member was present at the bedside for any one SDOT evaluation.

**CONCLUSION**

Bedside standardized direct observation tool assessment of point-of-care ultrasound competency using a mobile SurveyMonkey platform correlates well with traditional competency evaluation by asynchronous weekly image review quality assurance and provides a readily exportable record suitable for documenting experience to a trainee’s portfolio.

**References**

Window to the Unknown: Using Storytelling to Identify Learning Needs for the Intrinsic Competencies Within an Online Needs Assessment

Eric K. Tseng, MD, MScCH, David Jo, MD, Andrew W. Shih, MD, Kerstin De Wit, MD, MSc, FRCPC, and Teresa M. Chan, MD, MHPE

ABSTRACT

Introduction: Needs assessments are important for developing online educational resources, but they frequently do not capture learning needs in the intrinsic physician competencies. Storytelling exercises, by promoting critical reflection and emphasizing values and context, may assist curriculum developers in identifying emergent knowledge gaps in these areas that are initially unknown to learners.

Methods: We developed an online curriculum for thrombosis and hemostasis based on an open-access online needs assessment comprised of a topic list, case scenarios, and storytelling exercise. In the storytelling exercise, learners described 1) a difficult clinical case and 2) why that case was difficult. In this qualitative descriptive study, we performed a secondary thematic analysis of this storytelling data, coded for the CanMEDS 2015 intrinsic roles. Two investigators independently coded transcripts with iterative comparison.

Results: A total of 143 respondents completed the storytelling exercise. All responses yielded a gap in medical expertise, while 25 (17.5%) described an additional intrinsic role. Learning needs in all six intrinsic roles were identified. The most commonly cited learning needs were in the leader (recognizing how resource allocation impacts health care), communicator (communicating knowledge with patients), and collaborator (unclear communication between providers) roles. These excerpts were notable for how they expressed the complexity and affective components of medicine.

Conclusions: Storytelling exercises can highlight context, attitudes, and relationships that provide depth to needs assessments. These narratives are a novel method of identifying gaps in intrinsic physician competencies.
that are initially unknown by learners (Johari window). These emergent intrinsic learning needs may be used to enrich learner-centered curricula.

The needs assessment is an important first step in planning educational programs for health professions education. In designing needs assessments to address gaps in knowledge, skills, or attitudes, it may be helpful to conceive of learning needs as being either known (or apparent) to learner and teacher or unknown (gaps that are not immediately apparent to learner and/or teacher).\(^1\)

The interplay between these known and unknown gaps is illustrated by Johari’s window, a 2 \times 2 taxonomy that displays what is known and unknown to the learner and/or teacher (Figure 1).\(^2\) Different needs assessment methods may address learning gaps by touching upon separate aspects of this taxonomy. For example, open needs (known to both learner and teacher) may be ascertained through focus groups, surveys, and interviews that establish what learners desire to learn.\(^3\) By contrast, audits and knowledge tests may aid in determining deficiencies that are not immediately apparent to learners (but may be suspected as deficiencies by teachers).\(^4\)

Learning needs that are unknown to both learner and teacher may be the most challenging to ascertain. Identifying these gaps, which Luft and Ingham\(^4\) would classify as “unknown” needs within the Johari window, often requires feedback from patients or multisource feedback which may be impractical to obtain. This challenge becomes exacerbated when attempting to identify gaps in the nonmedical expert, or “intrinsic,” physician competencies. These intrinsic competencies are highlighted in several physician competency frameworks, including CanMEDS 2015 (collaborator, leader, scholar, communicator, health advocate, professional) and the Accreditation Council for Graduate Medical Education (ACGME) Core Competencies (practice-based learning and improvement, systems-based practice, interpersonal and communication skills, professionalism).\(^5,6\) Strategies to determine intrinsic needs have included focus groups, questionnaires, and standardized patient encounters.\(^7-9\) However, these methods may be inefficient, challenging to implement, and seldom detect gaps that are not already known to learner and teacher. How then can we more efficiently and effectively discern the unknown intrinsic role needs of practicing clinicians?

A possible answer may lie in the use of storytelling exercises. Storytelling within medical education may impact learners by enabling the exploration of complexity, uncertainty, and doubt. Through the recounting of stories, the immediate, specific, and practical challenges presented in clinical experiences may help to emphasize the importance of attitudes and values within medicine.\(^10-13\) Through their rich descriptions of narrative, storytellers may undergo a process of critical reflection on their professional roles, which commonly involve physician competencies within nonexpert domains.

A recent report from our group described the utility of a storytelling exercise as a novel method of ascertaining learning needs, within a so-called “Massive Online Needs Assessment (MONA).”\(^14\) In this study we present the findings from a preplanned qualitative secondary analysis of data from these exercises within the MONA. Herein, we hypothesized that the use of storytelling exercises would enable the declaration of learning needs in the intrinsic competencies that are unknown to both learners and teachers. These findings were used to inform the development of a learner-centered

![Figure 1. The Johari window. The original Johari window of Luft and Ingham, with its application to differing needs assessment modalities.](image-url)
curriculum incorporating learning needs in the intrinsic competencies.

**METHODS**

**Study Design**

This was a qualitative interpretive description study in which we performed a thematic analysis of data collected from within a MONA to create an online curriculum in thrombosis and hemostasis. Interpretive description, which springs from nursing and other applied disciplines, is a type of generic qualitative method that examines any text (in this case stories generated within a needs assessment survey), hoping to discover themes that might emerge during an analysis. The complete methods for the MONA has been previously described in our initial study but is summarized here.

The needs assessment was embedded as an online survey within a blog post on CanadiEM.org, a self-identified Free Open Access Medicine (FOAM)-aligned website. It consisted of three parts that were completed in one sitting: a topic list (and opportunity to free-text self-identified learning needs), case scenarios with multiple-choice questions, and a storytelling exercise (see Table 1). For the storytelling exercise there was no word limitation, and responses were collected in English and Spanish.

**Study Participants and Data Collection**

The survey was created as a Google form (Mountainview, CA), and responses were entered directly by participants online. The MONA was left open from September 20 to December 10, 2016, and took approximately 30 minutes to complete. The study team recruited participants on social media via a separate CanadiEM blog post, Twitter, and Facebook. Enrollment was open to all health care providers who were practicing or in training, including physicians and nonphysicians. As such this was a convenience sample composed of providers with varying experience levels.

