
The Journal of Collegiate Emergency Medical Services

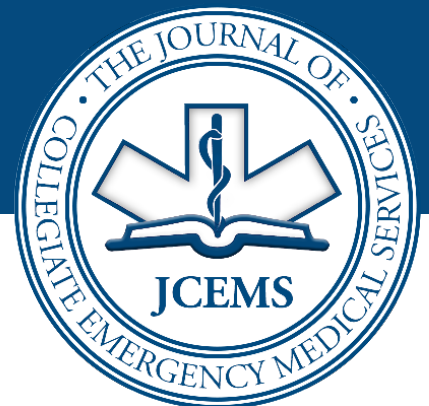
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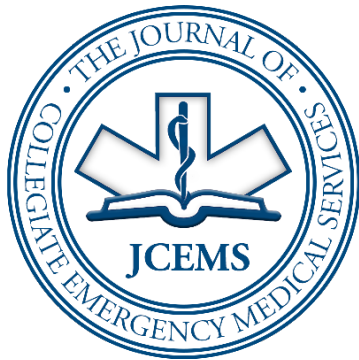
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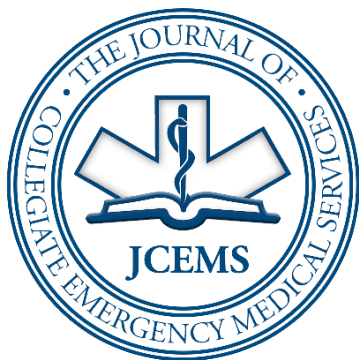
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COLLEGIATE EMERGENCY MEDICAL SERVICES

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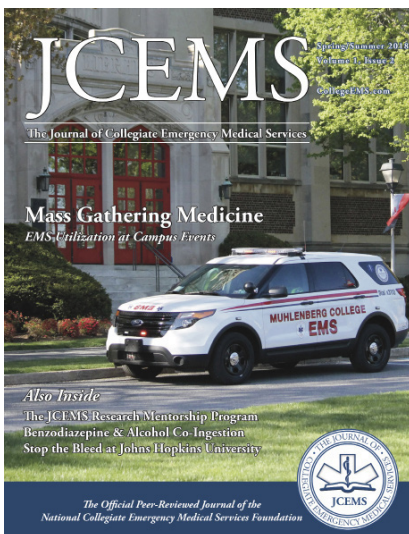
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The Journal of Collegiate Emergency Medical Services is the official **scholarly, peer-reviewed journal** of the National Collegiate EMS Foundation.



Original research is prioritized. Case reports, reviews, and articles featuring perspectives and commentary are also invited.

Original Research

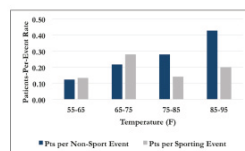


Figure 1. Patients-Per-Event rates at outdoor events with at least 1,000 attendees, grouped by temperature and event type (sport vs. non-sporting).

sum-sized university setting. First, while JCEMS provided a significant amount of readily accessible at small- or medium-sized events, relatively few of these events had acute medical issues requiring EMS resources. Except for concerns, all types of events on average had less than 1 patient-per-event.

The investigators could not reliably distinguish even large events (such as 1,000 versus 5,000 attendees). However, because of the size of Georgetown University, and limited areas for mass gatherings on campus, it is unlikely that events with significantly more attendees occurred; the largest on-campus versus only was 2,500 attendees. Outdoor non-sporting events with higher temperatures were associated with more patients

as easily obtainable data point in advance of the event and can serve as a valuable tool to aid collegiate event planners in determining appropriate EMS resource allocation.

