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Faculty Assessment of Emergency Medicine Resident Grit: A Multicenter Study

Nathan Olson, MD, MAEd, Adriana Segura Olson, MD, MAEd, Kelly Williamson, MD, Nicholas Hartman, MD, MPH, Jeremy Branzetti, MD, and Patrick Lank, MD, MS, for the Emergency Medicine Education Research Alliance (EMERA)

ABSTRACT

Background: Assessment of trainees’ competency is challenging; the predictive power of traditional evaluations is debatable especially in regard to noncognitive traits. New assessments need to be sought to better understand affective areas like personality. Grit, defined as “perseverance and passion for long-term goals,” can assess aspects of personality. Grit predicts educational attainment and burnout rates in other populations and is accurate with an informant report version. Self-assessments, while useful, have inherent limitations. Faculty’s ability to accurately assess trainees’ grit could prove helpful in identifying learner needs and avenues for further development.

Objective: This study sought to determine the correlation between EM resident self-assessed and faculty-assessed Grit Scale (Grit-S) scores of that same resident.

Methods: Subjects were PGY-1 to -4 EM residents and resident-selected faculty as part of a larger multicenter trial involving 10 EM residencies during 2017. The Grit-S Scale was administered to participating EM residents; an informant version was completed by their self-selected faculty. Correlation coefficients were computed to assess the relationship between residents’ self-assessed and the residents’ faculty-assessed Grit-S score.

Results: A total of 281 of 303 residents completed the Grit-S, for a 93% response rate; 200 of 281 residents had at least one faculty-assessed Grit-S score. No correlation was found between residents’ self-assessed and faculty-assessed Grit-S scores. There was a correlation between the two faculty-assessed Grit-S scores for the same resident.

Conclusion: There was no correlation between resident and faculty-assessed Grit-S scores; additionally, faculty-assessed Grit-S scores of residents were higher. This corroborates the challenges faculty face at accurately assessing aspects of residents they supervise. While faculty and resident Grit-S scores did not show significant concordance, grit may still be a useful predictive personality trait that could help shape future training.
higher scores on Step 1 of the United States Medical Licensing Examination (USMLE) confer a greater likelihood of passing the specialty boards after training in general surgery, pediatrics, obstetrics and gynecology, and emergency medicine (EM).4–7 However, test-taking aptitude and knowledge acquisition are not the only domains that determine the effectiveness of physicians. Noncognitive affective traits, including persistence, self-discipline, and teamwork skills, are essential to producing well-rounded competent physicians.8 These traits are beginning to be explored through a variety of assessment tools.5–10 As a more expansive view on competency develops, new assessments of skills and personality traits are needed. However, these are often less quantifiable than medical knowledge and it is unclear how well faculty, who evaluate and mentor residents, are at assessing noncognitive traits.

Grit, defined as “perseverance and passion for long-term goals” has emerged as a means to quantify an aspect of personality.11,12 Grit is a noncognitive trait and is not correlated with IQ.11 The Grit score, calculated through a self-reported questionnaire, has been found to help predict items such as educational attainment, grade point average among Ivy League undergraduates, and retention among cadets at the United States Military Academy.13–15 Within medicine, the Grit score has been found to negatively correlate with surgery resident burnout rates and likelihood of leaving their training program and to positively correlate with pharmacy students’ pursuit of residencies and fellowships.16–18 The short Grit Scale (Grit-S) is a validated eight-question test scored on a 1–5 scale (5 is the highest score) with the average of the eight responses representing a person’s grit. The Grit-S has been shown to predict the same outcomes as the original Grit Scale but in a more efficient manner.19

In other populations, the Grit-S score has also been shown to be accurate with an informant report version, which is filled out by someone who knows the subject well.4 Informant report scores of noncognitive assessments are important as research has shown that personality traits are likely better assessed in a multimodal fashion as this may help address some aspects of response bias. Additionally, some personality traits have been shown to be better assessed by others rather than by oneself.20,21 Therefore, as personality traits are being explored in medicine, it may be useful to gather both self-assessed and informant-assessed scores when possible. Since Grit has been shown to predict achievement in other populations as well as correlate with burnout and attrition rates in surgical residents, this type of brief quantifiable measurement of an important personality trait holds promise for medical educators in determining the current and future needs of their trainees.16,17 Knowledge of Grit-S scores may be useful in helping faculty foster Grit in residents as well as to identify residents that may benefit from closer monitoring and training. However, these are often less quantifiable than medical knowledge and it is unclear how well faculty can assess noncognitive traits in their residents. In this study, we sought to assess the correlation between an EM resident-assessed Grit-S score and a faculty-assessed Grit-S score of that same resident.

METHODS

Study Setting

This study was a secondary analysis of a larger multicenter educational trial investigating the effectiveness of a wellness didactic curriculum and involved 10 allopathic EM residency programs in the United States during 2017. All sites obtained institutional review board approval. Eight sites were postgraduate year (PGY)-1 to -3 residencies and two sites were PGY-1 to -4 residencies.

Study Subjects

Study subjects were PGY-1 to -4 EM residents at 10 allopathic Accreditation Council for Graduate Medical Education (ACGME)-approved United States EM residencies. There were no further exclusion criteria for resident subjects. Additional study subjects were resident-selected faculty at the 10 sites who were asked to participate in person by each respective site investigator. Faculty were eligible to participate if they worked primarily at the main clinical hospital site of the residency program.

Study Protocol

Informed consent was obtained from all study participants. In February 2017, the Grit-S was administered to all EM residents participating in the study. After completing the Grit-S, resident study participants were asked to “list two faculty members that you feel know you well. These two faculty members will fill out a Grit-S about you.” Site investigators then asked identified faculty participants to complete the Grit-S as pertaining to that particular resident. Each resident was assigned a unique identifier number known only to the individual participant and the respective site.
investigator. Faculty were given the name of the resident to complete the form, but only the unique identifier number remained on the form when it was returned to the site investigator.

**Statistical Analysis**

Categorical outcomes were summarized with frequencies and percentages and continuously distributed outcomes were summarized with the sample size, mean, and standard deviation (SD). The resident-assessed Grit-S scores by PGY were assessed with a one-way analysis of variance (ANOVA). A Pearson’s product-moment correlation coefficient was computed to assess the relationship between residents’ self-assessed Grit-S score, the residents’ faculty-assessed Grit-S score, and the relationship between the two faculty members who calculated a Grit-S score for the same resident.

**RESULTS**

A total of 281 of 303 residents completed the Grit-S as part of a larger study for a response rate of 93%. The mean (±SD) age of participants was 30 (±3.1) years. The participants were 70% male and 30% female (Table 1).

The mean (±SD) resident-assessed Grit-S score was 3.58 (±0.54; Table 1 and Figure 1). There was no statistically significant difference between the Grit-S scores of each PGY (p = 0.976; Table 2). Of the 281 residents with a self-assessed Grit-S score 81 residents did not have a faculty member assess their Grit-S score either because they did not select faculty or the faculty did not return the Grit-S; these residents were removed from further analysis. Of the 200 residents with faculty-assessed Grit-S scores, 174 had two faculty assessed Grit-S scores and 26 only had one faculty assessed Grit-S score. The mean (±SD) faculty-assessed Grit-S score for residents was 4.22 (±0.54; Table 1). A subgroup analysis by ANOVA of faculty-assessed Grit-S scores by PGY could not be performed secondary to a small sample size (Table 2). There was no correlation between the residents’ self-assessed Grit-S score and the residents’ faculty-assessed Grit-S score (r = 0.13, n = 200, p = 0.06; Figure 2). Of the residents with faculty-assessed Grit-S scores, 167 of 200 (84%) had lower self-assessed Grit-S scores than faculty-assessed Grit-S scores. There was a moderate correlation between the two faculty-assessed Grit-S scores for the same resident (r = 0.47, n = 174, p < 0.0001; Figure 3).

**DISCUSSION**

Graduate medical education has moved toward competency-based standards. The goals of competency-based education encompass both cognitive knowledge-based skills and practice and affective noncognitive attributes such as professionalism, personality, communication, teamwork, empathy, and perseverance. The field of medicine does not fully understand what assessments, tools, or trainings help advance the noncognitive domains of competency-based education. Multiple studies have indicated that these noncognitive skills and traits, including personality, can help predict career interest and satisfaction, academic performance, and health care clinical outcomes. Different aspects of personality such as conscientiousness and openness have been shown to be important in gaining and applying medical knowledge. Research indicates that people are relatively effective at providing accurate self-assessments about noncognitive traits; however, they have

<table>
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<th>Table 1 Demographics of participants</th>
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<td>Participant Characteristics</td>
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<td>PGY-4</td>
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<tr>
<td>Resident self-assessed Grit-S score</td>
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<tr>
<td>Faculty-assessed Grit-S score¶</td>
</tr>
</tbody>
</table>

Data are reported as mean (±SD) or n (%).  
* n = 281/303 participants completed self-assessed Grit-S score.  
† n = 262, 19 participants did not indicate age.  
‡ n = 280, 1 participant did not indicate  
§ n = 272, 9 participants did not indicate ethnicity  
¶ n = 200, number of participants with at least 1 faculty-assessed Grit-S Score
difficulty predicting their actual performance. Furthermore, observer reports of noncognitive traits may be better predictors of actual performance than self-assessments.

In 2007, Duckworth et al. introduced Grit as a personality level trait that measures perseverance and passion for long-term goals. Grittier individuals, controlled for natural talent (IQ), have higher educational attainment, higher GPA, and fewer career changes and are less likely to drop out of a rigorous military training program. Grit is also important in medicine as studies have shown that surgical residents with lower Grit-S scores have higher burnout rates and were more likely to leave their training program.

While studies have examined personality and medical education, to the best of our knowledge, no study to date has compared faculty-assessed Grit-S scores to resident self-assessed Grit-S scores. While Grit-S scores for an individual can be predicted by family members and close peers, it is not clear how well faculty can assess personality traits such as grit in their residents. The evidence as to whether supervising faculty can accurately assess different aspects of residents is mixed. Pediatric faculty demonstrated correlation between their assessment of trainee medical knowledge and the performance on the pediatrics in-training examination (ITE). However, internal medicine and EM faculty were not able to accurately predict ITE scores for their trainees. Similarly, a recent study showed that EM faculty were poor at predicting burnout in their trainees. In addition to non-observable traits, faculty also have difficulty providing assessments of observed clinical skills for resident physicians.

In our study, there was no correlation between the resident-assessed and faculty-assessed Grit-S scores. This corroborates the challenges that faculty have at accurately assessing aspects of residents they are supervising not only in cognitive, but also noncognitive, domains. There are multiple reasons that we believe this may be occurring. First, there may be a lack of familiarity and decreasing observation time of faculty spent interacting with residents, secondary to faculty’s nonclinical academic responsibilities, pressure for increased patient flow, and lack of dedicated

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**Figure 1.** Resident self-assessed Grit-S score. Grit-S = Grit Scale.

**Table 2**

<table>
<thead>
<tr>
<th>Grit-S Score</th>
<th>PGY-1 (n = 81)</th>
<th>PGY-2 (n = 94)</th>
<th>PGY-3 (n = 88)</th>
<th>PGY-4 (n = 18)</th>
<th>p-value</th>
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<tbody>
<tr>
<td>Self-assessed Grit-S</td>
<td>3.6 ± 0.54</td>
<td>3.58 ± 0.51</td>
<td>3.56 ± 0.55</td>
<td>3.62 ± 0.65</td>
<td>0.976</td>
</tr>
<tr>
<td>Faculty-assessed Grit-S</td>
<td>4.32 ± 0.97</td>
<td>3.45 ± 2.19</td>
<td>3.9 ± 1.56</td>
<td>4.12 ± 0.41</td>
<td>-</td>
</tr>
</tbody>
</table>

Data are reported as mean ± SD.
While the residents self-selected faculty evaluators, it is likely that faculty do not know residents nearly as well as the family members or close peers in the validation study of the Grit-S informant report. It is unclear from our study how knowing residents in different capacities may have influenced the faculty-assessed Grit score. We did not, for example, differentiate how faculty knew the resident, whether it was from clinical shifts, from completing research projects with them, from mentorship, as program leadership, or socially.

There was no correlation between the resident-assessed and the faculty-assessed Grit-S score; the mean Grit-S Score for residents was 3.58 and the mean faculty-assessed Grit-S score was 4.22. At all sites, faculty scored residents higher than residents scored themselves, with 84% of residents having lower self-assessed Grit-S scores. This is similar to previous findings of faculty prediction of resident attributes and achievements. Faculty overestimated the ITE scores of EM residents and underestimated the rate of burnout in EM residents. This suggests that faculty may view their residents more favorably than their actual performance or self-assessments would suggest, whether that is within cognitive or noncognitive domains. There may be a number of reasons for this trend of faculty overestimation of trainees. Faculty likely think very highly about their residents, either because they were involved in recruiting them to the program or because they are their mentors. Because of these relationships, faculty may be self-projecting onto their residents and assessing their Grit more highly because they want them to be successful. Another reason for higher faculty-assessed Grit-S scores could be a generosity error (or bias), which typically make ratings more favorable than other data would suggest they should be. Residents, on the other hand, are often burned out and overwhelmed during residency so they may be more critical of themselves than their faculty are, accounting for the lower resident-assessed Grit-S scores.

**LIMITATIONS**

There are several important limitations of this study. Seventy percent of EM residents who participated in
the study were males and 30% were females. The proportion of females in our study was lower than the national average of 47% for female EM residents. The majority of our participants were male (70%), whereas in the validation study by Duckworth and Patrick of the informant report of the Grit-S, the majority of participants were female (89%). This difference in the sex of participants may have affected the results of our study. Twenty-six percent of residents self-identified as underrepresented minorities, which is higher than the 14% of U.S. EM residents self-identifying as underrepresented minorities.

Residents selected the specific faculty whom they believed would best be able to assess their Grit. In the original Grit-S informant report study, the selected individuals were family and friends who likely knew the study subjects over many years and different types of experiences giving them more insight into their passion and perseverance for long-term goals. Program leadership (program directors, assistant/associate program directors, etc.) or more experienced faculty may be more accurate assessors of noncognitive traits, but this was not measured in this study. However, many subjects did select at least one member of program leadership to assess them in this study. It is likely that a certain amount of interaction and observation time is necessary to accurately assess another person’s Grit. Thus, it may be true that assessments between faculty and senior residents are more accurate than juniors; however, a subgroup analysis by ANOVA of faculty-assessed Grit-S scores of residents by PGY level was not possible due to the small sample size in each PGY. Due to the complexity of EM shifts, rotations, and faculty availability, we also lacked the means to explicitly track the amount of interaction a faculty participant had with a resident subject. Since approximately one-third of the residents did not have a faculty-assessed Grit-S score, it is also possible that there was a selection bias toward residents thought of more highly by the faculty.

The Grit-S score has been shown to have predictive value in other disciplines and correlated with burnout and attrition rates in surgical residents but has yet to be studied in depth in medicine. Thus, regardless of predictive accuracy of faculty, more work needs to be done to understand the value of Grit in physicians. If

![Figure 3. Correlation of faculty members’ prediction of the same resident’s Grit-S Score. Grit-S = Grit Scale.](image)
the correlation with burnout seen in surgical residents is replicated in further assessments of Grit and other medical specialties, it may be a useful tool in physician training programs.16

CONCLUSION

Our study was unable to demonstrate a correlation between emergency medicine resident self-assessed and faculty-assessed Grit-S scores; however, we believe that noncognitive affective traits like Grit should be explored further. Information gleaned from Grit-S scores may help identify learner needs and future educational courses and career development opportunities. Since Grit has been correlated with surgery residents' burnout and attrition rate,16,17 further study is needed to determine if a self-assessed Grit-S score is predictive or revealing of EM residents, as well as how to better utilize noncognitive assessments to improve resident training and education.

References


36. Lu DW, Lank PM, Branzetti JB. Emergency medicine faculty are poor at predicting burnout in individual trainees: an exploratory study. AEM Educ Train 2017;1:75–8.


Supporting Information

The following supporting information is available in the online version of this paper available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10309/full
Data Supplement S1. Grit-S Scale.
The Relationship Between Grit, Burnout, and Well-being in Emergency Medicine Residents

Aaron Dam, MD, MSc, Thomas Perera, MD, Michael Jones, MD, Marianne Haughy, MD, and Theodore Gaeta, DO, MPH

ABSTRACT

Background: Burnout has become endemic in medicine, across all specialties and levels of training. Grit, defined as “perseverance and passion for long-term goals,” attempts to quantify the ability to maintain sustained effort throughout an extended length of time. Our objective is to assess burnout and well-being and examine their relationship with the character trait, grit, in emergency medicine residents.

Methods: In Fall 2016, we conducted a multicenter cross-sectional survey at five large, urban, academically affiliated emergency departments. Residents were invited to anonymously provide responses to three validated survey instruments; the Short Grit Scale, the Maslach Burnout Inventory, and the World Health Organization-5 Well-Being Index.

Results: A total of 222 residents completed the survey (response rate = 86%). A total of 173 residents (77.9%) met criteria for burnout and 107 residents (48.2%) met criteria for low well-being. Residents meeting criteria for burnout and low well-being had significantly lower mean grit scores than those that did not meet criteria. Residents with high grit scores had lower odds of experiencing burnout and low well-being (odds ratio [OR] = 0.26, 95% confidence interval [CI] = 0.46–0.85; and [OR] = 0.33, 95% CI = 0.16–0.72, respectively). Residents with low grit scores were more likely to experience burnout and more likely to have low well-being (OR = 6.17, 95% CI = 1.43–26.64; and OR = 2.76, 95% CI = 1.31–5.79, respectively).

Conclusion: A significant relationship exists between grit, burnout, and well-being. Residents with high grit appear to be less likely to experience burnout and low well-being while those with low grit are more likely to experience burnout and low well-being.

Burnout is defined as a prolonged response to chronic emotional and interpersonal stressors on the job defined by three dimensions: emotional exhaustion, depersonalization, and a sense of reduced personal accomplishment. It affects physicians at every level of training, from medical school to practicing clinicians. At the start of residency, well-being measures in residents are consistent with findings in medical school. However, after entering training, residents’ depression and burnout rates increase significantly compared to their peers. Literature evaluating stress during medical education has
been well documented with studies primarily focusing on negative factors such as depression, burnout, and bullying in an effort to determine overall well-being. Burnout and fatigue have also been associated with undesirable patient-care outcomes. Residents with high burnout scores were more likely to report making errors and providing a subsatisfactory level of patient care.

Grit, a novel personality trait, is defined as “perseverance and passion for long-term goals,” and attempts to quantify the ability of an individual to maintain sustained effort throughout an extended length of time. Grit has been found to be a superior predictor of success in several high-stress, high-achievement fields.

Prior work revealed that low grit was an accurate predictor of attrition in cadets at the United States Military Academy. In fact, grit was a superior predictor than measures of standard intelligence (test scores and intelligence quotient). Additionally, gritty adult learners reach higher educational achievements, and gritty teachers are more likely to retain their jobs and instill higher academic performance in students. Grit and resilience have also been offered as a possible explanations for success in health professional students who succeed in the face of pressure.

In medical education, higher grit scores correlated with higher performance in historically difficult courses (gross anatomy) and residents with below-median grit were more than twice as likely to consider leaving surgical residency training. Furthermore, grit has also been shown to be related to resident wellness and burnout in surgical training. Grit was predictive of later psychological well-being as measured by the Maslach Burnout Inventory (MBI) and the Psychological General Well-Being Scale.

Grit appears to be an important personality characteristic that is key to success in high-stress professions. However, burnout and depression also seem to plague these same high-stress professions. With the growing concern for burnout and depression among physicians, evaluating factors that are related to the mental health and professional success is of utmost importance. Grit predicts success in part by promoting self-control, thus allowing people to persist in repetitive, tedious, or frustrating behaviors that are necessary for success.

Residency is an exhaustive and stressful time during medical training. Passion, perseverance, and resilience could play an important role protecting against burnout and depression in residency training. The objective of this study was to assess burnout and well-being and to examine their relationship with the character trait grit in emergency medicine (EM) residents.

**METHODS**

In Fall 2016, we performed a multicenter, cross-sectional study of EM residents from five training programs accredited by the Accreditation Council for Graduate Medical Education and/or the American Osteopathic Association. The institutional review board at each institution approved the study.

Residents from both EM 1–3 and 1–4 U.S. training programs were invited to participate in an anonymous electronic questionnaire using the SurveyMonkey online survey tool. Participants were assigned a study number at random and sent reminder e-mails on a weekly basis for 3 consecutive weeks. The survey contained three distinct assessments: the MBI, the World Health Organization-5 (WHO-5) Well-Being Index and the Short Grit Scale (Grit-s).

Residents completed the MBI, a 22-item rating scale designed to assess three aspects of the burnout syndrome: emotional exhaustion, depersonalization, and lack of personal accomplishment. The MBI has well-established discriminant and convergent validity, and three-factor analysis has shown it to be invariant among different groups, including residents. The WHO-5 Well-Being Index scores are based on a maximum of 25, and scores below 13 suggest poor mental well-being. It has been recently used in residents, and there is validity evidence from other groups.

The Grit-s is a validated, eight-item questionnaire. It is scored on a 5-point scale from 1 (not at all like me) to 5 (very much like me) with four questions being reverse scored. The summed score is then divided by 8 to give a final score. Higher scores indicate higher levels of grit. Analogous to Duckworth et al., we defined high grit as having a grit score greater than 1 SD from the cohort mean and low grit as having a grit score less than 1 SD from the cohort mean.

All data were sent to a central location where individual surveys were coded and scored. Burnout was further dichotomized into yes/no, with overall burnout defined as meeting the MBI definitions of high emotional exhaustion, high depersonalization, and/or low personal accomplishment.

Categorical variables were summarized using frequency and percentage and continuous variables were summarized using mean ± SD. Rates of burnout by PGY level, sex, and
grit were compared using chi-square test and an ANCOVA model was used to assess their relative contribution to the outcomes of interest. All tests were two-sided and significance was defined as \( p < 0.05 \). All comparisons were performed using SAS version 9 (SAS Institute) and/or Stata version 15.1 (StatCorp).

**RESULTS**

There were 258 eligible residents and a total of 222 residents completed the survey (response rate = 86%). Demographic characteristics and results on the assessment tools are reported in Table 1.

The mean (±SD) grit score was 3.57 (±0.54) in our cohort. Controlling for sex and program level, grit had significant inverse correlations with the emotional exhaustion (\( r = -0.28, p < 0.001 \)) and depersonalization (\( r = -0.35, p < 0.001 \)) dimensions of burnout and significant positive correlations with the personal accomplishment (\( r = 0.30, p < 0.001 \)) dimension of burnout and the WHO-5 Well-Being Scale (\( r = 0.24, p < 0.001 \)).

The grit score for PGY-1 was significantly higher than that for PGY-2 (\( p < 0.05 \)); however, there were no other differences in mean grit scores between other PGY levels. There were no differences in mean grit score between males and females. Furthermore, the rates of high, moderate, and low grit scores did not differ by PGY level or sex (Table 2).

The mean grit score of residents who met criteria for burnout was significantly lower than residents who did not meet the criteria for burnout. Similarly, residents who met the criteria for low well-being had a significantly lower mean grit score than residents who did not meet the criteria for low well-being (Figure 1).

To further evaluate this relationship, we compared the prevalence rates of burnout and well-being by PGY level, sex, and grit. PGY level was associated with higher scores for emotional exhaustion; however, rates of depersonalization, low personal accomplishment, and low well-being were not. While rates of low well-being were significantly higher in female residents compared to males, there was no significant relationship between burnout and sex. All components of burnout and low well-being differed significantly by grit level. Those with high grit had lower rates of

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<td>MBI, WHO-5 Well-being, and Grit Scoring Results in EM Residents</td>
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</tr>
<tr>
<td>Overall burnout</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Low well-being</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Grit</td>
</tr>
<tr>
<td>High</td>
</tr>
<tr>
<td>Moderate</td>
</tr>
<tr>
<td>Low</td>
</tr>
</tbody>
</table>

| MBI = Maslach Burnout Inventory; WHO-5 = World Health Organization-5. |

<table>
<thead>
<tr>
<th>Table 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence Rates of High, Moderate, and Low Grit by PGY Level and Sex in EM Residents</td>
</tr>
<tr>
<td>PGY</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>

Data are reported as % (%).

*High grit was defined as being 1 SD greater than the cohort mean and low grit was defined as being greater than 1 SD below the cohort mean. Moderate grit was defined as being less than 1 SD from the cohort mean.*
burnout and low well-being while residents with low grit had higher rates of burnout and low well-being (Table 3).

We further examined grit by determining the odds of experiencing burnout and low well-being for those meeting criteria for high and low grit scores. Residents with high grit scores were less likely to experience burnout and low well-being (OR = 0.26, 95% CI = 0.46–0.85; and OR = 0.33, 95% CI = 0.16–0.72, respectively). Residents with low grit scores were more likely to experience burnout and low well-being (OR = 7.67, 95% CI = 2.06–33.21; and OR = 2.76, 95% CI = 1.31–5.79, respectively).

**DISCUSSION**

This is the first study to examine the character trait of grit and its association with burnout and well-being in EM residents. We report a high level of burnout among residents that was not related to level of training or sex. The prevalence of emotional exhaustion and depersonalization were within the ranges documented in previously published studies. Our study participants reported a lower sense of personal accomplishment when compared to internal medical residents, but not as dramatic as findings reported in another cohort of EM residents. When we dichotomized burnout into yes/no, a method previously used
in the literature,\textsuperscript{17,18} the rate of burnout in EM residents was consistent with that in prior studies.\textsuperscript{16}

We found the median grit score in EM residents to be higher than the median grit score in the general population.\textsuperscript{5} Resident grit was estimated to be was slightly lower than that reported in surgical residents\textsuperscript{10,11,19} but higher than that of attending physicians across multiple specialties.\textsuperscript{20} Notably, grit appears to predict burnout and psychological well-being in EM residents. Residents that were experiencing burnout had significantly lower mean grit scores compared to those not experiencing burnout. This was true across all three subcategories of burnout as well as overall burnout. We also found that residents who screened positive for low well-being had significantly lower mean grit scores. The prevalence of burnout and low well-being were lower in residents with higher grit.

Our findings suggest that grit may be able to identify residents who are at greatest risk for burnout, low psychological well-being, and depression. Unlike the MBI and WHO-5, the short grit scale is easy to administer and short and does not contain any sensitive questions that residents may be hesitant to answer for program directors. Program directors could use the short grit scale to identify residents early on in training who may benefit from intervention to provide psychological support and improve resilience. Early intervention during training to improve perseverance and passion for long-term goals could contribute to future professional success and may limit physician burnout.

LIMITATIONS

Our study had several limitations. This cross-sectional study represents a snapshot in time. We can only report a correlation between the variables assessed. To date, there are no long-term studies that follow grit over time during medical training. It is possible that grit may change over the course residency. In addition, the residency programs involved in the research represent a convenience sample. They are all located in the northeastern United States and therefore the generalizability of the findings may be limited. Although our response rate was high, it is possible that response bias contributed to our findings and that residents suffering with more severe burnout symptoms participated in the study. This was a self-assessment survey, and while it was anonymous it may have suffered from reporter’s response bias. Residents may have felt pressured to respond to sensitive questions with answers they felt their program director would believe is most appropriate. Finally, burnout and low well-being have also been shown to be affected by other factors not controlled for in this study. Factors such as marital status, job satisfaction, level of professional autonomy, and anxiety levels have been shown to be related to rates of burnout.\textsuperscript{18–20}

Grit may be an important character trait for residency directors to consider during the residency candidate selection process. While attrition is not prevalent in EM, high stress has led to one of the highest levels of burnout in the medical field. Gritty residents may be more resistant to burnout and low well-being, which can be beneficial for both the program and the psychological health of the residents. However, applying Grits as a screening tool has limitations. Self-reported questionnaire measures of grit have never been validated outside the low-stakes context of confidential research. In cases of a high-stakes recruitment or selection process participants may misrepresent themselves. Robertson-Kraft and Duckworth\textsuperscript{7} developed and evaluated an objective method to assess grit in teachers by examining extracurricular activities and work experiences. Higher objective grit scores were correlated with success at reaching tenure. This more objective method may be a useful way to evaluate grit on potential residency candidates and warrants further analysis.\textsuperscript{21}

CONCLUSIONS

Burnout and low well-being are prevalent in emergency medicine residents. We have identified a significant relationship between the character trait grit with resident burnout and well-being. Emergency medicine residents with high grit appear less likely to experience burnout and low well-being. Inversely, residents with low grit appear more likely to experience burnout and low well-being.

References

A Mixed-methods Comparison of Participant and Observer Learner Roles in Simulation Education

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ABSTRACT

Background: Traditional simulation-based education prioritizes participation in simulated scenarios. The educational impact of observation in simulation-based education compared with participation remains uncertain. Our objective was to compare the performances of observers and participants in a standardized simulation scenario.

Methods: We assessed learning differences between simulation-based scenario participation and observation using a convergent, parallel, quasi-experimental, mixed-methods study of 15 participants and 15 observers (N = 30). Fifteen first-year residents from six medical specialties were evaluated during a simulated scenario (cardiac arrest due to critical hyperkalemia). Evaluation included predefined critical actions and performance assessments. In the first exposure to the simulation scenario, participants and observers underwent a shared postevent debriefing with predetermined learning objectives. Three months later, a follow-up assessment using the same case scenario evaluated all 30 learners as participants. Wilcoxon signed rank and Wilcoxon rank sum tests were used to compare participants and observers at 3-month follow-up. In addition, we used case study methodology to explore the nature of learning for participants and observers. Data were triangulated using direct observations, reflective field notes, and a focus group.

Results: Quantitative data analysis comparing the learners’ first and second exposure to the investigation scenario demonstrated participants’ time to calcium administration as the only statistically significant difference between participant and observer roles (316 seconds vs. 200 seconds, p = 0.0004). Qualitative analysis revealed that both participation and observation improved learning, debriefing was an important component to learning, and debriefing closed the learning gap between observers and participants.

Conclusions: Participants and observers had similar performances in simulation-based learning in an isolated scenario of cardiac arrest due to hyperkalemia. Findings support current limited literature that observation should not be underestimated as an important opportunity to enhance simulation-based education. When paired with
Medical simulation improves knowledge and skills acquisition while creating an educational method with a high level of learner satisfaction. Simulation is a unique educational modality because it alleviates educational constraints of case availability, unifies learner exposure to critical thinking, hones procedural skills prior to performance on patients, allows for exposure to complex ethical and spiritual issues, and refines important interpersonal professional skill-sets.