**Data Analysis**

Free-text data from the storytelling exercise was extracted. Content analysis of open-ended text responses was performed in an iterative fashion informed by fundamental qualitative description and coded for intrinsic competencies found within the CanMEDS 2015 competency framework. CanMEDS was chosen as the coding framework, instead of the ACGME Core Competencies, as it is well established within Canadian medical education, and a significant proportion (35%) of the CanadiEM readership is Canadian. Using an established framework such as CanMEDS would also facilitate curriculum development based upon the results of this secondary qualitative analysis. This data-driven, low-inference approach was chosen to identify and describe emergent themes present in the textual responses.

Two investigators (ET, DJ) read and independently coded each transcript and then compared codes to resolve discrepancies and reach consensus for themes in the coding framework. Written notes from each reviewer were also analyzed for additional themes. Cases of discrepant coding were resolved by a third

<table>
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<tr>
<th>Table 1</th>
<th>Phases of MONA</th>
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<td>Phase</td>
<td>Description</td>
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<tr>
<td>1. Online survey of topics</td>
<td>A list of possible topics as learning needs was generated by content-area experts. Participants were provided this list in an online survey and asked to identify which topics they considered to be learning needs. They were also asked to list any additional topics they identified as learning needs, as free text.</td>
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<tr>
<td>2. Case scenarios followed by multiple choice questions</td>
<td>Participants were presented with five online case scenarios, with a case vignette followed by three multiple choice questions. Questions were developed by content-area experts.</td>
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<tr>
<td>3. Storytelling exercise</td>
<td>In free text, participants were asked to describe difficult cases they had encountered involving derangements in bleeding and/or clotting. They were asked two questions: “Please describe a difficult scenario you had due to clotting or bleeding, or where you had a patient with a blood disorder. Please do not put confidential information such as name or location. Keep your story generic.” “Please tell us why the scenario was difficult for you.”</td>
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MONA = Massive Online Needs Assessment.
reviewer with experience in qualitative research methodology (TC). Techniques to ensure analytic rigor included the use of written notes and the incorporation of differing perspectives in the analytic team, as the group included a medical student (DJ), clinical fellow (ET), and attending physician (TC) from different medical specialties (hematology, emergency medicine).

Ethics
This study received approval from our institutional review board (Hamilton Integrated Research Ethics Board, File 2016-1954-GRA).

RESULTS
A summary of MONA participant characteristics can be found in Table 2. Most respondents were training or practicing physicians from North America. Most participants were hospital-based physicians in emergency medicine or internal medicine, which reflects the readership of CanadiEM.org.

A total of 198 participants provided responses to any phase of the needs assessment, of whom 143 (72.2%) completed the storytelling exercise. All storytelling responses yielded a medical expert need, while 25 (17.5%) described at least one additional nonexpert learning need (Figure 2). The most commonly cited intrinsic roles were collaborator (8/25 responses, 32.0%) and leader (8/25, 32.0%), followed by scholar (4/25, 16.0%), communicator (3/25, 12.0%), advocate (3/25, 12.0%), and professional (1/25, 4.0%). Participants whose storytelling responses described an intrinsic learning need were primarily from emergency medicine (21/25, 84.0%), along with one individual in each of internal medicine, critical care, anesthesia, and obstetrics. Among the responses describing an intrinsic competency, nine of 25 (36.0%) were physicians practicing at least 5 years, seven of 25 (28.0%) were physicians practicing less than 5 years, five of 25 (20.0%) were medical students or residents, and four of 25 (16.0%) were interdisciplinary (registered nurse, pharmacist, physician assistant).

Themes relating to the intrinsic competencies were reflected in the intrinsic roles of the CanMEDS 2015 competency framework (Table 3). Excerpts were notable for how they exhibited the complexity of clinical medicine, with their affective components making them memorable and difficult for both training and practicing providers.

Responses Reflecting Collaborator Role
The ability of health care professionals to communicate and work together effectively to provide patient-centered care was frequently cited. Stories often situated the learner as caught in the middle between consultants or colleagues who were failing to communicate with each other, leaving the learner as primary physician in an uncertain position. This reflects our participant demographics as most were in primary care or generalist specialties.


WHY difficult: Balancing risk of thrombosis with intracranial bleeding risk

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<td>Participant Characteristics</td>
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<td>Other</td>
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Data are reported as n (%).
This story demonstrates frustration and lack of clarity on the part of the learner, who is not receiving advice regarding management as multiple specialists do not collaborate effectively. While the story clearly reflects a medical expert need, it also speaks to workplace complexity and the ability to navigate between providers. It suggests that a curriculum focused on interprofessional collaboration and communication would be of particular benefit.

A similar theme reflecting a lack of shared knowledge and perspective between providers was also reflected by learners at the systems level. Here, a lack of prior consensus between physician groups resulted in difficult decision making at the bedside:

**Story:** Young guy, 20 [years old], with sickle cell disease used to get blood transfusions by the pediatric ward; now his hematologist says he can’t. Now comes in with sickle cell pain crisis, [hemoglobin] 70 g/L. Transfuse or not?

**WHY difficult:** Because [of] the completely different approach[es] of our pediatricians compared to our [adult] hematologists.

In this excerpt the learner has not consulted a specialist yet but is drawing on prior experience to highlight the lack of agreement between physicians. The learner suggests that a more unified collaborative approach would provide clarity.

**Responses Reflecting Leader Role**

Several respondents highlighted how resource limitations affected their ability to provide optimal care. Their case descriptions suggested that they knew from a medical expert perspective what the appropriate management should have been; the difficulty was in the allocation and availability of resources in their setting.

**Story:** Patient with massive GI hemorrhage from esophageal varices. He vomited at least a liter of bloody emesis. Besides liver disease he was also on [rivaroxaban].

**WHY difficult:** I was at a community affiliate site with limited resources. No GI availability and had to stabilize prior to transfer . . . [I] had to administer various agents to reverse liver-associated coagulopathy and [rivaroxaban].
While recognition of resource limitation is a first step in developing a high-quality system, there are many downstream skills that are needed to enact change to improve the quality and patient safety. These leader competencies—applying the science of quality improvement, resource stewardship, and team leadership—were not reflected in the responses received, possibly due to how the questions were framed. However, given that multiple respondents cited resource limitation as a primary challenge, this theme suggested that strategies for navigating resource constraints were worth exploring in the online curriculum.