Outdoor sporting events did not demonstrate this near-linear correlation between temperature and PPE at large MGEs. This weaker relationship may be due to the presence of athletic participants who are better able to withstand adverse heat conditions. The length of the event may have also been a confounding factor as the sporting events were generally shorter in duration than events like concerts and graduations. The investigators were not able to reliably classify alcohol availability at athletic MGEs and thus alcohol could

per event. Previous studies have demonstrated a similar impact of heat weather.¹³ Concerns and graduation activities, both outdoor non-sporting events, had the highest numbers of patients-per-event of any MGE group. Given the typically higher temperatures, the antihypertensive that graduates are associated with a higher PPE due to a greater incidence of heat-related emergencies. Additionally, the audience present at graduation is likely to be older and have a higher prevalence of pre-existing health conditions that may place them at greater risk of requiring EMS services, when compared to the younger and likely healthier student that comprise most other on-campus MGEs. Temperature is

Table 3. Patients-Per-Event rates at MGEs, grouped by alcohol availability.

Alcohol Availability	# Events	# Patients	Patients-Per-Event Rate
No Alcohol	38	2	0.05
Alcohol Consumed	99	49	0.49
Alcohol Provided	30	8	0.27
Sporting Event	239	28	0.12

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JCEMS Research Scholars Program

The JCEMS Research Mentorship Program aims to facilitate productive, scholarly relationships between collegiate EMS providers and established investigators, clinicians, and scholars. Students who participate in the program will develop research competencies, setting the stage for their continued development as research leaders in EMS and other fields.

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Integrating EMS and Public Health in Collegiate Disaster Response: CERT and SORT at the University of South Florida

Samantha Sadorf, EMT-B

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

The University of South Florida (USF) hosts two complementary student-led programs that integrate emergency medical response and public health preparedness within a collegiate setting: the Community Emergency Response Team (CERT) and the Student Outbreak Response Team (SORT). Initially established in 2013, USF CERT operates under the Hillsborough County Office of Emergency Management which is responsible for activating the team during emergencies². CERT focuses on teaching disaster management and immediate emergency response to students, faculty, and staff. SORT was developed in 2014 in response to a gap in outbreak-focused and environmental health-related training within emergency response systems. Emory University's SORT team inspired the formation of USF's own program². Since these programs function within a college campus where public health and emergency medicine is studied, engagement and impact remains high. While CERT and SORT maintain distinct operational missions, their collaboration allows for a coordinated response that strengthens both emergency response and public health preparedness across campus and the surrounding community when faced with disaster.

To become a CERT volunteer, individuals are required to complete the FEMA-aligned CERT Basic Training curriculum totaling 24 hours over the span of three days. To date, around 780 individuals have completed this training, with over 80 volunteers trained each year². This curriculum includes emergency preparedness, the Incident Command System (ICS), disaster psychology, search and rescue, and emergency medical operations. Medical skills include triage, airway positioning, bleeding control, tourniquet application, shock recognition, and hands-only cardiopulmonary resuscitation (CPR). In accordance with Hillsborough County, CERT membership is structured into three tiers based on training and background check status, and this determines the scope of activities allowed during activations. Members with advanced certifications, such as EMTs, nurses, or amateur radio operators can be assigned specialized roles. Prior to deployment in an activation, many of these responders receive Just-in-Time Training, where instruction is relative to the exact situation they are in.

Samantha Sadorf, EMT-B, is a senior pre-medical student at the University of Florida majoring in Applied Physiology and Kinesiology, set to graduate in Spring 2026. She has presented research at NCEMSF, receiving the 2024–2025 Collegiate EMS Research Poster of the Year Award, and is continuing this research in collegiate EMS. She is also involved with the Journal of Collegiate Emergency Medical Services (JCEMS), contributing to outreach initiatives and manuscript development.

Large-scale hurricanes yield numerous hazards that require emergency response, and CERT plays a significant role. During Hurricane Irma in 2017, approximately 200 CERT-trained volunteers were deployed to support county emergency operations, including staffing a special needs shelter on USF's campus that served around 780 individuals. CERT members assisted with triage, patient monitoring, logistical support, and coordination with the county health department. Similar medical and sheltering needs were necessary during Hurricane Ian in 2022, and again during Hurricanes Helene and Milton in 2024. According to USF Health News, during the Helene and Milton response period, more than 123 USF volunteers contributed over 1,300 hours of service through CERT, supporting emergency operations center activities, shelter coordination, damage assessments, and post-storm recovery efforts in collaboration with county agencies and nonprofit partners¹. These disasters reinforced CERT's effectiveness in medical and operational response. However, there were still challenges in water testing across a large span of affected communities. While CERT was increasingly efficient with medical and logistical needs, the absence of individuals trained on environmental health and public health disasters created an opportunity to incorporate environmental and public health knowledge into disaster response.

