

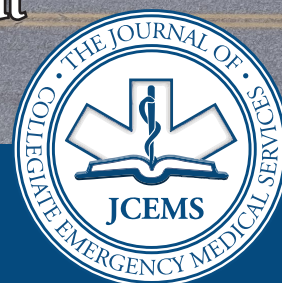
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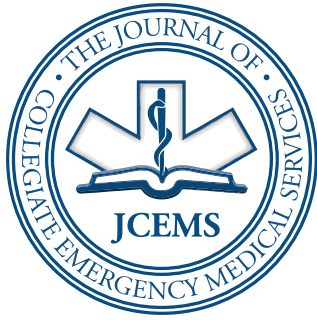
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Compassion Meditation to Improve Psychological Well-Being
Innovation in College Emergency Medical Services
Passing the Torch to Decrease Healthcare Burnout
Advising Resilient Healthcare Teams



*The Official Peer-Reviewed Journal of the
National Collegiate Emergency Medical Services Foundation*



The Journal of **COLLEGIATE EMERGENCY MEDICAL SERVICES**

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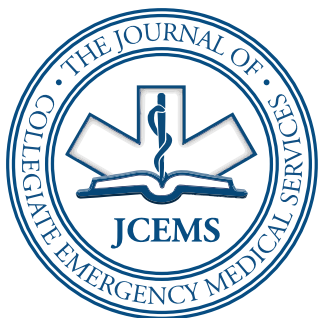


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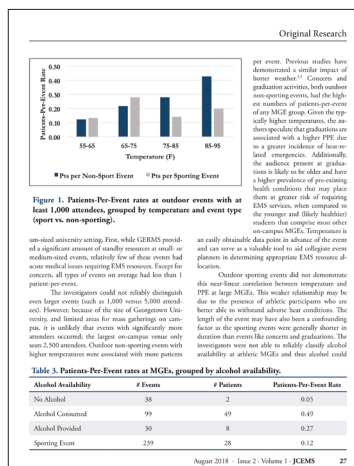
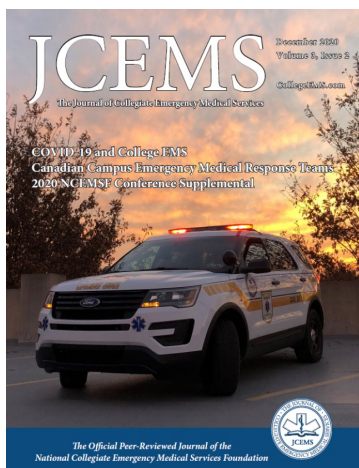
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Innovation in Collegiate Emergency Medical Services

Adhitya Balaji, BS, EMT; **Jacob Robishaw-Denton**, BS, EMT; **David L. Rodgers**, EdD, NRP; **Andrew K. Watters**, MD; **Thomas Lardaro**, MD, MPH; **Scott C. Savett**, PhD, EMT

Keywords: collegiate-based emergency medical services; innovation | **Corresponding Author and Author Affiliations:** Listed at the end of this article

Campus-based emergency medical service (CBEMS) is a specific niche of emergency medicine, characterized by a variety of unique challenges and opportunities for growth and advancement. The continuous improvement of the EMS field is crucial, and collegiate EMS agencies, with their ties to academic institutions, serve as an ideal setting for piloting innovations and advancements. In the following editorial, we review the current technology utilized by many EMS agencies and explore the various advances that may be coming soon to the prehospital world. This editorial is organized based on ease of implementation by CBEMS agencies – short, moderate, and long-term.

Through the support of *The Journal of Collegiate Emergency Medical Services* and the National Collegiate Emergency Medical Services Foundation, the authors of this editorial come from a wide range of backgrounds. All authors are highly involved in the field of EMS, serving in medical director and leadership roles across the country. Additionally, all authors have extensive clinical experience in emergency medicine and EMS, advocating for the expansion of CBEMS agencies, and actively conduct EMS research. These research interests range from simulation-based education and the implementation of new technologies to enhancing clinical practice and operations. These backgrounds make this group of authors ideal to review potential uses of current and future innovations in EMS.

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We then discuss our Call for Papers for an upcoming special edition in *The Journal of Collegiate Emergency Medical Services* regarding innovations in the field of collegiate EMS, highlighting the importance of continuous improvement and the need for your contributions.

Short-Term Implementation

Computer-aided dispatch (CAD) systems are programs that assist in assigning specific units to emergency calls. Originally integrated into police, fire, and EMS in the late 1970s, CAD systems are driven mostly by advances in computing hardware that made technology more compact and readily available on the market.¹ Over the last several decades, various advances have allowed for continual improvement in CAD capability. Notable examples include integrating GPS tracking for field units and advanced mathematical models that can predict resource needs for emergency calls.² While it may not be as helpful for collegiate EMS agencies that only staff one unit daily, CAD is vital to the efficient utilization and deployment of emergency personnel in most EMS systems, along with campus police.

Radio communication has often been identified as a weakness in many systems, especially during inter-agency responses such as mass gatherings such as sporting events on campus. Interoperability between agencies is challenging, with different frequencies, encryption models, and equipment limitations impacting range and building penetration. These newer technologies will benefit CBEMS, as they cover large events inside stadiums and coliseums such as sports or concerts, while allowing for adequate interoperability.

Twelve-lead electrocardiograms (ECGs) have become a versatile diagnostic tool in prehospital care, particularly for evaluating and triaging patients with chest pain. In 2019, the National EMS Scope of Practice expanded the BLS scope of practice for Emergency Medical Technicians (EMTs) to allow for acquisition and transmission of 12-lead ECGs.³ This skill allows BLS units to potentially identify ST-elevation myocardial infarctions (STEMIs) or other cardiac abnormalities in collaboration with medical control and the emergency department physician. With most CBEMS agencies staffing at the BLS level, multi-lead ECG transmission to receiving hospitals by BLS units improves the triage of suspected cardiac patients to receive treatments in the cardiac catheterization laboratory.⁴

Lastly, one of the most prominent pieces of technology brought to EMS, and healthcare in general, is the implementation of electronic medical records (EMRs). Many EMS agencies have transitioned from paper records to EMRs within the past few years. However, CBEMS agencies, along with a minor portion of EMS agencies, tend to fall behind the norm for many reasons, including financial and technical challenges.⁵ However, despite these challenges, EMRs provide the potential to improve clinical care by implementing continuous quality improvement (CQI) at in more detail utilizing data analytics and providing online access to medical direction – compared to reviewing paper charts. A 2012 study by Newgard et al. found that electronic data processing identified a larger pool of patients for CQI with strong validity compared to traditionally manual methods.⁶ This emphasizes the utility of EMRs for data mining while ensuring quality data is entered into patient records. Similarly, a review by Porter et al. found that although there were several barriers to implementing EMRs in EMS, they allow EMS agencies to improve documentation and data-driven operational and clinical decisions, resulting in a higher quality of patient care.⁷

Moderate-Term Implementation

As EMS continues to transition from a system focused primarily on emergency response to an integral part of the healthcare system, it is essential to highlight innovations with the potential to improve the workflow and patient care of EMS providers for both emergency and non-emergency responses.

Recently, there has been increased discussion centered around incorporating innovations from other healthcare fields and public safety agencies. Most of these technological improvements are centered around improving communication, transparency, and preparedness, particularly regarding education and operations. These include an increased emphasis on simulation-based education, the integration of telehealth, and the potential for artificial intelligence in EMS.

Simulation-based education has been well-established in the medical field, and is becoming an increasingly effective teaching modality, particularly in emergency medicine. The Accreditation Council for Graduate Medical Education (ACGME), the oversight board responsible for the accreditation of residency programs in the US, requires emergency medicine residents to perform a minimum number of critical procedures before graduation. However, recognizing the value of simulation, the ACGME allows for rare procedures, such as cricothyrotomy and pericardiocentesis, to be performed using simulation. This highlights the utility of simulation for both skill acquisition and maintenance of low-frequency high-acuity skills, such as chest tube placement and intubations. This is highly relevant to CBEMS as many agencies have low run volumes, inherently making all skills low frequency, which would allow simulation to supplement clinical experience in developing new providers.

The most significant concern regarding simulation is the potential cost of utilizing high-technology simulators. CBEMS agencies

nationwide have wide variations in funding sources for operations and education. While some CBEMS agencies are fully integrated into and subsidized by their respective universities, others contract with campus and community units to support their agency.⁸ When taking this within the context of rising costs in supplies and equipment, as seen in a recent National Association of Emergency Medical Technicians survey of 450 agencies nationwide, many CBEMS agencies may believe that simulation-based education isn't a feasible option.⁹ However, there are methods of integrating simulation into CBEMS education curricula, regardless of budget. When considering simulation, most people initially gravitate towards high-technology manikins. While these simulators can help improve the experience of training sessions, they are by no means a requirement. Other simulation methods can utilize low technology manikins, volunteer actors, tabletop scenarios, and moulage. A recent article in the *Journal of Emergency Medical Services* highlights how effective EMS education is focused on developing clear objectives, realistic scenarios, and productive debriefing to supplement the education of EMS professionals.¹⁰

Long-Term Implementation

Many recent advances in telehealth have the potential to revolutionize how certain events are handled in EMS. Mental health crisis events on campus have slowly been increasing over the past few years, but this isn't new to EMS by any means.¹¹ As a whole, emergency services have been increasingly responding to mental health patients, which are typically low acuity. With increasing mental health events on and off campus, CBEMS agencies need to become more comfortable with managing these situations. Although most CBEMS agencies are not undergoing staffing shortages, there is a prominent issue within the larger field of EMS concerning workforce retention and recruitment. This shortage requires innovative solutions to provide the best patient care possible. A 2022 study performed in Australia found that the utilization of telehealth mental health nurses resulted in fewer ambulance dispatches, which allowed for more optimal resource allocation and minimal expense increases.¹² Similar results were found in a study performed by the Houston Fire Department, which resulted in a 56% absolute reduction in ambulance transports.¹³ These studies provide an avenue for CBEMS to explore in the future as resources to consult, similar to medical control, as access to adequate mental health care becomes increasingly strained in the face of a nationwide collegiate mental health crisis.¹⁴

Additionally, developments in geolocation have included the development of tracking programs that go beyond traditional two-dimensional location (latitude and longitude) to include altitude or elevation, such as Tactical Assault Kit (TAK) (<https://tak.gov/>) and CalTopo (<https://caltopo.com/>).¹⁵ While historical usage has been limited to military and government agencies, tracking technology has recently been released to public safety agencies. These technologies also allow for integration of mutual aid agencies, better improving interoperability at large events.¹⁶ With greater accuracy, this technology can potentially refine geolocation in CAD systems to the individual level. With three-dimensional

locating capabilities, CBEMS is well-positioned to utilize the technology at large gatherings such as sporting events or concerts.