**Responses Reflecting Scholar Role**
Health care professionals are expected to practice lifelong learning through continuing education, teaching, evaluation of evidence, and scholarly contributions. These components of the scholar role encompass skills that are often learned outside of the clinical setting. However, the stories were indicative of how the need for skills in seeking and evaluating evidence may have implications at the bedside. The example below illustrates the challenges of integrating an evidence-based approach to the uncertainty of clinical medicine:

**Story:** DVT vs. cellulitis—unclear if application of Wells DVT criteria was correct—preceptor ignored Wells score as it just “didn’t quite look like a DVT.” Goes on to ultrasound leg anyway, [and] we [treated] for cellulitis.

**WHY difficult:** Even with easy access to Wells DVT criteria on MedCalc, it is difficult to know if application of rule is correct. For instance, I think more teaching is needed as to what “localized tenderness along deep venous system” is . . . I’d also like more help learning about how this rule helps us clinically, the population it was studied in, and what to do when your patient doesn’t fit the study population.

Other participants similarly described scenarios in which there was uncertainty and cited aspects of the scholar role that would help them address their clinical queries. This included comments about strategies for obtaining reliable information for uncommon conditions and descriptions of how reflecting on such experiences led to self-improvement.

**Responses Reflecting Communicator Role**
The ability to communicate effectively with patients is a key physician competency. Effective communication skills encompass a suite of abilities including effective listening, eliciting information, patient counseling, and making informed decisions based on patient preferences. Respondents who cited the communicator role focused primarily on the challenges of providing information using effective explanatory skills. This was relevant as the scenarios described exhibited competing risks of thrombosis and bleeding.

**Story:** I find it difficult to truly communicate what the risk of bleeding is versus the risk of clotting, even with risk scores, in a way that patients understand, for things like stroke or [pulmonary embolism].

**WHY difficult:** Risks and benefits of both bleeding and clotting are real but small in a lot of cases (for example, stroke with [atrial fibrillation], and I find patients don’t pay much attention to small numbers.

This passage is striking in that the storyteller has chosen to discuss a theme of difficulty in communication skills that applies across many patients for a common clinical scenario. It suggests that a curriculum addressing this topic would be enriched by describing practical strategies for patient-centered communication.

**Responses Reflecting Health Advocate Role**
Physicians as health advocates contribute their expertise and leverage their position to support patients in improving their health. Advocacy may involve recognizing and responding to the needs of either individual patients or their broader communities. A few trainees acknowledged that determinants of health were key factors that impacted access to health care, adding complexity to the patient interaction.

**Story:** Young female patient with new [deep vein thrombosis], no prior, unprovoked [event]. No insurance or coverage for medications.

**WHY difficult:** Had difficulty with choice of anticoagulant, given cost and
accessibility restraints, and also difficulty providing information to patient regarding ‘best’ choice considering long duration of therapy.

In this passage, the respondent has identified an obstacle that would greatly impact therapeutic options. In an otherwise straightforward scenario, the difficulty was driven not by a knowledge gap but by socio-economic barriers. This suggests that a learner-centered curriculum would potentially reflect how experienced providers advocate for patients in these settings.

**DISCUSSION**

Determining learning needs provides the foundation for planning continuing education for learner-centered curricula. Creating an online curriculum is challenged for planning continuing education for learner-centered curricula. Determining learning needs provides the foundation for identifying learning needs may be unreliable as learners often have difficulty assessing their own performance. There have been few studies with high-quality comparisons of self-assessed needs against valid assessments of learning needs. The use of mixed methods for needs assessment has also been employed by Amery et al. These authors identified different learning needs among hospice physicians when answers on a questionnaire were compared with interview responses based on incidents recorded in an educational diary; the diaries/interviews revealed intrinsic learning needs related to communication, teamwork, and personal coping strategies. Our study was similar in identifying different learning needs by using a strategy that promoted self-reflection. Ample literature has suggested that learners in the medical education context lack the ability to self-assess adequately. Our hope is that by incorporating elements of storytelling elements in needs assessments we can prompt learners in this space to reveal to continuing professional development providers their more hidden needs.

The most commonly described intrinsic competencies in this small sample were the collaborator and leader roles. Within the collaborator role, learners primarily expressed challenges in communicating with other physicians and health care providers in complex scenarios. Meanwhile, in the leader role the focus was on strategies for delivering care in resource-limited settings. These responses may have reflected the complexity of the cases presented in which collaborative decision-making or specialist-level resources would be warranted, with overlap between different intrinsic roles. Although it is unclear whether the use of a storytelling exercise in another context would yield a
similar distribution of learning needs, the main utility of this exercise was to identify learning topics.

It is notable that the storytelling exercise yielded expert and nonexpert learning needs expressed by both practicing and training providers. The FOAM movement provides an avenue for continuing education but is primarily focused on providing expert content. This is consistent with surveys of practicing providers; for example, a study of practicing academic emergency medicine physicians described a strong preference for expert continuing education content. The identification of intrinsic learning needs in this study demonstrates the utility of a storytelling exercise to identify a spectrum of needs from a heterogeneous group of learners that can be addressed in future educational programs. Harnessing the power of these questions in a more homogenous or local groups may prove to be even more powerful than what has been shown in this study—since local participants may be more readily able to use stories to highlight idiosyncratic needs at their own institution (e.g., need for joint conflict resolution workshops with one specific consultant group, if recurrent difficulties occur within that field).

The Johari window is a conceptual framework that can help others to explore new ways of making the hidden, blind, and unknown aspects of our learners’ needs more apparent to us for the purpose of planning new continuing education resources. For our own purposes, we have harnessed the power of our needs assessment mentioned in this paper to develop goals and objectives for a curriculum we are publishing via the online CanadiEM blog. This new series (entitled “Blood & Clots”) harnesses the power of blog posts, infographics, and podcasts to deliver content derived from this phase of our needs assessment. Specifically, the podcast (titled the “Thrombophonia”) takes the stories we have gathered to create clinical vignettes that serve as the entry point for a deep dive into difficult scenarios.

**LIMITATIONS**

One limitation in this study was the small group of learners sampled. While we did not reach theoretical saturation of the themes identified owing to the study methodology, there was substantial repetition of themes that would be integrated and triangulated with other data from the MONA. It is also notable that only 25 of 143 (17.5%) of storytelling respondents cited an intrinsic competency. It is unclear whether these proportions would have been reflected in a larger sample and whether the types of intrinsic roles cited would differ.