SORT complements CERT by preparing volunteers to respond to disasters from a public health perspective, emphasizing outbreak investigation, environmental health assessment, water testing, and food safety. During the COVID-19 pandemic, SORT deployed more than 200 individuals to aid with contact tracing, vaccination sites, and management of data entry and traffic control within local and state health departments. These deployments reinforced the need for a trained public health response team. SORT has since expanded its training to accommodate field epidemiology and environmental health response that aligns with local and state health departments.

Between both programs, CERT and SORT maintain approximately 85 consistent members and 15 officers. Meetings usually involve 15 to 25 participants, trainings engage 30 to 45 individuals, and large-scale exercises include 65 to 80 participants². Many volunteers participate in both programs to gain comprehensive training and enhance coordinated response.

CERT holds two to three medical-oriented training sessions per month, and SORT offers one public health-focused training monthly alongside a monthly newsletter through social media. Many CERT members are also involved in the University Emergency Medicine Student Association (UEMSA) and the USF Medical Response Unit (MRU) where they hold additional emergency medicine-related certifications. As a result, CERT and SORT work closely with USF's other emergency medicine organizations to further supplement campus medical response capacity.

Outside of campus, CERT and SORT contribute to regional preparedness on a larger scale. They closely collaborate with local and state health departments, whose representatives often participate in trainings and deliver guest lectures on applied emergency management and public health preparedness. CERT and SORT members also serve as patient actors during mass casualty incidents hosted by Tampa International Airport, further involving themselves with regional emergency preparedness efforts. Additionally, they coordinate biannual large-scale post-hurricane response exercises with 45 partner agencies. These biannual trainings provide hands-on experience in coordinated disaster response, and have also created opportunities for qualitative research. Both programs receive financial support from USF and Hillsborough County. Although they maintain distinct operational focuses, USF's CERT and SORT continue to work as a team to tackle future outbreak and disaster response. These programs strengthen community resilience through ongoing education, training, and engagement. This manuscript was developed using information obtained through interviews with program leadership and an article from USF Health News¹.

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Promoting Bystander AED Accessibility at the University of Pennsylvania

Julia N. Smolyak, BA, EMT-B; Micaela Alpert, MS, NRAEMT; Stacy L. Ritchey, MLA; Eugene Janda, CFPS; Joshua E. Glick, MD, FACEP

Keywords: collegiate-based emergency medical services; AED; cardiopulmonary resuscitation **Corresponding Author and Author Affiliations:** Listed at the end.

Since the Fall 2025 semester, the University of Pennsylvania has added informational flyers beside every automated external defibrillator (AED) on campus to promote cardiac emergency preparedness and education.

According to the American Heart Association, while most cardiac arrests occur out of hospitals, only 10.2% of patients experiencing out-of-hospital cardiac arrests (OHCA) have an AED applied by a bystander.¹ Studies suggest low levels of AED awareness among lay rescuers, ranging from 19% to 43%. A majority of study respondents were unaware that AEDs are resuscitative tools geared toward use by lay rescuers.² Consequently, OHCA is associated with substantially higher mortality than cardiac arrest occurring in hospitals: nearly 2.5-fold higher in adults and 4-fold higher in children.³

Prior to the introduction of these flyers, the University of Pennsylvania (Penn) had 250 AEDs that lacked contextual information regarding their use. Although AEDs are widely available across campus, many students and faculty are also unaware of the importance of and how to use this life-saving technology. After working as EMTs and caring for patients experiencing cardiac emergencies, former Penn students and Medical Emergency Response Team (MERT) leaders Julia Smolyak (2024 MERT Internal Technology Officer) and Micaela Alpert (2024 MERT Chief) were inspired to address this gap. Smolyak began exploring ways to increase AED awareness on campus, and with support from Alpert and MERT Medical Director Dr. Joshua Glick, the idea developed into a project aimed at improving cardiac emergency preparedness among Penn and West Philadelphia community members. Working alongside Penn's Division of Public Safety Chief of Fire and Emergency Services Eugene Janda and the Division of Facilities and Real Estate Services (FRES), Smolyak and Alpert put this initiative into action.