With the explosion of publicly available artificial intelligence (AI) platforms, such as ChatGPT and Microsoft Copilot, there have been large strides in understanding potential implications and uses for AI in emergency services and medicine. AI usage can vary widely, including clinician use for charting patient care reports, retrospective chart review for quality assurance/quality improvement (QA/QI), previously mentioned ECG interpretation, advising EMS operations, and development of education and training programs. The paramount issue regarding this advancement is the understanding that AI should enhance the clinician, not replace provider judgment.

As previously mentioned, EMS is facing a nationwide staffing shortage, which is confounded by increased burnout rates of prehospital providers. A 2020 study by Crowe et al. in JACEP Open found that EMS professionals facing high job demands experienced a 10-fold increase in odds of burnout. High job demands included factors such as time pressure and run volume.¹⁷ As typical with any aspect of medicine, corresponding patient charting following a patient encounter contributes to job demands. This becomes increasingly cumbersome in emergency medicine and EMS when run volumes and patterns can be difficult to predict, along with patients' varying acuity levels.¹⁸ The utilization of AI can potentially decrease the burden on providers for charting, which could ultimately provide some relief in terms of burnout. The sphere of AI utilization in patient charting is currently growing with the development of startup companies such as OneChart.¹⁹ Although CBEMS agencies typically have lower run volumes preventing the development of traditional burnout, CBEMS providers face unique challenges which can be alleviated with the utilization of AI-based charting software. The biggest challenge for CBEMS providers is the time they spend on runs and performing EMS duties, compared to their studies and other extracurricular activities. AI-based charting software can assist CBEMS providers in reducing the time they spend writing patient care reports to get back to their academic pursuits more quickly.

Continuous quality improvement through chart review is integral to research, improvement, and patient safety. While chart review is critical, manually entering each record and extracting relevant information can be highly burdensome. Additionally, chart review can be cost-prohibitive for healthcare organizations, which could be a deterring factor from emphasizing a culture of quality improvement.²⁰ AI can help reduce these costs by automating chart review in certain respects. However, a key aspect to consider when utilizing AI for chart review is that it is no replacement for human review, particularly for complex cases. Human chart reviewers can understand nuances that AI may not. The role of AI in quality review is still being developed, and its role in healthcare is continually being explored.²¹

As previously mentioned, field activation for STEMIs allows the hospital to be prepared to go straight to the cardiac catheterization

lab. This decreases door-to-balloon times, a standard quality metric for field STEMI activations, and is associated with reduced mortality.²² However, false positive activations are extremely common with prehospital STEMI diagnosis.²³ Artificial intelligence could improve the accuracy of ECG interpretation to guide clinical practice. Baker et al. recently published a retrospective cohort study assessing AI-driven prehospital ECG interpretation. This study found no difference in false-positive rates of STEMIs between AI software and native ECG monitor software interpretation. However, the AI-based software did not miss any STEMIs, while the native ECG software missed 5% of STEMIs in this study. This highlights how AI has the potential to increase the accuracy of STEMI identification, but more studies are required to validate this finding.

Lastly, AI has the potential to impact EMS operations. Multiple models exist within CBEMS, such as event-standby, non-transport, and transport services. Additionally, there are many response models within EMS as a whole, including static and system status management (SSM).²⁴ Static models include stationing ambulances in fixed locations, such as fire and EMS stations. In contrast, a system status model focuses on the redeployment of assets throughout the response area at various posts, depending on call volumes and locations. The ultimate goal of SSM is to get the quickest, most appropriate asset to the patient. However, predicting where the next call will occur is a difficult task. While there have been attempts at creating a predictive model, AI can potentially develop a more reliable model that accounts for variations in call volume based on regional differences. AI could be used in the CBEMS setting to suggest crew levels based on historical events from prior years (e.g., an increase in orthopedic injuries during a soccer camp), campus health surveillance (e.g., a recent uptick in visits to the campus health center for respiratory symptoms), or anticipated weather-related responses.

Ultimately, AI has the potential to impact EMS and CBEMS to enhance clinical care and improve patient outcomes. However, the current knowledge base regarding AI's limitations and capabilities for advising EMS operations has many limitations. A major risk is the potential for patient data breaches and Health Insurance Portability and Accountability Act (HIPAA) violations. As Marks et al. discusses, HIPAA was written in a period before technology and may not adequately protect patient information in today's digital landscape.²⁵ While deidentified data can be used with AI, it is not entirely risk-free, as such data can potentially be reidentified or misused, causing harm.

Instead of focusing solely on whether AI software complies with HIPAA, users should critically evaluate the type of information being inputted and consider its potential for harm. Additionally, Federspiel et al. warn about AI's broader threats to public health, such as its role in spreading targeted misinformation.²⁶ The COVID-19 pandemic highlighted the dangers of misinformation, and AI could amplify these issues.²⁷ Therefore, responsible use of AI and careful oversight are essential to minimize risks and ensure ethical implementation. This presents an opportunity for

more research to be completed in this sphere of AI in healthcare.²⁸

Conclusion and Call for Papers

As discussed, the field of EMS is one of continuous innovation, with many new advances on the horizon, including simulation-based education, telemedicine for mental health, and the utilization of artificial intelligence in EMS. Even so, the current literature is barren regarding advancements in EMS, with most of it being a decade old. Given the unique position of collegiate EMS at academic centers, it is an optimal environment for the development of future innovations in EMS.

This editorial only scratches the surface concerning innovations in collegiate EMS. There are so many areas of technology this editorial didn't touch on, such as ambulance patient compartment safety, the use of hybrid powertrain technology, and novel emergency warning devices (lights and sirens). There's also operational technology, such as dispatch/response apps, which CBEMS agencies can potentially be using already.

As such, *The Journal of Collegiate Emergency Medical Services* invites you to respond to our Call for Papers for an upcoming special edition. Manuscripts for this edition should discuss recent innovations and improvements your collegiate EMS agency has implemented and their resulting impact on patient care and agency operations. Both best practices and research manuscripts will be considered for publication. Please submit any manuscripts to abalaji@jcems.org. We look forward to hearing from you!

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An Inside Look into Collegiate Emergency Medical Services



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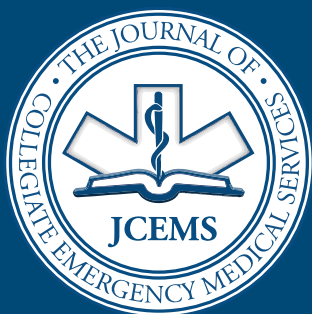
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Advising Resilient Healthcare Teams: An Overview of the Hiring Procedures of McMaster University's Emergency First Response Team (EFRT)

Marion Miguel Antazo, BHSc, EMR; **Marina N. Fonseca**, BHSc, EMR; **Fezan Khokhar**, BSc, EMR; **Mellina J. Solomon**, EMR

Keywords: collegiate-based emergency medical services; hiring, recruitment | **Corresponding Author and Author Affiliations:** Listed at the end of this article

The life of a collegiate EMS provider is unique. Navigating post-secondary education while working long shifts in the prehospital world of complex medical emergencies is undeniably challenging. Treating patients experiencing physical trauma, mental health crises, or sudden medical emergencies requires superb training. More importantly, it demands true resilience to work these often unpaid positions.

Following conversations with student leaders of collegiate EMS teams at a roundtable discussion, at the 2023 National Collegiate Emergency Medical Services Foundation conference, it is clear that the stressful life of a collegiate EMS provider leads to service-level complications. Collegiate EMS leaders reported poor retention levels, which heightens the workload for the remaining service members, thus contributing to burnout. This destructive positive feedback loop also negatively affects patient safety.¹

Collegiate EMS team leaders have employed strategies in attempt to promote retention. Strategies mentioned at the roundtable discussion included balancing hours, demonstrating appreciation, and offering professional development opportunities. However, we believe the most crucial means of promoting retention is hiring providers who are well-prepared for the life of a collegiate EMS provider—those who are highly resilient and capable of growth. McMaster Students Union's (MSU) Emergency First Response Team (EFRT) has curated a multi-step, highly selective hiring process, which boasts exemplary retention rates.

Marion Miguel Antazo, BHSc, EMR is a graduate of McMaster University's Honours Biochemistry program, and is currently a Physician Assistant candidate at the University of Toronto. Marion has served on McMaster's Emergency First Response Team for three years. **Marina N. Fonseca**, EMR graduated from McMaster University's Health Sciences program (BHSc), and is a candidate for McMaster University's Applied Psychology program (BASc). Marina has served on McMaster's Emergency First Response Team for four years. **Fezan Khokhar**, BSc, EMR is a graduate of McMaster University and was on the Emergency First Response Team (EFRT) for 4 years and was the 2023-2024 Program Director. Fezan currently sits on the EFRT advisory board and is a MD Candidate at the University of Toronto. **Mellina J. Solomon**, EMR is the 2024-2025 Assistant Director at McMaster University's Emergency First Response Team and a fourth-year student at McMaster University graduating with a B.Sc in Psychology, Neuroscience and Behaviour. Mellina is in her fourth year with McMaster's Emergency First Response Team.