Another limitation was the lack of a control group as all potential respondents were asked to complete all parts of the MONA, including the storytelling exercise. While this may limit our ability to determine if learners, in their storytelling, were merely stating an already-perceived need (compared with an unknown need), none of the learners volunteered an intrinsic learning need when provided with the opportunity to list, by free text, any additional learning topics in the first portion of the MONA (Table 1). This may suggest that storytelling indeed prompted the uncovering of learning needs that were not explicitly expressed or apparent to learners before the MONA. In future studies one would consider asking learners specifically if they perceived any learning needs specifically in the nonexpert competencies.

Another limitation was the lack of a “criterion standard” by which to compare needs gleaned from the storytelling exercise. For practical reasons it would be challenging to ascertain whether, for example, a learner identifying a collaborator issue in a thrombosis scenario had broader difficulties with collaboration in practice. Given the learner-centered aims of this resource, such triangulation would be of limited value as the developed intervention would still be likely to benefit other learners. A third limitation was the brevity of reflection in this exercise. While other publications have allowed for longer pieces to promote critical reflection, a shorter exercise in our MONA enabled focused identification of key issues. It is also possible that a greater length or depth of answers would be provided if the needs assessment were performed in person, but this would not be amenable to widespread distribution online as part of the MONA. Our initial framework of intrinsic needs could be used to develop a more comprehensive questionnaire or interview guide to inform further learning needs.

**CONCLUSION**

Requests for storytelling can highlight the context, attitude, and relationships present in the complexity of medicine. The eliciting of such narratives may capture new learning needs in the intrinsic competencies that are unknown to both faculty and learners. These
intrinsic learning needs may ultimately be used to enrich learner-centered curricula.

References

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Iatrogenic Critical Care Procedure Complication Boot Camp: A Simulation-based Pilot Study

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ABSTRACT

Background: Traditional medical education strategies teach learners how to correctly perform procedures while neglecting to provide formal training on iatrogenic error management. Error management training (EMT) requires active exploration as well as explicit encouragement for learners to make and learn from errors during training. Simulation provides an excellent methodology to execute a curriculum on iatrogenic procedural complication management. We hypothesize that a standardized simulation-based EMT curriculum will improve learner’s confidence, cognitive knowledge, and performance in iatrogenic injury management.

Methods: This was a pilot, prospective, observational study performed in a simulation center using a curriculum developed to educate resident physicians on iatrogenic procedural complication management. Pre- and postintervention assessments included confidence surveys, cognitive questionnaires, and critical action checklists for six simulated procedure complications. Assessment data were analyzed using medians and interquartile ranges (IQRs), and the paired change scores were tested for median equality to zero via Wilcoxon signed rank tests with p < 0.05 considered statistically significant.

Results: Eighteen residents participated in the study curriculum. The median (IQR) confidence increased significantly by a summed score of 12.5 (8.75–17.25; p < 0.001). Similarly, the median (IQR) knowledge significantly increased by 6 (3–8) points from the pre- to postintervention assessment (p < 0.001). For each of the simulation cases, the number of critical actions performed increased significantly (p < 0.001 to p = 0.002).

Conclusion: We demonstrated significant improvement in the confidence, clinical knowledge, and performance of critical actions after the completion of this curriculum. This pilot study provides evidence that a structured EMT curriculum is an effective method to teach management of iatrogenic injuries.
frequently underreported, making their management crucial to enhancing patient safety. The inevitability and variability of procedural errors has demonstrated the need for training in these clinical skills that incorporates crisis resource management and error management strategies. A formal curriculum to train residents in the leadership and management of iatrogenic procedural errors is paramount to ensuring patient safety.

Error management training (EMT) requires active exploration and encouragement for learners to make errors and learn from those errors. EMT allows exposure to high-acuity, low-frequency situations while enhancing the learner’s thought process during clinical management. Studies demonstrate that when the learner is encouraged to make mistakes during training he or she is able to recognize knowledge deficits without exposing patients to further morbidity. Learning from errors enhances critical thinking and discussion of subsequent consequences, while creating memory consolidation of the appropriate management.

Another benefit of EMT is emotional control in subsequent situations due to the exposure in a controlled setting. Simulation-based training is the ideal method to expose learners to difficult, infrequent situations and allow the learner to freely make mistakes without compromising patient safety.

In recognizing the educational need, we developed a curriculum to provide foundational knowledge and leadership training for physicians in the management of iatrogenic injuries. In teaching the management of these iatrogenic injuries in the simulation environment, students may be encouraged to intentionally make errors in this controlled environment without any direct consequences to patients. The aim of this brief report was to identify if the use of this standardized novel curriculum would improve learners’ confidence, cognitive knowledge, and performance with iatrogenic injury management.

METHODS

Study Location and Equipment

The study was performed in a tertiary care, university-affiliated teaching hospital simulation laboratory. The 3-day iatrogenic boot camp curriculum was designed for residents and fellows involved in performing critical care procedures. High-fidelity patient simulators were set up to exhibit iatrogenic complications that learners were expected to recognize and manage as they entered the room. As dictated by the scenarios, the simulators were modified to reflect an iatrogenic injury and the subsequent manifestation of mismanaging that complication, i.e., results of student errors (Data Supplement S1, Figure S1, available as supporting information in the online version of this paper, which is available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10317/full). The simulation setup included a simulated patient monitor, crash cart, intubation box, images to be provided as requested, one to two confederate actors who provided background and assisted the learner without providing guidance or suggestions, and other equipment for each scenario if requested by the learners. This study was deemed exempt from review by the local institutional review board.

Curriculum Development

The curriculum consisted of three parts: preintervention, intervention, and postintervention. The confidence survey, knowledge test, and critical action checklists were identical for both pre- and postintervention evaluation. These evaluation elements were created and assessed by five emergency medicine-trained faculty members after an extensive literature review was completed. The critical action checklists were pilot tested with trial runs of each simulation case to ensure they were comprehensive, logical, and easy to use for faculty. Each participant was scheduled for 10 hours over 3 days. The cases included propofol overdose, chest tube placed below the diaphragm, tracheal laceration during attempted intubation, pneumothorax after attempted central venous catheter placement, central venous catheter placement in the carotid artery, and pneumothorax on the ventilator.

Participants, Faculty, and Staff

Residents and fellows from emergency medicine, pediatrics, surgery, and pediatric emergency medicine were invited to participate. Two medical simulation fellowship-trained emergency medicine physicians were present to assess the critical actions and lead the debriefing and intervention phase. A respiratory therapist with medical simulation training participated in the ventilator case debriefing. Each station required one simulation technician.