Julia N. Smolyak, BA, EMT-B graduated from the University of Pennsylvania in 2025 with a degree in Biology and served as the 2024 Internal Technology Officer of the Penn Medical Emergency Response Team. **Micaela Alpert, MS, NRAEMT** is a first-year medical student at the Perelman School of Medicine, pursuing combined MD and MBE degrees. She received her BA in Biochemistry, Biophysics, and Biology and her MS in Chemistry from the University of Pennsylvania in 2025 and served as the 2024 Chief of the Penn Medical Emergency Response Team. **Stacy L. Ritchey, MLA**, is the Director of Communications at the University of Pennsylvania Division of Public Safety and oversees internal and external communications and marketing needs, including managing websites, social media, and branding, as well as crisis and emergency communications. **Eugene C. Janda, CFPS**, is Chief of Fire and Emergency Services at the University of Pennsylvania and advises the Penn Medical Emergency Response Team. **Joshua E. Glick, MD**, is an attending physician in the Department of Emergency Medicine at the Hospital of the University of Pennsylvania and an Associate Professor in the Perelman School of Medicine. He currently serves as the Medical Director of the Penn Medical Emergency Response Team and the Mobile CPR Project Philadelphia.

Initiative Overview

The initiative involved Smolyak designing educational flyers to be displayed alongside every AED on campus. Each flyer defines what an AED is and underscores its lifesaving role in cardiac arrest. The flyer includes two QR codes that link to instructional videos featuring MERT members demonstrating how to apply an AED, along with how and when to initiate CPR measures. This resource offers students and faculty the opportunity to learn more about the relevance of AEDs and how to incorporate them into effective bystander CPR. The videos are intended for use by passersby in non-emergent settings, providing lay rescuers the opportunity to scan the QR code at their convenience, prior to encountering an OHCA. By lowering barriers to understanding and awareness, these flyers and videos could improve confidence among lay rescuers and increase the likelihood of immediate intervention during OHCA, with the intent of maximizing survival for anyone experiencing cardiac arrest on or near campus.

Development Process

The flyers were designed with clear language, intended to be easy to read and eye-catching in busy campus settings. Drafts underwent careful review by the Division of Public Safety's Director of Communications, Stacy Ritchey, and Penn's Office of Risk Management and Insurance's Associate Vice President, Benjamin Evans, who helped refine the materials into more effective, accessible resources. Smolyak worked with other MERT members to direct and produce the instructional videos, which present clear, approachable demonstrations of CPR and AED use. Penn FRES also provided essential support with logistics and planning, helping to coordinate the placement of flyers and ensuring the initiative could be implemented effectively across all 250 AED sites.

Looking Ahead

The hope is that these flyers and videos prepare students, faculty, and community members for emergencies and inspire confidence and responsibility in the community.

As MERT evaluates engagement and impact through analytics and feedback, this initiative can serve as a model for other universities and community organizations nationwide. Ultimately, this effort is an example of how a relatively simple, low-cost intervention may raise awareness of OHCA and highlight the critical role of bystander CPR and AED use in cardiac resuscitation. Future efforts may include the implementation of similar initiatives on other university campuses and outside collegiate settings.

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An Inside Look into Collegiate Emergency Medical Services

A podcast by The Journal of Collegiate Emergency Medical Services

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Drexel EMS Certifies Members in ACLS Through On-Campus AHA Training Center

Rahma Fares, News Contributor JCEMS

Drexel University EMS (DUEMS) is a student-run collegiate EMS agency located in Philadelphia, Pennsylvania. It recently certified 20 of its members in Advanced Cardiovascular Life Support (ACLS) through classes taught on campus by the Drexel University College of Nursing and Health Professions, an AHA Training Center.