Drawing from educational and psychosocial theories of Schön, Dewey, Kolb, and Russell, participation in simulation evokes learning due to deliberate practice and the experiential, activating nature of scenarios. As such, participation in simulation should be critical to learning. Study investigators, however, have anecdotally perceived the learning benefit of the observer role. Bandura’s social learning theory further supports the notion that most experiential learning could be accomplished through observation. To date, there is limited evidence to support that participation within scenarios is necessary for maximum learning and performance improvement. The educational benefit of simulation observation is therefore worthy of investigation. We hypothesized that the simple cognitive experience of considering clinical decisions, whether directly participating in a simulated scenario or not, benefits both observers and participants alike, particularly when paired with postevent debriefing.

Simulation education is both labor- and resource-intensive. Understanding the educational value of the learner role and other contributory factors, such as debriefing, may be instrumental to optimizing resource allocation in simulation-based education. If evidence reveals there is improved learning through scenario participation over observation, investments in equipment and dedicated simulation space may be required. Conversely, if evidence reveals that there is improved learning through scenario observation over participation, then a revised approach to the education of many learners with simulation could be employed. In addition, the value of quality postevent debriefing may demand further support for dedicated education of simulation educators. This pilot study aimed to explore the relative impact of simulation-based learner role on learning by evaluating predefined critical actions (CAs) and performance metrics within a single simulated scenario and identify other possible factors affecting learning for simulation-based learner roles.

METHODS

Study Design, Setting, and Population

The relative effects of learner role as scenario participant or observer within simulation-based education were studied within a well-established simulation-based critical care curriculum from January to August 2016 at a 900-bed hospital that serves as a tertiary referral center, trauma center, and branch campus of a medical school. The Intern Simulation Common Critical Care Curriculum (4Cs) provides focused instruction on core topics and procedural skills imperative for first-year residents caring for critically ill adult patients.

Approximately 60 interns from internal medicine, general surgery, emergency medicine, family medicine, obstetrics/gynecology, and orthopedics are enrolled in the 4Cs annually. Within this curriculum, each intern participated in three separate 4-hour simulation-based sessions over a 6-month period using Laerdal Sim Man 3G (Laerdal Medical AS). Each session was attended by four residents. Within each session, each resident was involved in one of four discrete simulation scenarios as the participant role, with the other three learners observing the scenario via real-time video. There were 12 discrete clinical scenarios within the curriculum. The case scenario of cardiac arrest due to critical hyperkalemia was chosen for this investigation due to its definitive, evidence-based therapies and directly observable and quantifiable CAs.

The investigation scenario was designed for uniformity and used carefully scripted roles, scenario information, actor actions, and cues. Actors within this scenario included a nurse confederate, respiratory technician, and nursing assistant for ventilation and chest compressions as directed by the participant. The mannequin was outfitted with a dialysis catheter and presented as unresponsive, apneic, and pulseless, with a wide-complex rhythm displayed on the monitor. Laboratory values and historical patient information were provided to the scenario participant uniformly after each specific request. Chemistry panel results were provided to the scenario participant 5 minutes into the case, if not previously requested. This allowed participants the opportunity to demonstrate appropriate postevent debriefing, scenario observers and participants may reap similar educational benefits.
clinical management of cardiac arrest due to hyperkalemia if the diagnosis remained elusive. The case concluded with consultation for definitive dialysis care or following 15 minutes of elapsed time.

Immediately following each scenario, the scenario participant and three scenario observers underwent a shared postevent debriefing. Debriefing lasted approximately 45 minutes and explored immediate reactions, case objectives, clinical management, pathophysiology, and guided feedback to improve future clinical performance. Debriefings were conducted by a dyad of four possible facilitators using the PEARLS model of debriefing and consisted of the same predetermined learning objectives for all trainees. The principal investigator (PI) was the lead debriefer, with one of three other faculty serving as an associate debriefer. Each faculty had previous experience facilitating simulation debriefings and had codebriefed in previous years’ curricula. The PI led all codebriefings to assure all debriefings were uniform.

The 4Cs curriculum is mandatory for all interns caring for adult patients within our hospital; however, involvement in both the three-month follow-up assessment for this study and the focus group were voluntary. Stipends of $100 were provided to learners who participated in the follow-up simulation assessment, as well as those who participated in the focus group. Follow-up assessment, video recording, and focus group participation were approved by our institutional review board and study subjects gave written informed consent.

Quantitative Data Sources and Analyses

As shown in Figure 1, 30 learners were recruited and enrolled in this study. One of the four learners within each curricular session was intentionally selected as the investigation scenario participant. Fifteen learners acted as the scenario participant during the curriculum (initial participants). This stratified intentional sample ensured that participant representation was proportional to the size of each residency discipline and prevented oversampling or under sampling of any discipline for the study (see Table 1). The other three learners within each 4Cs session were observers to the investigation scenario. The 15 initial investigation scenario participants were recruited for inclusion in the follow-up simulation assessment. There were no refusals. Fifteen scenario observers were additionally enrolled in the follow-up assessment in a similar intentional sampling to represent relative sizes of each residency discipline within our hospital.

The study involved two simulation assessments: baseline assessment occurred within the 4Cs, and follow-up assessment occurred 3 months after completion of the within-curriculum assessment. The scenario of cardiac arrest due to critical hyperkalemia was used for both assessments. During the follow-up assessment, the 15 initial participants repeated the investigation scenario (“follow-up participants”), and an intentional sample of 15 observers became scenario participants and performed the same investigation scenario (“follow-up observers”). Thus, there were three groups of videos for assessment at follow-up: 1) initial participants, 2) follow-up participants, and 3) follow-up observers. Initial participant performance data (group 1 in the previous sentence) were collected prior to postevent debriefing and were compared to follow-up performance metrics of both follow-up participants (group 2) and follow-up observers (group 3).

Each participant’s clinical management was assessed by the number and frequency of completed CAs, time to CA, and performance assessment by two trained raters via retrospective video review using a performance assessment tool (Figure 2). The performance assessment tool evaluated the eight clinical domains included in oral board examination by the American Board of Emergency Medicine: data acquisition, problem solving, patient management, resource utilization, health care provided, interpersonal relations, comprehension of pathophysiology, and clinical competence. The performance assessment contained multiple dichotomous CAs decided a priori by expert consensus. CAs were anchored to each domain to assist raters with assessments. Domain ratings were scored on an 8-point ordinal scale. Independent clinical domain ratings and an averaged overall performance rating were attained for scenario participants. The performance assessment tool was chosen for this study as it has demonstrated high interexaminer agreement for CAs and performance ratings when used by calibrated raters in an oral board specialty examination. Additionally, this tool has demonstrated the ability to discriminate training level in the simulation setting, and correlates to objective test scores measuring relevant clinical knowledge. Furthermore, learner assessment with this tool has correlated with real-life performance in the intensive care unit setting.

Steps were taken to optimize rater agreement and reliability and reduce potential bias. Prior to the study, the two raters were calibrated by assessing three video
recordings of the investigation scenario that represented excellent, moderate, and poor clinical performances. These calibration videos did not involve the study subjects. After this calibration exercise, the PI and raters met to discuss any rating variation. Raters were not involved in the educational curriculum, and

**Figure 1.** 4Cs quantitative study design flow diagram. 4Cs = Common Critical Care Curriculum.
study subjects were identified by unique identifiers to decrease potential bias from possible clinical interactions raters may have had with study subjects. Raters were also blinded to whether scenario videos involved initial participants, follow-up participants, or follow-up observers.

Descriptive statistics, including means, standard deviations, medians, and interquartile ranges (IQR), were calculated for each measure. Participant data were paired within subjects. Since observers did not have initial within-curriculum performance evaluated, follow-up observer data were compared to initial median participant metrics (see Figure 1). Follow-up metrics of both learner roles were also compared. Wilcoxon signed rank and Wilcoxon rank sum tests were used for variables measured on a continuous scale, and Fisher’s exact tests were performed for categorical variables. To compare scores between the two raters, a series of t-tests were conducted on each of the eight clinical domains. An intraclass correlation was determined using the raters’ average of the eight domain assessments to assess inter-rater reliability and agreement. Analyses were performed with SAS Enterprise Guide Version 5.1 and StatsDirect Version 3.0.183.

### Qualitative Data Sources and Analysis

A narrative-based case study methodology was implemented in the tradition of ethnographic approaches to explore perception differences between learner roles regarding their own simulation-based learning. This case study was bound by the 4Cs length and a postcurriculum focus group. Two qualitative sources were included.

First, detailed observations and reflective notes regarding learners and their simulation learning experiences were documented in study journals by faculty (MB, SF, CW, AH). These journals yielded reflections and initial analysis during the study period. Recognizing reflexivity and bracketing as an important component to qualitative study, faculty were reminded to be explicit in their biases within their reflective journals, as well as in any interpretations.

Second, a voluntary postcurriculum focus group was conducted with a sample of six learners representing each of the six specialties and both learner roles. The focus group was led by the 4Cs director (PI), who has 10+ years of simulation debriefing experience, qualitative study expertise, and an MS-HPEd degree. A structured guide with open-ended questions was used to guide the discussion of trainee perspectives on learner role and its impact on learning (Data Supplement S1, available as supporting information in the online version of this paper, which is available at http://online library.wiley.com/doi/10.1002/aet2.10310/full). Since all learners fulfilled both participant and observer roles during the 4Cs, each had perspective on both experiences. Additional probing questions were used to clarify examples recalled from past experiences and other deeply held beliefs. The focus group also attempted to uncover factors that affected simulation-based learning and performance within the context of cardiac arrest due to critical hyperkalemia.

Qualitative data analysis was conducted as an applied thematic analysis and was overseen by an experienced qualitative PhD researcher/educator (DN) who was not involved in the 4Cs. Two researchers conducted the analysis (MB and DN). Qualitative data from the focus group were audio recorded, professionally transcribed verbatim, and analyzed using both nVivo software and manual techniques. MB and DN reviewed the focus group data to identify emergent codes based on previously published theories on learner role within

### Table 1
Characteristics of Study Subjects and 4Cs*

<table>
<thead>
<tr>
<th></th>
<th>Medical Specialty</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EM</td>
<td>FM</td>
</tr>
<tr>
<td><strong>Quantitative Study: Baseline and Follow-up Simulation Assessments</strong> (n = 30)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial participants</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Initial observers</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>% of study subjects</td>
<td>36</td>
<td>17</td>
</tr>
<tr>
<td>Total learners in 4Cs</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>% of Learners in 4Cs</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td><strong>Qualitative Study: Focus Group</strong> (n = 6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participants</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

4Cs = Common Critical Care Curriculum; EM = emergency medicine; FM = family medicine; GS = general surgery; IM = internal medicine; OB/Gyn = obstetrics and gynecology; OS = orthopedic surgery.
## Intern Simulation Common Critical Care Curriculum (4Cs)

**Subject ID:** _______________  
**Specialty:** ____________________  
**Reviewer:** _____________________  

### PEA due to Hyperkalemia

<table>
<thead>
<tr>
<th>Step</th>
<th>Yes</th>
<th>No</th>
<th>Time (in seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess for pulse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ask for compressions to begin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ask for patient to be ventilated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ask for epinephrine or vasopressin to be administered</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ask for Calcium Gluconate or Calcium Chloride to be administered</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consult nephrology or state need for emergent dialysis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unacceptable</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
</tbody>
</table>

### Data acquisition
- (CA) pulse check
- Consider scoring down if initially believe patient has pulse

### Problem solving

#### Patient management
- (CA) Calcium administration
- Consider scoring up if epinephrine or vasopressin administration
- Consider scoring up if CaCl or >1 amps of CaGlu
- Consider scoring up if albuterol added to insulin/glucose
- Consider scoring down if insulin and glucose not given
- Consider scoring down if Calcium given after insulin/glucose
- Consider scoring up if doses known

#### Resource utilization
- Consider scoring up if backboard used
- Consider scoring up if stool used

#### Health care provided
- (CA) compressions given

#### Interpersonal relations
- Consider scoring up if clear/concise consultation for dialysis
- Consider scoring up for clear communication with staff
- Consider scoring up for request for code status

#### Comprehension of pathophysiology
- (CA) consult for dialysis

#### Clinical Competence
- (CA) Ventilate patient

---

**Figure 2.** Learner performance assessment tool.
simulation-based education. Data were coded independently, and these codes were discussed among the researchers until a consensus was reached. The final codes were clustered and grouped into emergent themes in an iterative process. Member checking was accomplished through sharing the resultant themes with learners via e-mail and asking them to provide feedback regarding accuracy of the results to ensure their perceptions were appropriately represented.

RESULTS
Table 1 displays the specialty (medical discipline) and gender of all study subjects. The majority of subjects in the quantitative study were female (73%) and there were no significant differences between initial participants and initial observers, except for a slightly higher representation of family medicine among initial participants compared with observers (four and one, respectively). Table 1 shows that each specialty was represented in the qualitative study, and four of the six focus group participants were male.

Quantitative Results
Our performance assessment tool demonstrated excellent reliability. The intraclass correlation of the raters’ average of the eight domain assessments was 0.92. While rater 1 assigned statistically significant greater scores than rater 2 on every domain, reliability remained high in that each rater agreed on the relative performance of the participants (Figure 3). Since rater performance assessments were found to have excellent reliability, the average of the two raters’ domain performances were used for the remaining analyses.

Table 2
Performance Domain Assessments

<table>
<thead>
<tr>
<th>Assessments</th>
<th>Participant</th>
<th>Observer</th>
<th>Wilcoxon Signed Rank (Initial Participant vs. Follow-up Observer)</th>
<th>Wilcoxon Rank Sum (Initial Participant vs. Follow-up Observer)</th>
<th>Wilcoxon Rank Sum (Follow-up Participant vs. Follow-up Observer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall domain rating</td>
<td>15 6 5.0-6.0</td>
<td>15 6 5.5-6.5</td>
<td>0.17</td>
<td>0.48</td>
<td>0.77</td>
</tr>
<tr>
<td>Comprehension of pathophysiology</td>
<td>15 5.5 5.0-5.5</td>
<td>15 6 5.5-6.5</td>
<td>0.39</td>
<td>0.65</td>
<td>0.84</td>
</tr>
<tr>
<td>Clinical competence</td>
<td>15 6 5.5-6.0</td>
<td>15 6 5.0-6.5</td>
<td>0.82</td>
<td>0.98</td>
<td>0.93</td>
</tr>
<tr>
<td>Data acquisition</td>
<td>15 6 4.5-6.0</td>
<td>15 6 5.0-6.5</td>
<td>0.03</td>
<td>0.40</td>
<td>0.40</td>
</tr>
<tr>
<td>Health care provided</td>
<td>15 5.5 4.0-6.0</td>
<td>15 6 5.5-6.5</td>
<td>0.17</td>
<td>0.34</td>
<td>0.58</td>
</tr>
<tr>
<td>Interpersonal relations</td>
<td>15 5.5 5.0-6.5</td>
<td>15 6 5.5-6.5</td>
<td>0.26</td>
<td>0.26</td>
<td>0.89</td>
</tr>
<tr>
<td>Patient management</td>
<td>15 6 5.5-6.5</td>
<td>15 6 5.5-7.0</td>
<td>0.79</td>
<td>0.76</td>
<td>0.68</td>
</tr>
<tr>
<td>Problem solving</td>
<td>15 6 5.0-6.5</td>
<td>15 6 5.5-7.0</td>
<td>0.05</td>
<td>0.47</td>
<td>0.39</td>
</tr>
<tr>
<td>Resource utilization</td>
<td>15 5.5 4.5-6.0</td>
<td>15 5.5 5.0-6.0</td>
<td>0.56</td>
<td>0.16</td>
<td>0.55</td>
</tr>
</tbody>
</table>

IQR = interquartile range.
performance ratings was used to compare initial participant and 3-month follow-up performance data. Averaged overall participant performance rating demonstrated no statistical improvement. Likewise, there was no improvement in averaged overall ratings for observers. Participants, however, were rated higher upon follow-up assessment in two independent clinical domains reaching statistical significance: data acquisition [6 (IQR = 4.5–6.0) – 6 (IQR = 6.0–6.5)] and problem solving [6 (IQR = 5.0–6.5) – 6 (IQR = 5.5–7.0)]. These improvements were driven by the difference in IQR although the medians remained the same. When comparing participants and observers at the follow-up assessment, no significant difference was found in averaged overall rating or any independent clinical performance domain (Table 2).

Tables 3 and 4 display participant and observer metrics for time to CA completion, number of CAs completed, and individual CA completion frequency. Median time to CA completion improved for six of six CAs measured for participants, and four of six for observers over the assessment interval. Except for participants’ time to calcium administration (316 to 200 seconds; p = 0.0004), improvements in time to CA completion did not rise to the level of statistical significance. Analyses comparing follow-up participants to follow-up observers for time to CA completion demonstrated a statistically significant difference between groups for calcium administration (200 and 238 seconds, respectively; p = 0.02). Both learner roles demonstrated no statistical improvement in the median number of CAs completed. Initial participants completed a median number of 5 CAs (IQR = 4–6). The total number of CAs completed in the follow-up assessment for participants and observers were 6 (IQR = 4–6) and 5 (IQR = 5–6), respectively. The findings were similar when analyzed by each individual CA completion frequency.

To identify confounding exposure to critical hyperkalemia during the study period, learners were surveyed regarding exposure to lectures and patient encounters at the initiation and completion of the investigation period (Tables 5 and 6). There was no statistically significant change in education on hyperkalemia or patient encounters external to the 4Cs for scenario participants. Observers, however, were exposed to a statistically significant number of external hyperkalemia lectures (p = 0.0024). Observers were exposed to nearly two more lectures on hyperkalemia compared with participants (p = 0.0426) over the 9-month investigation period. Learner roles did not differ in hyperkalemia patient encounters.

**Qualitative Results**

Qualitative data uncovered six themes pertaining to factors that affect learning in the simulation-learning environment: 1) **Participation improved learning:** scenario participation created an activated learning environment and facilitated increased learning. One learner stated: “... being the active participant ... [makes me] always learn ... because the pressure is on, and makes it stick ... because you are responsible for the decisions. When you’re in the room it feels real, and [only] you are responsible for the outcome of the scenario.” 2) **Observation improved learning:** observing scenarios engaged learners and facilitated learning, but perhaps not to the same degree as participation. One learner remarked: “[One] could argue that the person actually in the scenario is more engaged ... but I never actually felt that way. [As an observer] you are [mentally] in [the scenario]; trying to problem solve with [the scenario participant] ...” Another learner noted that even “… when you are the observer, you are still participating on a macro level. Because the case is going on in real-time and [the learners] are talking about the case, you are [mentally] going through the case, like you were [actually] in there.” 3) **Debriefing was key:** debriefing was necessary for maximal learning in both learner roles. “I think whether you were the observer or the participant, everyone was engaged and debriefing sessions took the scenario to another level.” 4) **Debriefing closed the learning gap:** debriefing elevated learning benefits of observation to that of scenario participation. “I think you could argue that the debrief is probably the most important part for the people who are the observers. Even though you are not [participating] within the scenario, the group discussions are where you come full circle and reflect on the case.” 5) **Interdisciplinary richness was valued:** interdisciplinary perspective was important to learning and enabled critical thinking. One learner stated: “It’s hearing other people’s perspectives and how they would have approached that scenario.” Another remarked: “I learned ... from talking and problem-solving with other people and learning from [their] experience.” 6) **Safe learning environment was critical:** a constructive, safe learning environment was crucial for simulation-based learning. Best stated by one of the learners: “A non-threatening environment allowed learners to open up and reflect.”
### Table 3
**Time to CA\(^*\) and Total Number of CAs Completed**

<table>
<thead>
<tr>
<th>Time to CA</th>
<th>Initial No.</th>
<th>Median</th>
<th>IQR</th>
<th>Follow-up No.</th>
<th>Median</th>
<th>IQR</th>
<th>Wilcoxon Signed Rank (Initial Participant vs. Follow-up Participant)</th>
<th>Wilcoxon Rank Sum (Initial Participant vs. Follow-up Observer)</th>
<th>Wilcoxon Rank Sum (Follow-up Participant vs. Follow-up Observer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epi or Vaso</td>
<td>15</td>
<td>439</td>
<td>208–900</td>
<td>15</td>
<td>228</td>
<td>110–900</td>
<td>0.64</td>
<td>0.51</td>
<td>0.84</td>
</tr>
<tr>
<td>Ca(^+) Gluc or chloride</td>
<td>15</td>
<td>316</td>
<td>184–426</td>
<td>15</td>
<td>200</td>
<td>142–240</td>
<td>0.0004</td>
<td>0.96</td>
<td>0.02</td>
</tr>
<tr>
<td>Compressions</td>
<td>15</td>
<td>59</td>
<td>32–900</td>
<td>15</td>
<td>40</td>
<td>35–60</td>
<td>0.06</td>
<td>0.39</td>
<td>0.34</td>
</tr>
<tr>
<td>Dialysis</td>
<td>15</td>
<td>518</td>
<td>500–900</td>
<td>15</td>
<td>307</td>
<td>270–735</td>
<td>0.14</td>
<td>0.78</td>
<td>0.22</td>
</tr>
<tr>
<td>Ventilation</td>
<td>15</td>
<td>146</td>
<td>53–259</td>
<td>15</td>
<td>90</td>
<td>46–812</td>
<td>0.95</td>
<td>0.45</td>
<td>0.94</td>
</tr>
<tr>
<td>Pulse</td>
<td>15</td>
<td>30</td>
<td>20–140</td>
<td>15</td>
<td>27</td>
<td>20–31</td>
<td>0.09</td>
<td>0.48</td>
<td>0.59</td>
</tr>
<tr>
<td>No. of CAs</td>
<td>15</td>
<td>5</td>
<td>4.0–6.0</td>
<td>15</td>
<td>6</td>
<td>4.0–6.0</td>
<td>0.37</td>
<td>0.33</td>
<td>&gt;0.99</td>
</tr>
</tbody>
</table>

CA = critical action; Ca\(^+\) Gluc = calcium gluconate; Epi = epinephrine; Vaso = vasopressin.
*If critical action was not completed, then time was set to 900 seconds.

### Table 4
**Frequency (Freq) of Completed CAs**

<table>
<thead>
<tr>
<th>CA Freq</th>
<th>Participant</th>
<th>Observer</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial Freq</td>
<td>Freq</td>
<td>Percent</td>
</tr>
<tr>
<td>Pulse</td>
<td>Yes 12</td>
<td>80.00</td>
<td>Yes 15</td>
</tr>
<tr>
<td></td>
<td>No 3</td>
<td>20.00</td>
<td>No 0</td>
</tr>
<tr>
<td>Compression</td>
<td>Yes 11</td>
<td>73.33</td>
<td>Yes 14</td>
</tr>
<tr>
<td></td>
<td>No 4</td>
<td>26.67</td>
<td>No 6</td>
</tr>
<tr>
<td>Ventilation</td>
<td>Yes 13</td>
<td>86.67</td>
<td>Yes 12</td>
</tr>
<tr>
<td></td>
<td>No 2</td>
<td>13.33</td>
<td>No 3</td>
</tr>
<tr>
<td>Epi or Vaso</td>
<td>Yes 9</td>
<td>60.00</td>
<td>Yes 8</td>
</tr>
<tr>
<td></td>
<td>No 6</td>
<td>40.00</td>
<td>No 7</td>
</tr>
<tr>
<td>Ca(^+) Gluc or chloride</td>
<td>Yes 15</td>
<td>100.00</td>
<td>Yes 15</td>
</tr>
<tr>
<td></td>
<td>No 0</td>
<td>0</td>
<td>No 0</td>
</tr>
<tr>
<td>Dialysis</td>
<td>Yes 12</td>
<td>80.00</td>
<td>Yes 14</td>
</tr>
<tr>
<td></td>
<td>No 3</td>
<td>20.00</td>
<td>No 1</td>
</tr>
</tbody>
</table>

CA = critical action; Ca\(^+\) Gluc = calcium gluconate; Epi = epinephrine; IQR = interquartile range; Vaso = vasopressin.
DISCUSSION

Adult education theory suggests that learners who are more activated during an experience should demonstrate improved learning and clinical performance as opposed to less activated learners. As such, it has been assumed that scenario participation has an important role for learning and performance improvement when compared to observation. However, simulation-based observation may prove as beneficial as scenario participation if the observer is appropriately “activated.”

Limited studies have demonstrated the benefit of simulation observation; however, factors that affect observational learning have yet to be defined. To date, most simulation studies have had observers use structured observation tools, such as CA checklists, to activate them during the experience. Kaplan et al., for example, demonstrated no learning differences between participants and observers; however, observer activation was augmented by the use of CA checklists to critique participant performance while watching the scenario unfold. Bong et al. promoted observer activation by having the observer believe that he or she might be called upon to assist within the scenario while observing directly in the patient encounter room. Conversely, our study demonstrated benefit in the “nondirected” observer role without tools, specific guidance, or objectives to maintain observer activation. This finding suggests that the use of specific observational tools or “directed observation” may not be required for observer activation and simulation observation to be beneficial.

When evaluating the success of an educational intervention, the recognized confounder of skill decay must be considered. Skill and knowledge can quickly decay after simulation-based education, with one study reporting decay as early as 2 weeks. Educational theory suggests the benefit of simulation stems from repetitive practice. Yet even with repetition, skills and knowledge decay, Braun et al. demonstrated that learner performance declined at 2 months even with repetitive practice until “mastery-level performance” was met. Cardiopulmonary resuscitation skills and knowledge using simulation education in nursing students demonstrated decreased retention at 3 months despite having over 4 hours of training.

Our education on critical hyperkalemia consisted of only 45 minutes of postevent debriefing. Along with the issue of skills decay, there is also current uncertainty in appropriate timing of education assessment intervals to evaluate learning within educational interventions. Assessment periods with short intervals may not reflect the effect of knowledge and skills decay. Thus, short duration between testing periods may bias previous findings comparing scenario participation and observation. Stegmann et al., for example, had interval learning assessments only days after the educational intervention. Longer assessment intervals may be biased due to failure to account for external education or influences, such as repetitive practice. Bloch and Bloch demonstrated the benefits of observational simulation learning among pediatric emergency medicine fellows over a 7-month assessment period. However, learning in their
study was influenced by repetition of tested skills within curriculum, as well as learning within the larger pediatric emergency medicine fellowship, which included education on similar material. Additionally, Bong et al. demonstrated the equivalence of observational learning for nontechnical skills when compared with scenario participation; however, their study included repetitive education and a short, 3-week interval assessment period. Learners in our study demonstrated improvement trends over a lengthy (3-month) testing interval without the benefit of repetitive practice, with minimal external education on hyperkalemia, no significant hyperkalemic patient encounters and despite expected knowledge/skill decay. Additionally, our learners were multidisciplinary, with many specialties having little or no external daily experience with the investigation subject matter.

Similar to previous work by Gordon et al., our study further demonstrates the value of using a learner performance assessment tool within a simulation-based environment that was designed for and previously used in specialty oral board examinations. The excellent performance of our tool supports further use of similar learning and performance assessment tools in acute care simulation scenarios.

Our study explored the impact of learner role on simulation-based education. Quantitatively, this study demonstrated no significant advantage for either learner role for the scenario of cardiac arrest due to critical hyperkalemia. Congruent with quantitative findings, emergent themes from the focus group reinforced this theory, further demonstrating the value of nondirected simulation-based observation when paired with postevent debriefing. The results of this study may offer practical solutions to combat challenges faced by today’s simulation educators such as space, time, equipment, large numbers of learners, and availability of trained simulation educators. Participants demonstrated statistically significant decreased time to calcium administration when compared with observers. Given that this CA is the most clinically important for initial stabilization of the patient in cardiac arrest due to hyperkalemia, scenario participation would be highlighted as critical to learning. Conversely, as suggested by most of our data analysis, observation is of equal benefit as scenario participation and provides a reasonable approach to educating a large number of learners. Finally, it was apparent that high-quality, faculty-facilitated postevent debriefing elevated the learning benefits of observation to that of participation. As such, it could be surmised that simulation technology simply provides a social forum for activated didactics, and learning (particularly for scenario observers) is most affected by debriefing, which requires proper education of simulation educators.

LIMITATIONS

This study had several limitations. First, the quantitative study was limited by the need to integrate it into a preexisting curriculum and the number of 4Cs learners. While this may have underpowered the study, we enrolled all available subjects for our study population. It is possible this sample size was not large enough to demonstrate differences between learner roles; however, our results did suggest improvement trends in both participants and observers. Using our quantitative results as exploratory data, this pilot may open the door for increased resources and ability to further understand the impact of learner role in simulation-based education.

Second, the simulation-based education on critical hyperkalemia was limited to a single 45-minute shared postevent debriefing. This limited time frame, without the benefit of repetitive practice may have affected study findings. Additionally, the 3-month assessment interval may also have contributed to study findings given previous discussion on knowledge decay and uncertain timeframe for appropriate assessment interval.

Third, unlike participants, observers did not have an initial assessment to pair performance metrics at follow-up assessment. Thus, observers were compared to the performance metrics of the initial within-curriculum participants (Figure 1). This strategy assumed our intentional sampling of 15 initial participants appropriately captured a representative performance for all 54 learners in the 4Cs curriculum. Thus, the initial participant metrics may or may not be a true representation of the entire learner group. Randomization might be suggested to improve the impact of the study; however, this sampling was implemented to assure representation and perspective across disciplines and avoid over- or underrepresentation of any one specialty. Randomization (if resulting in over- or underrepresentation of any specific discipline) might bias the results due to specific disciplines, such as emergency medicine, being exposed to critical hyperkalemia more than others. Additionally, adult learners have varying motivation to learn the investigation subject matter relative to its applicability to their respective discipline. Finally, the prescheduled curriculum made randomization infeasible. From a
qualitative standpoint, it is worth mentioning that while the stratified sampling of the focus group contributed to the inclusion of all perspectives, the applied thematic analysis methodology does not assure thematic saturation.

Finally, the content of the simulation (cardiac arrest due to critical hyperkalemia) and the training level of the study subjects may affect the generalizability of our results to other learner groups and clinical scenarios. While learners were from different disciplines, all study subjects were trainees 6 months post–medical school graduation and thus had similar baseline knowledge. Plus, hyperkalemia represents a clinical pathophysiology that affects patients on all services. Observers did report two more didactics on hyperkalemia than participants over the course of the 9-month investigation (6-month curriculum + 3-month interval assessment). This, too, may have affected results; however, given the previous discussion on knowledge decay, it likely had little effect.

CONCLUSION

This pilot study provided a preliminary evaluation and comparison of simulation-based scenario participants and observers who experience a shared postevent debriefing. With high-quality debriefing, there was no demonstrable advantage of one learner role in simulation-based education in an isolated scenario of cardiac arrest due to hyperkalemia. Observation should not be underestimated as an important opportunity to enhance simulation-based education. Future work should look to further evaluate the learning benefits of the simulation observer role and specific factors affecting its benefit.