This paper outlines the hiring process for the 2024 hiring cycle. This paper may not be completely reflective of EFRT's current hiring process as it is dynamic and changes year-to-year in alignment with the administration of that year. Other collegiate EMS teams may replicate or adapt it to reduce retention complications and promote the quality of care provided to the community.

This article outlines our hiring process at McMaster University's Emergency First Response Team (EFRT). Other collegiate EMS teams may replicate or adapt it to reduce retention complications and promote the quality of care provided to their community.

Hiring Process Overview

Our hiring process includes four phases, each described below. See Figure 1 for a hiring flowchart.

Phase 1: Written Application

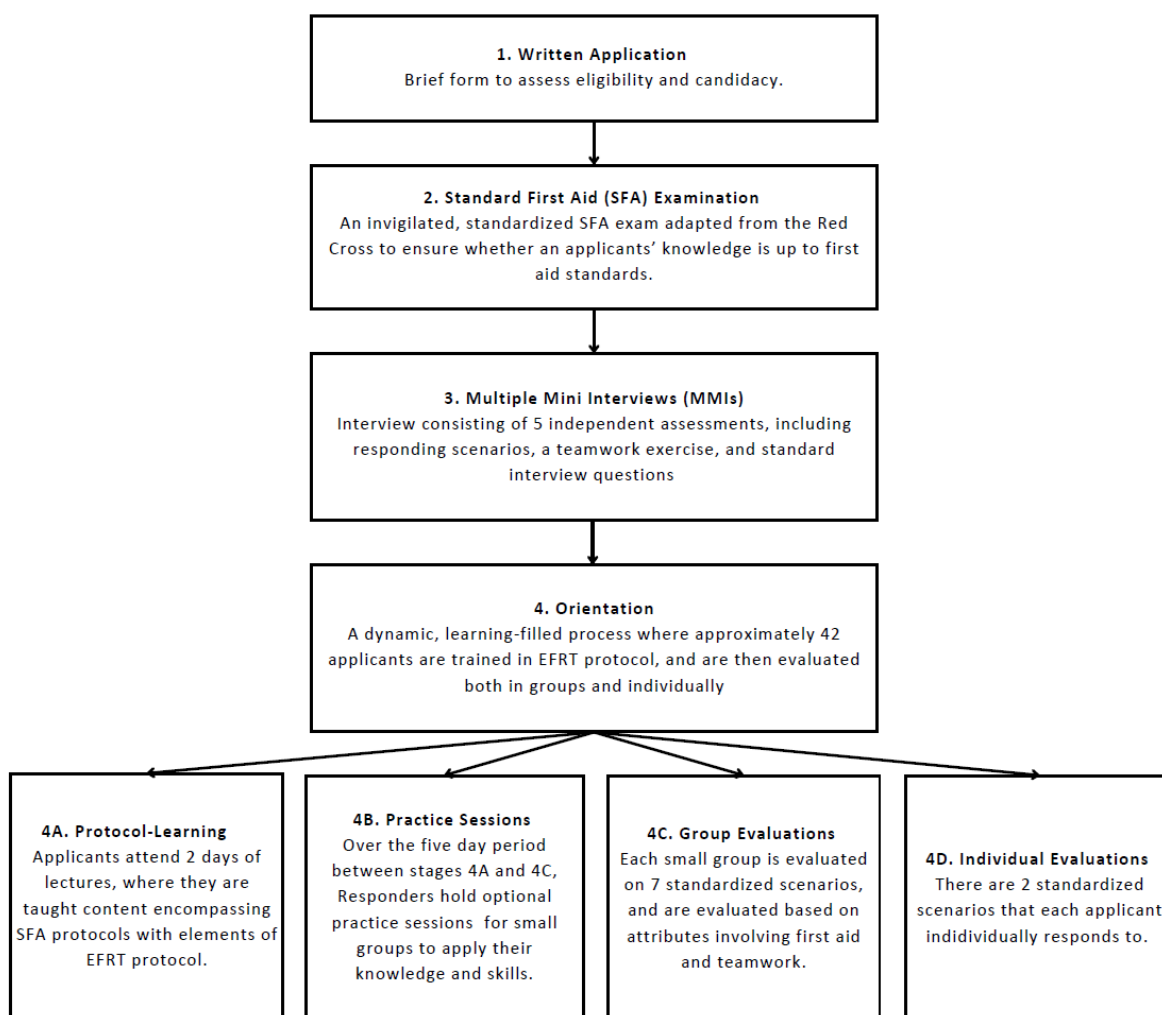
The application process began with an online written application, involving demographic (e.g., program, academic year), eligibility (e.g., full-time student status, certification requirements), and short answer questions. The EFRT requires applicants to hold a valid Standard First Aid (SFA) with CPR-C certification. There is no prerequisite experience necessary. Approximately 90% of applicants advanced to Phase 2, as applicants were only screened out for ineligibility, red flags or evidence of inadequate soft skills as determined by the team.

Phase 2: SFA Written Test

All applicants individually completed a 60-minute SFA written test consisting of 20 multiple choice questions and two situational short answer questions. Multiple choice and short answer questions were created by the EFRT Executive Team. The correct answers to the multiple-choice questions and rubric for the short answer questions was created from the Canadian Red Cross SFA and CPR-C learning standards. The top-scoring 80 applicants were invited to the next phase.

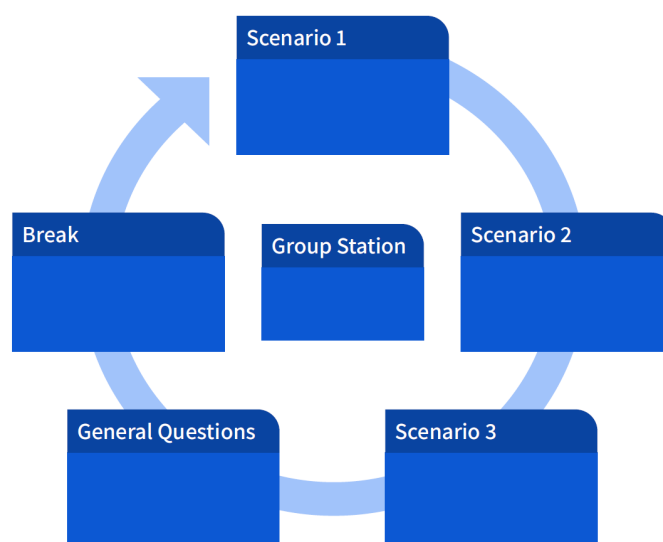
Phase 3: Multiple Mini Interviews (MMIs)

Figure 1: Hiring process flowchart



In MMIs, applicants underwent five interview stations. In each station, applicants were scored based on a standardized rubric that included explicit actions/time limits that would yield a specific score. There were three simulated scenarios involving standardized patients to holistically assess the application of first aid skills alongside soft skills (e.g., active listening, respond empathetically, demeanor). Applicants underwent a “classic interview” with the EFRT Program Director, a student hired by the MSU to manage and oversee all team operations. The interview evaluated their passion for serving the community, and why they want to join the team. For the ‘classic interview’ station, the rubric included, but is not limited to, sections on authenticity, communication skills, and general impressions. Last, there is one group station where the executive team, EFRT responders hired by the Program Director, observed applicants’ teamwork, critical thinking, and problem-solving dynamics. For the group station, the rubric includes, but is not limited to, sections on teamwork, skills/knowledge, communication, and general impression. After the MMIs, the executive team selected approximately 42 applicants to progress to orientation (discussed in-depth in the ‘Selection’ section of the paper). See Figure 2 for a sample MMI schedule.

Figure 2: Sample MMI schedule



Phase 4: Orientation

Orientation included nine days of intensive learning and practicing, giving applicants a glimpse into the nature and workload involved with volunteering on the EFRT. Orientation also allowed the EFRT responders to participate in the holistic evaluation of applicants.

Phase 4A: Protocol Learning (Orientation 1)

Orientation began with a two-day training, colloquially termed 'orientation 1,' which standardizes applicants' knowledge. Orientation 1 consisted of lectures and small group activities teaching SFA, Basic Life Support (BLS), and elements of the EFRT's protocol. Topics include medical emergencies (myocardial infarction, stroke, anaphylaxis etc.), trauma emergencies, and mental health emergencies. The approximately 42 applicants were assigned into small groups of three applicants. Applicants worked with their small group throughout orientation and ultimately completed the group evaluation together. In small group sessions, the EFRT responders with over one year of experience responding on the team clarified lecture content, discussed case studies, performed demonstrations, and delivered practice scenarios.

Orientation 1 equipped applicants with the knowledge and skills needed for their formal evaluations. By incorporating the EFRT's protocol during orientation, we established foundational skills for our future junior responders and test an applicant's ability to learn and apply new information.

Phase 4B: Practice Sessions

Over the five days between orientation 1 and the formal evaluations, responders held optional practice sessions for applicants, which allowed applicants to apply their knowledge and improve their technical skills. Sessions included practice scenarios or skills practice. Responders provided constructive feedback and clarified any misunderstandings.

On the final practice session, applicants could attend one optional executive member led individual practice scenario. The standardized scenario represented the difficulty of the individual examination (Phase 4D) and concludes with the executive member providing the applicant with feedback.

Phase 4C and 4D Group Evaluation Group and Individual Evaluation (Orientation 2)

Final evaluations spanned two days: group evaluations on the first day and individual evaluations on the second. Applicants were expected to demonstrate their growth and learning throughout orientation. Evaluations consisted of simulated scenarios which were similar to Observed Structured Clinical Examinations (OSCEs) seen in various healthcare training programs.²

The scenarios used in the group and individual evaluations were created before orientation. For the group evaluations,

responders were split into seven groups to create a scenario. The Training Coordinator, a member of the executive team, reviewed all scenarios and ensured each scenario was standardized. For the individual evaluations, the executive team created and standardized the scenarios.