“We thought that hosting an ACLS class would allow them to both grow their knowledge base to become better providers as well as give them a certification to hopefully set themselves up for success outside of DUEMS,” stated Joey Kloss, Captain/VP of Drexel University Emergency Medical Services.

The training to certify 20 total members took place in two separate six-hour classes, with required completion of pre-course material, such as electrocardiogram (ECG) reading and interventions. The class consisted of hands-on ACLS scenarios and lectures. Funding for this training was paid with agency budget through the Drexel University Student Organization Resource Center.¹

Planning the training was difficult logistically, due to limited member availability on weekdays. The training was eventually held on a weekend, and DUEMS selected members to participate in the ACLS course through a tiered system: current/former officers, FTO corps, crew chiefs, and general membership EMTs. The ACLS training was intended to enhance patient care within DUEMS by ensuring EMTs have a deeper understanding of the cardiovascular system, as well as the procedures they could assist paramedics with in cases of cardiac emergency calls. In addition, the ACLS certification course served as a confidence booster for newly trained EMTs and strengthened their provider skills.

When asked about advice for other collegiate EMS agencies looking to certify their own members, DUEMS recommended starting planning early and with a realistic timeframe, asking training centers about group pricing deals, ensuring participants can commit to the pre-coursework and in-class effort required, and considering implementing a fair sign-up priority system if spots are limited.

DUEMS shared that offering an ACLS course to collegiate EMS agency members had many benefits, including a stronger understanding of cardiac emergencies, greater confidence in assisting paramedics during high-acuity calls, and added value for members preparing for future healthcare roles. According to the agency, the training also gave members an opportunity to learn together and strengthen their connections as providers.

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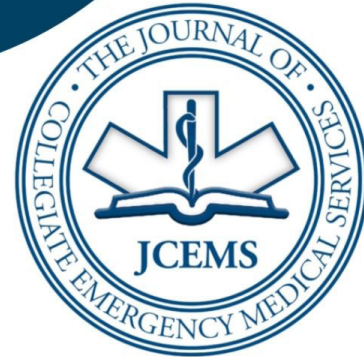
¹ DUEMS got a discount from their school's AHA Training Center to host the training.

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Charting a Better Way: Two Harpur's Ferry EMTs turned late-night paperwork into Lucent EMS Solutions

Ira Sarkar

Ask any collegiate EMS provider about the end of a long day shift or even worse an overnight shift and you'll hear some version of the same thing: the calls are finished, but the charts are not. For Joshua Ackerman and Yoav Reshef, two EMTs with Harpur's Ferry Student Volunteer Ambulance Service at Binghamton University, that recurring moment became the seed of a company. This spring, they were awarded a \$25,000 grand prize at the New York Business Plan Competition.

Ackerman and Reshef, both members of the Class of 2027 in Binghamton's School of Management, took the top award at the New York Business Plan Competition (NYBPC) for Lucent EMS Solutions, a venture built to make patient care documentation faster and more accurate. It was the first time Binghamton University had ever won the competition's grand prize. The pair took first place in the NYBPC's Health & Wellbeing track, advancing to a final live pitch-off against the first-place winners of the other five industry categories to claim the overall grand prize.

Both founders have been EMTs since high school, and found their way to Harpur's Ferry, a nonprofit, student-run agency that has provided support and care to the Binghamton campus and surrounding community since 1973. For Ackerman, who worked his way up to the agency chief's office, the pull was the people. Members "genuinely care and want to be there," he said, describing a culture where students train in-house and take real responsibility for their patients. Reshef frames the work as a rare opportunity saying "There are very few things you can do at this age like this," adding that he encourages newer members not to limit themselves. This mindset is what led Reshef and Ackerman to found the company and see it through to success.