The authors acknowledge Megan Templin, Dickson Advanced Analytics, Carolinas Healthcare System, who completed quantitative data analysis; and Kelly Goonan, MPH, CPHQ, Scientific Writer, Department of Emergency Medicine, Carolinas Healthcare System, who edited manuscript.

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/aet2.10310/full

Data Supplement S1. Guiding questions for focus group.
Faculty Development Program for Emergency Medicine Physicians in India: A Pilot Program

Katherine Douglass, MD, MPH, and Amanda Williams, MD, MPH

ABSTRACT

Background: The specialty of emergency medicine (EM) is developing worldwide at a rapid pace. While more and more postgraduate training programs are developing, a major gap persists in numbers and availability of well-trained academic faculty members. This article describes a pilot faculty development program (FDP) aimed to develop advanced academic skills among a group of EM physicians in India.

Methods: A FDP was developed with foundations in adult learning principles, using a combined approach of online and in-person didactic sessions. Specific expectations were established regarding academic contributions to participants’ home institutions. Mentorship relationships were established between academic emergency physicians and program participants.

Results: A 12-month pilot program was implemented across four EM training programs in India. Nine faculty members completed the full requirements of the pilot program, eight of whom have continued to work as academic faculty members in EM training programs. Academic productivity among these physicians since completion of the program includes 11 abstract publications, six peer-reviewed articles, and 71 mentorship relationships. Program challenges included participant attrition, connectivity issues, and low rates of completion of evaluation requirements by both participants and mentors.

Conclusions: This pilot program in faculty development provides a foundation from which further programs may be developed in the international sector. Effective faculty development is a cornerstone of good academic medicine, which is of particular relevance, importance, and challenge in the global context of a developing specialty.
Recent years have seen a growth in the importance of faculty development programs (FDPs), with increased focus on more effective and sustainable medical education and training. Various challenges are associated with effective FDPs, including generational differences, expense and distance, sustainability and participation, and useful evaluation metrics for these programs. Asynchronous learning modules and social media have been used as an innovative method of information delivery and faculty development, and educators are increasingly using online methods to provide faculty development opportunities. While online FDPs seem comparable to traditional programs and better than no training at all, this is based on a limited number of programs with limited evaluation metrics. Increased focus on more rigorous evaluation methods is repeatedly noted as a future priority for all FDPs, both in person and online, for better understanding of the true value and impact of these programs.

Given the relative youth of the specialty of emergency medicine in India, it is no surprise that the availability of faculty members is limited. The general availability of specialty trained emergency physicians is very limited, and as such so is the availability of trained EM faculty members. There is limited guidance as to how to bridge the gap as these emergency departments (EDs) transition from traditional nonacademic casualty wards to academic EM departments with EM-trained faculty and EM education and training programs. Given the context of medical education and medical practice internationally, there is even more complexity involved including the differentiation between the public and private sector as it relates to academics and a teaching mission, the prevalence of the traditional hierarchical approach to medicine and clinical decision making, and the limited availability of educational resources such as journals and evidence-based sources.

The confluence of these factors contributed to our development and pilot implementation of a FDP for academic EM physicians in India. The goal of this article is to describe the development of this curriculum, the pilot phase of implementation, lessons learned, and goals for the future. India is by no means unique in its stage in development of EM as a specialty, and applied theories and lessons learned from this experience are undoubtedly relevant to other locations with similar stages of development and need for quality education and training, both in the field of EM and beyond.

**METHODS**

We developed a 12-month FDP to improve teaching, research, and administrative competencies of faculty members at programs that are currently training EM physicians. The two program directors were core faculty members from our institution who were already involved in the ongoing education and training programs in India. Five additional program mentors were recruited from a group of active, academic EM faculty members in the United States and United Kingdom, also with prior experience working in India. Physicians who have completed 2 or more years of EM training and are currently active in clinical practice in EM in an academic EM training program were eligible for enrollment. Alternatively, given the reality that many faculty members may not have completed specialty training in EM, non-EM-trained physicians with formal postgraduate training in other specialties including anesthesia, medicine, surgery, obstetrics and gynecology, pulmonology, pediatrics, or orthopedics were eligible for enrollment, provided that they were also actively working in the clinical practice of EM in an academic EM training program. Program participants were recruited from existing partnership institutions in India, through word of mouth and direct e-mails to faculty members. The study design and materials were submitted to the institutional review board of our institution and deemed exempt from review.

The format of the 12-month program combines monthly didactic sessions with an ongoing online learning community. Didactic topics are listed in Table I and cover many core issues for academic physicians in EM. The didactic topics were chosen by the program directors and mentors. Monthly discussions based on the didactic schedule were facilitated by a program mentor and held via online conference as feasible to facilitate real-time participation of program participants from various regions of the country and from different institutions. A separate online learning platform was established for delivery of content and information, as well as a means of
Table 1
Didactic Topics

<table>
<thead>
<tr>
<th>Month</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td>Introduction Development of 12-month plan</td>
</tr>
<tr>
<td>August</td>
<td>Teaching methods/how to develop and deliver a great lecture</td>
</tr>
<tr>
<td>September</td>
<td>Conducting research in the ED</td>
</tr>
<tr>
<td>October</td>
<td>Bedside teaching in ED</td>
</tr>
<tr>
<td>November</td>
<td>Delivering effective feedback/evaluations</td>
</tr>
<tr>
<td>December</td>
<td>Evidence-based medicine—effectively searching the literature</td>
</tr>
<tr>
<td>January</td>
<td>Supervising trainee research projects (option for specific project discussions)</td>
</tr>
<tr>
<td>February</td>
<td>Mentoring/leadership</td>
</tr>
<tr>
<td>March</td>
<td>How to write and publish</td>
</tr>
<tr>
<td>April</td>
<td>Professional development ● Physician wellness ● Continued self-directed learning</td>
</tr>
<tr>
<td>May</td>
<td>Quality assessment/quality improvement</td>
</tr>
<tr>
<td>June</td>
<td>Career planning ● Personal finance ● Finding the right job</td>
</tr>
</tbody>
</table>

Table 2
Program Requirements

<table>
<thead>
<tr>
<th>Individual requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Complete the learning enhancement and achievement plan (LEAP) for the year.</td>
</tr>
<tr>
<td>● Develop a detailed 12-month plan for completing goals of the FDP.</td>
</tr>
<tr>
<td>● Attend monthly FDP didactic sessions, either in person or via distance technology.</td>
</tr>
<tr>
<td>● Meet with U.S. faculty advisor monthly (virtually) over Skype or VSee to review progress, evaluate any current research, evaluation teaching progress, get feedback on how to given effective evaluations and feedback, etc.</td>
</tr>
<tr>
<td>● Show successful completion of key administrative tasks/project within your department, for example, ED operations, teaching, administration, EMS, trauma program development, implementation of an effective triage process, development of clinical pathways for the department, or quality assurance and peer review processes.</td>
</tr>
<tr>
<td>● Maintain diary of all academic/FDP activities.</td>
</tr>
<tr>
<td>● Participate in online discussion forum.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Academic requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Participate in 20% of all educational activities in the department.</td>
</tr>
<tr>
<td>● Supervise no less than five morning reports monthly.</td>
</tr>
<tr>
<td>● Give three grand rounds presentations (evidence-based) during the year.</td>
</tr>
<tr>
<td>● Supervise a minimum of one journal club (assist with selecting articles, analysis) during the year.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Conduct at least one active research activity. (Can be accomplished by working with a resident on their research thesis which hopefully will lead to an abstract submission.)</td>
</tr>
<tr>
<td>● Supervise a minimum of two residents in their research projects (assist resident with the timeline that has been outlined for completion of a project over a 30-month period).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation/feedback requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Complete quarterly evaluations of residents you are supervising clinically and provide feedback to the resident.</td>
</tr>
<tr>
<td>● Assure minimum number of evaluations completed by residents of 40% of teaching activities.</td>
</tr>
<tr>
<td>● Complete monthly evaluation of FDP didactic sessions.</td>
</tr>
</tbody>
</table>

FDP = faculty development program.

communication and discussion among program participants and mentors. Articles related to didactic topics were selected by both program directors and mentors and distributed via the online learning platform in preparation for didactic sessions. The participants were expected to engage in numerous activities over the course of the 1-year program as listed in Table 2.

A core initial task for each participant was to create an adult learning plan to identify planned activities for the course of the year. Ongoing contribution to the home institution’s academic program was expected, as well as additional academic and administrative projects. Participants were expected to keep a log of activities and communicate with an individually assigned, international mentor on a monthly basis to gauge progress. Each program participant was paired with a mentor for regular communication, and mentors were expected to monitor task completion and provide ongoing feedback. Mentors and mentees were responsible for scheduling of meetings, and the program directors provided general oversight to program activities.

RESULTS

A total of 19 faculty members completed the initial enrollment process, and nine of these faculty members from four institutions completed the full program requirements between 2012 and 2014. These institutions were located in New Delhi, Kolkata, Mumbai, and Calicut. The program participants who completed the program fulfilled all of the requirements and received certificates of completion. All didactic topics were completed over an 18-month time period, and ongoing communication and mentorship relationships persisted throughout that time.

Participants who completed the program requirements fulfilled a broad spectrum of activities. All reported positive learning and positive impact on their teaching skills as a result of the program. Research and administrative topics studied represented various topics, including toxicology, acute coronary syndrome, prehospital care systems development, infectious disease, training in resuscitation, and more. A total of 249 student posts were recorded in the online learning community, in addition to 57 instructor posts. Participants who completed the program were contacted via e-mail 18 months after program completion to
Productivity in terms of research projects and departmental quality projects was required. In the 2 years since the completion of the program, program participants collectively report 11 abstract publications, six paper publications, and having maintained a total of 71 mentorship relationships themselves. These outputs are undoubtedly related to the participants’ affiliation with ongoing academic programs, where residents are required to complete an academic project as part of their program. We cannot say that the productivity is necessarily due to participation in the FDP, although prior study has shown measurable academic outcomes associated with faculty development.\textsuperscript{15} In any case, this degree of productivity is notable.

**Program Challenges**

In implementing this FDP, we learned numerous important lessons that would be important to consider in developing further programs, especially in an international context. First, when we planned the program, we envisioned a capacity for online collaboration and meetings as an essential piece of the program. Program sites were spread across the country of India, and despite their location in major cities in India, the actual capacity for programs to coordinate with online meetings and video conferencing was limited. Numerous meetings were either postponed or poorly attended secondary to accessibility issues. Ultimately, the program lasted for 18 months rather than the planned 12 months due to the ongoing issues with scheduling. Meetings that were held often times only connected two sites, rather than four. Those who were able to connect were very enthusiastic and communicative, but the inability to connect for other sites led to program fatigue and some participant dropout. We did not collect specific information regarding those individuals who chose to leave the program, but these decisions were made in conversation between mentors and participants. Anecdotally, most attrition was due to issues with scheduling and connectivity of didactic sessions. In future similar programs, an exit interview of all participants would be a useful addition. The program was established with no cost to participants, and in retrospect charging a fee could have facilitated a more advanced online community, which in turn may well have brought about a more functional program with better ability to collaborate via video conferencing and perhaps even better participant retention.

An additional challenge specifically relevant to faculty development in the international sector is the
prioritization of many health care systems on care delivery, often times at the expense of education and training. In our program, most participants are working in the private sector where there is little or no support for academic pursuit. While training programs are housed in these settings, faculty members are expected to work long clinical hours with little or no protected time. Regardless of a person’s level of dedication to academics, specified job requirements come first. Numerous participants related frustration with this reality of their employment, but many of those who ultimately did not complete the program related this reason as primary in their attrition.

Finally, although our program on paper included numerous evaluation requirements, we did not effectively collect these evaluations. Of the requirements listed in Table 2, most of the information was collected informally by mentors or included in informal conversations. Effective evaluation of faculty development initiatives is difficult and is frequently cited as a priority area for future research.7,9,14 Future programs should prioritize data collection for evaluation to assure the impact of the program merits the time spent.

LIMITATIONS

The major limitation to our study was the selection of participants and mentors and the small number of participants. Participants were recruited from faculty members working at an affiliated program site to our institution, in India. Mentors were also selected from a limited group of faculty members with prior program experience in India. Each of these factors may have brought some bias to the study, given the existing and ongoing relationships. The small number of participants who completed the program limits the generalizability of the results.

CONCLUSIONS

Faculty development is considered an important component of mature academic medical systems, and in India there is ample need for further investigation and program development in this area, particularly in the nascent specialty of EM. Faculty development programs generally provide high participant satisfaction, as well as some changes in participant attitudes and changes in teaching behavior.14 It is much more difficult to evaluate the long-lasting impact of programs, although evaluation and measurement is necessary as means of accountability.16 The pilot program described here provides a framework from which we hope that future programs can reach additional faculty. Its format addresses a breadth of topics important for development of mature academic faculty members. In this case, the complexity of the pilot program likely contributed to the attrition rate of participants and extended length of the program. In future programs, we would consider either increasing the timeline or decompressing the requirements to provide a higher chance of successful completion for all participants. However, the core components of a robust faculty development program are included in this format, and the implementation as such with effective evaluation tools will undoubtedly contribute to the continually advancing maturation of emergency medicine in India and other countries with similar context.

References


Performance Standards of Comprehensive Airway Management for Emergency Medicine Residents

Ashish R. Panchal, MD, PhD, David P. Way, MEd, Andrew M. King, MD, Rachel Yudkowsky, MD, MHPE, Thomas E. Terndrup, MD, and the Airway Mastery Collaborative (AMC)

ABSTRACT

Background: The Emergency Medicine (EM) Milestone Project provides guidance for assessment of resident trainee airway management proficiency (PC10). Although milestones provide a general structure for assessment, they do not define performance standards. The objective of this project was to establish comprehensive airway management performance standards for EM trainees at both novice and mastery levels of proficiency.

Methods: Comprehensive airway management standards were derived using standard-setting procedures. A panel of residency education and airway management experts was convened to determine how trainees would be expected to perform on 51 individual tasks in a standardized airway management simulation encompassing preparation, endotracheal intubation, backup airway use, and ventilation. Experts participated in facilitated exercises in which they were asked to 1) define which items were critical for patient safety, 2) predict the performance of a "novice" learner, and 3) predict the performance of a "mastery" learner nearing independent practice. Experts were given a worksheet to complete and descriptive statistics were calculated using STATA 14.

Results: Experts identified 39 of 51 (76%) airway management items as critical for patient safety. Experts also noted that novice trainees do not need to complete all the items deemed to be critical prior to starting practice since they will be supervised by a board-certified EM physician. In contrast, mastery-level trainees would be expected to successfully complete not only the critical tasks, but also nearly all the items in the assessment (49/51, 96%) since they are nearing independent practice.

Conclusion: In this study, we established EM resident performance standards for comprehensive airway management during a simulation scenario. Future work will focus on validating these performance standards in current resident trainees as they move from simulation to actual patient care.
Patients undergoing airway management and endotracheal intubation (ETI) during emergency circumstances are at increased risk for adverse events (25%–30%)\(^1\) compared to patients treated in elective circumstances (0.2%).\(^2\) While acuity differences and limited time for preparation explain part of this safety gap, public and professional expectations are that practitioners should be able to demonstrate mastery performance.\(^3\) In a variety of academic health centers, documentation of suboptimal airway management performance has been reported in intensive care settings and emergency departments (EDs).\(^4\)–\(^8\) First-pass success rates for emergency medicine (EM) trainees have been measured at 83% overall with postgraduate year (PGY)-1 residents at 72%, PGY-2 residents at 82%, PGY-3 residents at 88%, and PGY-4 residents at 82%.\(^4\) For physician trainees preparing for practice settings where airway management is required, but infrequently performed, the methods for mastering and maintaining safe and effective levels of performance remain undefined.

The Milestone Project provides guidance for assessment of EM resident procedural competencies (ACGME 2015). The airway management subcompetency (PC10) provides a roadmap of increasing patient complexity and procedural competencies through which a resident navigates in stepwise progression across milestone levels until they transition to instructor level at milestone level 5. To demonstrate competency and progress out of level 4, residents are required to have completed a minimum of 35 intubations. This number corresponds to the minimal number of intubations required for completion of training as described in the EM Program Requirements. Although this paradigm provides general guidance for resident training, it does not define mastery performance of airway management skills.

Clearly defining airway management mastery performance standards and training learners to achieve mastery level performance, along with periodic reassessment and remediation, may result in decreased rates of complications and adverse events. In this study, we established performance standards for comprehensive airway management by defining expectations for overall patient safety and then defining both novice and mastery levels of proficiency for EM trainees. This was done using a standard-setting procedure completed by experts in residency education, airway management, and simulation. By identifying these standards, we hope to better assess the proficiency level of trainees and determine the need for further skills development.

METHODS

Rationale for Item-based Standard Setting

Standard setting for comprehensive airway management is essential for identifying learners who have attained a mastery level of skill performance. The goal of this type of standard setting is to articulate levels of performance such that all learners know what is required of them to be well prepared for future practice.\(^9\) The use of mastery testing combined with a competency-based curriculum for residency programs has been shown to significantly improve patient outcomes.\(^10\)–\(^12\) Specifically, standard setting allows educators to identify trainees who have achieved mastery in residency and those who may need further assistance in skill development.

This was an item-based standard-setting procedure, utilizing a defined airway management situation, in which experts were asked to: 1) define which airway management tasks (items) are needed to be performed properly because they were critical to patient safety or outcome, 2) define the performance of a well-prepared “novice” learner, and 3) define the performance of a “mastery” learner.\(^13\) In our setting, the novice learner is a new PGY-1 resident who is beginning an EM residency and is well prepared for the next level of training, which can include supervised practice with real patients. In comparison, a mastery learner is an individual who is near the graduation target for residency and is well prepared to demonstrate the translation of their simulation mastery to the independent care of real patients.

Standard-setting Methodology

To develop standards of performance for comprehensive airway management, the modified Angoff and patient-safety standard-setting procedures were employed.\(^9,14,15\) Both methods were compared to identify which is most appropriate for EM residents at different levels of training who are overseen by board-certified physicians who assure patient safety.

A panel of experts was convened to make judgments about how trainees would be expected to perform on individual items or behaviors during a simulated airway management performance assessment. The panel consisted of 11 experts in EM graduate medical education, airway management and
simulation recruited from the Airway Mastery Collaborative (AMC). The Airway Mastery Collaborative is an interdisciplinary, multi-institutional group of EM, anesthesiology, educational methodology, psychometric, and biostatistics investigators who research airway management education and safety.

The expert panel members were able to join the standard-setting meeting in person or via electronic communication. Upon arrival to the standard-setting meeting, the expert panel were oriented to the standard-setting exercise and the specific comprehensive airway management performance assessment (see below). Experts then participated in a 1-hour facilitated discussion about the airway management tasks they would expect a well-prepared novice trainee and a mastery level EM trainee to be able to effectively perform. This standard-setting discussion occurred using the framework of a simulated comprehensive airway scenario that would typically be used to assess trainees. During the discussion, the experts identified specific characteristics of these learner groups including challenges they face on the path to developing mastery of the individual tasks and aggregate skills.

Following this discussion, a calibration exercise was conducted. Experts were asked to complete a five-item practice standard-setting worksheet (Figure 1). During the calibration, experts were asked to consider each comprehensive airway management task (e.g., positions patient optimally) and indicate: 1) whether performing the task correctly was critical to patient safety and/or outcome (yes/no); 2) whether a beginning resident would be expected to properly perform this task (yes/no); 3) the probability that a well-prepared, beginning resident would be able perform the task (0%–100%); 4) whether a mastery level resident would be able to properly perform this task (yes/no); and 5) the probability that a mastery level resident would be able to perform this task (0%–100%). Results of the worksheet were electronically tabulated and projected for the group of experts to review. For each task on the worksheet, the results were discussed and experts were asked to state their opinion and reasons behind their judgment. These five items and the discussion around them were used to develop clear concepts of novice and mastery performance.

At the conclusion of the meeting the experts were charged with completing the five judgments for each of the 51 tasks on the full standard-setting worksheet (Data Supplement S1, Appendix 1, available as supporting information in the online version of this paper, which is available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10127/full). The full worksheet was distributed electronically, and experts were given 24 hours to complete the exercise. Following completion, the data were tabulated and analyzed.

**Comprehensive Airway Scenario Description**

The comprehensive airway management performance assessment used for this standard-setting exercise

<table>
<thead>
<tr>
<th>Critical to patient safety and/or outcome? (yes/no)</th>
<th>Beginning resident must do item to pass? (yes/no)</th>
<th>Probability that a well prepared, beginning resident will accomplish this task (0-100%)</th>
<th>Mastery level resident must do item to pass? (yes/no)</th>
<th>Probability that a mastery level resident will accomplish this task (0-100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positions patient optimally (trauma, ramp, sniffing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not assess gag reflex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assures continuous pulse oximeter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identifies primary and back-up plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>States correct dose induction agent (local standards)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 1. Practice standard-setting worksheet.*
describes a complex airway management situation that assesses four skill sets: 1) preparation for the procedure, 2) endotracheal tube placement, 3) backup airway placement, and 4) ventilation. The simulation is framed as a challenging airway case, involving a trauma scenario and a patient with the potential for a severe head injury. The simulation uses a realistic high-fidelity manikin with a rigid cervical collar already applied and an artificially inflated tongue. The scenario is started with the following script:

You are an emergency physician managing a patient following a motor vehicle collision. Your patient is a 70-year-old male. He is 5’10” and about 90 kg. Inside the ED, you find him making incomprehensible sounds. With painful stimuli, he opens his eyes and withdraws. He has a boggy contusion in the left temple area. You are the only emergency physician available. Proceed as you normally would."

Trainees are then presented with the patient’s vital signs: “Vital signs: BP 150/70, HR 110, RR 30, O2 saturation on NRB 95%.”

Following this, trainees proceed through the airway simulation as outlined in Figure 2. The overall goal of the simulation is a comprehensive assessment of the approach to a difficult airway. So that all skill sets are appraised, trainees are required to continue the assessment even if they successfully intubate the patient within their first three attempts. This is done by allowing the trainee to follow one of two pathways through the simulation: 1) successfully intubating the patient or 2) failing to intubate the patient. If the trainee successfully intubates the patient, the following information is provided:

The endotracheal tube was dislodged accidentally. You have attempted to intubate this patient twice since your first successful endotracheal intubation. You note that the airway is significantly edematous, full of secretions and you are unable to visualize the ET tube pass through the vocal cords. The ETCO2 is 0; Pulse oximetry is 70%. Please proceed with the scenario.

If the trainee fails to intubate during the scenario, the trainee is allowed to continue to manage the airway with the use of a backup airway device. Ventilation performance is evaluated throughout the entire simulation.

The instrument that accompanied the scenario is composed of 51 items covering the four skills sets involved in comprehensive airway management: preparation (nine items), ETI (21 items), backup airway placement (12 items), and ventilation (nine items). The instrument was originally established through previous research involving assessment of comprehensive airway management in the prehospital setting and has been adapted for the in-hospital setting by the Airway Mastery Collaborative using expert consensus on items needed for resident comprehensive airway management.

Analysis Plan
As part of the standard-setting process, analyses were conducted in three phases: 1) determine the airway items which are critical for overall patient safety irrespective of the learner, 2) determine proficiency standards for a well-prepared novice resident (new PGY -1), and 3) determine proficiency standards for a mastery-level resident who is nearing independent practice. Study data were tabulated and descriptive statistics were conducted using STATA 14 (Stata Statistical Software, Release 14, 2015, StataCorp LP).

Standard Setting for Patient Safety. Experts were directed to determine which airway management
items are critical for patient safety or outcome (Data Supplement S1, Appendix 1). An airway task was considered to be critical for patient safety if 70% or more of the experts rated the task as critical.

**Standard Setting for Novice Proficiency.** The data from the expert judges concerning novice proficiency were collected. The novice proficiency standard setting asked what specific skills a well-prepared beginning trainee must be able to do prior to direct patient care. The collected data were used to implement two standard-setting procedures (modified Angoff and modified patient-safety analyses). As noted, both methods were compared to identify which is most appropriate for EM residents at different levels of training that are overseen by board-certified physicians who assure patient safety.

The first method of standard setting was via the modified Angoff procedure where, for the novice competency level, the probabilities assigned to each task were averaged across the judges and then summed across tasks. This sum is the expected raw score of the well-prepared learner (at either the beginner or the mastery level) and then divided by total number of tasks generating a percentage cut score.

The second method is a modified patient-safety method where the judges are asked to indicate, for a novice trainee, whether the trainee must do the specific airway item to pass to assure patient safety (Data Supplement S1, Appendix 2). To be more rigorous and patient safety focused, tasks were identified as important for patient safety if a simple majority of experts rated the task as one that must be accomplished by the novice resident to pass. The cut score for the modified patient-safety method is the completion of all items designated as those that must be completed at the novice competency. Performance of the noncritical items does not compensate for missing a critical item.

**Standards for Mastery Proficiency.** Finally, after evaluation of novice proficiency, the data from the expert judges concerning mastery skills competency were assessed. The mastery proficiency standard asked what specific skills a mastery proficiency trainee, who is nearing independent practice, must be able to do (Data Supplement S1, Appendix 1). The collected data were used to implement the two standard-setting procedures (modified Angoff and modified patient-safety analyses) as described above.

**RESULTS**

Airway management and graduate medical education experts were recruited and brought together for the standard-setting meeting on November 2016. Data Supplement S1, Appendix 2 describes each of the subject matter experts’ affiliations and titles. A total of 11 experts were recruited and completed all steps of the standard-setting exercise.

Experts defined two performance levels of comprehensive airway management—novice and mastery-level performance—and set standards for both. The calibration procedure lasted 1.5 hours to provide sufficient time for discussion concerning proficiency levels, understanding of the simulation assessment, and practice with the standard-setting worksheet (Figure 1). Following the discussion, experts independently completed the electronic surveys for scoring the 51 airway management items.

**Critical for Patient Safety and Outcome**

Experts designated 39 of the 51 (76%) items as critical for patient safety or outcome (Table 1). These items were considered independent of the level of learner. In other words, they must be performed effectively regardless of the skill level of the rescuer.

**Novice Airway Proficiency**

The tabulated data on each performance item for novice proficiency are shown in Table 2. Using the modified Angoff procedure, experts determined that the novice resident would need to perform 38 of 51 (73%) of the items correctly to pass the assessment. However, when we evaluated the experts’ consideration of the patient-safety approach, they determined that a well-prepared beginning resident needed to correctly execute 25 of 51 items (49%) to pass. This finding suggests that experts focused on the need for beginning residents to be skilled enough to assure safe task performance. The tasks that experts identified as essential included the use of monitoring; understanding, selecting, and using appropriate equipment for airway management; identifying esophageal intubation through a variety of confirmation methods; and being able to appropriately ventilate patients through bag-valve-mask.

**Mastery Airway Proficiency**

Item results for mastery-level proficiency are also shown in Table 2. Using the Angoff procedure to
### Table 1

Tasks From Comprehensive Airway Management Process Identified by Expert Panel as Critical for Patient Safety and Outcome

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item Description</th>
<th>Frequency (%)</th>
<th>Critical for Patient Safety/Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Positions patient optimally (trauma, ramp, sniffing)</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Does not assess gag reflex</td>
<td>7 (63.6)</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>Assures continuous pulse oximeter</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>Identifies primary and backup plan</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>States correct dose induction agent (local standards)</td>
<td>10 (90.9)</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>States correct dose neuromuscular blockade (local standards)</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>Uses straight-to-cuff stylette curvature technique</td>
<td>4 (36.4)</td>
<td>No</td>
</tr>
<tr>
<td>8</td>
<td>Checks equipment for cuff leaks</td>
<td>10 (90.9)</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>Maintains C-spine precautions during airway management</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td>Uses cricoid pressure</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>11</td>
<td>Equipment organized for first pass without loss view</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>12</td>
<td>Selects and uses appropriate equipment</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>13</td>
<td>Suctions airway fluids safely</td>
<td>10 (90.9)</td>
<td>Yes</td>
</tr>
<tr>
<td>14</td>
<td>Grasps laryngoscope with left hand at junction of blade and handle</td>
<td>8 (72.7)</td>
<td>Yes</td>
</tr>
<tr>
<td>15</td>
<td>Laryngoscope tip in vallecula</td>
<td>5 (45.5)</td>
<td>No</td>
</tr>
<tr>
<td>16</td>
<td>Inserts laryngoscope to appropriate depth</td>
<td>10 (90.9)</td>
<td>Yes</td>
</tr>
<tr>
<td>17</td>
<td>Moves blade tip smoothly without shaking or jerking</td>
<td>4 (36.4)</td>
<td>No</td>
</tr>
<tr>
<td>18</td>
<td>Elevates mandible from 45°–90° with laryngoscope</td>
<td>6 (54.6)</td>
<td>No</td>
</tr>
<tr>
<td>19</td>
<td>Flips up epiglottis or exposes laryngeal inlet</td>
<td>10 (90.9)</td>
<td>Yes</td>
</tr>
<tr>
<td>20</td>
<td>Changes angle ETT toward feet when 2–3 in. in mouth</td>
<td>6 (54.6)</td>
<td>No</td>
</tr>
<tr>
<td>21</td>
<td>Maintains view until ETT has stopped advancing</td>
<td>9 (81.8)</td>
<td>Yes</td>
</tr>
<tr>
<td>22</td>
<td>Passes ETT with limited or no cord impingement</td>
<td>6 (54.6)</td>
<td>No</td>
</tr>
<tr>
<td>23</td>
<td>Passes tube through cords (laryngoscope in mouth to tracheal placement) in &lt; 20 sec</td>
<td>8 (72.7)</td>
<td>Yes</td>
</tr>
<tr>
<td>24</td>
<td>Disconnects syringe immediately after inflating cuff of ETT</td>
<td>5 (45.5)</td>
<td>No</td>
</tr>
<tr>
<td>25</td>
<td>Confirms presence of breath sounds over each lung</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>26</td>
<td>Confirms absence of breath sounds on epigastric region</td>
<td>8 (80)</td>
<td>Yes</td>
</tr>
<tr>
<td>27</td>
<td>Checks end-tidal CO₂—the end of ETT placement</td>
<td>9 (81.8)</td>
<td>Yes</td>
</tr>
<tr>
<td>28</td>
<td>Checks pulse oximeter—the end of ETT placement</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>29</td>
<td>Secures ETT</td>
<td>10 (90.9)</td>
<td>Yes</td>
</tr>
<tr>
<td>30</td>
<td>Successfully intubates in one ETI attempt</td>
<td>6 (54.6)</td>
<td>No</td>
</tr>
<tr>
<td>31</td>
<td>Inserts oropharyngeal airway prior to BVM ventilation</td>
<td>8 (72.7)</td>
<td>Yes</td>
</tr>
<tr>
<td>32</td>
<td>Inserts oropharyngeal airway to proper depth</td>
<td>6 (60)</td>
<td>No</td>
</tr>
<tr>
<td>33</td>
<td>Chooses correct oropharyngeal airway size</td>
<td>9 (81.2)</td>
<td>Yes</td>
</tr>
<tr>
<td>34</td>
<td>Ventilates patient immediately (within 30 sec) with BVM</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>35</td>
<td>O₂ attached and flow &gt; 12 L/min</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>36</td>
<td>Ventilates patient at rate of 10–12/min</td>
<td>8 (72.7)</td>
<td>Yes</td>
</tr>
<tr>
<td>37</td>
<td>Evaluates BVM technique for visible chest rise</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>38</td>
<td>Uses thenar eminence technique (E-C grip)</td>
<td>7 (63.6)</td>
<td>No</td>
</tr>
<tr>
<td>39</td>
<td>Preoxygenates prior to backup plan</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>40</td>
<td>Recognizes need for backup airway</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>41</td>
<td>Identifies an appropriate backup airway device</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>42</td>
<td>Backup airway appropriately used</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>43</td>
<td>Immediately inflates cuff, prior to ventilation</td>
<td>9 (81.8)</td>
<td>Yes</td>
</tr>
<tr>
<td>44</td>
<td>Immediately disconnects syringe after inflating cuff of ETT</td>
<td>6 (54.6)</td>
<td>No</td>
</tr>
<tr>
<td>45</td>
<td>Confirms proper backup placement by auscultation over each lung</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
<tr>
<td>46</td>
<td>Confirms absence of breath sounds on epigastric region</td>
<td>10 (90.9)</td>
<td>Yes</td>
</tr>
<tr>
<td>47</td>
<td>Checks end-tidal CO₂—the end of backup airway placement</td>
<td>9 (81.8)</td>
<td>Yes</td>
</tr>
<tr>
<td>48</td>
<td>Checks pulse oximeter—the end of backup airway placement</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

(Continued)
Table 1 (continued)

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item Description</th>
<th>Frequency (%)</th>
<th>Critical for Patient Safety/Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>Maintains control over backup airway after placement</td>
<td>9 (90)</td>
<td>Yes</td>
</tr>
<tr>
<td>50</td>
<td>Successfully places backup airway within one attempt</td>
<td>8 (72.7)</td>
<td>Yes</td>
</tr>
<tr>
<td>51</td>
<td>Ventilates without interruption of &gt; 30 sec at any time</td>
<td>11 (100)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Frequency (%) is the number and percentage of judges who deemed the item to be critical. Items achieving 70% or more of expert consensus were judged as critical.