The small groups from orientation 1 responded to seven simulated scenarios of varying topics that are taught throughout orientation. Applicants are evaluated on everything they are taught during Orientation 1 including a variety of medical emergencies, trauma emergencies, and mental health emergencies. Group evaluations assess applicants' didactic, practical, communication, and teamwork skills in a high-stress environment. All EFRT responders worked together to evaluate scenarios. Similarly, individual evaluations had applicants respond to two simulated scenarios. Members of the executive team ran the individual evaluations to provide insight into each applicant's skills and knowledge.

Selection Process

Pre-Hiring Training

Before the EFRT's application process began, the Assistant Director and Training Coordinator created a presentation for responders taking part in the hiring process. The Assistant Director is a paid student position selected by an MSU hiring committee who sits on the executive team and is appointed to oversee many processes, one of which is orientation. The presentation taught responders to create practice scenarios with intentions (e.g., practicing BLS skills) and explicit 'must-sees' and 'nice-to-sees'. 'Must-sees' are actions that a responder should meet within a set time limit to complete the scenario successfully. These are often actions that are pertinent to the patient's survival. 'Nice-to-sees' are actions that contribute to a positive patient interaction, but do not change the patient's survival outcome. For instance, in a heart attack scenario, a 'must-see' assessing the need to administer aspirin, while a 'nice-to-see' would be loosening tight clothing. The presentation included a discussion of power dynamics and hiring biases to make responders aware of the existing power dynamic between them and applicants.

Responders are trained on how to make decisions based on evidence and are taught about different types of biases to look out for (e.g., Confirmation Bias, Halo Effect, First Candidate Effect).

Responders are expected to be aware of any Conflict of Interests (COIs) they may have with applicants and are instructed to declare COIs to the Assistant Director. Responders do not evaluate COIs.

Group and Individual Evaluations

The group and individual evaluations are scored objectively. Responders who made the scenario standardize the rubric used for evaluations prior to the event (i.e., it should be clear what criteria make a 1/5 different from a 2/5 score). During the scenarios, each applicant is evaluated on three criteria: skills/knowledge,

communication/teamwork, and patient care. Each criterion is evaluated on a Likert Scale from 0 to 5 (e.g., 0 = unsatisfactory, 5 = EFRT responder level).

For the individual evaluations, applicants were evaluated on a pass/fail basis. There were 4 evaluation outcomes: strong fail, weak fail, weak pass, or strong pass. An applicant were evaluated by comparing their performance to the scenarios' 'must-sees' and 'nice-to-sees.' An applicant's performance in their individual evaluation was compared to their scores from the group evaluations. This is used to understand the applicant holistically (i.e., to ensure they perform well individually in addition to in a team).

Once the scores from both days were compiled, the executive team created a list of the top-scoring 24 applicants. The executive team referred to interviews and written applications when creating the list.

Executive Team Selection Meeting

The executive team selection meeting looked at a combination of the final evaluation scores (indicative of technical skills) and feedback made throughout the evaluations (indicative of soft skills). As seen in the EFRT's 40 years of operations, responders hired off of technical skills alone are likely to respond well at the SFA-level but may not flourish at the Emergency Medical Responder level (in which the EFRT operates). To ensure that the executive team hires applicants that will flourish, a high degree of skills must be demonstrated alongside -soft skills valued by the organization "or maybe" soft skills associated with effective medical professionals. Questions asked during this meeting could include things like:

- Who is most likely to be able to provide optimal patient care?
- Who is most likely to adapt to EFRT clinical practices?
- Who will be committed to training and the time commitment of EFRT?
- Who is open to constructive feedback?
- Who fits the Emergency Medical Responder role while demonstrating strong resiliency?

This meeting culminated to picking 14 applicants to be hired onto the team. Two applicants were put on a waitlist in case of declined offers.

Inclusive & Equitable Hiring

In an umbrella review by Gomez and Bernet, patient outcomes improve with diverse healthcare teams.³ The EFRT recognizes that being a group of diverse responders helps provide optimal care for patients. Introduced in 2023 to promote inclusive and equitable hiring, the EFRT has included a self-disclosure section on the written application for applicants to disclose their status within a marginalized community. Disclosures are not mandatory. Applicants can choose when and if they make a disclosure.

Disclosures can be made at any time during the hiring process to any member of the executive team and disclosures are kept confidential, within the executive team.

Self-disclosures do not put applicants at any disadvantage during the hiring process. Rather, self-disclosures may be factored in at points in the hiring process where decisions must be made regarding a tie between applicants. For example, when choosing applicants to progress to MMIs after the written test, if two applicants scored the same, the executive team may choose to pick the applicants that reflects McMaster University's commitment to building an intersectional inclusive community.

Admission and Retention

Admission into the EFRT is competitive, with an average acceptance rate of approximately 8.5% over the past four years. Approximately 90% of the total applicants who submit a written application are invited to the SFA test, and from there, approximately 52-70% of applicants are invited to the MMIs. After the MMIs, approximately 50% of applicants move on to orientation. The hiring process concludes with 12-14 applicants selected each cycle. See Table 1 for a breakdown of applicants at each stage, including data spanning the past four years (2020-2023).

The EFRT has retention rates ranging from 93-100% in junior cohorts (within the first year of responding), and 83-100% in senior cohorts (the remainder of their time on the team prior to graduation). In our opinion, we attribute our team's high retention to the success of the orientation process, which is two-fold in its realistic portrayal of our responsibilities and commitment as a responder, and its accuracy in identifying individuals with substantial potential as a responder, encompassing both in their soft skills and first-aid proficiency. Firstly, despite the time investment demanded from both applicants and current responders, we believe that the high degree of dedication and time commitment required from applicants accurately portrays what is required of a

Table 1: Admission & Retention

Year	2020	2021	2022	2023
Total Applicants (n)	Data not available	136	171	170
Standard First Aid Examination (n)	127	125	155	143
Multiple Mini Interviews (n)	88	84	80	75
Orientation (n)	36	42	42	42
Offered Position (n)	12	12	14	14
Accepted Position (n)	11	12	14	14
Junior Retention (n, % of accepted)	11, 100%	12, 100%	13, 92.86%	14, 100%
Senior Retention (n, % of accepted)	11, 100%	10, 83.33%	13, 92.86%	Data cannot be assessed until 2025

Note: Retention is defined as the Responders who remained on the team. Responders not retained included both those who were terminated and resigned.

collegiate EMS responder. As such, the successful applicants are those who demonstrate dedication and time to practicing and improving their skills. Furthermore, given the comprehensive nature of our five-stage evaluation process, our team believes we possess ample insight into the applicants to comprehend their potential as a responder. See Table 1 for a breakdown of retention rates, including data spanning the past four years (2020-2024).

Conclusion

MSU EFRT has established a comprehensive and highly selective hiring process to ensure junior responders are resilient and well-prepared to handle the demanding nature of collegiate EMS. Using a multi-phase selection method, we identified applicants with the necessary technical and soft skills. We strongly believe that this method enhanced the quality of care provided to the community and contributed to the EFRT’s exemplary retention rates. Other collegiate EMS teams facing retention challenges may find it useful to adopt or adapt our hiring process to build a team of resilient responders that can withstand the demands of their role.

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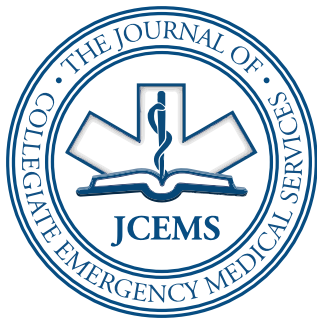
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Pass The Torch to Decrease Healthcare Burnout

Reagan Bessinger Williams, BS, AEMT

Keywords: collegiate-based emergency medical services; burnout | **Corresponding Author and Author Affiliations:** Listed at the end of this article

Burnout. A label that is all too familiar in healthcare.

Familiar as it may be burnout does not extinguish a person's flame all at once. Rather, burnout works slowly, as if dimming a flame that once burned brightly. Each of us starts our work with a passionate flame, fueled by our inner fervor and enthusiasm. Yet, when not properly tended, our flame slowly withers away, leaving behind only a faint trace of what once was. We see burnout in our colleagues, hear about burnout in late-night conversations, and feel burnout slowly closing in on our own careers. Though it surrounds us all, no one expects their flame to wither away—until, all too often, it's too late.

Many people go into healthcare with a deep desire to help others in life's most challenging moments. And it's true: saving lives is incredibly fulfilling. But as we settle into our routines like any other job, whether we're in the back of an ambulance or inside the sterile walls of a hospital, it's easy for that once-burning passion to begin to dim. The excitement that used to fuel our marathon shifts can devolve into a sense of routine rather than purpose. The question isn't whether burnout will come; it's when. So, when it does, how do we reignite the flame that brought us into this work in the first place?

Take my first partner on the ambulance, Matt, for example. Matt's a seasoned paramedic with 15 years' experience. Through navigating emergencies in downtown Atlanta, he had mastered his skills—but I could sense the job had become routine, and his passion had started to fade. However, when Matt's old partner retired, and he got paired with me—the new guy—I soon realized that my excitement to learn would spark his desire to teach.

Fresh out of Advanced Emergency Medical Technician (EMT-A) school, I was full of enthusiasm yet lacked any experience with the basics. Skills as simple as obtaining intravenous (IV) access, reading electrocardiograms (ECGs), performing high-quality cardiopulmonary resuscitation (CPR), or administering naloxone seemed like I was moving mountains at first. Yet, Matt was there to guide me through these challenges, offering support and insight that helped me grow. And each time I improved, I noticed something in him: a renewed flame.

Reagan Williams, BS, AEMT is a third-year medical student at Mercer University School of Medicine. After graduating from the University of Georgia, Reagan went to work for Grady EMS in Atlanta, GA as an Advanced-EMT. After an exciting couple of years, Reagan became eager to continue his studies and returned to school to pursue a degree in medicine. He is a husband and proud father, living with his family in Savannah, GA, while striving to achieve his professional aspirations and contribute to his community along the way.