That firsthand experience is exactly where Lucent began. Documentation, Reshef notes, is the one part of the job that follows a provider to every agency. After a single 911 call, writing up a report can take anywhere from 20 minutes to more than an hour. However, this time adds up in a collegiate setting where students split their time between classes, often creating a rushed environment; even if that wasn't the intent. Things become complicated when calls begin to cluster on nights and weekends, creating backlogs. Students are often documenting one patient while trying to make it to class, straining to recall the details of an incident from hours earlier, as Reshef stated: "The details become very hard to remember, especially for the earlier patients".

The stakes go beyond lost time. Patient care reports are legal records that hospitals, insurers, and even courts may later rely

on. Reshef points out that emergency physicians depend on them to understand what care patients receive in the prehospital setting. When a provider is prioritizing the emergency in front of them, reconstructing every detail afterward becomes genuinely hard.

The idea took shape in February when Reshef started texting Ackerman with ways to automate the process. Their solution captures both audio and visual information from the scene, more than a simple scribe or dictation tool, and parses it into a structured patient care report. Crucially, the founders describe the software as an aid, not a replacement. The software drafts the chart; a human still reviews and signs off on every one.

Privacy and accuracy sit at the center of the design. The team is building on HIPAA-compliant language models, where recordings are not stored, and the system is designed to surface its own confidence, leaving a field blank when it isn't sure rather than guessing. This would allow providers to stay vigilant rather than complacent as well as ensure patient security is maintained.

Reaching the final took months. The team pitched through a 15-minute regional round, produced a video for an intermediate round, and advanced as a state finalist in Health & Wellbeing before the grand stage. Along the way, they leaned on mentorship from Dr. Chou-Yu Tsai, who played a fundamental role in helping them develop an effective business plan and pitch, as well as Mike Bronikowski, who offered insights as past winner of NYCBPC, gave them feedback on the company and provided crucial technological support. Along with SOM Deans and a network of alumni and fellow students, including one of the original founders of Harpur's Ferry, Ackerman and Reshef had the support to make their company a reality. The founders also credit their own discipline centered on daily "lock-in" calls to align on goals, roughly four slide decks scrapped along the way, and a habit of covering for each other during exam season. Additionally, most of the prize money, the founders say, will go toward software development as they grow their team.

For a pair juggling full course loads, agency leadership, and a startup, the win has been validating, but their advice to other collegiate EMS members stays grounded. "When there's something you need to do, you just need to do it," Reshef said. Ackerman offers a complementary lesson, learned from those scrapped slide decks: "Success can be intimidating, but you can do it. Sometimes you put a lot of work into something, and it turns out terrible. That's redirection, not the end."

For two providers who started by wishing for a better way to close out a chart during busy days, the goal is simple: give EMS crews their time back, and give patients better care. If it works, the agency that inspired Lucent may be the first to feel the difference.

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Advising the Advisor: How a Collegiate EMS Advisor Can Impact Their Emergency Service Organization

Joshua Bishop, MA & EMT-B

Setting the Scene:

Advisors to a collegiate Emergency Medical Services (EMS) agency are in a weird position within their agency.

Collegiate EMS is a weird field to be in in general – can we agree on this?

We ask providers to obtain their EMS certification while being full time students, and we ask a select few to run the agency while many have only been providers in a limited capacity at their institution. For a traditional emergency services organization (ESO), it would be years before someone would “get their white hat” or “white shirt” – that is, become a chief officer. But we ask them to do it with perhaps a year of experience. And, to their credit, they rise to the occasion.

Collegiate EMS advisors are in a whole other world as well. If they are lucky, the advisor can reference their own experience as a provider within some type of ESO, whether that be EMS, fire, or another agency type. However, that is not always the case as some faculty and staff advisors are voluntold to assume the position as a product of some other job on campus. Some may have worked tangentially related as staff members, taught something in the medical field, or perhaps is just close with a student and were willing to fill the advisor role.