BVM = bag-valve-mask; ETI = endotracheal intubation; ETT = endotracheal tube.

Table 2
Beginning and Mastery Performance Expectations for Comprehensive Airway Management

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item Description</th>
<th>Beginning Proficiency</th>
<th>Mastery Proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Probability That Well-prepared Beginning Residents Will Accomplish This Task</td>
<td>Item Must Be Done to Pass</td>
<td>Probability That Mastery-level Residents Will Accomplish This Task</td>
</tr>
<tr>
<td></td>
<td>Probability That Mastery-level Residents Will Accomplish This Task</td>
<td>Item Must Be Done to Pass</td>
<td>Probability That Mastery-level Residents Will Accomplish This Task</td>
</tr>
<tr>
<td>1</td>
<td>Positions patient optimally (trauma, ramp, sniffing)</td>
<td>69.1</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Does not assess gag reflex</td>
<td>59.1</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Assures continuous pulse oximeter</td>
<td>Yes</td>
<td>90.1</td>
</tr>
<tr>
<td>4</td>
<td>Identifies primary and backup plan</td>
<td>69.1</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>States correct dose induction agent (local standards)</td>
<td>65.5</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>States correct dose neuromuscular blockade (local standards)</td>
<td>63.2</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>Uses straight-to-cuff stylette curvature technique</td>
<td>50.5</td>
<td>77</td>
</tr>
<tr>
<td>8</td>
<td>Checks equipment for cuff leaks</td>
<td>69.1</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>Maintains C-spine precautions during airway management</td>
<td>Yes</td>
<td>90.9</td>
</tr>
<tr>
<td>10</td>
<td>Uses cricoid pressure</td>
<td>Yes</td>
<td>38.6</td>
</tr>
<tr>
<td>11</td>
<td>Equipment organized for first pass without loss view</td>
<td>67.3</td>
<td>Yes</td>
</tr>
<tr>
<td>12</td>
<td>Selects and uses appropriate equipment</td>
<td>Yes</td>
<td>80.9</td>
</tr>
<tr>
<td>13</td>
<td>Suctions airway fluids safely</td>
<td>Yes</td>
<td>91.4</td>
</tr>
<tr>
<td>14</td>
<td>Grasps laryngoscope with left hand at junction of blade and handle</td>
<td>Yes</td>
<td>85.5</td>
</tr>
<tr>
<td>15</td>
<td>Laryngoscope tip in vallecula</td>
<td>63</td>
<td>Yes</td>
</tr>
<tr>
<td>16</td>
<td>Inserts laryngoscope to appropriate depth</td>
<td>Yes</td>
<td>79.5</td>
</tr>
<tr>
<td>17</td>
<td>Moves blade tip smoothly without shaking or jerking</td>
<td>45.5</td>
<td>Yes</td>
</tr>
<tr>
<td>18</td>
<td>Elevates mandible from 45°-90° with laryngoscope</td>
<td>63.2</td>
<td>Yes</td>
</tr>
<tr>
<td>19</td>
<td>Flips up epiglottis or exposes laryngeal inlet</td>
<td>Yes</td>
<td>76.4</td>
</tr>
<tr>
<td>20</td>
<td>Changes angle ETT toward feet when 2–3 in. in mouth</td>
<td>52.3</td>
<td>Yes</td>
</tr>
<tr>
<td>21</td>
<td>Maintains view until ETT has stopped advancing</td>
<td>55.9</td>
<td>Yes</td>
</tr>
<tr>
<td>22</td>
<td>Passes ETT with limited or no cord impingement</td>
<td>49</td>
<td>Yes</td>
</tr>
<tr>
<td>23</td>
<td>Passes tube through cords (laryngoscope in mouth to tracheal placement) in &lt; 20 sec</td>
<td>41.8</td>
<td>Yes</td>
</tr>
<tr>
<td>24</td>
<td>Disconnects syringe immediately after inflating cuff of ETT</td>
<td>64.1</td>
<td>Yes</td>
</tr>
<tr>
<td>25</td>
<td>Confirms presence of breath sounds over each lung</td>
<td>Yes</td>
<td>98.2</td>
</tr>
<tr>
<td>26</td>
<td>Confirms absence of breath sounds on epigastric region</td>
<td>Yes</td>
<td>91.5</td>
</tr>
<tr>
<td>27</td>
<td>Checks end-tidal ( CO_2 )—after ETT placement</td>
<td>Yes</td>
<td>87.3</td>
</tr>
<tr>
<td>28</td>
<td>Checks pulse oximeter—after ETT placement</td>
<td>Yes</td>
<td>96.4</td>
</tr>
<tr>
<td>29</td>
<td>Secures ETT</td>
<td>Yes</td>
<td>77</td>
</tr>
<tr>
<td>30</td>
<td>Successfully intubates in one ETI attempt</td>
<td>Yes</td>
<td>41.4</td>
</tr>
<tr>
<td>31</td>
<td>Inserts oropharyngeal airway prior to BVM ventilation</td>
<td>71.5</td>
<td>Yes</td>
</tr>
</tbody>
</table>

(Continued)
evaluate mastery proficiency, the raw score and percent correct items were calculated. The cut score for mastery level performance was determined to be 48 of 51 (94%) of items performed correctly in the evaluation. Considering the patient-safety approach, experts noted that the 49 of 51 (96%) of the items identified in the scenario were essential for mastery-level comprehensive airway performance. Only two items were not determined to be critical based on the mastery-level assessment: these included using cricoid pressure and using straight-to-cuff stylette curvature technique.

**DISCUSSION**

A standard-setting procedure was conducted with residency education and airway management experts to define specific standards for EM trainees. Even with the fundamental challenges associated with airway management, there is a paucity of data on assessing airway performance behaviors, outside of success rates, during graduate medical education. Our study is the first to define airway performance standards for EM trainees.

Through these methods, experts identified the comprehensive airway management tasks that were critical for patient safety and outcome along with defining proficiency levels for beginner and mastery levels. Experts easily identified items which were critical for patient safety for any learner level if practicing independently (Table 1). This list differed from the beginning and mastery-level performance tasks defined by the panel. The beginning-level task list did not include all the critical patient-safety items (Table 2). Since beginning residents are directly supervised by attending physicians, the beginning list may serve as the minimal ability that a PGY-1 resident should possess prior to attempting supervised airway management in the clinical setting. In contrast, the mastery-level proficiency list included almost all performance tasks including those critical for patient safety and outcome (96%, Table 2). Therefore, the expert panel defined mastery-level performance as maintaining skills beyond the critical aspects of performance and including non-critical tasks, which may optimize success.

We discovered that the modified patient-safety standard setting better profiles the clinical airway

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item Description</th>
<th>Beginning Proficiency</th>
<th>Mastery Proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>Inserts oropharyngeal airway to proper depth</td>
<td>70.5</td>
<td>97.5</td>
</tr>
<tr>
<td>33</td>
<td>Chooses correct oropharyngeal airway size</td>
<td>Yes 82.5</td>
<td>Yes 99.5</td>
</tr>
<tr>
<td>34</td>
<td>Ventilates patient immediately (within 30 sec) with BVM</td>
<td>Yes 95</td>
<td>Yes 100</td>
</tr>
<tr>
<td>35</td>
<td>O₂ attached and flow &gt; 12 L/min</td>
<td>Yes 95</td>
<td>Yes 100</td>
</tr>
<tr>
<td>36</td>
<td>Ventilates patient at rate of 10-12/min</td>
<td>59.5</td>
<td>81</td>
</tr>
<tr>
<td>37</td>
<td>Evaluates BVM technique for visible chest rise</td>
<td>Yes 86.4</td>
<td>Yes 98.6</td>
</tr>
<tr>
<td>38</td>
<td>Uses thenar eminence technique (E-C grip)</td>
<td>67.3</td>
<td>Yes 93.2</td>
</tr>
<tr>
<td>39</td>
<td>Preoxygenates prior to backup plan</td>
<td>Yes 90.9</td>
<td>Yes 100</td>
</tr>
<tr>
<td>40</td>
<td>Recognizes need for backup airway</td>
<td>73.6</td>
<td>100</td>
</tr>
<tr>
<td>41</td>
<td>Identifies an appropriate backup airway device</td>
<td>71.8</td>
<td>100</td>
</tr>
<tr>
<td>42</td>
<td>Backup airway appropriately used</td>
<td>70.9</td>
<td>100</td>
</tr>
<tr>
<td>43</td>
<td>Immediately inflates cuff, prior to ventilation</td>
<td>Yes 82.3</td>
<td>Yes 99.5</td>
</tr>
<tr>
<td>44</td>
<td>Immediately disconnects syringe after inflating cuff</td>
<td>70.5</td>
<td>94.5</td>
</tr>
<tr>
<td>45</td>
<td>Confirms proper back up placement by auscultation over each lung</td>
<td>Yes 95.5</td>
<td>Yes 100</td>
</tr>
<tr>
<td>46</td>
<td>Confirms absence of breath sounds on epigastric region</td>
<td>Yes 88.6</td>
<td>Yes 90.9</td>
</tr>
<tr>
<td>47</td>
<td>Checks end-tidal CO₂—after backup airway placement</td>
<td>Yes 86.8</td>
<td>Yes 100</td>
</tr>
<tr>
<td>48</td>
<td>Checks pulse oximeter—after backup airway placement</td>
<td>Yes 95</td>
<td>Yes 100</td>
</tr>
<tr>
<td>49</td>
<td>Maintains control over backup airway after placement</td>
<td>69.5</td>
<td>Yes 90</td>
</tr>
<tr>
<td>50</td>
<td>Successfully places backup airway within one attempt</td>
<td>54.1</td>
<td>Yes 93.6</td>
</tr>
<tr>
<td>51</td>
<td>Ventilates without interruption of &gt;30 sec at any time</td>
<td>Yes 74.5</td>
<td>Yes 99.5</td>
</tr>
</tbody>
</table>
management practice for EM residents since they are actively supervised by board-certified EM physicians. This is apparent in the lower numbers of critical tasks required of novice trainees by the patient-safety method (49%) compared to the Angoff (73%). The patient-safety standard-setting method takes into account the difference in supervision of EM residents while the modified Angoff is based solely on the probability of a learner to accomplish each task. Interestingly, the results of the two standard-setting methods were similar for mastery since experts recognized the need for high performance as trainees transition to independent practice.

In the anesthesia literature, airway standards have been suggested to be from 27 to 57 ETI cases to reach a 90% success.\textsuperscript{3,18,19} Currently, in EM, the Milestone Project provides good guidance for assessment of resident procedural competency.\textsuperscript{20} At level 4, residents are required to complete a minimum of 35 intubations for competency. One recent evaluation examined the development of learning curves in EM residents by cumulative summation testing and defined 74.7 intubations as a number needed to achieve a 90% success rate for ETI.\textsuperscript{21} The implication of this, however, is an accepted 10% failure rate that, when placed in the context of the significant morbidity and mortality of failed airway management, should not be tenable.

The milestones provide a strategic framework that educators can use to communicate progress throughout training. However, current assessment methods involving counts of the number of times a trainee completes a procedure do little to inform medical educators about the trainee’s proficiency with regard to that procedure. The challenge now is to design rigorous performance assessments with defined standards to improve milestone designation. This exercise helped us to see that for airway management, even a resident who is designated as having passed the novice standards would not be qualified to perform airway management on a patient in need. Practice in the simulation environment with airway models of different levels of difficulty will enhance training and assessment.

**LIMITATIONS**

Our data concerning proficiency standards were derived from individuals who have been identified as experts in airway management or residency education. It is possible that another expert panel, depending on the composition, may select different items as critical for airway management or perceive a different proficiency standard for novice and mastery levels. However, we have tried to mitigate this through the specific choice of individuals who possess significant experience as identified by their involvement in the Airway Mastery Collaborative. Additionally, we used a large group of individuals such that all perspectives could be expressed.

Further, although these are standards set by experts for each proficiency level, it is unclear whether resident trainees attain these proficiency levels. Not all trainees at the start of a residency program possess the same baseline skills, and it is unknown how many require additional training prior to clinical practice. Further, it is unclear if residents, at graduation, attain mastery level of proficiency. Future work will focus on identifying these proficiency levels in current resident trainees utilizing this simulation scenario.

Finally, the items identified as critical for patient safety in this simulation scenario may not be the same for other scenarios. The standard setting was specifically directed at the defined scenario provided to the experts. Other scenarios may require standard setting to clearly define proficiency levels.

**CONCLUSION**

In this study, we established emergency medicine resident performance standards for comprehensive airway management during a simulation scenario. A panel of graduate medical education, airway management, and simulation experts defined performance expectations for novice and mastery level emergency medicine trainees. The patient-safety standard-setting method was found to best reflect the supervised practice of emergency medicine residents. Future work will focus on identifying these proficiency levels in current resident trainees utilizing this simulation scenario.
REFERENCES


APPENDIX A

Airway Mastery Collaborative (AMC) Study Group

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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/aet2.10127/full

Data Supplement S1. Supplemental material.
Evaluation of a Web-based Educational Program to Teach the Identification and Management of Alcohol Withdrawal in the Emergency Department

Cameron Thompson, MSc, Shelley L. McLeod, PhD(c), MSc, Vsevolod Perelman, MD, MSc, Shirley Lee, MD, MHSc, Sally Carver, MD, Taylor Dear, BSc, and Bjug Borgundvaag, MD, PhD

ABSTRACT

Background: Ideal management of alcohol withdrawal syndrome (AWS) incorporates a symptom-driven approach, where patients are regularly assessed using a standardized scoring system (Clinical Institute Withdrawal Assessment for Alcohol–Revised [CIWA-Ar]) and treated according to severity. Accurate administration of the CIWA-Ar requires experience, yet there is no training program to teach this competency. The objective of this study was to develop and evaluate a curriculum to teach clinicians how to accurately assess and treat AWS.

Methods: This was a three-phase education program consisting of a series of e-learning modules containing core competency material, an in-person seminar to orient learners to high-fidelity simulation, and a summative evaluation in an objective structured clinical examination setting using a standardized patient. To determine the impact of the AWS curriculum, we recorded how often the CIWA-Ar was appropriately applied in the emergency department (ED) before and after training. A CIWA-Ar protocol breach was defined as inappropriate administration of benzodiazepines (CIWA-Ar < 10) and failure to administer benzodiazepines when required (CIWA-Ar ≥ 10). ED length of stay, amount of benzodiazepines administered in the ED, discharge prescriptions, and unit doses (take-away bottle of four tablets) of benzodiazepine given were recorded.

Results: Seventy-four ED nurses completed the curriculum over an 8-week period. In the 5 months prior to the educational program delivery, we identified 144 of 565 (25.5%) CIWA-Ar protocol breaches, compared to 64 of 547 (11.7%) in the 5 months after training (Δ 13.8%, 95% confidence interval [CI] = 9.3%–18.3%). Program completion resulted in a reduction in the median total dose of diazepam administered in the ED (40 mg vs. 30 mg, Δ 10 mg, 95% CI = 0–20 mg) and no change was detected in ED length of stay and benzodiazepines prescribed.

Conclusions: Completion of this curriculum resulted in better compliance with the CIWA-Ar protocol by those who administer the CIWA-Ar; however, changes in inappropriate benzodiazepine prescribing practice will require future interdisciplinary initiatives.

From the Schwartz/Reisman Emergency Medicine Institute (CT, SC, TD, BB); Sinai Health System (CT, SLM, VP, SL, SC, TD, BB); and the Division of Emergency Medicine, Department of Family & Community Medicine (SLM, VP, SL, BB), University of Toronto, Toronto, Ontario, Canada.

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Mr. Thompson and Dr. McLeod contributed equally to the manuscript.


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Author contributions: The authors all stand behind the conclusions of this manuscript, agree to be accountable for all aspects of the work, and support its publication. All authors contributed to the study conception and designed the protocol. All authors contributed to the manuscript preparation and have given approval for its submission.

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Alcohol is one of the most commonly used mind-altering substances, with more than 50% of the U.S. population over the age of 12 reporting regular consumption. In the United States, it has been estimated that more than 8 million people are alcohol dependent, and half of these individuals will experience withdrawal if consumption is abruptly reduced or stopped. Alcohol withdrawal syndrome (AWS) is commonly encountered in the ED and can lead to serious complications such as seizures, delirium tremens, and even death. Manifestations of AWS typically start within 12 hours of significantly reduced consumption or abstinence; however, the onset of delirium tremens may be up to 48 to 96 hours from the last drink. AWS is best treated with benzodiazepines, preferably those with a long half-life. Benzodiazepines act on GABA receptors as pharmacologic mimics of alcohol, and when administered early can reduce both the duration and the severity of withdrawal symptoms. The 90-hour half-life of diazepam and its metabolites makes it an ideal choice for ED use. Patients fully treated in the ED with diazepam are protected from the serious manifestations of alcohol withdrawal and will not require outpatient benzodiazepine prescriptions.

Ideal management of AWS incorporates a symptom-driven approach, whereby patients are regularly assessed using a standardized scoring system. The severity of alcohol withdrawal can be assessed using the Clinical Institute Withdrawal Assessment for Alcohol–Revised (CIWA-Ar) scale, a validated scale measuring withdrawal symptoms in ten individual domains. Nine domains are scored on a scale of zero to seven (orientation is scored on a scale of 0 to 4), with a maximum score of 67. A total CIWA-Ar score < 10 indicates mild withdrawal, while a score ≥ 10 requires treatment. Using the symptom-guided approach, patients in moderate or severe withdrawal (CIWA-Ar ≥ 10) should be treated with 10 to 20 mg of diazepam orally (if tolerated) or intravenously, with reassessment at least hourly (more frequently if severe withdrawal). Previous randomized controlled trials have shown that compared to a fixed-dose regimen, a symptom-guided approach using the CIWA-Ar protocol results in faster symptom resolution, lower total dose of benzodiazepine administration, and no increase in adverse events.

Accurate administration of the CIWA-Ar requires experience, yet there was no training program at our institution to teach and ascertain this competency. Prior research by our group demonstrated CIWA-Ar protocol breaches (inappropriate administration of benzodiazepines) occurred in nearly 50% of ED cases. To identify important knowledge gaps in the treatment of AWS, we conducted a needs assessment as part of a plan to develop an AWS knowledge translation program for ED staff. Others have reported lack of knowledge, training, and familiarity with existing hospital protocols as important challenges to providing good care to AWS patients. In response to these reported deficiencies in AWS care, the objective of this study was to develop and evaluate a Web-based curriculum to teach ED clinicians how to accurately assess and treat AWS.

METHODS

Study Design and Setting
This was a single-center study at an academic teaching hospital (annual ED census 65,000). The curriculum was informed by results of a local needs assessment that identified gaps in knowledge and staff confidence regarding the treatment of AWS in the ED. The AWS curriculum was delivered weekly to groups of 7 to 10 nurses from March 1 to April 30, 2016, as part of the mandatory annual education program for all full-time nurses working in our ED. The research protocol was approved by the research ethics board at Sinai Health System prior to the start of this study.

Study Protocol
Our curriculum consisted of a blended learning model, involving e-learning and (in vivo) simulation for deliberate practice mastery and consisted of three phases:

Phase 1. A series of e-learning modules containing core competency material was presented in an interactive, multimedia style. Module 1 consisted of a 20-minute presentation containing core competency material related to the basic pharmacology, identification, and management of AWS in the ED. Module 2 was an introduction to the CIWA-Ar, focusing on how to assess each of its 10 domains, with review of real-patient videos depicting the full spectrum of AWS tremors for learner self-assessment. Instructions were also provided on the use of our smart phone app to assess AWS tremor. Module 3 consisted of standardized patient assessments depicting five common ED scenarios: mild, moderate, and severe AWS; an intoxicated
patient; and a patient with delirium tremens. Learners were asked to assign a diagnosis and CIWA-Ar score if applicable and to provide an ED disposition plan for each case. Learners were able to progress to the next module only after successful completion of the previous module, which on occasion required several attempts.

**Phase 2.** After completing the e-learning modules, participants attended a 30-minute in-person seminar, facilitated by one of the investigators. This seminar reviewed material learned in the modules and introduced participants to high-fidelity simulation with mental rehearsing, role-playing, and formative assessments.

**Phase 3.** The final phase consisted of a summative evaluation in an objective structured clinical examination (OSCE) setting, with learner’s knowledge and understanding of course material assessed using a simulated encounter with a standardized patient. Summative feedback was given at the end of the session to confirm learned principles and correct any errors.

**Outcome Measures**
To evaluate the impact of this educational program, we recorded how often the CIWA-Ar protocol was appropriately applied in the ED in the 5 months prior to (October 2015 to February 2016) and following training (May to September 2016) using a standardized data extraction tool. We included assessments of patients identified as having AWS who presented to the ED with a complaint related to alcohol withdrawal. Charts were identified based on a Canadian Emergency Department Information System presenting complaint of “substance withdrawal code 753” or any of the following International Classification of Disease (ICD) 10 codes: F10.0-F10.9; T51.0; T51.2 or T51.9. Patient assessments were excluded if patients were acutely intoxicated, were in withdrawal from a substance other than alcohol, or were not put on the CIWA-Ar protocol in the ED.

Our primary outcome was a breach of the CIWA-Ar protocol. A CIWA-Ar protocol breach was defined inappropriate administration of benzodiazepines (CIWA-Ar < 10) and failure to administer benzodiazepines when required (CIWA-Ar ≥ 10). Our secondary outcomes were ED length of stay, amount of benzodiazepines administered in the ED, prescriptions, and unit doses (take-away bottle of four tablets) of benzodiazepines given at discharge, any adverse events occurring in the ED (seizure, respiratory depression, delirium tremens), and hospital admission.

**Data Analyses**
Data were collected and stored in Microsoft Excel (Microsoft Corp.). Descriptive statistics were summarized using means and standard deviations (SDs), medians and interquartile ranges (IQRs), and frequencies with 95% confidence intervals (CIs). Median differences were estimated using the Hodges-Lehnman method and proportional differences were determined using the Newcombe-Wilson hybrid score method, where appropriate.15–17 All statistical analyses were conducted using Stata 15.0 (StataCorp LP).

**RESULTS**
Seventy-four ED nurses completed the AWS curriculum over an 8-week period. It was delivered weekly to small groups (seven to 10 nurses) from March 1 to April 30, 2016, as part of the mandatory annual education program for all full-time nurses working in our ED. The entire curriculum took approximately 2.5 hours to complete. Median (IQR) time to compete Module 1 was 23 (18–26) minutes, Module 2 was 15 (12–20) minutes, and Module 3 was 31 (29–35) minutes. After completing the e-learning modules, participants attended a 30-minute in-person seminar, followed by a 30-minutes OSCE. We identified 130 patient encounters in the pretraining phase, and 126 patient encounters in the posttraining phase that were included in the study (Figure 1). There were no differences detected in demographic characteristics between the pre- and posttraining groups (Table 1). In total, 1112 CIWA-Ar scores were derived for the 256 ED patient encounters included during the study period: 565 (50.8%) in the pretraining period and 547 (49.2%) in the posttraining period (Figure 1). Mean (±SD) numbers of CIWA-Ar scores per patient encounter were 4.3 (±2.9) and 4.3 (±2.9) in the pre- and posttraining groups, respectively.

A comparison of CIWA-Ar protocol breaches between the pre- and posttraining periods is shown in Figure 1. In the 5 months prior to the program delivery, we identified 144 of 565 (25.5%) CIWA-Ar protocol breaches, compared to 64 of 547 (11.7%) in the 5 months after training (Δ13.8%, 95% CI = 9.3%–18.3%). Program completion resulted in a reduction in the inappropriate administration of benzodiazepines in the
Before training, 113 of 326 (34.7%) patients with a CIWA-Ar < 10 received benzodiazepines when they were not required, compared to 39 of 346 (11.3%) in the posttraining group (Δ23.4%, 95% CI = 17.2%–29.5%). For patients in moderate or severe alcohol withdrawal (CIWA-Ar ≥ 10), 31 of 239 (13.0%) did not receive benzodiazepines when not required, compared to 25 of 127 (19.8%) in the posttraining group (Δ -6.3%, 95% CI = -16.7% to 4.1%).

Figure 1. Flow diagram of patients included in the study. AWS = alcohol withdrawal syndrome; CIWA-Ar = Clinical Institute Withdrawal Assessment for Alcohol–Revised.

Table 1
Demographic Characteristics of the 256 Included Patient Encounters

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Before Training (n = 130)</th>
<th>After Training (n = 126)</th>
<th>% Difference (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>98 (75.4)</td>
<td>99 (78.6)</td>
<td>3.2 (-7.2 to 13.4)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>44.9 (±12.6)</td>
<td>44.7 (±12.9)</td>
<td>0.2 (-2.9 to 3.3)</td>
</tr>
<tr>
<td>No fixed address</td>
<td>19 (14.6)</td>
<td>18 (14.3)</td>
<td>0.3 (-9.0 to 8.4)</td>
</tr>
<tr>
<td>Walk-in</td>
<td>49 (37.7)</td>
<td>48 (38.1)</td>
<td>0.4 (-11.3 to 12.1)</td>
</tr>
<tr>
<td>CTAS score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 1</td>
<td>2 (1.5)</td>
<td>2 (1.6)</td>
<td>0.1 (-4.0 to 4.2)</td>
</tr>
<tr>
<td>Level 2</td>
<td>57 (43.8)</td>
<td>48 (38.1)</td>
<td>5.7 (-6.2 to 17.5)</td>
</tr>
<tr>
<td>Level 3</td>
<td>67 (51.5)</td>
<td>74 (58.7)</td>
<td>7.2 (-4.9 to 19.0)</td>
</tr>
<tr>
<td>Level 4</td>
<td>4 (3.1)</td>
<td>2 (1.6)</td>
<td>1.5 (-2.9 to 6.2)</td>
</tr>
<tr>
<td>Blood EtOH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No value</td>
<td>9 (6.9)</td>
<td>11 (8.7)</td>
<td>1.8 (-5.0 to 8.8)</td>
</tr>
<tr>
<td>≤2 mmol/L (≤9.2 mg/dL)</td>
<td>39 (30.0)</td>
<td>47 (37.3)</td>
<td>7.3 (-4.2 to 18.6)</td>
</tr>
<tr>
<td>&gt;2 mmol/L (&gt;9.2 mg/dL)</td>
<td>82 (63.1)</td>
<td>68 (54.0)</td>
<td>9.1 (-2.9 to 20.8)</td>
</tr>
<tr>
<td>EtOH &gt; 2 mmol/L (&gt;9.2 mg/dL)</td>
<td>126.3 (±3.3) mmol/L</td>
<td>208.7 (±3.5) mmol/L</td>
<td>6.0 (-3.6 to 15.6) mmol/L</td>
</tr>
</tbody>
</table>

Data are reported as n (%) or mean (±SD). CTAS = Canadian Triage Acuity Scale; EtOH = ethanol.
patients in the pretraining group did not receive benzodiazepines when they were indicated, compared to 25 of 201 (12.4%) in the posttraining group (Δ0.6%, 95% CI = −5.9% to 6.7%).

Approximately half of all CIWA-Ar breaches (109/208; 52.4%) occurred in patients with a CIWA-Ar score between 8 and 12, indicating treatment decisions in the range of CIWA-Ar scores close to the treatment threshold are most problematic. In this range (CIWA-Ar score between 8 and 12), there were 73 of 162 (45.1%) protocol breaches in the pretraining group, compared to 36 of 149 (24.2%) in the posttraining group (Δ20.9%, 95% CI = 10.4%–30.8%).

Figure 2 describes the proportion of all CIWA-Ar scores resulting in a breach, on a month-to-month basis. During the 5 months after training, there was a sustained reduction in CIWA-Ar breaches, with no reduction in mean number of CIWA-Ar scores per patient (4.3 in both the pre- and the postintervention groups).

After program completion, there was a reduction in the median total dose of diazepam administered in the ED (40 mg vs. 30 mg, Δ10 mg, 95% CI = 0–20 mg) and no change was detected in ED length of stay and benzodiazepines prescribed (Table 2). Adverse events occurring in the ED (seizure, respiratory depression, delirium tremens) were similar before and after the AWS curriculum training. There was one incidence of delirium tremens in both the pretraining and the posttraining periods (Table 2). Hospital admission increased by 10.7% (95% CI = 1.4% to 20.0%) from the pretraining to postraining phase; however, most admissions (75.0% in the pretraining group and 72.4% in the posttraining group) were unrelated to AWS.