As Matt passed me the torch of his expertise, my path forward was illuminated. I quickly went from fumbling through emergency calls to taking initiative in complex situations. After each call we responded to, Matt would give me his feedback on how I could've done better or take the time to show me his tips and tricks to refine my technical skills. As a result, with each call we went on, I learned to proceed with more ease and better execution. And over time, we both began pushing each other to continue learning and growing in how we helped patients. Not only did our multi-system trauma calls become highly efficient, but we even began reading medical journals together and exploring new ways to vagal maneuver patients out of cardiac arrhythmias. I began to see us as a 'well-oiled machine'—or, as I'd now put it, a 'well-kindled fire'.

After seeing how passing the torch revitalized Matt's career, I couldn't help but wonder how I, too, would feel about teaching one day. Though I'm still early in my career, I've seen how burnout can creep up on anyone, even in the first few years. Watching Matt rediscover his passion made me realize that teaching and passing on what we know can be a key to keeping that flame alive—for all of us, no matter where we are on our journey. As if keeping a flame in isolation restricts any opportunity it would've had to grow.

Later, when I had the opportunity to go back to school and study medicine, I didn't want to wait years to finally have this chance to teach. Instead, I applied to the local technical college and became an EMT instructor, helping to teach night classes to all the aspiring EMTs. During these classes, even while running through the basic steps of IV access on a manikin's arm, I saw the same passion in my students' eyes that I had when I was in their shoes not long ago. It reminded me just how powerful teaching can be, not only for the student but for the instructor, too.

After years on the job, it's easy for the flame to not feel as bright as it was when you first began. And when we operate in isolation and don't make room for other fuel sources to build us up, our passion can burn out. So, the fastest way to rekindle your flame? Teach. Pass the torch. Pair up with someone new to the field, and you'll rediscover the depth of your expertise and how fulfilling it is to build someone up. Skills that have become second nature to you will be eye-opening to beginners. Watching fresh EMTs struggle through the basics will remind you of your own journey—one in which you drew upon different fuel sources to learn and grow along the way. And most importantly, you can remember the spark that drove you to this work in the first place.

My challenge to you is simple: make the effort to teach. Whether

you're an EMT, nurse, physician, or in any other field, pass on the torch of knowledge you've gained. Look for opportunities within your role to train the new person, share your tips with someone who's struggling, or suggest ways your team can improve its productivity. What do you have to lose? At worst, you'll remain where you are. But at best, you'll rekindle the fiery passion that first led you to this career—through the excitement and fresh perspective of someone eager to learn. And just maybe, you'll reignite your own flame to bigger than what it was when you first began.

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Compassion Meditation to Improve Psychological Well-being Among Volunteer Collegiate Emergency Medical Technicians

Sayli Sonsurkar EMT-A, BS; Arri Eisen, PhD; Erin Bauer, MPH; Ishani Vyas, BS; Nicholas A. Giordano, PhD, RN, FAAN; Jennifer S. Mascaro, PhD

ABSTRACT

Background: Student volunteer EMTs in collegiate-based emergency medical services (CBEMS) agencies deliver life-saving care under significant physical and psychological stress. Their dual status as students and EMTs places them at risk for psychological distress. **Objectives:** CBCT (Cognitively-Based Compassion Training), an evidence-based analytical meditation intervention that combines attention stabilization with compassion cultivation, is a potential effective and safe intervention. **Methods:** This randomized; waitlist-controlled longitudinal pilot study investigated CBCT's potential to improve CBEMS provider well-being. Semi-structured interviews (n=5) and short recorded audio prompts (n=13) were conducted to elucidate agency level and interpersonal factors and resiliency. EMTs were randomized to CBCT (n=8) or waitlist (n=17). Feasibility, acceptability, and perceived benefit were examined. Participants completed self-report measures of burnout, compassion satisfaction, secondary traumatic stress, perceived stress, and compassion malleability pre- and post-CBCT. **Results:** Participants discussed excessive rumination, difficulty transitioning between school and work, and empathic entanglements from treating peers. We found participants randomized to CBCT reported a significant increase in compassion malleability ($p=.003$), as well as a strong trend towards reduced burnout ($p=.05$). **Conclusion:** This mixed-methods study indicates that CBCT is effective in improving well-being among CBEMS providers and yields insights into improving conditions for other providers and patients.

Keywords: collegiate-based emergency medical services, meditation, psychological well-being

Corresponding Author and Author Affiliations: Listed at the end of this article.

On many campuses across North America, collegiate-based emergency medical services (CBEMS) organizations provide emergent prehospital care to their communities. CBEMS agencies typically involve staffing by student volunteers, with oversight from campus health systems, campus safety departments, or student government bodies.¹ CBEMS organizations evolved greatly in the last twenty-five years, with new organizations established every year.² CBEMS

agency capacities differ by agency, with some providing only first responder care, while others own and operate multiple transport vehicles.¹ Providers in these organizations range from those certified as a Basic EMT to Advanced EMT to the Paramedic level. CBEMS agencies also typically take part in standby operations for special events and gatherings on campus, as well as community outreach safety events.

Although approximately 90% of four-year public and private colleges rely on jurisdictional EMS agencies via local 9-1-1,³ CBEMS programs have proliferated,¹ with growth due in part to several advantages that these agencies afford. First, college campuses are wide-ranging communities, filled with thousands of students, faculty, staff, and visitors of all ages, and campus safety and preparedness organizations must devise robust measures to ensure safe practices and preventative measures. CBEMS organizations provide advantageous complementary capabilities, such as rapid response times, easy integration into campus gatherings and events, and learning opportunities for students.¹ Providers also often have a heightened understanding of campus intricacies and layouts, resulting in a more efficient response.

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Furthermore, CBEMS providers have the distinct ability to offer peer-to-peer support and to establish a strong foundation in the subsequent chain of medical care.⁴ This can be advantageous in mental health crises, as students may feel more comfortable speaking with a CBEMS provider as opposed to a local non-campus EMS provider.⁵

Despite the growth of CBEMS on college campuses and the vital role they play in acute care, very little research has examined the well-being and mental health needs of student CBEMS volunteers. However, there are several lines of existing research to indicate that student CBEMS volunteers are at risk for mental health concerns. First, EMTs typically face significant physical and psychological stressors and frequent exposure to traumatic events, but often have little to no time for reflection or closure. CBEMS providers must additionally balance this already grueling profession with the demands and rigor of a college education. Their dual status as both college students and EMS personnel may place them at greater risk for psychological distress. In addition, CBEMS providers face the added affective component of responding within their own community and for their peers. A national survey of 474 CBEMS providers showed 32% self-reported depression and 20% reported thoughts of self-harm.⁷ In comparison, the prevalence of depression in college students as a whole reported by studies with varied methodology ranges from 7% to 17%.⁷ Additionally, 33% reported not feeling comfortable with seeking help for themselves.⁷ In systems where mental health services are available, less than 40% of individuals from the general population that experience mental health symptoms seek help.⁸ This rate is expected to be even lower among first responders because of a culture of strength and self-reliance.⁹ Furthermore, maladaptive coping techniques, such as emotional distancing, gallows humor, and repression have been observed among single-status EMTs (non-college student).⁶ These studies taken together demonstrate that CBEMS providers may be at high risk for the development of mental health disorders compared to their non-provider peers and may have unique support needs to bolster resilience and well-being. Yet, direct correlations between dual-status CBEMS providers and single-status college student counterparts is difficult due to limits in scope of CBEMS provider surveys.⁷

Although research on the mental health of CBEMS providers is sparse, there is extensive research documenting the mental and occupational health symptoms experienced by those in helping professions who are exposed to high stress and suffering of others. Routine exposure to high acuity, critical incidents can take a significant toll on providers' well-being, placing them at high risk for psychological factors such as burnout, secondary traumatic stress, and compassion fatigue. High workload, systematic frustration, and exhaustion can lead to burnout.¹⁰ In addition to burnout, secondary traumatic stress (STS) can arise when the act of witnessing and helping others through their trauma causes a unique kind of psychological distress for the helpers.¹¹ STS refers to the psychological symptoms gained through exposure to another individual suffering a certain trauma or extreme stress.¹² In addition, empathic entanglements – the synchronization of

emotional states between people-- , may be more common in CBEMS populations due to their peer-to-peer nature. This in turn may place providers at risk for compassion fatigue , a state in which one has exhausted their capacity to care for another.¹³ The concept of compassion fatigue has gained traction in the last two decades, though some argue that there is more research needed into how compassion presents in health care to generate a more evidence-based patient-informed definition of both compassion and compassion fatigue.¹⁴

To address the vital need for evidence-based approaches to mitigate stress and bolster resilience among CBEMS providers, this study introduces and evaluates the feasibility, perceived benefit, and efficacy of a compassion-based meditation protocol in a CBEMS agency at a mid-sized Southern liberal arts research university. Cognitively Based Compassion Training (CBCT) is based on Indo-Tibetan Buddhist *lojong*, or mind training, practices and was adapted to be accessible to those of any or no faith tradition.¹⁵ Previous studies have found that CBCT practice leads to a reduction in stress and lower cortisol levels, decreased inflammatory response, and increased adaptability to cortisol surges from social stress among college students.¹⁶ CBCT has also been associated with decreased depression and greater empathic accuracy and has been employed for diverse groups, from breast cancer survivors that reported lower depression and increased psychological functioning, to fostered adolescents that showed increased hopefulness, to increased self-compassion in a population of African American suicide attempters.^{17–19,19–22}

Toward the ultimate goal of addressing the mental health needs of CBEMS volunteers, we used a mixed-method approach to address several aims: (1) to characterize the specific needs of the population, given there is limited research on CBEMS organizations; (2) to evaluate the feasibility, acceptability, credibility, and expectancy of CBCT for college student EMTs; and (3) to examine the effectiveness of CBCT for improving participant psychosocial well-being.