In this conversation, I will discuss from the position of college employees who fill the role of EMS advisor with prior experience. For advisors without ESO experience, I still encourage you to read, as many sections may still be applicable to supporting your students. I also encourage you to make connections with local ESOs (e.g., local EMS agencies, fire departments, or even local law enforcement). These connections can help bridge gaps you may experience in your own knowledge. Many are likely to be very willing to share how they meet state requirements, staff their agency, obtain supplies, order uniforms, and other topics essential to running an EMS agency.

For advisors with a background in ESO, consider how you fit within your collegiate EMS agency. Are you a hands-on or hands-off advisor? Do you share your experiences or let your students

figure it out for themselves? Do you participate in training or take reports from check-in meetings? Have you decided how involved you will be on your own or have you consulted with your members to see what they would like? If you have consulted them, was it with your current team or with those who were active when you first started?

For many collegiate EMS agencies, you are not an operational member of the agency. However, you are still present. You may liaise with the school on behalf of the agency, and you may assist with their budget. You are not on the roster, and you are generally not responding to calls for service. So, where do you fit in?

Author Background:

I am currently the advisor to my campus' EMS agency, and a chief officer within my fire department. I have been an EMS provider for the last fifteen years, including while I was in college (though, not for a collegiate EMS agency). When asked to take on the role of a collegiate EMS advisor, at surface level, the roles of collegiate EMS advisor and chief officer did not sound too different. However, in practice, the roles are far from the same.

In my fire department, I oversee emergency incident scenes, implement policy, create training, direct responders, and generally take a hands-on approach. With the collegiate EMS agency, I function more as a sounding board for my officers and agency. They are doing the work that directs their team. My job is to try and give them the pieces they need to succeed.

Learning from a Misstep:

When starting in this position, I would the student providers things they could do that would improve their agency. However, that largely came from the perspective of a provider with no experience with a campus-based agency. There was a perspective of “knowing better” than the student perspectives from a decade-plus of experience without considering how different a college-based agency may be different or the experience of the student providers.

This typically resulted in advice falling on deaf ears and being ignored because it lacked collaboration and communication. After taking a step back and learning from the providers on this campus, we have been able to collaborate more with a lot of give and take between the agency leadership and myself. I am proud to say that this approach strengthened the relationship between us. After a year of intentional collaboration, my students even nominated me to receive the “Club Advisor of the Year” award at the student leadership awards on campus. Getting to this point takes time and commitment to understanding the agency you work with.

Joshua Bishop, MA, EMT, is the Director of Environmental Health and Safety of Hobart and William Smith, where he has served as an advisor/co-advisor to his campus EMS agency since 2023. Joshua has been a volunteer firefighter and EMT since 2011 and currently serves as the deputy chief and training officer of his fire department. Joshua is a proud husband and father of two in Geneva, NY, where he works to ensure the safety of his community within his academic institute and the fire department.

Institution Specific Advisor Requirements:

I encourage you to go through your agency bylaws, standard operating guidelines, or other governing documents to find out how your role is reported by your agency. This discussion is not intended to be a hands-on, day-to-day guide, nor is it intended to replace any of these documents. Each advisor will have different responsibilities based on our agency and our role may change if we are someone with no prior experience, with ESO experience, or if you find yourself in a dual advisor-medical director role.

Steps to Success:

Finding success in the advisor role is a collaborative effort. I have met many collegiate EMS advisors during my tenure and found the advisors with the most success are the ones who collaborate with their students. Success can mean different things to each agency:

- Having a high agency membership pool
- Meeting all scheduling requirements to stay in service
- Providing a set number of community training events
- No workplace accidents or injuries

Through collaboration with the students, the advisor can set goals in these or other areas to ensure the agency is meeting its objectives for the year.

Agencies where student leaders and advisor have open dialogue seem to have the most positive experiences. How can an advisor expect to know what an agency needs if they don't stop to listen? Similarly, how can an advisor expect students to know their expectations if they have not communicated them? Advisors and student leaders need to take the time to talk to each other and understand expectations.

While we generally allow collegiate EMS agencies to have a high level of autonomy compared to other campus groups, we do on occasion need to set firm directives. For example, budget from the college, college policies, and others. These are things that the advisor is more likely to understand than the students. If you have had that open dialogue and communication earlier, the items that "need to be done" become easier for your members to receive.