**DISCUSSION**

This study demonstrates that our blended curriculum model improved the care delivered to AWS patients over the 5 months following completion of training by ED staff nurses. Over the course of more than 500 CIWA-Ar assessments, our program significantly reduced errors in benzodiazepine administration as part of a standardized AWS treatment protocol. We found that this educational initiative provided the greatest improvement in the treatment of patients with CIWA-Ar scores in the 8 to 12 range, where discrimination between requiring and not requiring treatment is most difficult. Nurses who completed our program...
were significantly less likely to administer benzodiazepines to patients when such treatment was not indicated.

While undertreatment of AWS patients requiring benzodiazepines is a concern, unnecessary administration of benzodiazepines to patients with mild withdrawal symptoms is also problematic. Excessive benzodiazepine treatment is likely to increase sedation, potentially prolong ED length of stay and divert nursing resources from other ED patients. Additionally, unnecessary benzodiazepine treatment of patients with mild withdrawal may reinforce patient perceptions that they require benzodiazepine treatment for alcohol craving, possibly resulting in benzodiazepine dependence. In our study, reduced benzodiazepine administration to patients with mild withdrawal symptoms (CIWA-Ar scores < 10) was not associated with an increase in adverse events in the ED or admissions specifically related to alcohol withdrawal, suggesting conservative management was appropriate.

In this study, we did not find a change in benzodiazepine prescribing behavior at discharge. Given that only nurses completed the education training program, this finding is not unexpected. Unnecessary benzodiazepine prescriptions and unit dose distribution at discharge are harmful and an important area where patient care could be improved. It remains unknown if this program could influence physician prescribing.

General lack of knowledge around all aspects of the management of AWS is a barrier to providing good care to these patients in the ED. One of the main challenges is the perceived complexity of how to administer and interpret responses to the questions in the CIWA-Ar protocol. Acquisition of these skills requires experience, yet there is no training program to teach this competency. The resulting lack of confidence may contribute to inconsistent and inappropriate care. Our study shows that an electronically delivered AWS curriculum coupled with a practice seminar and an OSCE (which has an added educational value) is an effective educational tool to teach this competency and improve patient care. The online format of this innovative program makes it an easily distributed electronic resource that can be shared.

Compared to didactic teaching methods, deliberate practice simulation-based education, which provides a thorough background and opportunities for repetition until mastery, has been shown to be more effective when teaching procedural skills. Performance feedback is a key component of this educational model, allowing participants to progress at their own pace toward achieving mastery. However, the effectiveness of this AWS curriculum in other settings without a local expert/champion to help facilitate knowledge acquisition remains unknown.

**LIMITATIONS**

This study was conducted in a single-center tertiary care institution, and the results might not be...
generalizable to other settings. Due to the retrospective nature of this study, we can only report what was documented in the patient chart, and it is possible clinical management may have been dictated by information not documented in the chart. Importantly, we are unable to comment on patient preferences that may have challenged standard of care and guided a patient’s treatment plan. To evaluate the impact of this educational program, we recorded how often the CIWA-Ar protocol was appropriately applied in the ED in the 5 months prior to and following training. Although the curriculum was delivered as part of the mandatory annual education program for all full-time nurses, not all nurses (i.e., part-time nurses) working in our ED completed the AWS training program. Due to the fluctuations of nursing care in the ED (shift change, break coverage, etc.), there was no feasible way to include only patients assessed by nurses who completed the program. This may have resulted in an underestimation of the impact of the training program on ED care, as a number of the nurses in the post-intervention period would not have completed the AWS curriculum. Although we believe that this training program contributed to the fewer protocol breaches and improved patient care documented in the 5 months after training, further study is needed to determine if the nurses who completed the AWS curriculum retained the knowledge and competency with the CIWA-Ar protocol beyond this time period.

CONCLUSIONS

Completion of our alcohol withdrawal syndrome curriculum resulted in better compliance with the Clinical Institute Withdrawal Assessment for Alcohol–Revised protocol and significantly reduced errors in benzodiazepine administration as part of a standardized alcohol withdrawal syndrome treatment protocol. This educational initiative improved ED care for patients with alcohol withdrawal syndrome and had the greatest impact in the treatment of patients with Clinical Institute Withdrawal Assessment for Alcohol–Revised scores in the 8 to 12 range, where discrimination between requiring and not requiring treatment is most difficult.

The authors thank all emergency department staff who participated in the training for their continued commitment and contribution to high quality care.

References


Nicole M. Dubosh, MD, Jaime Jordan, MD, Lalena M. Yarris, MD, Edward Ullman, MD, Joshua Kornegay, MD, Daniel Runde, MD, MME, Amy Miller Juve, EdD, and Jonathan Fisher, MD, MPH

ABSTRACT

Objectives: The objectives were to critically appraise the emergency medicine (EM) medical education literature published in 2016 and review the highest-quality quantitative and qualitative studies.

Methods: A search of the English language literature in 2016 querying MEDLINE, Scopus, Education Resources Information Center (ERIC), and PsychInfo identified 510 papers related to medical education in EM. Two reviewers independently screened all of the publications using previously established exclusion criteria. The 25 top-scoring quantitative studies based on methodology and all six qualitative studies were scored by all reviewers using selected scoring criteria that have been adapted from previous installments. The top-scoring articles were highlighted and trends in medical education research were described.

Results: Seventy-five manuscripts met inclusion criteria and were scored. Eleven quantitative and one qualitative papers were the highest scoring and are summarized in this article.

Conclusion: This annual critical appraisal series highlights the best EM education research articles published in 2016.

Efforts to promote high-quality education research in emergency medicine (EM) have increased over the past decade. The 2012 Academic Emergency Medicine consensus conference “Education Research in Emergency Medicine: Opportunities, Challenges, and Strategies for Success” called for a growth in hypothesis-driven education research studies. Additionally, increasing grant opportunities from EM organizations including the Society for Academic Emergency Medicine (SAEM) and Council of Emergency Medicine Residency Directors (CORD), faculty development efforts including the Medical Education Research Certification Program (MERC), development of the CORD Academy for Scholarship in Education in Emergency Medicine, and the growing number of EM medical education fellowship programs have likely contributed to this. The increased focus on medical education has led to a significant increase in research publications specific to EM learners.

In this ninth installment of the annual critical appraisal of the EM education research, we systematically analyze and rank the best publications of 2016.
We used modified previously published criteria for qualitative and quantitative research studies similar to prior installments of this series.7–14 We also describe and summarize current trends in medical education research over the past year as they relate to EM learners and educators. This appraisal is designed to serve as a resource for EM educators and researchers invested in education scholarship.

METHODS

Article Identification
A medical librarian reproduced a previously used Boolean search strategy to identify all 2016 English language research publications relevant to EM education.7 While previous installments of this article included keywords inclusive of medical students, the authors recognized that some papers that focused on clerkships may have been inadvertently omitted. Therefore, the authors added “clinical clerkship” and “clerkship” to the search parameters for this installment. The search was run in November 2017 using medical subject heading (MeSH) and keyword terms, including keyword variations to ensure completeness (Data Supplement S1, Appendix S1, available as supporting information in the online version of this paper, which is available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10203/full). Other databases including Scopus, Education Resources Information Center (ERIC), and PsychInfo were also searched. Articles that are listed as Epub are included in the year that they are first listed and not when they are finally published.

Inclusion and Exclusion Criteria
Studies relevant to the EM education of medical students, graduate medical education trainees, academic and nonacademic attending physicians, and other emergency providers were included. Studies were defined as hypothesis-testing investigations, evaluations of educational interventions, or explorations of educational problems using either quantitative or qualitative methods. Publications were excluded if they were: 1) not considered to be peer-reviewed research (such as opinion pieces, commentaries, literature reviews, curricula descriptions without outcomes data); 2) not relevant to EM learners (such as reports on education of prehospital personnel and international studies that could not be generalized to EM training outside of the country in which they were performed); 3) single-site survey studies; and 4) studies that examined outcomes limited to an expected learning effect without a comparison group.

Data Collection
In total, 644 abstracts were retrieved through the database search. Duplicates were identified and deleted and one reviewer (NMD) applied exclusion criteria to the remaining 510 abstracts. Two reviewers then independently screened the included articles by full-text review and further refined the selection utilizing the exclusion criteria. Differences in opinion were resolved by discussion among the three reviewers (Figure 1).

Retrieved publications were maintained in a Microsoft Excel 2016 database and were classified as either primarily quantitative or qualitative methods for scoring purposes.

Scoring
Six reviewers scored the articles that met inclusion criteria. All reviewers have published in medical education and hold faculty positions in medical education at academic EM programs. All reviewers were trained in scoring by the senior author during two 1-hour-long conference calls. Scoring was based on a previously adapted version7–9 of the Research in Medical Education symposium of the Association of the American Medical Colleges15 and applying additional criteria from Alliance for Clinical Education study reviews.16 The scoring tool was iteratively modified in 2009, 2010, and 2016 to more accurately reflect EM education topics and the development of new areas of research including simulation and other technology. Each publication was assigned to a scoring system based on whether they were primarily quantitative or qualitative studies. The scoring criteria for both quantitative and qualitative research studies have been described above and previously published in this review series and are represented in Tables 1 and 2. It was decided a priori to include the top 10 best quantitative and one qualitative article that met consensus criteria described below. Reviewers recused themselves from reviewing articles in which they were coauthors. We adopted a two-stage scoring approach for quantitative articles due to the large number of quantitative studies this year that met inclusion criteria. Two reviewers (NMD and JF) independently scored all quantitative studies using an abbreviated scoring tool (Data Supplement S1, Appendix S2) based on methodology. The top 25 quantitative articles from the
first stage were made available for the other four reviewers to score independently in the second stage. The articles scores were converted to rankings. Using accepted recommendations and hierarchical formulations, qualitative studies were assessed and scored in nine domains, parallel to those applied to the quantitative studies, for a maximum total score of 25 points. These also included the domains of measurement, data collection, and data analysis criteria, as defined specifically for high-quality qualitative research. All reviewers scored all of the qualitative articles. As in years past, quantitative and qualitative articles that were in all reviewers’ top 10 were included as well as articles that were in at least 75% reviewers’ top 10 lists. Means with standard deviations (SDs) and rankings were calculated in Excel. The use of rankings was to improve consensus. Inter-rater reliability was assessed with intraclass correlation coefficient using a two-way random-effect model in SPSS 25.0.

Trends
Trends in medical education research were analyzed for all articles that met inclusion criteria. To identify important trends in 2016, a data form was created a priori based on trends reported in prior critical appraisals in this series. Articles were reviewed, including publishing journal, acknowledgments, disclosures, and author affiliations to determine study design, study population, number of participating institutions, topic of study, funding, publishing journal, and presence of author EM departmental affiliation. Data were abstracted by JJ and confirmed by a second reviewer, NMD. Discrepancies were resolved by discussion. Journal focus was determined by knowledge of study authors or, if the journal was unfamiliar, review of the journal website.

RESULTS
A total of 510 papers satisfied the search criteria and 75 papers met inclusion criteria, 69 quantitative and six qualitative. In the second round, the range of reviewers’ scores for the top 25 qualitative articles was 13 to 23 with a mean (SD) score of 17.4 (±3.0). For the six qualitative articles, the range of scores was 12 to 23 with a mean (SD) score of 16.8 (±2.7). During the initial round of quantitative scoring using the modified tool with two reviewers, the intraclass correlation was 0.997. For qualitative scoring intraclass correlation coefficient revealed a Cronbach’s alpha of 0.66. Given that there was a tie score, 11 quantitative articles were ranked in the top 10 by 75% of reviewers. The 11 highest-scoring quantitative and the single highest-scoring qualitative articles are reviewed below, in alphabetical order by the first author’s last name.

Selected Articles
1. Counselman FL, Kowalenko T, Marco CA, et al. The relationship between ACGME duty hour requirements and performance on the American Board of
Table 1
EM Education Research Scoring Metrics: Quantitative Research

<table>
<thead>
<tr>
<th>Domain</th>
<th>Item</th>
<th>Item Score</th>
<th>Maximum Domain Score</th>
</tr>
</thead>
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<tr>
<td>Introduction (1 point for each criterion met)</td>
<td>Appropriate description of background literature</td>
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<td>3</td>
</tr>
<tr>
<td></td>
<td>Clearly frame the problem</td>
<td>1</td>
<td></td>
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<tr>
<td></td>
<td>Clear objective/hypothesis</td>
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<tr>
<td>Study design: measurements and groups</td>
<td>Measurement (2 points max)</td>
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<td>One measurement</td>
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<tr>
<td></td>
<td>Two measurements two points in time</td>
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<tr>
<td></td>
<td>Groups (2 points max)</td>
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<td></td>
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<tr>
<td></td>
<td>One group</td>
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<td>More than two institutions or CORD listserv</td>
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<td>Response rate &lt; 50% or not reported</td>
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<td>Response rate ≥50%</td>
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<td>Response rate ≥75%</td>
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<td>Data analysis (add appropriateness + sophistication) 3 max</td>
<td>Appropriate for study design and type</td>
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<td>Discussion</td>
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<td>Data support conclusion</td>
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<td>Conclusion clearly addresses hypothesis/objective</td>
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<td>Conclusions placed in context of literature</td>
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Background: Starting in 2003, the Accreditation Council for Graduate Medicine Education (ACGME) set work duty hour limitations in an effort to enhance patient safety and improve education and working conditions. This created a concern for decreased educational opportunities. This study looked at the results

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<td>Incorporated validation strategies (e.g., member checking, triangulation)</td>
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of the American Board of Emergency Medicine qualifying exam (QE) before and after the duty hour limitations were instituted in 2003 and 2011.

Methods: Retrospective review of the QE results from 1999 through 2014. Candidates were broken into four groups based on timing of implementation of the duty hour restrictions. Mean QE scores and pass rates were compared between groups.

Results: Three of the five groups were identified as having distinct differences in duty hour requirements during the study period and were analyzed. There was a small but statistically significant decrease in the mean scores (0.04, p < 0.001) after implementation of the first duty hour requirements but this difference did not occur after implementation of the 2011 requirements. There was no difference among pass rates for any of the study groups.

Strengths of Study: This study used a large data set and found no real practical difference in scores based on duty hours. This study looked at performance related to two separate changes in duty hour requirements.

Application to Clinician Educators: It appears that duty hour limitations do not necessarily negatively impact examination scores. This may lend support to the benefits of work hour restrictions.

Limitations: Other variables related to residency training may have affected QE performance.


Background: Slide-based presentations are ubiquitous in the current educational paradigm. Research in instructional design has identified design principles which, when followed, have been shown to increase knowledge transfer and retention. Prior studies have involved undergraduate and medical students in controlled settings. This study sought to assess how practicing attending physicians responded to the use of these design principles in continuing medical education (CME) conference presentations.

Methods: This was a retrospective analysis of lecture slide content and attendees’ evaluation scores from six sequential national EM CME conferences from 2010–2012. A mixed linear regression was used to determine whether evaluation scores were associated with the percent of image-based slides per presentation, number of words per slide (text density), or the speaker’s academic seniority.

Results: A total of 105 unique presentations by 49 unique faculty participating were analyzed. A total of 1,222 evaluations, indicating a 70.1% conference attendee response rate, were also included in the analysis. Image fraction was predictive of overall evaluation scores and had the greatest influence on predicting evaluation scores of any of the measured factors while text density did not have a significant association. Speaker seniority was predictive of evaluation performance.

Strengths of Study: The relatively large data set of over 100 presentations and 1,200 evaluations allows for a robust analysis. The decision to evaluate quantifiable design principles increases the strength of both its conclusions and its reproducibility. The mixed linear regression analysis makes the results more easily intelligible and allows for statistical power.

Application to Clinician Educators: This paper represents the first analysis of the association between the application of evidence-based design principles and presentation evaluations among practicing physicians. It demonstrates a significant association between at
least one principle and significantly improved evaluations, strengthening the case that these principles should be taught and applied among health professions educators and providing a launch point for future research in this area.

Limitations: Confounding variables may have affected mean score and were not accounted for in this study. Additionally, the CME evaluation tool has not been validated.


Background: Transitions of care present increased risk for miscommunications and subsequent adverse patient outcomes. The objectives of this study were twofold: 1) to better define the current culture around handoff practices in EM and 2) to evaluate if these practices are evolving as more education is devoted to the topic.

Methods: This was a cross-sectional survey study guided by the Kern model for medical curriculum development aimed at 175 EM residency programs. It used a four-point Likert-type scale to elucidate current transitions of care practices. Comparisons were made to a previous survey from 2011 to evaluate for interval changes in these practices.

Results: A total of 127 programs (73%) responded to the survey. Significant interval changes were found in the following domains: increased use of a standardized handoff protocol, increased formalized training to residents during orientation, and decreased number or programs offering no training. The majority of respondents felt that their residents were “competent” or “highly competent” with the handoff process.

Strengths of Study: This was a multi-institutional survey study with a moderately high response rate making it highly generalizable. It addresses transitions of care, a topic not widely studied but that is widely encountered and affects both resident education and patient outcomes.

Application to Clinician Educators: This study demonstrates improvement in the standardization of handoff practices and formalized training of the process. It also demonstrates that future educational advancements should focus on assessment of proficiency of this educational intervention.

Limitations: The response rate of 72.6% may limit generalization to all academic EDs.


Background: The modern resident is accustomed to using technology on a daily basis. Residents use both text and e-mail as ways to acquire and disseminate information. This study sought to see if there was a difference between these two modalities in terms of knowledge retention of EM content.

Methods: Residents from three EM residencies were randomized into text or e-mail delivery of EM educational content from an EM board review textbook. All participants completed a 40-question pre- and post-intervention examination to assess knowledge retention. Examination scores were compared between groups using descriptive statistics, paired t-tests, and linear regression.

Results: Fifty-eight residents were included in this study. The authors found no significant difference between the primary outcomes of the two groups ($p = 0.51$). PGY-2 status had a significant negative effect ($p = 0.01$) on predicted examination score difference. Neither delivery method enhanced resident knowledge retention.

Strengths of Study: The multicenter nature of this study allows for generalizability. This study is novel in that it sought to investigate the effect of text messaging, a modern-day form of communication and learning that is relevant to the millennial learner.

Application to Clinician Educators: This study shows that there are a variety of methods to deliver educational content. This further enhances delivery of asynchronous education, which is critical in the current learning environment.

Limitations: The authors did not calculate a sample size for the secondary analysis (PGY level and sex) nor did they track whether the text messages and e-mails were viewed by the residents.


Background: Teaching and assessing professionalism poses challenges for educators and the lack of a consensus definition for professionalism is a major contributor to these difficulties. This study sought to explore EM trainees’ understanding and conceptualization of professionalism by quantifying the value they assigned to various professionalism attributes.

Methods: Survey of incoming and graduating EM residents at four U.S. programs. The authors used the
American Board of Internal Medicine’s “Project Professionalism” and the ACGME’s definition of professionalism attributes among seven professionalism domains. Residents were asked to rate each attribute on a 10-point Likert scale to determine their perceived contribution to the residents’ concept of medical professionalism. The analysis assessed how well each domain mapped to the concept of professionalism.

Results: One-hundred of 114 (88%) of eligible residents completed the survey. The authors found that “altruism” was rated significantly lower and “respect for others” rated significantly higher than the other domains. Graduating seniors rated five attributes: commitment to lifelong learning, active leadership in the community, a portion of care for patients should be for those without pay, active involvement in teaching and/or a professional organization, and compassion and empathy lower than new interns. The majority of residents felt that professionalism could be taught, but the minority thought that it could be assessed.

Strengths of Study: The high response rate and geographical diversity contributes to the quality of this study. In contrast to much of the previous research on professionalism, which often occurred via structured interview or group formats, the anonymous nature of this survey may have allowed for more honest responses from the residents. This article represents the first study of its kind to focus exclusively on EM residents.

Application to Clinician Educators: Developing an understanding of current EM residents’ conceptions of medical professionalism is an important component of future attempts to teach and evaluate this mandated core competency. The differences found in this study among institutions and training level with regard to certain key attributes of professionalism warrant more robust evaluation.

Limitations: Variability in response rate by institution may have skewed the results. When comparing residents by level of training, the authors only examined one snapshot in time; they did not compare individuals before or after training.


Background: Entrustable professional activities (EPAs) are units of professional practice that can be useful in determining entrustment decisions for trainees in a competency-based education model. Little is known about how to produce EPA content after suitable clinical tasks have been identified. This paper describes a rigorous approach to develop EPA content using qualitative methods.

Methods: This study applied focus group and individual interview methods to collect and analyze tasks, content, and entrustment scales for two specialty-specific EPAs in EM. Specific steps include: 1) select EPA topic, 2) collect EPA content from focus groups and interviews, 3) analyze collected data to generate EPA draft, 4) seek EPA draft feedback from participants and stakeholders, and 5) revise EPA based on feedback.

Results: Applying this approach, the authors developed EPAs for two EM-specific tasks: managing adult patients with acute chest pain and managing elderly patients following a fall. A three-level entrustment scale was developed to aid in entrustment decisions for targeted learners.

Strengths of Study: The qualitative methods for this study are rigorous and the conceptual framework is strong. Readers will find the detailed steps, sample interview protocol questions, and example EPAs to provide guidance for similar initiatives.

Application to Clinician Educators: The five-step process described by the authors can be applied to the development of other EPAs by educators across the continuum of medical education.

Limitations: The findings of the study are limited to emergency medicine in an urban hospital setting.


Background: Team-based practice is increasingly common for healthcare professionals and is especially important in the setting of trauma resuscitation. Mental practice (MP), defined as the “cognitive rehearsal of a skill in the absence of an overt physical movement,” has been shown to improve skill based performance when teaching surgical skills. Its impact on team performance has not previously been studied.

Methods: Prospective, single-blinded, randomized, simulation-based study involving anesthesia, EM, and general surgery residents. Residents were grouped into teams of two. Half of the teams received face-to-face teaching on the trauma algorithm and nontechnical elements of team-based trauma care whereas the other half underwent quiet MP of a descriptive script based on key trauma principles. All teams participated in a high-fidelity adult trauma simulation which was videotaped for
The study investigated the program to address some of the barriers. MERC was developed in 2009. This program was designed to involve residents in medical education. To overcome some of the challenges, the program was developed to improve career development including academic promotion.

**Results:** Seventy-eight PGY 1–5 residents participated in the study. The control group had more senior residents than the intervention group. The MP group had a statistically superior performance on the MHPTS and higher mMIQ scores compared to the control group.

**Strengths of Study:** This study was composed of participants from three specialties across a range of a PGY training. The main outcome measure was assessed in a blinded fashion using a previously validated simulation teamwork score. Despite the control group having more senior trainees than the intervention group as a result of randomization, the intervention group performed better on both measures.

**Application to Clinician Educators:** Team-based practice is a key element of EM clinical practice. This study suggests that MP may be an effective training tool to improve teamwork in high acuity/high cognitive load scenarios.

**Limitations:** The intra-class correlation was modest. A change in the resuscitation content may have precluded comparison between groups.


**Background:** Establishing one’s self as an education scholar while maintaining a busy clinical career has proven to be problematic for those interested in a career in medical education. To overcome some of these barriers, MERC was developed in 2009. This study investigated the program’s outcomes 5 years after its inception.

**Methods:** A mixed-method design was used in this study evaluating annual pre/post program surveys, alumni surveys, and quantitative tracking of participants publications or presentations resulting from involvement in the MERC program.

**Results:** At the time of publication of this paper, 149 physicians had participated in the program, 63 of whom have presented a national presentation and 30 of whom have authored a peer-review publication as a result of involvement in the MERC program. The majority of participants reported significantly improved skills and knowledge related to medical education research. The majority of alumni reported that knowledge attained from MERC has been instrumental in career development including academic promotion.

**Strengths of Study:** The longitudinal approach to the study design allows for an increased power and decreased bias by incorporating participants in a program as it grows, evolves and develops. This, coupled with the collection of both qualitative and quantitative metrics, adds to the rigour and validation of the outcomes.

**Application to Clinician Educators:** The authors of this study illustrate important and successful outcome measurements after the deployment of a novel longitudinal faculty development program. This demonstrates the importance of such programs and produces a framework for assessment of similar programs.

**Limitations:** This study had a relatively low response rate of 58% which may limit generalizability. Additionally, further long-term outcomes will take several more years to be fully assessed.


**Background:** Assessing resident knowledge of mechanical ventilation is important in EM and critical care. Validated assessment tools regarding this content area are currently lacking. This study aimed to determine the psychometric properties of a novel tool to assess resident knowledge regarding mechanical ventilation.

**Methods:** Prospective survey of EM residents at eight institutions across the northeastern United States. A nine-item survey on baseline mechanical ventilation knowledge was administered to participants. The results were analyzed using Classical Test Theory–based psychometric analysis, including item and reliability analyses to quantify reliability, item difficulty, and item discrimination of the assessment tool. Reliability analysis was performed using both Cronbach’s alpha and the Spearman–Brown coefficient for unequal lengths.

**Results:** A total of 214 of 312 residents (69%) participated in the study. Reliability, item difficulty, and item discrimination were found to be within satisfactory ranges, demonstrating acceptable psychometric properties of this knowledge assessment tool.

**Strengths of Study:** This study designs allows for validation of an assessment tool in an area of medical education where one is currently lacking.
Application to Clinician Educators: Mechanical ventilation knowledge is necessary for emergency physicians. Successful curriculum development requires validated assessment tools to demonstrate knowledge transition and acquisition. This validated tool with appropriate psychometric properties can be used to assess residents’ knowledge of mechanical ventilation.

Limitations: The response rate was 68.6%. Nonresponder bias may have affected item difficulty and discrimination analyses.


Background: There is increased focus on quality improvement and patient safety in the clinical learning environment but teaching strategies vary considerably. This study sought to identify whether a mobile device platform and team-based competition would improve resident engagement in an online quality improvement curriculum.

Methods: This was a prospective, randomized study of residents in multiple residency programs at a single institution. Residents were randomized into two groups: those who were involved in a competition and a control group. The competition group was assigned to a team and given points for performance in the online learning curriculum. The primary outcome was percentage of questions answered by residents. Secondary outcomes were total response time, proportion of residents who answered all of the questions, and number of questions that were mastered.

Results: Residents in the competition group demonstrated greater participation than the control group; the percentage of questions attempted at least once was greater in the competition group (79% [SD ± 32] vs. control, 68% [SD ± 37], p = 0.03) and median response time was faster in the competition group (p = 0.006). Differences in participation continued to increase over the duration of the intervention, as measured by average response time and cumulative percent of questions attempted (each p < 0.001).

Strengths of Study: Game mechanics across multiple specialties showed an increase in resident engagement. This is a novel way to deliver quality improvement education. The team-based approach appears to have a positive motivating effect on residents.

Application to Clinician Educators: Educators should consider team-based competition as a means to increase engagement in online learning in graduate medical education.

Limitations: This study assesses resident engagement in a quality improvement curriculum but does not assess mastery of content or improved clinical performance.


Background: Task switching is a patient care competency of interest to EM educators. The authors hypothesized that level of training affects EM resident performance and developed a simulation scenario with built-in task switching to measure differences in resident abilities to perform crucial tasks in the context of interruptions.

Methods: A convenience sample of residents at three institutions was invited to participate in a standardized simulated encounter that involved task-switching to manage a patient with a ST-elevation myocardial infarction (STEMI) while evaluating and treating a patient with septic shock. Critical actions for both simulated patients were measured by checklist, and logistic regression was used to analyze associations between level of training and demonstration of critical actions.

Results: A total of 87 of 91 (96%) subjects met criteria for proper management of the septic shock patient, and 79 of 91 (87%) subjects identified and properly managed the STEMI patient. There were no significant differences in performance by level of training.

Strengths of Study: This study uses simulation as a tool to elicit competency performance in a way that can be observed and measured in a reproducible way. The development of a scenario with the explicit intent of measuring a relevant but difficult-to-measure behavioral concept and implementation at multiple centers are strengths of this study.

Application to Clinician Educators: Educators wishing to study complex behaviors using simulation may find this study useful as a starting point for development and implementation of a multicenter educational study designed to assess task-switching performance.

Limitations: Inter-rater reliability was not assessed and the number of residents who did not perform the number of critical actions was small.

12. Wagner JF, Schneberk T, Zobris M, et al. What predicts performance? A multicenter study examining the association between resident performance, rank list position, and United States Medical Licensing...
Background: Residency programs devote significant time and resources into residency selection. Little is known about what applicant characteristics predict success in residency. This study explored whether rank order list (ROL) position, participation in an EM rotation at the program, or United States Medical Licensing Examination (USMLE) Step 1 rank were predictive of residency performance.

Methods: Graduating residents’ performances were ranked by full-time faculty at four EM residency programs. This graduate ROL was compared with the program’s residency ROL, USMLE Step 1 rank, and EM rotation participation to determine associations between each characteristic and ranked residency performance.

Results: In a sample of 93 residents, graduate ROL position did not correlate with Step 1 score or residency ROL position but did correlate with having rotated as a student at the program.

Strengths of Study: This study added to the programs’ understanding of factors that predict applicant performance in residency by quantifying that the ability to observe a student in an EM rotation at a given program is helpful in determining future residency performance.

Application to Clinician Educators: This study adds that USMLE Step 1 scores do not correlate with residency performance and that ROL list position does not reliably correlate with ranked graduate performance. Future educational advances might investigate whether some programs are more likely to produce ROLs that do correlate with ranked graduate performance. Exploring the selection methods of these programs may lend insight into what really matters in residency selection.

Limitations: Ranking residents based on judgment of attending faculty is subjective in nature and susceptible to multiple types of biases.

DISCUSSION

In 2016, there continued to be a trend toward increasing number of articles that meet our a priori criteria for full review (n = 75) compared with 2015 (n = 61) and 2014 (n = 25). As the field of medical education continues to grow, we expect that this trend will continue. There was a decrease in the number of funded studies in 2016; 11% of all articles compared to 20% in 2015 and 16% in 2014. There is some literature to suggest that funded medical education research may be of higher quality. However, the decline in funded research does not necessarily indicate a decline in quality of EM medical education research overall. Possible explanations for this trend may include a decrease in amount of available funds overall or shifting of research priorities of funding agencies. Three of the 12 highlighted studies were funded.

The number of studies that have at least one EM author continues to be high, 89% (67/75) in 2016 compared to 95% in 2015 and 84% in 2014. EM journals published 64% (48/75) of the articles in this review. This represents a decrease from 2015 where EM journals published 71% of the eligible articles. This decrease was balanced by an increase in articles published in various other types of journals (17% in 2016 compared to 11% in 2015), while the percentage of articles published in medical education journals remained relatively constant (19% in 2016 compared to 18% in 2015). The other journals that published EM medical education research in 2016 were broad in focus including simulation, trauma, ultrasound, quality and safety, and general medicine.