Methods

Design:

This pilot randomized; waitlist-controlled longitudinal pilot study investigated how CBCT may improve psychological well-being among volunteer collegiate EMTs. Initially, semi-structured interviews (n=5) were conducted with a subset of participants prior to randomization to elucidate the prehospital environment and agency level factors exacerbating stress and bolstering resilience. Participants also responded to short open-ended prompts (n=13) about their interactions with patients and inter and intra-agency providers. Audio responses were transcribed verbatim and analyzed using thematic coding. Next, CBEMS providers were randomized to either receive CBCT training or be placed on a waitlist. CBEMS providers (N=25) completed self-report measures of burnout, compassion satisfaction, secondary trauma stress, perceived stress, and compassion malleability

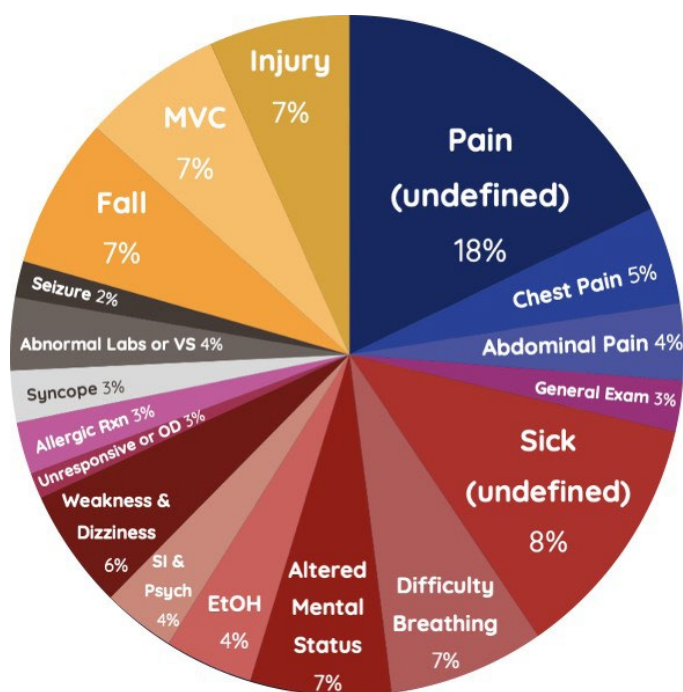
(described below). All study participants completed self-report measures prior to (Time 1) and within two weeks after completion of CBCT (Time 2). EMTs randomized to CBCT also completed post-CBCT self-report measures about perceived benefit and adherence to practice.

Sample and Setting:

Following approval from the Emory University Institutional Review Board, participants were recruited from a CBEMS agency. All CBEMS providers at our institution were eligible. Participants were recruited via email and posted flyers. All participants were active EMT providers with the CBEMS agency, were 18 years of age or older, and all provided informed consent to participation. There were no exclusion criteria. Participants received a \$10 gift card for completing each assessment (up to \$30 total).

Emory Emergency Medical Services (EEMS) is a volunteer CBEMS organization, operated by students, with oversight from Emory's Office of Critical Event Preparedness and Response. The agency, established in 1992, provides emergency medical care to Emory University students, faculty, staff, visitors, and the surrounding community. Previous agency call history includes anaphylaxis, drug overdose, cardiac arrest, motor vehicle collisions, behavioral health crises, and more (see Figure 1). EEMS also works standby for several large events such as concerts, marathons, and ceremonies on campus, as well as in the greater city. In addition, EEMS offers educational workshops, such as bystander CPR training. Internal data from EEMS reports from the year the intervention was offered

Figure 1: Emory EMS Call History Fall 2023
Internal data from Emory EMS shows call distribution by patient chief complaint in Fall 2023



showed that 30% of the agencies calls occurred on campus, 33% at a nearby senior living center, and 35% off campus. In addition, 28% of calls involved young adults, 29% adult, 38% geriatric, and 4% pediatric cases.

Randomization and Blinding:

EEMS EMTs were randomized to receive CBCT or to a wait-list comparison group using the RANBETWEEN function in Excel, so that roughly equal numbers of providers were in each group. Eligible participants randomized to CBCT were then contacted, and individuals were taken off the waitlist in random order and invited to CBCT one by one, if spots opened. An a priori power analysis was not done, all CBEMS providers were recruited for this pilot study. Study participants were blind to group assignments at Time point 1. Research personnel were also blinded during all data collection and analysis. The CBCT group included 8 participants, and the waitlist group had 17 participants.

Cognitively Based Compassion Training Course Delivery:

CBCT is composed of a foundational practice and six integrative modules that build upon each other to promote resilience, compassion, and well-being.¹⁵ Each module also incorporates a meditation exercise, known in CBCT as a “contemplative practice,” as the primary training approach.¹⁵ The practices and exercises employed in CBCT are regarded as “cognitive” or “analytical” meditation – which refer to a process of arriving at personal insights through mental investigation.¹⁵ This differs from practices that primarily focus on somatic experiences of compassion -- such as heart warmth, tingles, or other caring sensations.²³ CBCT instead uses cognitive reappraisals and mental retraining to restructure perspectives and actively cultivate traits such as empathy, impartiality, and compassion.²³

CBCT is traditionally taught once a week over the course of 8 weeks. For this study, we tested a novel 4-session abridged online version of this training that, in terms of time commitment, was thought to be more feasible for these providers. CBCT courses were taught by two trained and experienced CBCT instructors. CBCT instructor training consists of a 1-week retreat and workshop, 8-week seminar, and 10-week supervised teaching session. Participants in this study met once a week on Zoom for 75 minutes.

Qualitative Measures:

Semi-structured interviews

All study participants were invited to participate in semi-structured interviews about their experiences in EMS and with the chosen CBEMS agency prior to randomization. Participants indicated interest in being selected for an interview. Participants were randomized and selected till saturation. Participants were interviewed one-on-one on Zoom during a time convenient for them. Interviews lasted 15-20 minutes and were conducted by

a trained research facilitator using a semi-structured interview guide. Interviews were done prior to randomization to evaluate the EMS environment and factors contributing to stress and/or resilience. Participants were asked about their thoughts on the EMS agency, existing support avenues, and how they balance EMS with their college education. Each interview was audio-recorded and transcribed verbatim. Transcripts were also anonymized and cleaned. A codebook was developed of overlapping and emergent themes. All interview transcripts were coded in MAXQDA and queried by two independent coders.

Recorded Prompts

All participants were also asked to answer questions regarding their experiences with patients and inter- and intra-agency providers at Time 1. Participants were asked to record their answers on Qualtrics online platform. Recordings were stored within Phonic ai (<https://www.phonic.ai/>) platform and transcribed verbatim. An inductive codebook was developed to thematically code the transcripts. Transcripts were coded by two independent coders with discrepancies resolved by a third independent coder.

Quantitative Measures:

Self-Report

Quantitative self-report measures were completed by participants at both Time 1 and Time 2 using Qualtrics online platform. Pre-randomization all participants completed the meditation background survey (5-item questionnaire that examines participants background in meditative practices and views on it) and Interest in CBCT survey (6-items using Likert scale to assess interest in CBCT). At both time points all participants completed the compassion malleability beliefs scale (8-items using Likert scale from 1-7 to measure belief in malleability compassion with higher scores indicate greater belief that compassion is a malleable skill that one can develop over time),^{24,25} the Professional Quality of Life version 5 (ProQOL) scale (a 30-item inventory that addresses compassion satisfaction, burnout, and compassion fatigue),¹¹ and the Perceived Stress Scale – 4 (PSS-4) (a four-item scale measuring the degree to which situations in one's life are considered stressful).^{26,27} At time 2, post completion, the CBCT group completed the Intervention Credibility and Expectancy Questionnaire (15-item questionnaire exploring the perceived benefit, applicability, and feasibility of CBCT).²⁸

Statistical Analysis

Quantitative analyses were conducted using Statistical Package for the Social Sciences (SPSS) software (version 29.0 for Mac, SPSS, Inc., Chicago, IL, United States) and Statistical Analysis System (SAS). Normality was evaluated using the Shapiro-Wilk test. Descriptive statistics were evaluated in SPSS. Paired and independent t-tests assessed the differences between time points for each group. Effect size was evaluated with Cohen's d point estimates of effect sizes. Analysis of variance (ANOVA) using PROC MIXED was done in

SAS to evaluate group-by-time interactions. PROC MIXED was selected for its ability to use all available data to model correlation structure between measurements and because PROC MIXED has been shown to be a more conservative approach compared to other analysis techniques for repeated measures analysis.²⁹ For any variable demonstrating a significant group-by-time interaction, we examined whether changes in that variable were correlated with CBCT practice time using spearman's rho correlation analyses.

Results

The social and demographic characteristics of participants in the trial (N=25) are presented in Table 1. The average participant age was 20.8 (SD= 0.94). Most participants identified as women (64%), 32% as men, and 4% as non-binary. Experience in the health care field ranged from less than a year to 4 years. Around a third of participants (32%) identified as White, 4% as Black or African American, 60% as Asian, and 4% as other. Chi-squared analysis showed that there was no significant difference between CBCT and waitlist group demographic criteria.