Preintervention Assessment

On study day 1, each learner completed an 11-item confidence assessment on the management of
iatrogenic injuries using a 1 to 5 Likert scale, a 21-question multiple-choice knowledge test, and four questions pertaining to the learner’s personal exposure and management of actual clinical errors (see Data Supplement S1, Appendixes S1 and S2). Learners individually engaged in six 10-minute simulation scenarios and were assessed using the predetermined critical actions checklist (see Data Supplement S1, Appendix S3). Feedback was not given during the preintervention phase and students were instructed to manage each simulated case to the best of their ability to assess baseline performance.

Educational Intervention
Study day 2 was the educational intervention in which learners went through each the six 10-minute simulations as a group with a subsequent faculty-led bedside debriefing and didactic lecture lasting 45 to 50 minutes (6 hours total). Learners were explicitly told of the objectives of the curriculum and were encouraged to make errors in the management of the iatrogenic errors that originated with each case. This was done to allow for a better understanding the manifestations of mismanagement and to gain further clarity on how to manage these errors.

Postintervention Assessment
Learners completed confidence surveys and multiple-choice knowledge tests identical to the preintervention assessments on day three. Participants individually underwent the same six scenarios and were assessed using the same critical action checklists.

Data Analysis
Data were analyzed using Microsoft Excel and SPSSv24.0. Cohort specialty and training year designation were summarized using frequencies and percentages. Knowledge test, confidence scores, and critical actions were summed. The median, interquartile range (IQR), and range were used. The paired change scores were tested for median equality to zero via Wilcoxon signed rank tests with p < 0.05 via two-sided testing considered statistically significant.

RESULTS
A significant time investment by faculty, staff, and students was required to develop, implement, and assess this iatrogenic injury management curriculum, including approximately 80 hours for development of the curriculum, simulation cases, assessments, and rehearsals plus 12 hours to create the simulator modifications. The students attended the curriculum for 10 hours each and overall the faculty and staff ran 228 simulation cases.

Demographics
Eighteen physicians in postgraduate training participated representing emergency medicine (11, 61.1%), pediatric emergency medicine (five, 27.8%), pediatrics (one, 5.6%), and general surgery (one, 5.6%). Their current postgraduate years (PGY) were three PGY-1 (16.7%), four PGY-2 (22.2%), five PGY-3 (27.8%), three PGY-4 (16.7%), two PGY-5 (11.1%), and one PGY-6 (5.6%).

Two (11%) learners reported having received any formal training on how to correct errors that have already occurred. Four (22%) reported having caused an iatrogenic complication during postgraduate training. With regard to assistance for an iatrogenic error, two (22%) learners required assistance from another medical provider for an iatrogenic injury and three (17%) have corrected/assisted another provider after they caused an iatrogenic error.

Simulations and Assessments
Overall, 228 simulations were performed for this study, including 108 for preintervention assessments, 12 for formative training, and 108 for postintervention assessments. Each subject had significantly higher scores postintervention for each assessment (Table 1). The increased change in the knowledge assessment and confidence score ranged from 1 to 10 and 1 to 26 points, respectively.

DISCUSSION
Despite the significant potential educational benefit, leadership training, and patient safety benefits, there is a paucity of iatrogenic complication management literature. This is likely due to the lack of familiarity with the concept and benefits of EMT, the lack of appreciation of the importance of formally training residents how to manage errors once they have occurred, and the time and effort needed to effectively execute a curriculum focused on this rarely discussed topic.

This 3-day simulation-based curriculum demonstrated increased learner confidence, knowledge, and performance during high-fidelity simulated cases with iatrogenic injury management. A learning environment
in which the learners are faced with premeditated complications and are encouraged to make errors while managing complications will eliminate leaving these experiences to chance during training. Strengths of this novel curriculum included the iatrogenic-based simulation scenarios; encouragement; and ability to make errors without risk of harm to patients, repetition of the scenarios with debriefing, direct supervision with hands-on bedside training, and the focused didactic lectures on the appropriate management of iatrogenic procedural errors immediately after debriefing.

All learners demonstrated improved performance in each iatrogenic procedural complication scenario. Overall, the pneumothorax on the ventilator case has the lowest preintervention scores, which may be attributed to the high reliance on respiratory therapists and intensivists to manage the ventilator. During the propofol overdose case, many learners performed initial management measures such as providing a fluid bolus and administering positive pressure oxygen, but did not provide more aggressive treatment such as intubation and vasopressor support after vital signs deteriorated. The carotid artery cannulation case highlighted the need for iatrogenic EMT as many learners made the significant error of pulling the central venous catheter out of the dilated carotid artery, resulting in the development of a large neck hematoma with subsequent airway compromise and patient decompensation. The learners verbalized being unaware of the possibility of having airway compromise secondary to an expanding neck hematoma and did not recognize the need to urgently intubate the patient after making this error in management. In contrast, many critical actions were met on initial assessment of the misplaced chest tube; however, learners routinely missed determining a need for blood transfusion and obtaining additional imaging which demonstrated limitations in making independent clinical management decisions.

Although not formally assessed in this curriculum, some residents lacked fundamental understanding of some procedures, which was highlighted when forced to manage associated complications. By teaching leadership skills and management of complications, learners may better understand the procedure and underlying pathophysiology, as well as enhance their critical thinking.

Postcurricular feedback indicated that the learners felt that the scenarios were realistic and that the repetition helped them to remember specific management strategies and increased their confidence. They appreciated that they had to provide orders, assess the patient, and manage the complication without assistance and subsequently felt more responsible for the patient management and remembered management specifics in greater detail. The learners suggested improved time management in the study as several unexpected delays occurred on the first day of preintervention assessments and wanted to know the “correct answers” of the day 1 scenarios and have reading material to enhance knowledge prior to the formative training sessions.

**LIMITATIONS**

This study had several limitations. This was a small, single-site pilot cohort study that utilized a convenience
sample that was limited due to the 3-day commitment needed to complete the curriculum. Although all our assessment tools were developed by a panel of content experts, nonvalidated tools were utilized for assessment.

CONCLUSIONS

This curriculum was developed with the objective of establishing a formal and structured approach for the management of iatrogenic procedural complications. Knowing how to manage complications is a critically important patient safety objective. This curriculum serves as a guide for others to explore opportunities to improve patient safety, learner competence, and leadership and could be incorporated into an interprofessional curriculum. Overall, this study demonstrated significant improvement in the confidence, knowledge, and performance of critical actions after the completion of this curriculum and provides evidence that a structured curriculum is an effective method to teach the management of iatrogenic injuries.