While the majority of articles continue to come from the United States (84%; 63/75) and Canada (3/75; 4%) where EM and EM education research are widely accepted disciplines, there continues to be a notable presence (9/75; 12%) of studies from other countries around the world including the United Kingdom, France, Australia, Korea, Turkey, Belgium, and Iran. Three of the highlighted articles were from studies based outside the United States (Canada, United Kingdom, Australia).

In response to a call for increased rigor in medical education research, EM education researchers increasingly apply thorough methodologic standards and evaluate higher level outcomes in their research studies. In 2016, there was a notable increase in the number of studies utilizing an experimental (hypothesis testing) design, 15 of 75 (20%), compared to nine of 611 (5%) in 2015. Three of these studies with an experimental design were highlighted. There was a decline in the number of observational studies (35/75; 47%), compared to 36/61 (59%), but an increase in the number of studies using survey methodology (19/75; 25%) in 2016 compared to 10 of 61, 16% in 2015, and 0% in 2014. It
should be noted that all survey studies in this review drew data from participants from multiple institutions per the predetermined selection criteria. Commonly, these were nationwide surveys in the United States. This may reflect an increase in the quality of survey studies. Surveys addressing important topics can provide valuable information to EM educators provided that the study design is aligned with the research question and adheres to established guidelines. Two of these survey studies met criteria to be highlighted in this review. Additionally, in the United States, CORD maintains a listerv of EM educators making the widespread administration of Internet-based, education-related surveys feasible. A small number of studies included in this review utilized qualitative methods, which is consistent with the critical appraisals from prior years, six in 2016, six in 2015, three in 2014, and seven in 2013.

Excluding surveys, 10 studies (13%) were conducted at two or more institutions. This is similar to 2015 where 10 of 61 (16%) were multi-institutional. The results of multi-institutional studies are more likely to be generalizable and this type of work is to be encouraged. Of note, five of the highlighted articles in this review (excluding survey studies) were multi-institutional.

Similar to prior years, the most common study populations were medical students (21/75; 28%) and residents (48/75; 64%). Interestingly, this year only one study addressing medical students was highlighted for excellence, in contrast to prior years. In 2015, 33% of highlighted articles studied medical students, as did 42% of highlighted articles in 2014. The reasons for this finding are unclear; however, it serves as a reminder to the EM education community to invest in this process, research in this area is prudent. Another interesting finding was that three studies included in this review were specifically noted to be the work of EM professional society committees or task forces, demonstrating the support of education scholarship by the specialty as a whole.

LIMITATIONS

There are several limitations to this review. Despite extensive searches using previously implemented strategies, it is possible that our rigorous search methodology may be considered erroneously rigorous and, as a result, may have omitted some high-quality studies. Given the growing number of medical education publications this year, we believe that continuing to exclude single-site surveys and studies that examined outcomes limited to an expected learning effect without a control group, as has been done previously, would best allow us to identify those studies with the greatest ability to affect EM practice. Additionally, exclusion criteria were applied by one reviewer initially although uncertainty was resolved by two other reviewers through discussion. This may have introduced bias into excluded studies. Furthermore, while the scoring methodology has been adapted from previous iterations of this publication, it has not been externally validated. This may have led to a rubric that is too stringent. Finally, the first round of scoring was done by two reviewers based on methodology that may have further eliminated some studies. However, the interclass correlation was high ($\kappa = 0.997$).
CONCLUSION

This critical appraisal of the emergency medicine medical education literature highlights the top papers of 2016. The top scoring 11 quantitative and one qualitative study described represent the best research published this year. Additionally, trends in EM medical education research in 2016 are described. This paper is intended to serve as a resource for EM educators as exemplary models of sound medical education research and to help guide best medical education practices.

References

42. Lurie SJ. Raising the passing grade for studies of medical education. JAMA 2003;290:1210–12.
54. Bonjour TJ, Charny G, Thaxton RE. Trauma resuscitation evaluation times and correlating human patient-

Supporting Information
The following supporting information is available in the online version of this paper available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10203/full
Data Supplement S1. Supplemental material.
ABSTRACT
The purpose of this article is to provide a framework for academic clinicians, educators, and mentors to advise the emergency medicine (EM) resident with an interest in the field of critical care medicine. Prior articles have detailed the prerequisites and specific training curricula of the distinct critical care pathways, but an approach for the advising faculty member in this climate of increased interest in critical care training has yet to be disseminated. In this article, we assume a starting point of EM residency and focus on pivotal training and decision points that occur along the path to matriculation into a critical care fellowship program. These decision points are described in stepwise fashion with aligned questions to help the EM resident evaluate individual strengths and desires that may help the decision-making process. We also describe considerations of the postfellowship job market, as this also plays a role in the fellowship decision-making process.

TIMELINE CONSIDERATIONS
Formal critical care training is an exceptionally hot topic in emergency medicine (EM). There are four distinct pathways, each comprising a separate fellowship, to gain certification in critical care medicine after completing a residency in EM. The four specific pathways consist of neuro critical care medicine, internal medicine (IM) critical care, anesthesiology critical care medicine (ACCM), and surgical critical care medicine. EM-trained physicians are candidates for all four of these pathways. The decision to embark on a critical care fellowship is one that is often made early during an EM resident’s training. Current graduate medical education structure dictates that for the resident desiring to go directly into fellowship training, he or she must decide on future fellowship with a minimum of 18 months left in residency. Neuro–critical care and anesthesia–critical care fellowship programs require entry into the San Francisco Match 1½ years prior to fellowship matriculation. IM–critical care and surgical critical care fellowship programs accept applications through ERAS (Electronic Residency Application Service) and SAFAS (Surgical Critical Care and Acute Care Surgery Fellowship Application Service), respectively, approximately 1 year prior to fellowship matriculation.3,4 While any fellowship decision must be made around the midpoint of residency, the four distinct tracks of critical care fellowship training make the decision more complex. Additionally, the ratio of EM applicants to critical care fellowship positions has been steadily increasing since the acceptance of EM candidates for critical care board certification.5 So how can we best advise and support our residents seeking fellowship training in this increasingly competitive and popular field of work?
Decision Point 1: Formal Critical Care Training?

There are common themes in critical care that apply to all four pathways. These themes include continuity of care, more time with fewer patients, as well as daily rounds and family discussions. Guiding questions important for the EM physician interested in any of the paths toward critical care fellowship include, but are not limited to, the following:

- What do you like about EM, why did you choose this field?
- What don’t you like about EM?
- What did you like about your intensive care unit (ICU) rotation?
- What didn’t you like about your ICU rotation?
- Where do you align in the balance of time with patients? Do you desire more time with patients?
- Is continuity of care an important part of your practice?
- Are you a detail-oriented physician?
- Do you desire deep physiologic approaches to problem solving?
- How do overnight shifts (typically 7 PM–7 AM) and being on call impact your well-being?
- How do you feel about extended daily rounds on patients, in addition to family discussions?
- How do you approach the death/dying/palliative care process?
- Will your personal life allow you another 2 years of postgraduate training?

These questions allow residents to consider his or her own values, strengths, and weaknesses, as they relate to the daily practice of critical care. To answer these questions fully requires some minimal amount of exposure to the ICU setting. No specific array of answers demands that a physician should or should not seek formal training in critical care, but these questions do invite a deeper and more realistic rationale to pursue critical care fellowship, beyond reasons of finding critically ill patients “interesting” or the field “exciting.”

Decision Point 2: Which Critical Care Track/Fellowship?

Once a decision to pursue a critical care fellowship has been made, the next step is determining which track is best for the individual candidate. Earlier papers have described the updated requirements and interfellowship training approaches of the different pathways of critical care fellowship. This paper will not elucidate each of these details, but rather provide an approach to aid in the selection of a critical care fellowship track. To best serve the resident in making an appropriate choice of critical care fellowship, we believe that three components are necessary: expanded ICU exposure (including elective time), mentorship, and an organized approach for self-reflection.

Broad descriptions of the different critical care subspecialties and associated questions may allow a deeper understanding of why one pathway may be preferential over another for an individual candidate (Figure 1). The first dividing point, and likely the simplest, is a decision regarding care of medical versus surgical patients. If a candidate has a considerable affinity for surgical patients, either the surgical or the anesthesia pathway may be the best fit. Similarly, if the trainee wants to care for patients with respiratory or medically complex issues, the internal medicine pathway may be the better choice. A similar approach applies for the neuro–critical care pathway. If a candidate has a deep desire to care for the neurologically critically ill with both medical and surgical approaches to care, this decision point may be clear. From the most recent American Board of Emergency Medicine (ABEM) annual report of 2017 to 2018, overall 5.5% of EM physicians are board-certified in a subspecialty. There are 49 active board-certified EM intensivists in the anesthesia pathway, and 170 from the internal medicine pathway. The numbers of board-certified EM-CCM providers is small but increasing each year, with about 30 to 50 annually taking critical care board examinations. Surgical and neuro–critical care fellowship and board certification data are not readily available.

To support and advise a resident in choosing which of the four critical care fellowship paths to pursue, adjustments to the resident schedule may need to be made. If possible, knowing which direction a resident is leaning (medical vs. surgical) can be helpful when adjusting a schedule to accommodate rotations in different ICUs, ideally early in the second year of residency (or 3rd year if from a 4-year EM residency program). Adding an extra ICU rotation after intern year will give exposure to both the practice of critical care and the opportunity to engage current CCM fellows and attendings. This is also a good opportunity to identify intensivists who will write letters of recommendation. Identifying these persons early and requesting letters at the time of the rotation will
improve the ease of application, especially if applying after years in EM practice.

If the resident is considering an anesthesia critical care pathway, exposure to cardiothoracic surgical patients is key, as increasing numbers of these ICUs are staffed by anesthesia trained providers. Likewise, if a resident is considering a surgical critical care fellowship, an elective in a multidisciplinary surgical or burn ICU (as opposed to an exclusively trauma ICU) would be recommended. Other electives that are beneficial are palliative care, nephrology, and infectious disease, all which give broad exposure to different aspects of critical care. A benefit of the 4-year EM residencies includes more flexibility in scheduling ICU time, and more clinical experience to draw from when making decisions regarding fellowship tracks. Nonetheless, creative ways of scheduling rotations during the first and second years of 3-year EM residency programs can still provide the breadth of critical care exposure needed to inform decisions.

Mentorship is also crucial, and finding physicians from each of these areas of critical care who are willing to discuss the nuances of the field is invaluable. This may even require looking outside a trainee’s home institution, if a dual-trained provider is not on faculty. The American College of Emergency Physicians (ACEP) section on critical care or Emergency Medicine Residents’ Association (EMRA) critical care section may be worth investigating to find a mentor, and both organizations also provide mentorship matching services online, if a mentor is not available at the resident’s training institution. Both of these entities also have websites and publications guiding candidates through the application process as well as listing current fellowship and job openings.

Finally, we recommend an organized approach to self-reflection that includes lists of questions like those mentioned in this paper, a clear timeline to keep track of deadlines for decisions, as well as note-taking or journaling. Even a few words a week regarding a particular case or interaction while on an ICU rotation can aid in recalling the authentic and real-time experience of working in an ICU. Specific questions geared at this decision point include, but are not limited to:

- What do you want your future practice to look like? How will a fellowship get you there?
- Do you find a particular device or procedure desirable to manipulate/understand? (e.g., ventilators, ECMO, dialysis machines, LVADs, ventriculostomy drains).
- Are there groups/teams of providers you feel most comfortable with? (e.g., surgeons, neurologists, pulmonologists, medical subspecialists).

![Figure 1. Critical Care Pathways.](image-url)
• Does working in an “open” or “closed” ICU matter to you? Have you had exposure in both of these types of units?

Finally, showing interest in the field of critical care medicine will help strengthen the candidate’s application and create a solid foundation for a future career. Additional avenues to demonstrate critical care interest include participating in simulations, submitting abstracts to critical care publications, and attending or presenting at critical care conferences.

POSTFELLOWSHIP CONSIDERATIONS

Before making the decision to begin a critical care fellowship, one should be familiar with the job market that exists for dual-trained emergency and critical care physicians. Like the distinct pathways into critical care fellowships, the job prospects for these pathways are also divergent.

Current Job Trends

The year 2008 was the most recent survey from ACEP studying the job market for EM-CCM providers. The ACEP critical care section is currently collecting updated career data and will publish this in the near future. Some general trends based on this data are:

• 20% of practitioners practice exclusively in an ED (this includes an ED-ICU);
• 25% of practitioners practice exclusively in an ICU;
• About 50% of providers practice both ICU and ED with varying percentages of time spent in each location;
• 65% of EM-CCM physicians practice in academics while 18% are community practitioners.

For physicians interested in working in an academic setting, we recommend simultaneously applying to the respective critical care and EM departments. Those trained in the surgical and neuro pathways logically work primarily in those respective ICUs. Many anesthesiology-trained providers work in cardiology or surgical ICUs, with smaller numbers working in neuro and medical ICUs. Intensivists trained through the IM pathway may accept positions exclusively staffing a medical ICU (MICU), which would limit the number of surgical ICU opportunities, depending on the amount of exposure during one’s fellowship training. The American Board of Internal Medicine (ABIM) requires MICUs involved in training internal medicine residents be staffed only by intensivists boarded through the ABIM pathway.

Following critical care fellowship, some EM-trained physicians choose to practice exclusively EM or exclusively critical care. Additionally, a few institutions have developed ED-ICUs, which will be other areas for the EM intensivist to seek employment. Staffing models of these units can vary by institution, depending on whether the hospital requires a board-certified intensivist or an EM provider with extra training.

Practicing EM and critical care in private or community settings may mean working for two separate groups (if the hospital does not own both practices). Private practice critical care jobs are increasing in number, and the majority of these jobs will be work in a mixed medical–surgical ICU. While the presence of advanced practice providers (APPs) are increasing in the field of EM and critical care, this demographic of providers is particularly prevalent in the community or private practice setting. Experience working with APPs is a practice that should be sought out, especially by those interested in a community practice.

Contract and Schedule Negotiations

Complicated logistics often exist with respect to hiring and departmental ownership, particularly in the academic setting. Negotiating job contracts with each group or department can be complex. Each group or department has certain full-time equivalent (FTE) “currency,” meaning that a 1.0 FTE position may require more work-hours in one department compared to another. Employee benefit plans are often only offered by one department and may require greater than a 0.5 FTE position with that department to receive benefits. Similarly, promotion requirements and incentive opportunities will differ between departments. Depending on the hospital’s intensive care model, the intensivist may be on duty for a full week, with home call, or may perform shift coverage with fixed hours.

Scheduling between two departments can be complex depending on the system each department uses. Some intensivists prefer a standardized ICU week (i.e., the first week of every month) while others have varying precoordinated ICU time. Holiday schedules and expectations is another area of complexity, as both departments often require some holiday commitment. Many of these complexities are simplified when one of the two departments “owns” the employee’s primary academic assignment.
Compensation Models
Compensation models vary among academic and private/community practices. Typically, each department or group will have a base salary, with incentive options based on relative value units billed, quality metrics, and possibly specific procedures performed. Additionally, it is common for groups to have nighttime differentials, meaning that providers working the overnight shifts get compensated at higher rates.

CONCLUSIONS
With the rapid technical and pharmacologic advances seen in medicine of late, critical care–trained physicians offer a unique skill set and will continue to be in high demand. There is a national shortage of intensivists, although the magnitude of this shortage is difficult to determine. Not only are ratios of intensivists to patients needing critical care falling, the complexity of the care being provided in ICUs continues to rise. One study quoted the need for 1,500 new ICU physicians by 2020. Accordingly, there are increasing numbers of fellowship training spots, yet many go unfilled. While we call for further studies examining the interest, job prospects, and job satisfaction for EM intensivists, we hold a unique opportunity to guide and mentor our residents into both a highly desired and an indispensable discipline of medicine.

References
Turning Your Educational Work Into Scholarship

Abstract: This educational download will help readers turn their work into scholarship with 5 straight forward tips. When doing educational work-ask questions. Be sure to have a strong educational foundation for teaching, assessment, and evaluation. Work in teams. Use colleagues to help promote educational work. And finally, manage the work flow to ensure completion.

Education research and scholarship are essential for promotion of faculty as well as dissemination of new educational practices. Educational faculty frequently spend the majority of their time on administrative and educational commitments and, as a result, educators often fall behind on scholarship and research. This educational download focuses on five tips to increase and improve your scholarship.¹–³
Blank Pipeline for Download

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<tr>
<th>Timeline</th>
<th>Scholarship</th>
<th>To Do</th>
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<tr>
<td>Entering pipeline</td>
<td>What projects do you have in mind to start working on?</td>
<td>Example: Brainstorm, review literature</td>
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<td>Development/IRB</td>
<td>What projects are you currently developing? This includes projects you are</td>
<td>Example: Gather team, assign roles</td>
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<td>(Note who is team)</td>
<td>mentoring and assisting on the project. Leading (lots of work)</td>
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<td>Data gathering (Note who is team)</td>
<td>Example: Email reminders to participants</td>
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<td>What projects are in the data gathering phase?</td>
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<td>Analysis</td>
<td>Example: Discuss with statistician?</td>
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<td>What projects are you working on data analysis?</td>
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<td>Presentation</td>
<td>Example: What are deadlines? SAEM, CORD,</td>
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<td>What projects are ready for presentation?</td>
<td>Other</td>
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<td>Write</td>
<td>Example: Set deadlines</td>
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<td>What projects are you writing the papers?</td>
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<td>Rewrite</td>
<td>If rejected must resubmit quickly</td>
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<td>What papers are rejected and need rewrite &amp; resubmit?</td>
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<td>Accepted</td>
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References

Implicit Bias Education and Emergency Medicine Training: Step One? Awareness

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ABSTRACT

Objective: Prior research suggests that health care providers are susceptible to implicit biases, specifically prowhite biases, and that these may contribute to health care disparities by influencing physician behavior. Despite these findings, implicit bias training is not currently embedded into emergency medicine (EM) residency training and few studies exist that evaluate the effectiveness of implicit bias training on awareness during residency conference. We sought to conduct a mixed-methods program evaluation of a formalized educational intervention targeted on the topic of implicit bias.

Methods: We used a design thinking framework to develop a curricular intervention. The intervention consisted of taking the Harvard Implicit Association Test (IAT) on race to introduce the concept of implicit bias, followed by a facilitated discussion to explore participant’s perceptions on whether implicit bias may lead to variations in care. The facilitated discussion was audio recorded, transcribed, and coded for emerging themes. An online survey assessed participant awareness of these topics before and after the intervention and was analyzed using paired t-tests.

Results: After the intervention, participant’s awareness of their individual implicit biases increased by 33.3% (p = 0.003) and their awareness of how their IAT results influence how they deliver care to patients increased by 9.1% (p = 0.03). Emerging themes included skepticism of the implicit bias test results with the desire to have “neutral” results, acknowledgment that pattern recognition may lead to “blind spots” in care, recognition that bias exists on a personal and systemic level, and interest in regular educational interventions to address implicit bias.

Conclusions: This novel educational intervention on implicit bias resulted in improvement in participants’ awareness of their implicit biases and how it may affect their patient care. Our intervention can serve as a model for other residency programs to develop and implement an intervention to create awareness of implicit bias and its potential impact on patient care.
NEED FOR INNOVATION

In 2002, the Institute of Medicine (IOM) released a report detailing significantly lower quality of health care services received by racial and ethnic minorities.1 The recommendation from this IOM report suggested increasing awareness about disparities among health care providers to reduce unnecessary variations in care quality. In 2016, 14 years later, the National Health-care Quality & Disparity Report indicated significant disparities in care provided to racial/ethnic minorities still exist.2

The factors that lead to unnecessary and racially/ethnically disparate variations in care are complex. One factor thought to contribute largely to the disparity is implicit bias. Implicit bias refers to attitudes that affect our understanding, actions, and decisions in an unconscious matter. A May 2017 article in The Atlantic highlighted implicit bias workshops and their ability to raise awareness that bias and discrimination not only exist but also influence behaviors.3

In health care, implicit bias has been linked to altered clinical decision-making patterns among physicians and studies indicate that physicians have a prowhite implicit bias.4,5 Implicit bias training has been shown to be effective at raising awareness6,7 but is not yet a routine component of residency training. The lack of progress in over a decade in the reduction of health care disparities, the complex and multifaceted factors that contribute to these disparities including unconscious bias and the evidence that implicit bias workshops raise awareness all compel the development of innovative interventions to introduce implicit bias training among front-line health care providers. Furthermore, the American College of Graduate Medical Education (ACGME) emphasizes that residency curricula should address the needs of the community; incorporating implicit bias training may be an important first step to doing this.

OBJECTIVE OF INNOVATION

We sought to conduct a mixed-methods program evaluation of a formalized educational intervention targeted at the issue of implicit bias. Our curriculum had two objectives: 1) introduce awareness of implicit bias and 2) engage residents in a facilitated discussion of implicit bias. The overarching purpose of this intervention was to assess the utilization of a validated tool that measures unconscious bias during EM residency conference and to determine whether this intervention was successful at increasing participant awareness of implicit bias.

BACKGROUND

A systematic review by Hall and colleagues in 20155 evaluated 15 papers that evaluated implicit bias and health care professionals representing a variety of specialties. The authors concluded that health care professionals exhibit a prowhite bias. Most closely related to our report, a study by Green and colleagues8 evaluated implicit bias among internal medicine and emergency medicine (EM) residents using a case vignette and, again, found an implicit preference for white patients. Although a prowhite bias has been demonstrated as the norm in numerous studies, the effects of this bias on outcomes and clinical decision making are unclear. A recent systematic review by Dehon and colleagues9 included studies that evaluated implicit bias and clinical decision making. The results indicate that although there is a prowhite bias among physicians, none of the nine studies reviewed found bias to have an impact on clinical decision making.9

The emergency department (ED), because of the unique environment created by time constraints, cognitive stressors, lack of long-term relationship with patients, limited initial availability of clinical data, and a wide range of patient complaints and acuity, is ripe for bias. Prior studies indicate that physicians tend to rely more on their implicit biases when they experience cognitive overload.10 Johnson and colleagues10 demonstrated that increasing cognitive stressors during a shift in the pediatric ED, including patient load and overcrowding, may exacerbate implicit racial bias. Furthermore, the ED can serve as the origin for stereotyping and bias in medical care as the gateway to the hospital. This speaks for the necessity for implicit bias training among EM trainees.

DEVELOPMENT PROCESS

We used a design thinking framework to develop the intervention.11 We met with residents formally and informally across multiple specialties to discovery and define the problem around bias in clinical medicine. The vast majority of residents identified implicit bias as problematic and expressed interest in an educational intervention targeting awareness of implicit bias and how it may affect medical decision making. During the ideation phase, we met regularly with the university’s graduate medical education representative.
council as well as with experts in health care disparities and innovation. With their feedback, we developed prototypes that were repeatedly presented to the council and leadership and revised over a 6-month period. The prototype that received the most positive feedback was an intervention that utilized the Harvard Implicit Association Test (IAT) on race to introduce the concept of implicit bias which was then followed by a facilitated discussion. Specifically, we designed a discussion that highlighted: 1) the experience of taking the test, 2) the relationship between implicit bias and clinical practice, 3) identification of bias within one’s own practice, and 4) potential ways to mitigate bias. We developed a facilitator guide by modifying a previously designed guide from Baylor College of Medicine accessed on the Association of American Medical Colleges’ MedEd Portal.

### IMPLEMENTATION PHASE

The educational intervention occurred during regularly scheduled weekly EM conference. Prior to the session, the facilitator led a grand rounds on implicit bias. The facilitator was an EM-trained physician from a different institution.

### OUTCOMES

The educational intervention was evaluated quantitatively and qualitatively. We used a realist evaluation framework to link the context, mechanisms, and outcomes. This framework has been utilized to assess innovative educational interventions. It is an iterative cycle with which to test and generate hypotheses and subsequently provide an explanation of what components of an intervention are effective and why. Quantitative data were collected in the form of an anonymous survey to evaluate session logistics, interest in the topic/training, and change in awareness of implicit bias after the session. Qualitative data were collected to identify prominent and unique themes about the session and implicit bias.

#### Qualitative

The Mixed Methods Research Lab, a group of expert qualitative researchers, observed and audio recorded the facilitated discussion. Recordings were transcribed, coded, and analyzed, deriving codes from a thorough reading and understanding of the data and employing a summative content analysis approach to key themes identified. Themes from the discussion centered around 1) response to the results of the test 2) and effects of implicit bias on treatment or care, in particular negative effects of implicit bias (Table 1).

Residents expressed interest, mixed with skepticism and surprise, regarding the results of their IAT and the desire to have neutral results. With regard to bias, residents discussed “pattern recognition” and how it could potentially be helpful to learn how to recognize similarities of symptoms, presentations, and patients. However, residents commented that these patterns could lead to stereotyping, inaccuracies, and “blind spots” in care. This highlights a heuristic theory previously described by Monteiro and colleagues, suggesting that residents rely on shortcuts or heuristics. This process can be error-prone as it simplifies information

<table>
<thead>
<tr>
<th>Theme</th>
<th>Illustrative Quote</th>
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<td>Response to test</td>
<td>“I think hearing the dialogue that everyone’s kind of saying, honestly I think based on upbringing, based on society, I guess honestly I’m not that surprised with my result. And frankly, like everyone said, I think we all wanted neutral.”</td>
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<tr>
<td>Effects of implicit bias</td>
<td>“When a patient comes in sick, you want to make a really quick judgment in a very short time. And that’s the time you just make a really quick judgment based on your experience and that will carry that patient care really fast.”</td>
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<tr>
<td>“Pattern recognition”</td>
<td>“I think [a blind spot I have is] probably pain control in sickle cell patients. As far as that goes, I think it definitely influences how I kind of treat those patients and how I perceive their pain. And it’s a very subjective thing, so I think it’s very susceptible to bias.”</td>
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<td>Negative effects</td>
<td>“But for me if I had a strong bias against some people when I was a junior, I definitely did spend less time with them. And then I maybe even talked to them less about their discharge instruction. That’s a pretty different patient care you’re providing. It’s now about giving antibody on time, giving a fluid on time, but you’re spending less time with them.”</td>
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<tr>
<td>Personal and systemic effects</td>
<td>“The discussion is helpful. Being aware of bias is helpful. But I think more helpful would be ways to deal with bias and tips to improve it. Just talking about is only the beginning.”</td>
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</table>

1. Monteiro and colleagues, "Pattern recognition" and how it could potentially be helpful to learn how to recognize similarities of symptoms, presentations, and patients. However, residents commented that these patterns could lead to stereotyping, inaccuracies, and “blind spots” in care. This highlights a heuristic theory previously described by Monteiro and colleagues, suggesting that residents rely on shortcuts or heuristics. This process can be error-prone as it simplifies information
processing and can lead to bias.\textsuperscript{14} Finally, residents discussed how implicit bias can have both personal and systemic-level effects and provided suggestions for future interventions.

**Quantitative**

Residents were asked to voluntarily and anonymously fill out an online survey to assess participant awareness of these topics before and after the intervention. There was 100% completion rate of the survey. Twenty-one EM residents (47% female, 84% white) participated in the training. Most (85%) residents rated the intervention as good or excellent, and most residents (85%) wanted to see more training regarding health care disparities after the session. After the intervention, participant’s awareness of their individual implicit biases increased by 33.3% (\( p = 0.003 \)) and their awareness of how their IAT results influences how they deliver care increased by 9.1% (\( p = 0.03 \)).

**REFLECTIVE DISCUSSION**

This novel educational intervention among EM residents on implicit bias resulted in improvement in participants’ awareness of their implicit biases and how it may affect their patient care. Our intervention can serve as a model for other EM residency programs to develop and implement similar training tool (Table 2). However, there are limitations and improvements to take into consideration. This is a short-term, single educational intervention with a small and racially homogenous sample size. While it may serve as an outline or initial session to introduce the topic, it may not affect long-term culture change as a one-time intervention.

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<tr>
<th>Intervention</th>
<th>Time Allotted</th>
<th>Description</th>
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<tr>
<td>Grand rounds lecture on implicit bias</td>
<td>60 minutes</td>
<td>Faculty and residents invited Instructional lecture on the definition, consequences, and everyday manifestations of implicit bias</td>
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<tr>
<td>Harvard University’s IAT race test</td>
<td>10 minutes</td>
<td>Residents take test on their phones or laptops privately</td>
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<tr>
<td>Facilitated discussion</td>
<td>50 minutes</td>
<td>Facilitator leads discussion on participants’ reactions to test and results and on examples of how bias is manifested in emergency medical care</td>
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IAT = Implicit Association Test.

**LIMITATIONS AND BARRIERS**

There are a few logistic barriers that could be improved. First, it was difficult to identify a facilitator within the department. Many faculty felt uncomfortable with leading the session as they felt they either had too little or had too much knowledge on the content. Second, we would recommend smaller group sizes, ideally fewer than 10, in a small room where everyone is able to see one another and limit technical equipment.

**NEXT STEPS**

Future sessions should incorporate specific cases and strategies to mitigate bias. Participants expressed the desire for real-time solutions applicable to ED cases. In the future, ED case–based scenarios could be utilized with role play to identify variations in care that may arise from provider bias. Furthermore, adoption of similarly modeled intervention should be assessed in other EM residencies, particularly those with a more diverse group of participants.

**CONCLUSION**

The ED is a unique environment with which to evaluate implicit bias. The cognitive stressors can often be overwhelming for resident learners. Prior studies indicate that physicians tend to rely more on their implicit biases when they experience cognitive overload. Furthermore, the ED can serve as the origin for stereotyping and bias in medical care as the gateway to the hospital. It is essential that we incorporate implicit bias training in residency curriculum to raise awareness about provider biases and potential variations in care, so we can better evaluate how implicit bias may affect care outcomes.

The authors acknowledge Jennifer Myers and Jeffrey Berns at the Hospital of the University of Pennsylvania Graduate Medical Education Council, and Barbara Todd at the Office of Inclusion and Diversity, Penn Mixed Methods Research Laboratory.

**References**


CanadiEM: Accessing a Virtual Community of Practice to Create a Canadian National Medical Education Institution

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ABSTRACT

Background: The rise of free open-access medical education (FOAM) has led to a wide range of online resources in emergency medicine. Canadian physicians have been active contributors to FOAM.

Objectives: We aimed to create a virtual community of practice that would serve as a national platform for collaboration, learning, and knowledge dissemination.

Methods: CanadiEM was formed in 2016 from the merger of two Canadian websites and a podcast. Using a community-of-practice model, we introduced two training programs to support junior community members in becoming core editorial team members and employed asynchronous Web technologies to facilitate collaboration. We also introduced a coached peer review process and formed strategic alliances that aim to ensure a high quality of publication.

Results: CanadiEM has become a portal for readers to access a broad range of FOAM content. The website has published 782 articles. Of these, 71 have undergone a coached peer review process. The website has received over 2.5 million page views from 217 countries, and the associated CRACKCast podcast has been downloaded over 750,000 times.