All participants were asked about their level of interest in learning CBCT prior to randomization. Eighty percent of participants agreed that they were interested in learning CBCT to improve their work with patients, 76% agreed that they were interested in improving their mental health, 60% agreed that they were interested in learning to improve their physical health, 76% agreed that they were interested in learning to improve their personal relationships, 68% agreed that they were interested in learning to help manage their stress, and 76% agree that they were overall

Table 1: Sociodemographic Characteristics
Sociodemographic data of participants by full sample, treatment group, and wait-list group reported

Baseline characteristic	Full Sample	Treatment	Wait-list
Gender			
Woman	16(64%)	4(50%)	12(70.6%)
Man	8(32%)	3(37.5%)	5(29.4%)
Non-binary	1(4%)	1(12.5%)	0(0%)
Sex			
Male	8(32%)	3(37.5%)	5(29.4%)
Female	17(68%)	5(62.5%)	12(70.6%)
Age			
18	1(4%)	1(12.5%)	0(0%)
19	1(4%)	0(0%)	1(5.9%)
20	5(20%)	1(12.5%)	4(23.5%)
21	13(52%)	3(37.5%)	10(58.8%)
22	5(20%)	3(37.5%)	2(11.8%)
Years in Healthcare			
Less than a year	1(4%)	0(0%)	1(5.9%)
1	7(28%)	2(25%)	5(29.4%)
1.5	3(12%)	1(12.5%)	2(11.8%)
2	9(36%)	4(50%)	5(29.4%)
3	4(16%)	1(12.5%)	3(17.6%)
4	1(4%)	0(0%)	1(5.9%)
Race			
White	8(32%)	3(37.5%)	5(29.4%)
Black or African American	1(4%)	0(0%)	1(5.9%)
Asian	15(60%)	5(62.5%)	10(58.8%)
Other	1(4%)	0(0%)	1(5.9%)
Hispanic or Latino			
Yes	1 (4%)	1(12.5%)	0(0%)
No	24(96%)	7(87.5%)	17(100%)

very interested in learning CBCT.

Both the semi-structured interviews and short recorded audio prompts highlighted key aspects in the EMS environment related to students' stress and resilience. Semi-structured interviews focused on agency and position level factors contributing to stress and resilience. Representative codes and counts from key themes that emerged in the semi-structured interviews are shown in Supplemental Table 1. Key themes included systemic issues, lack of control, difficulty treating peers, transitioning between school and work, and avenues for improvement. One quote from these interviews really highlights challenges CBEMS providers face:

One call that I had difficulty processing came out as a cardiac arrest for an Emory student. The student was dead on arrival...the patient's mother had called the ambulance, and it was very hard to watch the family realize their son had died. And then also know that we were the ones who had to tell them this. Fortunately, my supervisor was on scene but after that call um I remember we had an extended debriefing with not only the supervisor on shift but also the director of EEMS and with the entire crew that was involved...a call that's like this obviously has you thinking about things after the shift and it kind of shocks you. This call it wasn't my first DOA, but it was my first DOA where I had to see the family um go through the initial stages of shock and grieving.

This quote portrays challenges that are relatively unique to CBEMS volunteers that other EMTs may not commonly encounter. Participants also noted potential stressors such as working amidst systemic issues in a system that "is just so broken", not following continuity of patients and being unaware of patient outcomes, having trouble transitioning between their roles as an EMT on campus and as a student on campus, and challenges of balancing rigorous coursework with long, busy shifts. Participants noted that they would like to see more avenues for supporting their well-being from the agency level:

Sometimes I do feel like there's not the best support in terms of difficult calls. It's gotten better this past year, but when I first joined, there wasn't that much conversation when difficult calls came up and support outside of working. I think a little bit of it is the culture. There's a lot of students just who are pre-med in general, who I just don't think are as affected by seeing some things that would be difficult for others.

Participants also described positive aspects of their profession and the agency that could be potential points of resilience. They noted helping patients and their community, pre-professional interests, diverse exposure to different kinds of patients, environments, and situations, connecting with patients in a deeper sense, as well as the friendship and strong sense of community and similarity they find in their agency. They also noted unique advantages such as being able to better connect with their patient population due to their

status as a CBEMS agency. Short, recorded audio prompts focused on individual connections that were associated with student stress and resilience. Representative codes and count from select themes that emerged in the short, recorded audio prompts are shown in Supplemental Table 2. Participants here likewise expressed factors that are potential stressors such as emotional trauma from treating peers and maladaptive coping mechanisms such as avoidance. Participants also noted challenging patients that made it difficult to care for them both physically and emotionally. Participants described challenges with other providers from within the agency and from other agencies from differences in opinions on care practices. Some participants also described the effect of high stress on their ability to provide optimal care:

I feel like all my all my training, my ABCs and everything flew out the window as I wanted to give definitive care because I could tell that she was in stress, and I wanted to like help her and like make it better.

Points of resilience were also evident in participants' interpersonal connections. Helping others and forming deeper patient interactions were key aspects potentially promoting their resilience. One participant described one connection with a patient:

It was clear that she just kind of needed someone to be there for her. I remember at one point she reached out and grabbed my hand and like held my hand and that was really adorable because it was a really nonclinical way that I could like you know, be there for her. And I just remember feeling so good that I was able to answer her questions and be the person that she could look up to and know she was safe with.

Overall participants also expressed introspective behavior, often advocated for more compassionate behavior, and were deeply motivated towards improvement.

In terms of CBCT acceptability, participants who were randomized to CBCT were asked about the perceived benefits of the meditation intervention. All of the participants (100%) reported that they felt more encouraged to be compassionate with themselves. All participants (100%) also felt that as a result of CBCT they were encouraged to be compassionate with their teams. 86% felt they learned more about their team members and 57% reported that they felt more connected to their team members as a result of CBCT training. Participants were also asked specific questions regarding the credibility and expectancy of CBCT. 86% felt that CBCT was able to reduce burnout and other negative feelings, 86% would recommend it to a friend, 86% felt CBCT improved well-being generally, and 72% felt more connected to others and less burned out. 86% felt the program was logical. Since this course was delivered in a novel online format, participants were also asked how they felt about the delivery. 29% of participants reported they would have preferred to meet in person and 57% of participants reported they preferred online. The course appeared to be feasible

for participants, given their attendance and meditation practice frequency. 85% of participants attended all or missed only one session total. 100% of participants reported practicing meditation outside of sessions.

Lastly, the efficacy of CBCT to improve specific psychosocial parameters was evaluated. Shapiro tests indicated that the difference in self-report measures from time 2 to time 1 did not show evidence of non-normality. Independent samples t-tests indicated that there was no significant difference in means between the waitlist group and CBCT group at Time 1, indicating that randomization was successful.

Paired t-tests revealed a main effect of time within the CBCT group for compassion malleability ($t(17) = 2.58, p < .05$ and a strong trend towards significance for burnout ($t(17) = 2.65, p = .05$) (see Table 2). Specifically, there was a significant increase in compassion malleability and decrease in burnout. Paired t-tests also showed a main effect of time within the wait-list group for compassion malleability ($t = 2.44, p = .03$) and PSS stress ($t = 3.14, p = .01$). Effect sizes of paired and independent t-tests are reported in Table 2. Repeated Measures ANOVA using PROC MIXED revealed significant group-by-time interactions for compassion malleability ($F = 15.13, p < .001$). There were no significant group-by-time interactions for compassion satisfaction, burnout, secondary traumatic stress, or stress. The observed reduction in burnout was also associated with CBCT practice. Correlation coefficients from spearman's rho correlation analysis also indicated that participants with greater practice time, across both the treatment and waitlist groups, were associated with lower burnout ($r(23) = -.86; p < .05$).

Discussion

This mixed-methods, interdisciplinary pilot study investigated stressors and points of resilience experienced by CBEMS providers, as well as feasibility, acceptability, and efficacy of CBCT in promoting psychosocial well-being. Overall, we found that participants randomized to CBCT had an increase in compassion malleability and reduction in burnout. We also found that this

reduction in burnout was associated with CBCT practice time.

Given that this was a pilot study, we investigated participants' perceptions of the benefits of CBCT. Specifically, participants were queried regarding feasibility, acceptability, credibility, and expectancy. Interestingly, participants showed greatest interest in CBCT for helping their patients. This level was even higher than their interest in CBCT for their own benefit, highlighting their character. Participants overall had high interest in learning CBCT at the outset of the study and reported after the course that CBCT reduced burnout and other negative feelings, improved well-being generally, was logical, and that they would recommend CBCT to a friend. 100% of participants also reported that as a result of CBCT they felt more encouraged to be compassionate with themselves and their team members, indicating that they thought CBCT was beneficial and feasible. Since this course was delivered in a novel virtual format, participants were also asked about their thoughts on it. Participants had varying opinions on the delivery format, which may indicate that offering both in-person and online options may be important to meet everyone's needs.

Semi-structured interviews and short recorded audio prompts provided insight into the nature of CBEMS EMTs and highlighted ways in which CBCT could apply. Semi-structured interviews revealed agency and role level stressors and points of resilience. Specifically, helping patients and community, pre-professional interests, agency support, and collegiate EMS advantages were some aspects of resilience seen unique to these agencies. Interviews also revealed stressors at this level, emerging from systemic issues, absence of patient continuity, difficulty treating peers, challenges transitioning between school and work, and changes needed to agency education and practice. The short, recorded audio prompts further revealed stressors and points of resilience at the interpersonal level meaning having to do with their patients or other providers. Here we see points of resilience such as introspection and examining one's actions and responses, motivation to improve, helping others, and deeper patient interactions. Yet, we also see emotional trauma, mistake making, and difficulties with inter and intra- agency providers.