References


Supporting Information

The following supporting information is available in the online version of this paper available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10317/full

Data Supplement S1. Supplemental material.
An Emergency Medicine Remediation Consult Service: Access to Expert Remediation Advice and Resources

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ABSTRACT
Resident remediation is a complex and common issue in emergency medicine programs and requires a specific knowledge base. The Remediation Task Force (RTF) of the Council of Residency Directors in Emergency Medicine (CORD-EM) was created to identify remediation best practices and to develop tools for program directors. Initially housed on a Wiki page, and now located within the CORD-EM website, the RTF provides resources including accepted universal language for documentation and sample remediation plans. The RTF also created a remediation consult service composed of experienced educators to provide real-time structured feedback and advice to submitted remediation scenarios with consultation outcomes and conclusions uploaded to the website. CORD-EM members now have easy access to online resources and expert advice for remediation queries through the consult service. The combination of online resources and access to real-time expert advice is an innovative approach to improving resident remediation and recognizing best practices.

NEED FOR INNOVATION
Emergency medicine (EM) residency leaders commonly identify residents requiring remediation. A survey of EM programs directors (PDs) demonstrated that the prevalence of remediation was 4.4%, with 90% of PDs reporting at least one resident and 66% reporting multiple residents undergoing remediation in the previous 3 years.1 Other specialties have demonstrated similar remediation rates in national PD surveys.2-4 Additionally, PDs across specialties report residents on remediation frequently have several deficiencies across several core competencies.1,5 Successful remediation requires a complex and multifaceted approach to optimize success.6 EM PDs report an 8.8% failure rate for remediation efforts, which may lead to prolonged remediation, probation, or even termination.1 Given these facts, we believed EM PDs could benefit from best practice recommendations and formal consultation with remediation experts. To our knowledge, a national specialty-based consultation service for PDs focused on remediation has not previously been described in the literature.

BACKGROUND
The Council of Residency Directors in Emergency Medicine (CORD-EM) Remediation Task Force (RTF) was developed to provide tools to identify struggling residents...
and to disseminate remediation best practices. Since its inception, RTF members have developed significant expertise in resident remediation, published best practices, lectured on remediation topics, and participated in annual remediation consult workshops at the CORD-EM Academic Assembly.\textsuperscript{1,6–13} The RTF recognized the significant need for remediation resources through involvement in national meetings, inquiries from the CORD-EM membership, and a PD survey conducted in 2016. PDs desired a toolbox providing remediation resources, plans with universally acceptable language, and an opportunity to seek advice. Initially the RTF received ad hoc consultations from CORD-EM members at meetings and through informal contacts. While each remediation situation was unique, common themes were frequently encountered. The RTF thereby determined that CORD-EM members would benefit from sharing experiences and expertise in remediation practices. Wiki pages are uniquely suited to the collaborative collection of resources when academicians are separated by time and distance. In an attempt to streamline and collate resources, the RTF developed a remediation Wiki as a centralized resource.

Examples of consultant services in academic medicine have been published in the literature. The residency assistance program is a consultative service available since 1975 to family practice residency programs specifically geared toward program development and operation.\textsuperscript{14} The Society for Academic Emergency Medicine offers consultation services for faculty development, residency program development and maintenance, and ethics.\textsuperscript{15} Other specialties have also published remediation tips and guidelines for PDs without demonstration of individualized consultative support.\textsuperscript{16–21} The Department of Medicine at the University of Pennsylvania has shown remediation success through their Early Intervention Remediation Committee, which developed faculty experts in remediation and referred learners to a central committee. In 2 years, they successfully remediated all trainees who were referred to this committee in multiple competencies.\textsuperscript{22} To our knowledge, there is no published literature that has demonstrated a remote national remediation consultation service for PDs.

**OBJECTIVE OF THE INNOVATION**

To formalize a process to address ongoing consultation requests from the CORD-EM membership, the RTF launched the remediation consult service (RCS) in 2016. The RCS would serve as an unbiased, expert resource for PDs struggling with remediation situations and ultimately create a case-based collection of examples for the membership.

**DEVELOPMENTAL PROCESS**

Utilizing a constructivist framework, incorporating both experiential learning theory and sociocultural learning theory, a task force model was developed.\textsuperscript{23} Under the constructivist framework, our task force acknowledged that there are many ways to view a situation, with many truths and meanings to be discovered, each built from the varied perspectives of those involved in the analysis. This framework was the basis for our process, where multiple RTF members would be asked to analyze the problem and would provide both their individual experience to construct a solution for the PD. Within the constructivist framework, the core tenets of experiential learning (that learning exists within a context) and of sociocultural learning (where the interactions of the group create and enhance learning) were considered. Specifically, RTF members were given details of not just the domain requiring remediation (e.g., medical knowledge), but also of the unique and individual circumstances of each resident that required consideration (the context). Individual suggestions were not viewed in isolation but linked together as group recommendations and were used to construct solutions for PDs.

The RTF created subcommittees mirroring the six ACGME core competencies (medical knowledge, patient care, interpersonal and communication skills, professionalism, systems-based practice, and practice-based learning and improvement [i.e. the core competency should be practice-based learning and improvement]). Subcommittee chairs were all members of residency leadership teams with extensive remediation experience and longitudinal membership on the RTF. Each had an identified area of interest for his/her core competency and worked to develop materials for the RTF’s centralized resources and Wiki. As a result, subcommittee chairs became experts in content related to remediation in their designated competencies. These chairs would function as content experts for the new RCS conceptualized by the RTF chairs.

**IMPLEMENTATION PHASE**

After the 2016 CORD-EM Academic Assembly, the RTF notified members of the new RCS through
electronic notification on both the CORD-EM newsletter and the national CORD-EM e-mail listserv. The RCS is accessible through a centralized e-mail address (rtfconsult@cordem.org) that autoforwards to the RTF Chair.

Consult requests were distributed to the appropriate subcommittee chair(s) based on the identified core competencies requiring remediation determined after screening by the RTF Chair. Identifiable information about the person requesting the consult or the specific resident was blinded for the consult team. Feedback from subcommittee members was collated and shared with the requestor. This feedback included type of problem identified, potential remediation resources, suggested interventions, as well as guidance on documentation, inclusion of key institution and departmental stakeholders, progress tracking, and follow-up consideration. After the consultation was complete, the RCS recommendations were uploaded to the remediation Wiki as a resource for the general CORD membership.