Conclusions: CanadiEM has succeeded in building a national multi-interface dissemination network that fosters collaboration and knowledge sharing in emergency medicine while fostering junior digital scholars. The construction of a community of practice has been facilitated by quality assurance, training programs, and the use of asynchronous Web technologies. Ongoing challenges in sustainability include a volunteer workforce with high turnover.
NEED FOR INNOVATION

Free open-access medical education (FOAM)\(^1\) has fostered the development of virtual communities of practice around the use of social media and online educational resources.\(^2\) Facilitated by critical clinicians, translational teachers, and interactive investigators,\(^3\) these communities disseminate educational and knowledge translation resources among geographically disparate health care practitioners.\(^4\,\,5\) FOAM is particularly adept at raising awareness and contextualizing knowledge—key steps in the knowledge translation process\(^6\,\,8\)—through the dissemination of accessible resources.

However, a digital divide exists between trainees and teachers in terms of preference for the resources created by the FOAM movement (e.g., podcasts, blog posts).\(^9\) Moreover, the ubiquity of these resources\(^10\) has raised suspicion about their quality, especially when they are produced by trainees. In response, early adopters have sought ways to assure quality, but often lack senior mentors with experience in this area. This innovation explores the development of a virtual community of practice to support the education and growth of the next generation of digital scholars through the coproduction of a FOAM website.\(^11,\,12\)

BACKGROUND

Groups from around the world including Australia (Life in the Fast Lane), the United States (Academic Life in Emergency Medicine), and the United Kingdom (St. Emlyn’s) have established national FOAM platforms which have gained international recognition and galvanized communities of practice within these countries.\(^13\) As of 2015, the Canadian FOAM community comprised approximately 10 unique websites with no comprehensive national platform or consistent engagement with geographically disparate collaborators. These websites were challenged by reliance on a small, junior volunteer workforce\(^14\) and found it difficult to quickly produce quality content.\(^15,\,16\)

To address these concerns, we developed a national website to foster a virtual community of practice that facilitates sustainability, collaboration, and education scholarship while developing junior digital scholars. We have been successful in disseminating high-quality content widely using strategies that could be adopted to other contexts and specialties.

DEVELOPMENT PROCESS

Conceptual Framework

Our organizational chart is based on Lave and Wenger’s Community of Practice (Figure 1).\(^17\) A community of practice establishes a social context based on shared interest that allows participants to learn together and from each other, resulting in versatile and dynamic knowledge exchange.\(^18,\,19\) Within the community, progression of roles and responsibilities is based on member engagement. CanadiEM was founded by several nationally acclaimed medical educators who functioned as senior editors for the website. The rest of the initial editorial board consisted of their digital mentees. These members formed the nexus around which a community of practice arose.

Our community of practice is based primarily in online communication technologies, and our online audience comprises our peripheral membership.\(^2\) CanadiEM accepts article submissions openly through a publicly available e-mail address, allowing peripheral members to contribute and further the goals of the community, a process termed legitimate peripheral participation.\(^17\)

Those interested in becoming core members have two opportunities for apprenticeship: first, the CanadiEM Junior Editor program trains junior learners in operational and leadership roles. Responsibilities include uploading and copyediting posts, liaising between authors and expert reviewers, graphic creation, promoting posts through social media, and optimizing content for search engines. These tasks transition junior editors from consumers of online educational resources to distributors and creators. They are supervised by faculty members, ensuring that high-quality content is developed and delivered.

Second, the CanadiEM Digital Scholars program provides Canadian junior faculty members and senior emergency medicine residents subspecialty expertise in digital medical education scholarship.\(^20\) Its competency-based curriculum consists of five modules (podcasting, blogging, digital identity, patient communication, translational teaching) is customized for each scholar and focuses on applying core medical education theory to online educational resources. Supervisors facilitate access to international leaders in medical education.
IMPLEMENTATION PHASE

In 2016, CanadiEM was formed through the merger of the BoringEM and FrontDoor2Healthcare websites, two independent Canadian FOAM platforms. The CRACKCast podcast joined shortly thereafter. It is unlikely that analogous online entities will come together in the future, but pressures like those that drove these groups together are commonplace in the FOAM community. Once amalgamated, CanadiEM’s five primary content sections were divided into independent teams (medical concepts, podcasts, academics, opinion & arts) and subsections (Data Supplement S1, Appendix A, available as supporting information in the online version of this paper, which is available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10199/full) and aimed to transition from disruptive to sustaining innovation.\(^{21}\)

The CanadiEM Editorial Board consists of two editors-in-chief (both experienced, graduate-trained clinician educators), who oversee 16 senior editors and 40 junior editors. To ensure robust communication among nationally distributed contributors, we use online technologies to empower asynchronous collaboration and mutual engagement among members (Data Supplement S1, Appendix B). As quality assurance was still a concern,\(^{15,16}\) content experts were sought to legitimize the community as a place for sharing and creating knowledge\(^{19}\) through two programs:

First, CanadiEM introduced a coached peer review process.\(^{22}\) This modified peer review process connects trainee authors with nonblinded content experts via e-mail. Content experts work with authors to improve article quality through multiple revisions in MS Word documents with tracked changes and correspond among themselves and the editor managing the piece. A core principle is that any submitted article has enough inherent value to become publishable. The timeline for the coaching process can range from 1 to 2 days to multiple months. Coached peer review is designed to be a positive collaborative experience for authors and experts, with the goal of encouraging future involvement in FOAM and other academic publications. Content experts also provide brief commentary that is published with the article. A complete description of this innovation has been published.\(^{22}\)
Second, we created strategic alliances with nationally recognized organizations, including the Canadian Journal of Emergency Medicine (CJEM), the Canadian Association of Emergency Physicians (CAEP), and Translating Emergency Knowledge for Kids (TREKK). These organizations provide educational resources for dissemination via our online platform. The alliances take the form of a unique memorandum of understanding between each group and our website that is customized to the needs of each partner. Broadly speaking, the organizations provide content that we customize for our blog’s style and disseminate via our social media platforms.

OUTCOMES

Website Content and Audience
To date, we have published 782 articles on the CanadiEM platform, including 288 imported from BoringEM and Frontdoor2Healthcare. Seventy-one articles have been vetted through coached peer review while strategic alliances have yielded 71 articles (TREKK n = 6, CAEP n = 48, and CJEM n = 17). In total, 141 contributors have written a median of one article (interquartile range = 1–2) and represent nine of the 10 Canadian provinces (Data Supplement S1, Appendix C). Excluding editors, the maximum number of submissions from an author is eight.

From the website launch (January 1, 2016) through September 23, 2018, CanadiEM received >2.5 million page views (now averaging >120,000 page views/month) while CRACKCast podcasts were downloaded >750,000 times (>35,000 downloads/month). Website viewers hailed from 217 countries, with approximately 35% from Canada, 30% from the United States, and 35% from the rest of the world. CanadiEM currently ranks ninth out of 148 in the June 2018 Social Media Index, which measures the impact and quality of emergency medicine and critical care websites.

Education Scholarship
At CanadiEM, the facilitated interactions between team members in our community of practice have developed an identity that values national collaboration on high-quality scholarship. Our community has produced more than a half-dozen nationally presented posters and presentations and four traditional academic publications. As CanadiEM has become an established leader in FOAM, we have begun to spearhead the online recruitment efforts of study participants and to support research on FOAM projects.

REFLECTIVE DISCUSSION

Despite the many benefits of the CanadiEM model, we acknowledge a major limitation related to human resources. Training of new members has required a mix of informal training and on-the-job learning, which has occasionally led to delays and technical glitches. CanadiEM continues to rely on volunteer medical students, residents, and staff physicians, who are subject to work and life stressors that affect their commitment to CanadiEM.

We have mitigated the effects of the above limitations by building a close-knit culture with constant online communication. In 2016, editors began holding annual meetings at the Canadian Association of Emergency Physicians Annual Conference and coordinating group events. We have rewarded our volunteer learners with networking benefits from being part of a community of practice; for example, digital mentorship, academic coaching, and letters of reference. All members benefit from skill development in leadership, teamwork, writing, and editing.

CanadiEM remains in the early stages of development. Future directions include curricular mapping of content, as some topic areas may be overemphasized. We continue to pursue strategies to reward participation within our community of practice, especially for our core editorial team. Some institutions have started to credit online educational resources toward academic promotion, which may reduce the opportunity cost of pursuing these projects. This strategy could also be adopted by residency training programs. A variety of funding models could improve sustainability and further exploration will be necessary to determine whether these models cost publication autonomy and independence.

CanadiEM has succeeded in building a national platform for collaboration and knowledge dissemination in emergency medicine while supporting the development of junior digital scholars. The construction of a community of practice has been facilitated by quality assurance, training programs, and the use of asynchronous Web technologies. Ongoing challenges in sustainability include costs and a volunteer workforce with high turnover.
The authors acknowledge the FOAM community and audience and specifically their mentors including Drs. Mike Cadogan, Michelle Lin, Anton Helman, Rob Woods, and Jonathan Sherbino.

References

27. Huang S, Martin LJ, Yeh CH, et al. The effect of infographic promotion on research dissemination and readership: a randomized control trial. CJEM 2018 [Epub ahead of print].


**Supporting Information**

The following supporting information is available in the online version of this paper available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10199/full

**Data Supplement S1.** Supplemental material.
Using Slack to Facilitate Virtual Small Groups for Individualized Interactive Instruction

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ABSTRACT

Individualized interactive instruction provides an opportunity for significant innovation and advances in curriculum design. We describe the development and implementation of virtual small group exercises into the curriculum of an emergency medicine residency training program using a free social media and communication platform (Slack). Two virtual small group exercises, one case-based and one open-ended, were trialed during the 2016 to 2017 academic year. We found that the exercises were feasible to implement in a learner group where 66% (41/62) had little or no prior experience with Slack. There was a trend toward a more favorable rating of the quality of the dialogue and of the task-technology fit for the case-based format as opposed to the open-ended educational activity.

NEED FOR INNOVATION

The Accreditation Council for Graduate Medical Education (ACGME) Residency Review Committee for Emergency Medicine (RRC-EM) allows residency training programs to use individualized interactive instruction (III) to replace up to 20% of planned educational experiences. The ACGME RRC-EM does not narrowly define III, but instead allows educational experiences to qualify so long as 1) the program director monitors resident participation, 2) there is an evaluative component, 3) there is faculty oversight, 4) and the activity is monitored for effectiveness. This broad guidance from the ACGME RRC-EM allows an opportunity for curricular innovation and integration of new technologies to meet the needs of modern learners. The best practices for these curricular innovations have not been well established and are an open area for education research.

BACKGROUND

To date, published descriptions of III curricula in emergency medicine residency training have followed a consistent structure. Residents either self-identify or are provided with educational resources to review in an asynchronous fashion. The resident’s participation in, and effectiveness of, the educational activity is then assessed by means of a written examination or through a written reflection. Kornegay and colleagues found that the implementation of such a curriculum was feasible and well accepted by learners and did not result in a detectable decrease in performance on in-training examination scores. As self-identification of high-quality online educational resources is problematic, Lin and colleagues developed a process by which quality educational resources can be identified and integrated into an III curriculum.
While the published descriptions of III are relatively easy to implement, are well accepted by learners, and meet the requirements set forth by the ACGME, their utilization of modern communication technologies to facilitate social communication and learning is limited. Asynchronous online discussions have been used extensively in distance learning, including in health professions education, and can be used to foster the development of virtual communities of practice for geographically and temporally isolated learners. Online asynchronous discussions are particularly well suited to a social constructivist approach to instructional design. In this theory, learning is socially mediated, and new knowledge and skills are constructed, or scaffolded, on existing knowledge. There are no descriptions of the implementation of asynchronous online discussions to serve as III as defined by the ACGME.

The factors that contribute to increased learner participation in, and satisfaction with, asynchronous online discussions is an active area of research. Gilbert and Dabbagh found that having a structured facilitator guide and distributing participation expectations and evaluation rubrics to learners encouraged more meaningful discourse. They also found that limiting the length of learner posts and requiring citations negatively impacted meaningful discourse. Bradley and colleagues found that the type of questions asked by the facilitator influenced the quantity and quality of dialogue, with brainstorming and direct link questions encouraging higher-order thinking. The presence of the facilitator also plays a key role in encouraging robust dialogue. Mazzolini and Maddison found decreased length and number of learner responses in groups where facilitators posted frequently. Likewise, An and colleagues found less interaction between learners in online discussion groups when the facilitator was more active.

**OBJECTIVE OF INNOVATION**

The objective was to investigate the feasibility and value of incorporating asynchronous online small group exercises using a free social media and communication platform (Slack).

**DEVELOPMENT PROCESS**

The idea for, and design of, the virtual small group exercises was heavily influenced by the social constructivism educational theory. A direct dialogue between learner and teacher allows the teacher to identify the gap between the learner’s existing understanding of a concept and the desired level of understanding (zone of proximal development). Within this dialogue, the learner and teacher can explore any number of facets of a clinical problem, be it a core pathophysiologic understanding or be it the operational implications of a particular course of action in the care of a patient. In this way, an asynchronous online discussion opens up the possibility for the construction of a deeper and more robust understanding of clinical concepts, tailored to the specific needs of the individual learner.

At the beginning of each month, residents were divided into six small groups. Each small group consisted of a core faculty member serving as facilitator and approximately six residents of all training levels (PGY-1 to -4). Using the residency’s Slack team, each group was assigned to a private channel on which the exercise was conducted. The authors of this paper served as “Slack super users” and were available both in-person and online to troubleshoot any technical issues that arose during the trials.

We developed and distributed a facilitator guide to each small group facilitator at the beginning of each month (Data Supplement S1, Supplement 1, available as supporting information in the online version of this paper, which is available at http://onlinelibrary.wiley.com/doi/10.1002/aet2.10201/full). The facilitator guide outlined educational goals and objectives for each week, including specific prompts that were copied and pasted into the Slack timeline along with guidance for additional discussion. The case construction and objectives were designed to be similar to objectives that could be implemented in a traditional in-person small group exercise. The intent was to encourage the dialogue between facilitator and learner that characterizes synchronous small group activities while incorporating objectives that could otherwise not be easily accomplished during an in-person small group (e.g., searching online for evidence and providing a critical analysis of that evidence). We instructed the facilitators to guide the discussion as they would if they were leading an in-person small group session, with an importance placed on asking follow-up questions and calling on less engaged members of the group.

We used a rubric to evaluate resident participation (Data Supplement S1, Supplement 2). We defined meaningful participation as as the sharing of knowledge and experiences, to include the sharing and discussion of primary literature relevant to the subject of discussion. Residents were expected to respond to at
least one facilitator-initiated discussion and to at least one other small group participant. We defined substandard participation as brief and limited engagement in the discussion where the learners’ responses lacked specificity, evidence-based discussion, and experiential perspective. Each small group facilitator was tasked with tracking and assessing resident participation with oversight provided by a member of the residency leadership team. We distributed the evaluation rubric and discussion expectations to the residents at the start of each month.

**THE IMPLEMENTATION PHASE**

We first trialed the virtual small group exercises in our curriculum during March and May of 2017. The concept for, and objective of, the educational activity was introduced to the residents via email and with a brief in-conference presentation. We collected pre-implementation data on the baseline characteristics of our learners including familiarity with the Slack platform and existing use of technology. Following each month, a post-implementation survey was distributed to learners and moderators and assessed attitudes towards the learning experiences, task-technology fit, facilitator presence, perceived quality of discussion, and the perceived time value of the experience. We also analyzed the transcripts of the discussions looking at total word count, moderator response time, and number of educational resources shared.

The structure of the small group exercise in March differed from that in May. In March, each small group was tasked with identifying a common pain-related chief complaint and researching the literature supporting an alternative to opiates for pain control (e.g. evidence supporting non-opiate means to control pain in symptomatic ureterolitiasis). The residents were asked to develop a position statement describing the evidence supporting their chosen treatment. In this iteration, the faculty facilitator aided in the identification of a pain-related complaint, assessed resident understanding of the treatment options, and probed for a deeper understanding of the quality of the found literature and how it applied clinically to patients presenting to the ED.

In May, the virtual small groups were presented with a case-based scenario with the structure of the discussion being similar to an oral boards case. The scenario for this month revolved around a patient presenting with shortness of breath who initially appears to have symptoms consistent with a COPD exacerbation. However, with further questioning and through the results of diagnostic tests, the patient is found to have a combined respiratory alkalosis and metabolic acidosis, leading to the ultimate diagnosis of salicylate toxicity. During the course of the month, the faculty facilitator was tasked with communicating key pieces of information related to the case, responding to resident questions, and probing the residents understanding of the pathophysiology of COPD and salicylate toxicity as well as the clinical implications of management decisions. Starting in the 2017–18 academic year and moving forward, we have scheduled virtual small group exercises quarterly in our curriculum based on resident feedback.

**EVALUATION**

Baseline experience with Slack was low with 66% (41/62) of respondents having little to no knowledge of the platform. Overall, residents perceived that their

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Characteristics of March and June III</th>
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</thead>
<tbody>
<tr>
<td>Characteristics of Small Group Transcripts</td>
<td>March Mean (±SD)</td>
</tr>
<tr>
<td>Total Messages</td>
<td>59 (±19)</td>
</tr>
<tr>
<td>Group Facilitator Messages</td>
<td>17 (±9)</td>
</tr>
<tr>
<td>Resident Messages</td>
<td>42 (±12)</td>
</tr>
<tr>
<td>Total Educational Resources Shared</td>
<td>13 (±4)</td>
</tr>
<tr>
<td>Word Count</td>
<td>3754 (±1050)</td>
</tr>
</tbody>
</table>

Resident perceptions were assessed using a 1–5 Likert scale. Both questions were categorized (1–3 “no”, 4–5, “yes”) and tested for differences using the chi-square test. The p value did not quite meet significance, and the CIs did cross zero. III = individualized interactive instruction.
efforts in the activities were worth 1.18 hrs of conference time which was not significantly different than faculty perceived time value of resident participation of 1.05 hrs.

In comparing the March and May activities, the case-based format of the May activity was preferred by the residents as compared to the more open-ended format of the March activity. As seen in Table 1, there was a trend towards a more favorable rating of the quality of the dialogue and the task-technology fit in May as compared to March. Though the quality of dialogue was rated higher in May, the quantity of messages sent and the total word count was less in May as compared to March.

**REFLECTIVE DISCUSSION**

The introduction of an unfamiliar technology poses significant challenges. Though the nature of the communication on the Slack platform is immediately familiar to most in this generation of learners, the use of the application was not. Push notifications and ensuring notifications settings are set to alert learners of new activity are technical solutions to the challenge of integrating a new technology into the educational routine of learners. There are a number of other factors that may contribute to the successful implementation of these educational activities including duration of discussion, structure and content of the activity, and the role of the moderator in the discussion.

Asynchronous online discussions represent a promising instructional method for III. By taking advantage of social media and communication platforms, they offer an opportunity for faculty-resident and resident-resident dialogue, a sharing of common problems and experiences, and the social construction of knowledge. Further study is needed to identify the factors that maximize the successful implementation of these educational activities.

**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/aet2.10201/full

Data Supplement S1. Supplemental material.
The Digital EMS California Academy of Learning: One State’s Innovative Approach to EMS Fellow Education


ABSTRACT

Introduction: Emergency medical services (EMS) fellowships are growing in significance within the United States prehospital health care system. While fellowships represent a cornerstone of EMS subspecialty education, an individual learner’s experiences are limited by local resources and practices. California EMS fellowships have developed an innovative method for expanding fellows’ educational experiences outside their immediate programs.

The Innovative Education Method: Each month, fellows, fellowship directors, and local EMS medical directors from throughout the state participate in a video conference. This meeting is divided into four distinct components: book chapter presentation, board-style question review, call review, and an EMS literature review.

Chapter Review: The two-volume text *Emergency Medical Services: Clinical Practice and Systems Oversight* has been categorized into 12 modules, one for each month of the fellowship. Every meeting, one fellow prepares a didactic presentation summarizing the highlights from that month’s chapters.

Question Review: Fellows each create five multiple-choice questions and answers, based on the section reading. Questions are assessed by the group, both for informational content and for appropriate formatting. After completion, these questions are submitted for future review for the EMS fellowship in-service examination.

Call Review: Based on that month’s module topics, a call is chosen and reviewed. Regional protocol and practice differences from different systems are discussed. The online medical oversight provided and the prehospital provider performance are evaluated by the group.

Literature Review: Fellows not assigned to present a call or didactic segment each choose one paper focusing on a subject relevant to the module or call. Strengths of the study design, analysis, outcomes, and relevance to EMS practice are discussed.

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Outcomes: Fellows and experienced EMS attendings are exposed to different protocol and system approaches in an interactive and accessible format. This partnership expands educational opportunities for fellows and promotes collaboration across EMS systems.

NEED FOR INNOVATION

The number of fellowships providing subspecialty training in emergency medical services (EMS) has grown over the past decade. During training, time, and resource limitations generally constrain the exposure of fellows to their local educators and practice environment. The resulting experience provides an appreciation of fundamental EMS principles but may hinder a broader understanding of variations within the field. Geography and faculty composition can also limit opportunities for mentorship, professional development, and deeper exploration of academic interests that are not immediately available in the training location.

BACKGROUND

Emergency medical services became a recognized subspecialty of the American Board of Emergency Medicine in 2010. Formal accreditation of EMS training programs in 2013, with a defined core curriculum and body of knowledge, transformed what was previously an on-the-job learning process into a more standardized educational experience. While national developments have been successful in advancing EMS medicine in many regions, fellowship education remains subject to variations, often due to differences in local expertise, resources, and program objectives.

Remote learning has been used effectively in training for prehospital providers, and literature suggests utility and success with use in graduate medical education. Given the limitations fellowships face in ensuring complete coverage of the curriculum, video conferencing offers an opportunity to expand understanding of other systems’ practices, structure, successes, and challenges. Additionally, teleconferencing removes barriers of physical distance or limited space, allowing larger numbers of participants, from wide-ranging geographic locations additional opportunities for engagement and collaboration.

OBJECTIVE FOR INNOVATION

The objectives were to expand the education of EMS fellows to systems outside of their local areas and to expose learners to additional mentors with personal and academic foci that may align more optimally with their own, regardless of institutional affiliation or geographic location.

DEVELOPMENT PROCESS

The concept of a consortium originated when two EMS fellowship programs in California decided to collaborate on a structured educational experience, and a monthly video teleconference was begun. Northern California programs discovered that they were providing similar modular curricula but were seeking opportunities for broader ideas exchange. Within a year, all of the EMS fellowships in California had joined what would become the Digital EMS California Academy of Learning (DECAL). Since that time, the California EMS fellows learn about their local system and benefit from exposure to a diversity of systems and faculty from across the state.

The Structure

Each month, fellows, fellowship directors, and local EMS medical directors from each of California’s five programs (University of California at San Diego, University of California at San Francisco, University of California at Los Angeles [Harbor-UCLA], University of Southern California, and Stanford University) participate in a 4-hour video conference. On a rotating basis, each fellow, with oversight from his or her faculty, is responsible for preparing material pertaining to one of four educational components: book chapter presentation, board-style question review, prehospital radio call review, and EMS literature review.

Chapter Review. The two-volume text Emergency Medical Services: Clinical Practice and Systems Oversight is divided into 12 modules. One fellow prepares and delivers a 30-minute presentation summarizing key points from that month’s reading. Differing practice patterns, controversies in EMS, and current issues as they relate to the topic are interspersed throughout the talk.

Question Review. Fellows each create five board-style multiple-choice practice questions and answers based on that month’s reading. Questions are assessed and edited by the group for content and style. After
completion and final editing, the questions are contributed to a national question bank\textsuperscript{13} for preparation for the EMS qualifying examination.

**Call Review.** One fellow selects a base hospital call from his or her local EMS system that is aligned with the month’s topics. The radio contact is reviewed by the group, and protocol and practice variations among the different systems represented are discussed.

**Literature Review.** Remaining fellows choose one journal article focusing on a subject relevant to the module. Strength of the methods, analysis, and outcomes are discussed by the group. Studies are typically selected from recent publications or from influential studies.

**Technical Support Details**
Participants from multiple locations use a teleconferencing system that allows for either video conferencing or audio only. Several teleconference systems allow for Mac, PC, landline, and smartphone users. The Consortium uses Skype. The product used was chosen for its familiarity among users as well as the abilities to share electronic materials and audio-record the conferences. This instrument is relatively user-friendly, free, and generally of high quality. Technical challenges occasionally occur, including streaming issues, poor quality audio or video, local Internet connectivity, and dropped calls. Encouraging participants to silence their lines while not speaking has improved some of the audio issues. High Internet speeds and strong connections are crucial for decreased interruptions during the consortium.

**OUTCOMES**
For 3 years, EMS fellows, program directors, and associated faculty and residents have expanded understanding of statewide variations in EMS practice through DECAL. In addition to exposing fellows to a range of EMS practices, this regular teleconference has sparked research collaborations, an educational podcast,\textsuperscript{14} and an expanded mentoring network.

**Appreciating EMS Practice Differences**
Discussions of practice patterns provide opportunities for fellows to consider factors that drive differences between EMS systems. Several levels of EMS service and regulatory bodies are represented at the teleconferences, including some of California’s most populous counties and cities and a range of provider services. The communal nature of the meetings allows for a more in-depth look at site-specific needs and open dialogue between directors and fellows.

**Creative Collaborations**
Digital EMS California Academy of Learning provides an informal setting for cross-pollination of ideas and for formation of creative partnerships. Using the teleconferencing platform, fellows can remotely contribute to projects created through the consortium. By pooling the collective resources of the group, collaborators have a higher likelihood of success in their research endeavors. Fellows can also establish multi-institutional partnerships early on and can improve both the quality and the impact of their individual work.

**Broadening Mentorship and Networking Opportunities**
The consortium expands the networking, mentorship, and sponsorship available to fellows. Most EMS fellowships accept only one or two fellows per year. DECAL broadens a fellow’s network of contemporaries and others with aligned interests. The large number of participating physicians and the range of mentors also increase the likelihood that a fellow from an underrepresented group within EMS (such as by sex, race, or sexual orientation) can connect with someone who understands the unique challenges faced in his or her career.

**REFLECTIVE DISCUSSION**
Since its inception, the consortium has refined its format to adapt to the changing needs of its participants. Delineation of presenter roles and responsibilities has improved the efficiency and depth of the educational experience.

One challenge faced by DECAL is the relative homogeneity of the clinical entities represented by the participating institutions, which are all from one state, generally urban, and led by board-certified EMS physicians and possess adequate resources for ongoing quality improvement and innovation. This does not represent a majority of EMS and provider agencies within the United States.\textsuperscript{15} DECAL hopes to involve EMS directors with more varied experiences, such as those without formal EMS training, practicing in rural areas, or working in less-resourced settings. This diversity would broaden the perspectives gleaned by consortium fellows.
Maintaining rigorous standards for presented data and engagement of participants is a challenge in e-learning. Encouraging a central location for each institution, rather than individual call-ins, increased participation at these sites. Assigning faculty mentors across sites who can review presentation materials and suggest peer-reviewed resources has also helped to ensure rigorous standards for discussions.

It is difficult to quantify the benefits of DECAL at this early stage. The objective value of board certification was evaluated: 100% of the six fellows participating in DECAL during its first 2 years passed the 2017 EMS board examination. This is compared to 76% of fellowship-trained physicians and 55% that used the practice pathway for the same test. Future assessments will include evaluations of fellow knowledge before and after participation, productivity measurements of creative output from the group, and employment following training.

Digital EMS California Academy of Learning is continuing to develop and expand. In 2018, another fellowship program was added, totaling six academic institutions in attendance for the monthly meetings. Advanced planning and delegation of duties has been crucial for DECAL’s success. Just as fellows are assigned monthly roles, faculty from each participating university organize and lead a monthly session on a rotating basis. End-of-year assessments are completed by all faculty and fellows to determine opportunities for improvement, and the collegial relationships between the different institutions foster discussions for any midyear concerns.

CONCLUSION

Digital EMS California Academy of Learning’s teleconference structure offers a unique educational environment for emergency medical services physicians-in-training. The consortium’s model offers increased exposure for learners and seasoned professionals to a variety of emergency medical services systems, practice styles, and mentoring opportunities and has many potential applications within graduate medical education.

References


Resident wellness is a paramount topic in medical education. Resident physicians have higher rates of burnout, depression, and suicidal ideation when compared to nonmedical cohorts. Most of the data collected in these prevalence studies are self-reported via previously validated surveys that measure burnout, depression, and suicidal ideation. These surveys can be lengthy and are limited by participant response bias. Finding an objective way for educators to identify residents at risk would be ideal. A Grit score may possibly serve as a surrogate as it has previously been demonstrated that residents with a high Grit score have lower rates of burnout. The Short Grit scale (Grit-S) is an 8-point measure that has been previously validated to measure grit reliably. In this study, investigators sought to determine the correlation between EM resident self-assessed and faculty-assessed Grit-S scores of that same resident.

Residents from 10 allopathic EM residency programs completed a Grit-S scale. The resident participant then selected two faculty members to complete the Grit-S scale on that individual resident. A total of 281 of 303 residents completed the scale. The average Grit-S score was 3.58 out of a possible 5. A total of 103 residents did not have a faculty member assess their Grit-S score and were removed from further analysis. The mean faculty-assessed Grit-S score for the residents was 4.23 out of a possible 5. There was no correlation between the resident self-assessed Grit-S score and the faculty-assessed Grit-S score for that same resident (r = 0.13, n = 200, p = 0.064). However, there was a correlation between the two faculty assessed Grit-S score for the same resident (r = 0.47, n = 175, p < 0.0001).

Finding a validated score that can be used as a surrogate to predict those trainees at risk of burnout would be very beneficial to medical educators. But let us ask the bigger question of why our residents are experiencing burnout and when the burnout begins. Brazeau et al. demonstrated that matriculating medical students had lower rates of burnout and depression symptoms and higher quality-of-life scores when compared to control matched age-similar college graduates. We know from other studies that medical students have high rates of burnout and those rates worsen in residency and fellowship training. The essential answers to find are what are we doing to our trainees that transitions them from having lower rates of burnout to higher ones and how can we fix it.

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Supervising Editor: John H. Burton, MD

References
COMMENTARY - UNSOLICITED

Is It Learning or Scutwork? Medical Students Adding Value in the Emergency Department

ABSTRACT
In busy emergency departments (EDs), it can be difficult for faculty to teach students amid pressure to provide patient care and conduct research. As a result, medical student teaching may be an afterthought rather than a priority, and there is a lack of focus on how students spend their time during clinical shifts in the ED. Students want to contribute to departmental workflow, but can be hampered by systems limitations and lack of clinical knowledge. One solution is for faculty and medical students to partner to add value to patient care in the ED. However, faculty and students must be wary of the distinction between activities that add value and “scutwork,” tasks that involve little learning and do not require medical expertise.