Table 2: Self Report Survey Measures Effect of Group and Time

Table reports treatment group time 1 and time 2 means with standard deviation. Paired t-test for treatment group displays effect of time on outcome. Findings from the wait-list group are also displayed. Post-treatment (Time 2) independent t-test displays the effect of group on outcome. PROC MIXED group-by-time interaction also reported

Outcome Variable	Treatment Group					Wait-List Group					Post-treatment t-test			Interaction	
	Time 1	Time 2	t	p	d	Time 1	Time 2	t	p	d	t	p	d	F	p
ProQOL compassion satisfaction	39.5(4.2)	40.8(4.9)	-0.93	.39	-.38	39.6(6.7)	38.9(7.0)	0.53	.61	.17	.83	.42	.40	1.42	.24
ProQOL burnout	24.2(3.9)	20.8(5.4)	2.65	.05 [#]	1.1	23.0(4.2)	22.7(4.6)	0.30	.77	.10	-.60	.56	-.30	3.62	.07
ProQOL secondary trauma stress	23.5(3.1)	20.3(4.1)	1.86	.12	.76	23.5(6.4)	21.9(4.2)	1.42	.19	.45	-.70	.50	-.34	1.03	.32
Compassion malleability	40.1(4.5)	45.1(5.8)	-2.58	.04 [*]	-.97	42.1(3.7)	38.7(4.2)	2.44	.03 [*]	.77	2.7	.02 [*]	1.3	15.13	<.001 ^{**}
PSS Stress	7.3(3.0)	5.0(3.3)	1.94	.11	.79	7.7(2.2)	5.9(2.3)	3.14	.01 [*]	.99	-.70	.50	-.34	0.02	.88

[#]p = .05, ^{*}p < .05, ^{**}p < .001

Participant responses also illuminated potential beginnings of burnout, reduced interest in work, compassion fatigue, stress, and more that could become larger issues over time if not acted upon. Providers recounted calls that were emotionally traumatic, describing how they often fixated on scenarios and got “flashbacks” from high stress events. They also pointed out occasions when challenging providers, patients, and scenarios resulted in them or their peers not performing optimally. Reflections that emerged in the qualitative interviews also helped with interpreting the reduction in compassion malleability seen in the control group. Persistent exposure to these stressors without avenues for well-being could further lower compassion malleability. Semi-structured interviews and short recorded audio prompts along with self-report data provided a holistic understanding of this unique, understudied population, and support the idea that interventions to improve resilience will be important to entrain the resilience necessary with such a stressful role.

In fact, the data from this study indicates that CBCT is effective for entraining such resilience. Participants randomized to CBCT reported significant increases in their belief in compassion malleability. This is consistent with other studies that found CBCT increases compassion malleability in hospital chaplains.²⁵ Compassion malleability is the belief that compassion can be trained or altered and is directly related to wellbeing.

Furthermore, the compassion malleability scale used in this work was developed based on an existing scale to measure the malleability of empathy.^{20,24} Research by other groups found that beliefs about the malleability of empathy predicted empathy and empathic behavior, especially in conditions when one's empathy is challenged.²⁴ Studies that examined this empathic malleability scale found that those with a more malleable belief worked harder to improve their empathic accuracy as determined by the Reading the Mind in the Eyes task.²⁴ Their belief in empathy influenced their motivation to grow, linking to the greater theoretical framework connecting growth mindsets with positive psychological outcomes.^{30,31} Studies looking at other compassion training interventions had similar findings: that motivation, commitment, and action were essential for effectiveness.³²

As described earlier, single-status EMTs alone face significant stressors, with 4 out of 5 EMTs reporting being overwhelmed/deeply disturbed from an incident, and 48.3% of EMTs experiencing some form of burnout.^{6,33} College students similarly experience unique stressors, with the prevalence of depression in college students ranging from 7% to 17%.⁷ It is also well documented that college students are in a transitional state in their lives and that young adulthood marks the period when many mental health problems arise.³⁴ Early career also marks a key time where healthcare workers may be highly susceptible to burnout and stress.³⁵ Thus, CBCT training may be a particularly effective approach for bolstering the well-being of CBEMS providers, given their dual status.

This increase in compassion malleability may arise from several

aspects of CBCT. CBCT instruction includes content on the definition and nature of compassion, discussing that it can be boundless. It also reinforces the idea that warm-heartedness can be cultivated and extended, even in challenging situations. CBCT builds on interconnectedness and one's relation to others and oneself, ideas that can be traced to the lojong tradition in Indo-Tibetan Buddhism. Lojong means “thought transformation” or “mind training” and is a systematic way of reversing thoughts, emotions, and behaviors that are maladaptive, and for altering them to thoughts, emotions, and behaviors that are beneficial to oneself and others.²³ Geshe Thupten Jinpa explains: that “the salient idea of transformation, whereby a process of training, habituation, cultivation, and cleansing induces a profound transformation—a kind of metanoesis—from the ordinary deluded state, whose modus operandi is self-centeredness, to a fundamentally changed perspective of enlightened other-centeredness.”³⁶ This change in mindset is the difference between CBCT and other non-analytical mindfulness programs that may instead focus on lovingkindness (metta) meditation.²³ CBCT incorporates concepts such as interdependence and gratitude to garner connectedness and equality, which can develop into a strong sentiment of love and compassion for others.²³

Finally, we observed a strong trend indicating that participants randomized to CBCT reported decreased burnout compared to those in the waitlist. This indicates that CBCT may be effective in improving the psychosocial well-being of CBEMS providers. The significant association of changes in burnout with CBCT practice lends further support for the effectiveness of CBCT for improving burnout symptoms.

Limitations

One significant limitation of this study was the small sample size and difference in size between the control and waitlist groups. Groups were randomized, and then participants were taken off the waitlist if individuals from the CBCT group were unable to attend. This may have created a discrepancy in the interest levels, workload, and stressors. Another limitation may have been the difficulty isolating stressors arising from the EMT provider status and those from being a college student. This, however, could be corrected by noting the equivalent wait-list control group. Moving forward, further research and implementation efforts are warranted to fully integrate CBCT and similar interventions into CBEMS organizations, thereby providing vital support to these dedicated individuals, as they navigate the challenges of balancing their multifaceted roles as college students and emergency responders.

Conclusion

CBCT training was found to significantly increase CBEMS EMT compassion malleability compared to those EMTs that continued normal service. CBCT was also found to result in a strong trending decrease in burnout. This trend was also significantly associated with greater CBCT practice time. This

study also thoroughly investigated stressors and points of resilience in the CBEMS environment using interdisciplinary methodology that serves as a basis for future work. Overall CBCT was found to be effective and feasible for CBEMS providers.

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Authorship Statement

SS, JSM, and AE conceived and designed the study. SS, JSM, and EB collected the data. SS, JSM, EB, AND IV analyzed the data. SS and JSM drafted the manuscript. All authors contributed to the revision of the manuscript. SS takes responsibility for the paper as a whole.

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Supplementary Materials (Available Online)

Table 1: Semi-Structured Interview Code Table

Table 2: Short Recorded Audio Prompt Code Table

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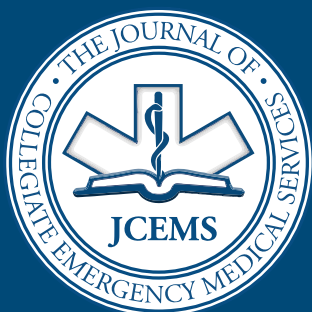
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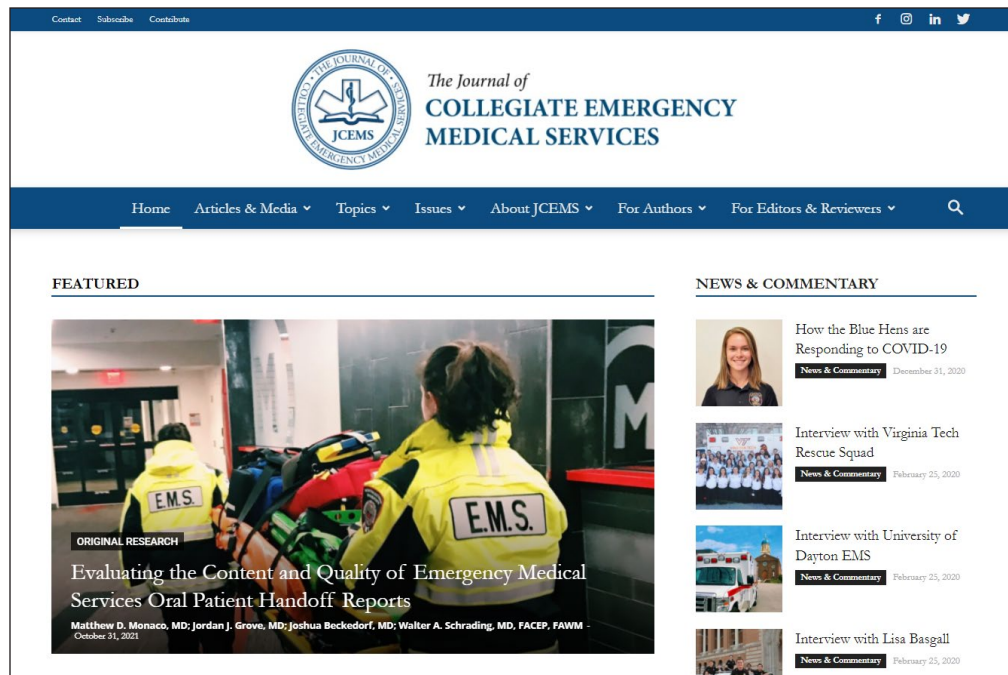


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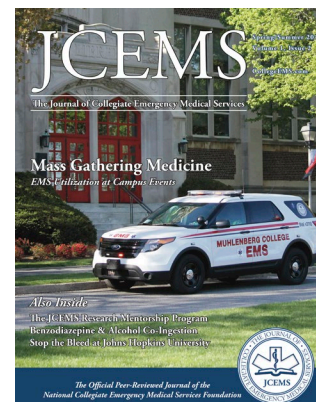
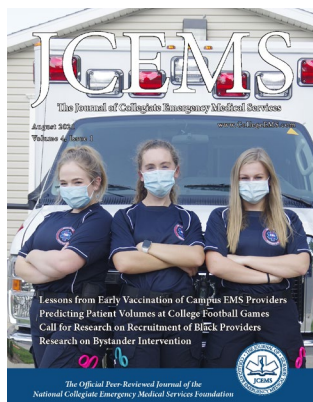
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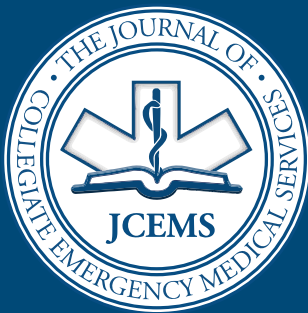
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