The remediation Wiki contained resources including examples of remediation contracts, recently published remediation literature, guidelines for remediation based on core competencies, and individual consults and responses from the RTF consult service. In June 2018, CORD moved the remediation Wiki to its own webpage for easy access to the members: http://www.cordem.org/resources/residency-management/remediation-resources/. The RCS continues to post completed consultations with unique content to the new webpage for member review through the CORD-EM administrative staff who manages the site. Management of the RCS and updated literature content is maintained by the chair of the RTF.

OUTCOMES

Since its beginning, the RCS has performed 15 consultations for EM programs around the country. Nine consultations included deficiencies across multiple core competencies (Figure 1). The remediation Wiki logged an average of 53 unique page hits per month in its original domain. While the nature of this type of interventions does not easily lend itself to reassessment of the specific case outcomes, there has been informal and anecdotal evidence that the RCS has been invaluable to the PDs who requested consults. Qualitative feedback obtained as a follow-up to consults includes: “The resident is scheduled for graduation this year, on time” and “After three months of remediation, the remediation was closed as the resident completed all assignments and demonstrated a shift in his actions/perspective.” Moving forward, the RTF plans to identify a standardized follow-up mechanism through which potential long-term outcomes and success of remediation plans can be tracked as a result of utilization of this consult service.

REFLECTIVE DISCUSSION

We report the successful development of a centralized repository of pooled electronic resources for residency leaders in EM. In addition to eliminating the need for PDs to reinvent material when needed, the RTF now provides streamlined access to expert opinion through the RCS year-round, rather than just in-person consultations held each year at the CORD-EM Academic Assembly. The RCS, modeled on constructivist principles, has the additional benefit of objective, nonbiased, and blinded advice constructed from experts in remediation. For some
PDs, the addition of an outside resource may lend additional credibility to a remediation plan for a learner as well as offer the support of a larger community as program leaders work through complex and sometimes unfamiliar challenges with trainees. Further, the RCS now has pooled experiences of the RTF members and previous consultations to administer creative and useful advice to those requesting formal consultation. To provide support and sustainability of the work described, CORD-EM has made the RTF a formal committee of the organization, thus ensuring resources and accountability of the leadership for the service it is providing. While institutions may provide local resources to medical educators, the RCS provides a model in the literature for other specialties to adopt and modify for their own PDs.

In its original design, the RCS did not collect full demographic information on the trainees. Additionally, outcome measures were not collected prospectively, which is a limitation of the initial service. Moving forward, we plan to institute a follow-up assessment of the consults completed to better quantify the outcomes of the remediation and obtain feedback on the process to add validity to the service.

References

Emergency Ultrasound Training Program in Guyana: Systematic Credentialing Process in a Resource-limited Setting

Jordan D. Rupp, MD, Sri Devi Jagjit, MD, and Robinson M. Ferre, MD

ABSTRACT
Ultrasound has become an important skill for emergency physicians. Ultrasound is more crucial in resource-limited settings where diagnostic testing may not be as timely or available at all. In 2015, an emergency medicine ultrasound curriculum was implemented at Georgetown Public Hospital Corporation in Georgetown, Guyana. Implementing an ultrasound-training curriculum in Guyana had four main challenges: limited ultrasound equipment, lack of informational technology infrastructure to record and review ultrasound examinations, availability of local emergency ultrasound expertise, and competing educational needs within the curriculum. These challenges were met with creative solutions and the formation of a formalized curriculum and credentialing process. The experience of creating the program is described along with the curriculum, credentialing process, and plan for sustainability. Since implementation, every graduating resident has displayed competency on final assessment.

In 2010, the Department of Emergency Medicine at Vanderbilt University Medical Center partnered with the University of Guyana and Georgetown Public Hospital Corporation (GPHC) to form the masters in emergency medicine residency program. Previously, emergency medicine did not exist in Guyana. The 3-year program, centered at the only tertiary referral hospital in Guyana, provides training in emergency medicine to physicians in Guyana and surrounding Caribbean countries.

The technical skill to operate an ultrasound machine, the ability to interpret emergency ultrasound (EUS) examinations, and incorporate examination findings into the clinical care of patients became important components of emergency care in Guyana where access to other advanced imaging (computed tomography) is limited. With increasing use of ultrasound in the accident and emergency (A&E) without structured training during residency, the need to ensure quality and consistent EUS training became vital to the success of the training program. An EUS training curriculum was created at GPHC with three goals: quality, high-level training for the emergency medicine residents; consistent training despite variation in visiting faculty; and a plan for sustainability.1,2

Implementing an EUS training curriculum in Guyana encountered four main challenges: limited ultrasound equipment, lack of informational technology infrastructure to record and review ultrasound examinations, availability of local EUS expertise, and competing educational needs within the curriculum. A formalized curriculum and credentialing process was created to address these challenges. Curricular adjustments were designed to avoid additional strain on limited resources.

Each challenge requires a unique solution. The lack of ultrasound equipment was addressed by the generosity of the Vanderbilt University Emergency Medicine
residents. They generously donated a dedicated machine for the A&E. The traditional means of EUS feedback via image storage and interpretation on a picture archiving and communication system was not possible. Providing quality assessment and consistency between each of the residents requires multiple solutions: hands-on training provided by triannual scheduled visiting EUS fellowship-trained faculty, directly observed scans by EUS trained faculty during these visits,3 observed structured assessments,4,5 and minimum number requirements for each application6 (Table 1).

The minimum number of ultrasound examinations is carefully crafted based on the available research and making adjustments for the relevant pathology and relevant treatments in the region. For example, there is less emphasis on diagnosis of abdominal aortic aneurysm because there is currently no available treatment in Guyana. Each examination is recorded in a logbook. A portion of these examinations requires direct observation by a EUS expert who provides feedback and assesses and records technical and interpretive proficiency. EUS competency is established when all requirements are met and residents demonstrate competency during hands-on scanning.

While EUS-trained faculty cannot be present year-round, non–fellowship-trained visiting faculty provide oversight and feedback of clinical EUS examinations. Recently, the EUS-credentialed residency graduates provide real-time feedback to current residents. EUS didactics delivered by visiting EUS experts, online asynchronous material, and hands-on instruction during clinical shifts help prevent crowding with the competing educational needs in the curriculum.