In this perspective, the student, resident, and faculty authors discuss learner and educator perspectives for how medical students can be productive contributors to patient care in the ED without being subjected to scutwork. They also recommend ideas for productive student activities that promote learning, contrasted with examples of scutwork to avoid. Definitions of value-added activities and scutwork depend on the learner’s experience level and interests and are subject to debate. However, if medical students can be engaged in learning while also providing meaningful contributions to patient care, students, educators, and patients stand to benefit.

In teaching hospitals, it can be difficult to teach effectively amid pressure to provide patient care and conduct research.1 Further, educational activities are not well reimbursed relative to patient care, and teaching is time-consuming and may decrease patient throughput.2–4 Despite these pressures, faculty have an obligation to teach medical students, as the future of medicine depends on the education of students who will graduate to become medical providers.

For students progressing through medical school, evolution of the educational experience from passive learning to working as a subintern is both challenging and formative. In the absence of clinical autonomy, studies show that merely shadowing leaves medical students feeling unprepared to begin work as medical residents.5 Not only do students desire more experiential involvement with patient care,6 it is vital to their professional development.7

There is critical tension in a busy emergency department (ED) between the pressure faculty feel to maintain departmental workflow and the student need for clinical responsibility. This prompts an important question: can faculty partner with medical students to add value in the ED, in a way that students learn and patients benefit during the process? It can be difficult to find an appropriate balance between added value and “scutwork,” defined as “nonclinical yet essential tasks that do not require a doctor’s degree or expertise.”8 While some of these tasks may be important for care, scutwork impairs learning and the learning environment. While resident perceptions of scutwork have been studied elsewhere, to our knowledge there are no accounts of the medical student perspective, nor has anyone explored how scutwork applies to emergency medicine (EM) as a specialty.9–11

THE LEARNER’S PERSPECTIVE
We face several challenges in our efforts to contribute in the ED. First, our limited experience with clinical care often necessitates faculty or resident supervision to ensure patient safety. Second, our clinical years of school are composed of month-long, wide-ranging rotations, making it difficult to contribute efficiently while learning a new workflow every month. Expectations for students can vary between rotations, making it
challenging to understand our role and contribute to the team. Third, efforts to take responsibility for patients may be thwarted by factors outside our control. Hospital staff may relay patient information directly to the senior resident or attending, limiting our ability to act or take responsibility for a patient, and rules about documentation can prevent our notes from directly contributing to the patient’s chart.

As learners seeking experiential education, medical students in the ED sometimes operate between the boundaries of learning and service. We may be tasked with jobs that are ancillary to patient care, such as obtaining records or collateral information from outside facilities, which can provide lessons about health systems and build communication skills useful for residency. However, when repeatedly performing auxiliary tasks without progressing our role in patient care, we worry that we may be forfeiting opportunities to develop medical knowledge and skills.

There are a number of ways that students can add value to the ED. In a field where high patient throughput is necessary, we have the opportunity to spend more time interviewing patients, making them feel heard while building the interaction and interview skills we desire. Although we lack the mental heuristics of more experienced physicians, we can approach staff with ideas and questions that provide teaching opportunities as well as help defeat anchoring and confirmation bias. Also, students can circumvent the inherent power dynamic of the doctor–patient relationship that can leave patients feeling defensive or powerless.

Appropriate student tasks evolve as we gain clinical experience. By the time we reach a fourth-year EM rotation, we are eager to function as members of the care team. We hope that our supervising physicians will be in tune with our skill and knowledge base and mindful of opportunities to entrust us with meaningful patient care."

THE EDUCATOR’S PERSPECTIVE

Finding time to teach effectively in a busy ED with multiple levels of learners, along with the pressure to provide excellent patient care, can be challenging. Among these challenges, shifts during brief student rotations mean that we often lack continuity with students and do not find time to develop a relationship or observe a significant amount of clinical work. Involving students with clinical care involves challenges to provider efficiency and patient throughput, such as the need to perform a full evaluation and documentation on patients instead of confirming key portions as is typically done with residents and lack of student experience with clinical tasks such as calling difficult consults and arranging. At times, it is tempting for the sake of efficiency to perform tasks ourselves, rather than coaching a student through them.

Additionally, less time often translates to fewer opportunities to entrust a student to determine what they can do independently versus what needs direct supervision. On rotations where students are given an acting intern role, students may be assessed by their ability to perform specific duties such as obtaining outside hospital records, contacting families, calling pharmacies, and gathering equipment for planned procedures. Rather than scutwork, these can serve as concrete tasks that aid in determining student performance and productivity when higher-level functions are not feasible to assign or assess. It is also worth noting that assisting with tasks for other patients can show engagement and enthusiasm for the specialty and may be relevant within the context of the Accreditation Council for Graduate Medical Education (ACGME) Milestones (“Team Management,” for example).12

Finally, it is important for students to experience and understand the unique workflow inherent to an ED. Physicians at all levels of training often find themselves performing nonclinical tasks. Providing patients with a pillow or blanket when requested is not a physician-level skill but important nonetheless. Thus, some of the work perceived by students as scutwork may still be an integral part of patient care in the ED and an important component of being a good physician."

HOW LEARNERS CAN ADD VALUE IN THE ED

In the interest of medical education and clinical workflow, medical students can engage in activities that are both productive and educational. Table 1 shows examples of educational, value-added activities for students rotating in the ED as well as scutwork that should be avoided.

Medical student experiences in the ED fall along a spectrum between education and service. On the education end of the spectrum might be a student delivering a minilecture about a patient’s rare disease to the
team. The service end of the spectrum involves rote assignments that benefit other providers but provide little to no educational value; at times, these may even qualify as medical student mistreatment.

An important caveat for our list is that tasks are rarely scutwork if a student is asked to perform them for a patient for whom they are responsible. The previously mentioned examples of obtaining outside hospital records or fetching blankets might be inappropriate requests for a student otherwise not involved with a patient’s care. However, if the student is caring for the patient, these are reasonable student tasks, as they will help the student demonstrate clinical responsibility and develop rapport with the patient.

The balance between education and service depends on the interests and experience level of the learner. As shown in Table 1, important skills for new clinical learners, such as collecting routine vitals, may be of little value for fourth-year medical students. As medical schools trend toward early clinical exposure for medical students, it is increasingly important for educators to consider a variety of clinical tasks tailored for different levels of learners.

We recognize that the various stakeholders in the ED will likely have different perceptions of scutwork. Learners may be focused on learning medicine and expanding medical knowledge and view less clinically oriented tasks as distractions. Supervising physicians may take an alternate view of skills important for future residents: demonstrating teamwork, multitasking, and systems-based management. Patients may have another view entirely, seeing added value in tasks that demonstrate empathy or provide face time with a provider. Tasks involving both education and service can benefit all parties: students develop professionally and gain confidence from contributing to patient care; educators get the satisfaction of watching students progress without disrupting departmental workflow; patients receive better treatment because the whole care team is utilized.

<table>
<thead>
<tr>
<th>Tasks for Early Learners (Preclinical or Very Early Clinical Students)</th>
<th>Tasks for All Learners</th>
<th>Scutwork (Not Okay if Not the Student’s Patient)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review medication list</td>
<td>Review records from outside hospitals</td>
<td>Call or fax requests for outside hospital records</td>
</tr>
<tr>
<td>Gather supplies for a procedure not performed by student</td>
<td>Gather supplies for student to assist and perform procedures</td>
<td>Clean up after procedures performed by residents/faculty</td>
</tr>
<tr>
<td>Ask patient about allergies</td>
<td>Update a patient or check on patient status</td>
<td>Assigned patients to follow that residents want to avoid (i.e., intoxicated/loud patient in the ED)</td>
</tr>
<tr>
<td>Perform tasks of ancillary staff (taking routine vitals, stocking line/airway carts)</td>
<td>Start intravenous fluids or draw blood for lab work</td>
<td></td>
</tr>
<tr>
<td>Make phone calls to pharmacy to confirm medications/dosing</td>
<td>Discuss medications with pharmacist</td>
<td></td>
</tr>
<tr>
<td>Dedicated interprofessional shadowing shifts to learn workflow of support staff</td>
<td>Discuss care with ancillary staff (nursing, social work)</td>
<td></td>
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<tr>
<td></td>
<td>Talk to other history sources (family, nursing home, etc.)</td>
<td>Drop off specimens at the lab; pick up medications from pharmacy</td>
</tr>
<tr>
<td></td>
<td>Discuss protocol for advanced imaging or findings with radiology</td>
<td>Transport patient for nonurgent imaging</td>
</tr>
<tr>
<td></td>
<td>Bring ultrasound into room and perform preliminary scan</td>
<td>Bring ultrasound into room for resident or faculty</td>
</tr>
<tr>
<td></td>
<td>Write notes (to support faculty documentation)</td>
<td>Excessive note writing not used for charting or educational feedback</td>
</tr>
<tr>
<td></td>
<td>Obtain history via translator</td>
<td></td>
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<tr>
<td></td>
<td>Review results, plan, and discharge instructions with patient and family</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Research the answer to a clinical question and share with team</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Council patients on smoking cessation or diet</td>
<td>Run nonclinical errands for residents/faculty</td>
</tr>
</tbody>
</table>

*All authors contributed to this list of activities. The student authors agreed on the classification of activities between each column.*
CONCLUSION

In teaching hospital EDs, medical students and their supervising physicians must balance patient care, education, and clinical efficiency. Students can proactively seek learning opportunities that also contribute to departmental workflow, while residents and attendings can guide their learners toward value-added activities and away from scutwork. Although our examples of value-added activities represent the opinions of a small group of medical educators and learners, we hope they will serve as an aide to students and teachers working in the ED.

Future research should focus on developing a broader consensus on scutwork and how to engage learners in clinically productive activities. Once identified, tasks widely accepted as value-added and scutwork could be mapped to ACGME Milestones, to compare work expectations for learners in undergraduate and graduate medical education."

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References

Talking About Professionalism Through the Lens of Professional Identity

Kenneth V. Iserson, MD, MBA

ABSTRACT
Professionalism is one of the Accreditation Council for Graduate Medical Education’s (ACGME) Core Competencies, but the breadth of its content often makes this a difficult topic, both in remedial counseling and when presenting the topic to medical trainees and practicing clinicians. Physician professionalism encompasses both clinical competence and the virtues that comprise the physician’s social contract. This difficult subject may best be approached tangentially, through the lens of professional identity. Professional identity describes clinicians’ affinity for, acculturation into, and identification with the practice of medicine. One method to highlight the benefits that individuals accrue by adopting professionalism’s elements is to pose questions that optimize listeners’ self-reflection about their lives and aspirations—in essence, their professional identity. Discussing professionalism this way often yields in-depth discussions of how trainees believe their professional identity was formed and will impact their long-term goals. Both in teaching and in counseling, educators can frame their discussions using professionalism and professional identity’s overlapping and reinforcing elements to show listeners how to advance their personal and professional goals and avoid the short- and long-term consequences of unprofessional behavior. To engage the audience, educators and supervisors can emphasize how adhering to the elements of professionalism may determine their career opportunities, the professional respect they receive, and their career fulfillment and, ultimately, longevity. In this way, educators can better guide trainees and clinicians to understand their personal reasons for acting professionally, that is, doing the right thing, at the right time, in the right way, and for the right reason.

Although professionalism is one of the Accreditation Council for Graduate Medical Education’s (ACGME) Core Competencies,1 the breadth of its content (Table 1)2 and its many parallels with behavior expected of all working professionals often make it a difficult concept to fully grasp. That greatly complicates the task of discussing professionalism with clinicians at any training level (medical students, residents and fellows, practicing physicians, and other health care professionals), whether in remedial counseling or in group presentations. This paper presents a method (Table 2)3–7 for educators to help recipients understand how adhering to professionalism’s basic elements will affect their career trajectory.

When I was asked to present the topic of professionalism to residents who, their faculty felt, had not been behaving professionally, I was initially at a loss on how to make a topic viewed as abstract both relevant and interesting. My approach was to discuss professionalism through the lens of professional identity (Table 3)—a personal issue for every clinician. This strategy yielded an in-depth discussion of how the trainees believed their professional identity was formed and would affect their long-term goals and aspirations. Encouraging self-reflection on professional identity is a way to introduce ideal professional norms and how they align with trainees’ own personal attitudes, values, and goals. This reflection can include role model and mentor behavior they hope to emulate and unprofessional or disruptive behavior they should avoid in the pursuit of their professional goals.

WHAT IS PROFESSIONALISM?
Physician professionalism encompasses both clinical competence and the virtues that comprise the
physician’s social contract. Aside from the knowledge and skills needed to proficiently practice medicine, the ideal medical professional demonstrates “compassion, integrity, and respect; [is] responsive to patient needs; and [is] accountable to patients, society, and the profession,” and uses generally accepted ethical principles to identify and reason through ethical dilemmas. The sources of ideal virtuous physician behavior stem from ancient and modern medical ethical oaths and codes that flowed naturally from Aristotle and subsequent philosophers’ writings that urged individuals to act consistently in an ethical manner. The goal of virtue-based medical professionalism is for clinicians to internalize such values and ethical reasoning so that they can develop an unselfish disposition toward patients and colleagues. Within this framework, professionalism is the application of virtue to practice. 

Defining the attributes of professionalism helps trainees understand the accepted rules that they must follow to successfully acculturate in their chosen career path. But educators need to do more than define these important attributes. As the Royal College of Physicians and Surgeons of Canada stated, “To ensure that clinicians have the desired values and behaviors, we cannot rely on trainees to passively absorb them. Rather, we must formally teach and reinforce these values and behaviors among trainees and practitioners.” In explicit recognition of this, the ACGME has long included professionalism in its six Core Competencies: 

Over the past decades, major organizations governing postgraduate physician education in the United States, Canada, and the United Kingdom have reorganized teaching and evaluation, moving from what has been characterized as a virtue-based to an outcomes-oriented (metric-based) learning model. The ACGME now requires trainees to reach “Milestones,” increasingly complex behaviors at each level of a specialty’s training, which are assessed using the Core Competencies. However, measuring and evaluating professionalism has traditionally been both difficult and subjective, reliant on observation, coworker reports, sentinel events, and patient surveys. The ACGME’s suggested assessment methods for evaluating professional competency, “multisource feedback (MSF), patient surveys (can be part of MSF), and direct observation,” appear comparable to traditional methods of assessing virtue-based professionalism. By making professionalism a Core Competency with associated Milestones, the ACGME signals both that they consider it an integral part of the medical school curriculum and that they recognize Aristotle’s admonition that the study of ethical principles is not the goal but rather a tool to help individuals act in an ethical manner.

**WHAT IS PROFESSIONAL IDENTITY?**

Professional identity describes clinicians’ affinity for, acculturation into, and identification with the practice of medicine. Personal identity develops from the multiple relationships and experiences throughout life. It likely begins to develop as individuals are gradually exposed to real doctors and the media’s interpretation of them. They then form their own image about who physicians are, what they do, and how they ought to behave. Beginning with acceptance into medical school, trainees’ professional identities slowly form through experience, role modeling, and the assumption of clinical responsibilities. This transformation from layman to skilled physician requires them to assume the medical profession’s accepted roles, responsibilities, values, and ethical standards.

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**Table 1**

<table>
<thead>
<tr>
<th>Elements of ACGME’s “Professionalism” Core Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintaining emotional, physical, and mental health and pursuing continual personal and professional growth</td>
</tr>
<tr>
<td>Maintain a healthy lifestyle.*</td>
</tr>
<tr>
<td>Develop an approach to continuous lifelong learning (i.e., stay current in job requirements).*</td>
</tr>
<tr>
<td>Regularly attend conferences and CME activities (i.e., attend required meetings).*</td>
</tr>
<tr>
<td>Have a positive response to constructive criticism.*</td>
</tr>
<tr>
<td>Demonstrating humanism and cultural proficiency</td>
</tr>
<tr>
<td>Treat patients as humans, not subjects.</td>
</tr>
<tr>
<td>Treat patients and others respectfully (i.e., interactions with colleagues and clients should be respectful).*</td>
</tr>
<tr>
<td>Listen attentively, responding humanely.*</td>
</tr>
<tr>
<td>Maintain patient privacy and confidentiality.</td>
</tr>
<tr>
<td>Exhibit altruism and patient advocacy.</td>
</tr>
<tr>
<td>Advocate for the patient’s welfare.</td>
</tr>
<tr>
<td>Display empathy.*</td>
</tr>
<tr>
<td>Demonstrating professional conduct and accountability</td>
</tr>
<tr>
<td>Be on time and arrive prepared for work.*</td>
</tr>
<tr>
<td>Dress appropriately and maintain good hygiene.*</td>
</tr>
<tr>
<td>Continue to see patients throughout the work period (i.e., put in a full day’s work).*</td>
</tr>
<tr>
<td>Complete medical records thoroughly, honestly, and punctually (i.e., complete work accurately and in a timely manner).*</td>
</tr>
<tr>
<td>Consistently advocate for patients and their families.</td>
</tr>
<tr>
<td>Give and receive input and advice from colleagues.*</td>
</tr>
</tbody>
</table>

ACGME = Accreditation Council for Graduate Medical Education; CME = continuing medical education.

*Parallels with expectations of all working professionals.
Table 2
Key Points for Professionalism Presentations or Remediation: Using Professional Identity to Discuss Professionalism

<table>
<thead>
<tr>
<th>Presenters may want to use these questions and possible answers in a Socratic format, generating as much audience participation—and investment in the topic—as possible. During remediation, try to elicit appropriate responses from the individual, but be prepared to stimulate him or her, as required.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What do you want to accomplish during your medical career? What are your career goals?</strong></td>
</tr>
<tr>
<td>Help others?</td>
</tr>
<tr>
<td>Clinical excellence?</td>
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<tr>
<td>Academic excellence?</td>
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<tr>
<td>Professional leadership?</td>
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<tr>
<td>Scientific advances/publications?</td>
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<tr>
<td><strong>How about your personal goals?</strong></td>
</tr>
<tr>
<td>Enjoy practicing medicine?</td>
</tr>
<tr>
<td>Fulfilling family life?</td>
</tr>
<tr>
<td>Minimizing stress and enjoying personal time?</td>
</tr>
<tr>
<td>Financial, personal and geographic stability?</td>
</tr>
<tr>
<td><strong>What ideal physician characteristics (e.g., virtues, values, attitudes) do you possess or are working to achieve?</strong></td>
</tr>
<tr>
<td>Fairness</td>
</tr>
<tr>
<td>Honesty</td>
</tr>
<tr>
<td>Kindness</td>
</tr>
<tr>
<td>Teamwork</td>
</tr>
<tr>
<td>Judgment*</td>
</tr>
<tr>
<td>Leadership*</td>
</tr>
<tr>
<td><strong>What factors that you control in your professional life could advance your opportunities to achieve or prevent you from achieving these goals?</strong></td>
</tr>
<tr>
<td>Avoid or get treatment for substance abuse.†</td>
</tr>
<tr>
<td>Get prompt treatment for psychological issues</td>
</tr>
<tr>
<td>If suggested or suspected, get counseling for problematic personality traits such as narcissism, perfectionism, and selfishness†</td>
</tr>
<tr>
<td>Learn to control anger, especially under heightened stress†</td>
</tr>
<tr>
<td>Leave personal problems out of the work environment†</td>
</tr>
<tr>
<td>Be a reliable worker (e.g., no chronic lateness or absenteeism, come prepared to work)</td>
</tr>
<tr>
<td>Demonstrate positive team member behavior (e.g., do not cheat, falsify data, or disrespect or argue with other team or staff members)</td>
</tr>
<tr>
<td>Do not resist constructive advice (e.g., arrogance, defensiveness)</td>
</tr>
<tr>
<td>Work to improve relationships with patients and their families</td>
</tr>
<tr>
<td>Ask for help (clinically and emotionally) when you need it</td>
</tr>
<tr>
<td>Have a study plan and follow it</td>
</tr>
<tr>
<td>Read relevant professional literature</td>
</tr>
<tr>
<td>Identify a mentor and meet with him or her regularly</td>
</tr>
<tr>
<td>Know and follow the departmental, institutional, other relevant governing rules for your professional work. Accept supervisors’ directives</td>
</tr>
<tr>
<td>Actively participate in professional meetings, groups, and associations</td>
</tr>
<tr>
<td>Teach others, whenever possible</td>
</tr>
<tr>
<td>Ask for feedback on your clinical work and professional relations</td>
</tr>
<tr>
<td>Develop a career plan after investigating its feasibility for you</td>
</tr>
<tr>
<td><strong>What are the professional consequences of persistent unprofessional behavior?‡</strong></td>
</tr>
<tr>
<td>Delay in educational progress</td>
</tr>
<tr>
<td>Diminished professional status</td>
</tr>
<tr>
<td>Required remedial interventions (short- or long-term)</td>
</tr>
<tr>
<td>Limitations on specialty, fellowship or locations for graduate medical education</td>
</tr>
<tr>
<td>Probation at or expulsion from school, training program</td>
</tr>
<tr>
<td>Fewer patients and referrals</td>
</tr>
<tr>
<td>Limitations of clinical privileges</td>
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</tbody>
</table>

(Continued)
Medical educators generally accept Kegan’s framework for the development of professional identity. As Bebeau described the stages most applicable to medical trainees, “Individuals move from self-centered conceptions of identity [Stage 2] through a number of transitions, to a moral identity characterized by the expectations of a profession—to put the interests of others before the self, or to subvert one’s own ambitions to the service of society [Stage 3 or 4].” However, a study of EM residents suggested that may not happen for about half of medical students by the time they enter residency. In response to the question “Why is medicine important to you?” about half of incoming EM residents expressed self-focused answers (Kegan Stage 2), while the balance gave other-focused answers (Kegan Stage 3; i.e. altruistic, virtuous). This is not surprising, since the process continues to evolve throughout a clinician’s career, with individuals adopting their professional identity at different rates. Unfortunately, clinicians progressing more slowly through the stages (or stalled at a lower level) require more professional remediation than do those at the higher level.

For some physicians, their professional identity stems from a “calling.” For many others, it is a gradual acculturation process, involving clinical experience...
with patients and their families and time spent with respected teacher–role models and mentors. Role models are physicians who are “admired for their ways of being and acting as professionals.” Mentors are “experienced and trusted counselors,” affecting professional identity through close and prolonged contact with learners. Both role models and mentors generally exert their influence by modeling professionalism, spurring trainees to envision their professional future. While consciously observing, imitating, and practicing this behavior, trainees also absorb the knowledge these teachers have gained from experience. At every stage, peers also exert influence through modeling behavior and formal and informal feedback. Although trainees will inevitably observe supervisors or peers that periodically model unprofessional behaviors, every practicing physician is powerfully affected by behaviors that they want to emulate.

While multiple authors have proposed that professional identity formation be a major focus of medical education, at present, there is no generally recognized method to assess individuals’ progress in beginning to “think, act, and feel like a physician.” The purpose of asking clinicians to reflect on their professional identity (Tables 2 and 3) is to have them identify how their behavior, essentially professionalism, will enhance or prevent them reaching their goals. The additional benefit is that rather than being static, professional identity formation is an active, developmental process dynamic that dynamically evolves throughout physicians’ careers. While the proposed discussion format (Table 2) seems to focus on those at lower professional identification levels, it usefully reinforces the information and initiates career-goal reflection for all recipients.

**LAPSES IN PROFESSIONAL BEHAVIOR**

Educators, trainees, practicing clinicians, and the public benefit from defining and publicizing specific elements of professionalism that accompany clinical competence. This helps trainees understand the accepted rules they must follow to successfully acculturate in their chosen career path and ensures public trust in the medical community.

The physician’s social contract rests on the assumption that practitioners possess the qualities embodied in professionalism. This contract grants them unique (legal) access to restricted pharmaceuticals, high-level decision-making authority over patients (e.g., despite patient autonomy, clinicians generally decide how and when to perform invasive procedures), and permission to violate major societal norms (e.g., viewing and touching strangers). Failing to adhere to the elements of professionalism may void this contract and threaten a physician’s career goals, since “professionalism lapses are viewed as acts of inappropriate behavior and reflect a lack of skill in negotiating conflict-prone situations.” Ultimately, such lapses are “associated with poor adherence to practice guidelines, loss of patients, low staff morale and turnover, medical errors and adverse outcomes, and malpractice suits.”

Papadakis et al. noted that the most common physician lapses in professional behavior relate to severe irresponsibility (e.g., lateness or absenteeism, unreliability), an unreliable working relationship (e.g., cheating, falsifying data, disrespecting other members of the team), resistance to self-improvement (e.g., arrogance, defensiveness), and impaired relationships with patients and families. These professional lapses may occur when dealing with patients, colleagues, and society (e.g., health care facility, payers, and policy makers).

The most egregious examples of unprofessional behavior are labeled “disruptive,” implying behavior that is overtly and even dramatically offensive, disrupting patient care, damaging interprofessional relationships, and demonstrating erroneous role modeling for trainees. Both Swiggart et al. and The Joint Commission have recognized that this behavior can be both overt (aggressive) and passive (passive-aggressive) and is sometimes used to intimidate those with less power within the organization. The College of Physicians and Surgeons of Ontario describes disruptive behavior as instances “when the use of inappropriate words, actions or inactions by a physician interfere with his or her ability to function well with others to the extent that the behavior interferes with, or is likely to interfere with, quality health care delivery.” They go on to say that, while single events, such as assaulting a patient or colleague, may warrant the label, it usually defines a pattern of behavior that can include both verbal (insults, abusive language, outbursts of anger, inappropriate arguments) and nonverbal (refusal to comply with standards, failure to respond to calls, etc.) actions.

Those most at risk for unprofessional behavior may gain the most if their medical schools, residency programs, and health care institutions provide didactic and counseling interventions. Studies suggest that
unprofessional behaviors that occur during medical school and residency may predict future unprofessional behavior. Papadakis et al. found that irresponsible or unprofessional behavior in medical school indicates a greater likelihood of later receiving state board disciplinary action. Brenner et al. found that the presence of any negative comments in the dean’s letter from the resident’s medical school of origin correlated significantly with future performance problems and also with state medical board disciplinary action. Multiple researchers have found that unprofessional behavior during medical school correlates with applicants’ California Psychological Inventory scores in the domains of irresponsibility, lack of self-improvement, and poor initiative. Unfortunately, although educators, administrators and medical boards believe that interventions are helpful in reducing later unprofessional behavior, no one has shown that to be true.

PROFESSIONALISM: TEACHING AND COUNSELING

Lectures on professionalism routinely center on abstract topics, such as rule-based admonitions or the virtue-based elements of professional oaths and codes, which trainees may view as lacking testable and personally relevant information. The elements of virtue can be explained, but it is unclear how to imbue them in individuals except through role modeling. As Pellegriño described, “The virtuous person is someone we can trust to act habitually in a ‘good’ way—couragously, honestly, justly, wisely, and temperately. He is committed to being a good person and to the pursuit of perfection in his private, professional and communal life. He is someone who will act well even when there is no one to applaud, simply because to act otherwise is a violation of what it is to be a good person.”

Alternatively, speakers may detail process-driven ethical activities, such as writing do-not-attempt-resuscitation orders, interpreting advance directives, determining decision-making capacity, and soliciting help from bioethics committees and consultants. While these are vital skills for working through ethical dilemmas, they relate to professionalism only insofar as clinical competence is an essential component. Because professionalism and professional identity have overlapping and mutually reinforcing elements, speakers can frame their discussions as ways to use positive attitudes and behavior to advance listeners’ personal and professional goals and to avoid the short- and long-term consequences of unprofessional behavior.

Similarly, when supervisors must counsel individual clinicians about professional lapses such as obvious disruptive behavior (passive, passive-aggressive, or aggressive) or subtler rule violations, discussing professionalism tangentially by way of professional identity may be one strategy to avoid the problems inherent in addressing the topic head-on. Because candid discussions of behavior may devolve into accusations, making them uncomfortable and often unhelpful for both parties, it may be more beneficial to demonstrate how professional principles are consistent with the individual’s personal attitudes, values, and goals. Table 2 provides an outline that can be used both to present the topic and to provide remediation using the concepts of professional identity to personalize professionalism for the recipients. In this remediation schema, first have the trainee or clinician explicitly identify their personal and professional goals. Then, discuss his or her unprofessional behaviors (controllable factors) in terms of how he or she may hinder achieving those goals. At that point, specific methods to alter negative behaviors are discussed, including formal psychological counseling, monitoring with periodic feedback, or individual study plans (e.g., reading professionalism literature, preparing professional development self-reflection essays). If appropriate, the individual providing the remedial feedback can also suggest extreme consequences (e.g., probation at or expulsion from training, loss of institutional privileges, or reporting to the medical board) of continued adverse behavior.

One method to highlight the benefits that individuals accrue by adopting professionalism’s core competency elements is to pose questions that optimize listeners’ self-reflection about their lives and aspirations—in essence, their professional identity (Table 3). Asking clinicians and trainees to identify what drew them to their medical career, what they want to accomplish, and what they like about medicine—as well as the dangers that unprofessional conduct could have on their career—may be more compelling to audiences in educational and remedial professionalism discussions than emphasizing altruistic motives, abstract rules, and bioethics procedures.

In the first decade of this century, studies showed that many health care organizations failed to effectively deal with unprofessional, including disruptive, behavior among physicians, applying codes of conduct selectively,
reporting only the most serious violations, and treating high-value practitioners more leniently than others. This is no longer the case, and clinicians must recognize that successful, or even continued, careers rest on professional conduct. Institutional and state medical board actions against unprofessional physicians affect post-graduate training, career advancement, maintenance of clinical positions and privileges, and, ultimately, medical licensure. This is both the carrot and the stick when presenting information on professionalism. To engage the recipients of this information (trainees, clinicians), such talks could emphasize how adhering to the elements of professionalism may determine their career opportunities, the professional respect they receive, and their career fulfillment and, ultimately, longevity. Approached in this way, a talk assessing and reinforcing positive attitudes around professional behavior could perhaps be titled, “What do you want from your medical career?”

CONCLUSIONS

Those tasked with discussing professionalism with physicians, other health care professionals, and trainees may want to consider approaching the topic tangentially, through the lens of professional identity. Asking listeners to reflect on their own professional aspirations encourages them to consider professional principles in light of their own values and goals as well as the consequences of straying from the profession’s norms. This approach can be applied in didactic, small-group discussion and counseling sessions. By bringing the abstract concepts of professionalism into the realm of one’s professional identity, listeners will have the opportunity to interpret the information within the boundaries of their own professional lives. In this way, educators can better guide trainees and clinicians to understand their personal reasons for acting professionally, that is, doing the right thing, at the right time, in the right way, and for the right reason.

References