Since implementation in 2015, the program has graduated nine residents. Each resident has successfully completed the requirements and displayed competency in the final observed structured assessment. An important step toward sustainability will occur in 2019, when a residency graduate will complete an EUS fellowship. This will provide sustained presence of an EUS expert to oversee the curriculum.

EUS is a powerful diagnostic tool in resource-limited settings. We faced several barriers implementing an EUS training program. Obtaining a dedicated ultrasound machine was crucial. EUS fellowship–trained faculty visits, online asynchronous didactics, dedicated hands-on scanning, observation of clinical scans, and a final observed structured assessment were key to establishing EUS competency in our trainees. Our solutions can be adapted to other locations that face similar challenges.

### References


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Table 1

Evidence-based Ultrasound Curriculum Structure
One of my dreams as a child was to fly a plane. Of course, I never became a pilot, but I recently had the opportunity to fly in a high-fidelity full-flight simulator—the same one used by airline pilots for their training. After a short introduction to the airplane’s controls and an overview of the standard flight checklists, I was “up in the air.” At the end of the short flight (and a very bumpy landing), the captain turned to me and asked what I thought of the experience. With my hands still gripping the controls tightly, I told him that, above all else, flying the plane gave me a visceral sensation of cognitive overload—something I hadn’t felt in years.

From the moment I took the controls of my simulated flight, I could accomplish only a few basic tasks despite the coaching of the captain seated to my left. On takeoff, my hands gripped the yoke tightly as I focused on the controls. **Pull to go up, push to go down.** While cruising along, my eyes were glued looking straight ahead. **Keep the horizon level.** When it was my turn to land, I answered the captain with short responses. “My aircraft.” But that’s where it ended. Each additional stimulus, whether it was communicating with air traffic control or processing simple instructions, put a palpable strain on my working memory. Even my ability to go through the standard flight checklists was, for the most part, lost. I didn’t have an ounce of situational awareness. To say that I was cognitively overloaded doesn’t do justice to that visceral feeling.

Though I hadn’t felt that way for some time, that feeling was familiar. It reminded me of the way I felt managing a few difficult cases as a junior resident. One example sticks out in my mind. It was the middle of the night and I was called to assess a patient in the step-down ICU. A patient there had suddenly developed hypoxia and labored breathing. He had no air entry on the left side. He looked, in one word, unwell. As I quickly worked through the list of causes of sudden hypoxia and unilateral absent air entry in my head, I realized that I was going to have to needle decompress this man’s tension pneumothorax. I was both physiologically stressed—as I had never performed this procedure on a real patient, let alone unsupervised on a real patient—and cognitively overloaded.

But while the visceral response and discomfort I felt was familiar, the experience in the flight simulator was far more profound for some reason. Perhaps it’s the time that’s passed since I was a junior resident and I’ve simply forgotten. But I wonder whether having no experience whatsoever flying a plane had more to do with it. At least as a junior resident, I had practiced both the act of needle decompressing a patient’s chest and the act of making the decision to act many times in the simulation lab. In fact, this scenario was a perennial favorite in simulation teaching during my emergency medicine residency. And so, when I was tasked to perform the procedure in the real world, I wasn’t paralyzed.

In the flight simulator, on the other hand, I was immediately out of my element. Taking control of the keyboard on my IBM 486 and playing Flight Simulator 3.0 as a seven-year-old was the closest I’d ever been to the inside of an aircraft cockpit until that day. In the high-fidelity full-flight simulator, I had completely bought in and suspended all disbelief thanks to the fidelity of the simulator, with its true-to-life visuals, movements, sounds, and haptic feedback. As far as my brain was concerned, I was flying a real plane.
without the benefit of having practiced in a flight simulator first.

I hadn’t fully appreciated the profound impact that simulation training had on my career until the conversation with the captain after my simulated flight that day. Resuscitation-focused simulation was a central part of my emergency medicine training and I was lucky enough to have had the opportunity to learn and teach in the simulation lab at least once a week for five years as a resident. Looking back on it, I took this experience for granted. It was practice in the medical simulator that had prepared me for that night of call in the hospital. And it was a lack of practice in the flight simulator that made me feel overwhelmed flying the simulated plane.

But in addition to emphasizing the importance of simulation in my own training, this experience has opened my eyes in another way. As a simulation educator, I can’t help thinking about the parallels between the way I felt as a novice pilot and the way my novice learners must feel the first time they step foot in the simulation lab. That feeling of vulnerability in a new and unfamiliar environment is an important emotion for all teachers to remember. It becomes all too easy to forget, until you find yourself trapped in the headlights again.
To the Editor:

In 2018, AEM Education and Training published the authors’ article entitled “Development of an Emergency Medicine Wellness Curriculum,” detailing a multifaceted wellness curriculum that included bimonthly structured didactic presentation, corresponding nondidactic elements, individualized interactive instruction (III) assignments, and additional Internet-based resources. This curriculum was subsequently implemented at five emergency medicine residencies across the country from March 2017 to February 2018. At the conclusion of the curriculum, the authors performed a postintervention survey at the participating sites to determine resident perceptions of the curriculum. Specific survey questions included: “Did you find the wellness curriculum offered by your program this year to be beneficial to your overall feelings of wellness?”; “What were the most useful aspect of the curriculum for you?”; and “Besides resources offered by your residency program, what other resources did you access over this year with the goal of improving your wellness?”

There were several interesting findings to the survey that may aid educators in the development of future wellness interventions. A total of 93 of 174 (53%) residents completed the survey. A majority of resident respondents (53.8%) found the wellness curriculum to be moderately or highly beneficial to their overall feelings of wellness. Respondents reported that the most useful aspects of the curriculum were dedicated time for resident bonding (63%), dedicated time for residency wellness activities (48%), and a wellness retreat (41%). Far fewer residents found individualized interactive instruction (5%), designating wellness champions (3%), and assigned readings about wellness (2%) to be useful. Routinely accessed external resources included setting personal fitness goals (75%), regular participation in a hobby (53%), and yoga (28%). Fewer residents participated in volunteer activities (12%), meditation (10%), counseling (9%), and external wellness retreats (9%).

Our survey study demonstrated that for residents, the most valued components of the wellness curriculum centered on themes of social wellness, including dedicated time for resident bonding, and for residency wellness activities including a retreat. Items that may have been perceived to entail additional work, such as III, assigned readings, and designation of a wellness champion were not as well-received. As educators address the ACGME common program requirement concerning resident well-being, it is important to develop curricula that incorporate elements that are valued by resident physicians.

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