Additionally, make sure you are showing up for your students. They should be able to rely on you to be there and support them. Perhaps the school hosts student leader awards and you have a responder nominated- attend if that is appropriate at your agency. Maybe there is an annual membership gathering for fellowship- make an appearance, express your gratitude for their effort. If you show your agency that you help with what seem like the little things, it will go a long way for your students to know you will show up for the big things too.

Lastly, and this really encompasses everything about being an advisor, support your students. In what they do and in what they try, support them. Sometimes, support is letting them know they did a great job. Sometimes support is stepping in to prevent a mistake. And sometimes, support is letting students fail in a safe manner. Give your students the support that they need.

The four things mentioned here can help an advisor tremendously in advising their agency.

Using Your Experience:

One of the most frustrating parts of being advisor is having this wealth of knowledge outside of a college campus. You have likely seen different initiatives succeed or fail during your career. Your agency may propose an initiative that they are really excited about, but you "know" will not really get off the ground. You may make a recommendation based on something you did at another agency that they disregard. First thing's first: remember that any differences in practice are likely related to experience, and not something personal.

We know that collegiate EMS agencies are far different than their municipal counterparts based on years of service, diversity of calls, and even age of responders. We cannot expect they will operate the same. Your student providers may lack the experience of your traditional seasoned veterans. However, your students also may lack the apathy and long-term burnout that may hinder an agency. You must find some balance between this lack of experience and still having the excitement and vigor (non-apaty) to ensure the success and, equally important, the trust of your agency. Give relevant examples of things you have seen work (or not). If they aren't essential to organizational safety or patient care, let the agency take that information and use it however they would like.

By providing information instead of demanding obedience, you strengthen the team you have working for your agency. This allows your team to retain autonomy when necessary. There will be times when directives come from the institution, or mandates from your state that cannot be ignored, no matter how much the students disagree. These become easier to enforce for your team when you create a collaborative relationship.

Lastly, when it comes to using your own experience, make sure that you are purpose-driven in doing so. At some point, a seasoned provider may face high levels of trauma, burnout, or organizational frustration. We should not be using these as scare tactics to our providers. While we should not shy away from hard conversations, we also should not go out of the way to bring down morale. Who wants to rely on an advisor who is jaded and checked out due to their own experiences? Likewise, do not be the agency story top-per. It is entirely likely that you have seen a larger variety of calls than your students. Do not diminish their experiences or successes on an incident by lauding yourself for doing something "bigger", "worse", or "more gross".

High Impact Practices for Your Campus: The Five C's	
Communicate	Talk to agency members and leadership to best know how to support their needs.
Collaborate	Work together with the agency to determine need and execute tasks; this should be a continuous process that includes regular check-ins for timely feedback.
Care	Support the agency and its members; show up when they need you to show up.
Connect	Connect with external-to-campus agencies and providers for additional assistance.
Coach	Don't simply dictate orders and commands to an agency, coach them on ways to find success as an agency.

As the saying goes, Rome was not built in a day. You will not be able to do all these items in one day, week, month, or semester. It takes time to build credibility on your campus. This is especially true when the agency experiences a regular rate of turnover. Take your time and do the work. Most of all, never stop trying and never stop learning. This field changes all the time just like your roster. Make sure you check in with your agency about changes to practice and check in every academic year with the student leadership to see if what worked last year still works with the new team.

You have the chance to make a huge impact on your campus, to your students, and to the entire field of EMS. I apologize if that sounds cheesy to you, but it is true. By serving as an advisor to a collegiate EMS agency, you are serving as a mentor to the next generation of providers in EMS. With a revolving roster, the advisor may be the closest thing to a constant with members regularly graduating out of your agency. While many campus-based providers may initially get into collegiate EMS agencies as a steppingstone to another medical career, those who have a positive experience may be likely to remain in the field after they graduate. By offering care, support, and guidance through the advisor role, you may be instrumental in this provider retention.

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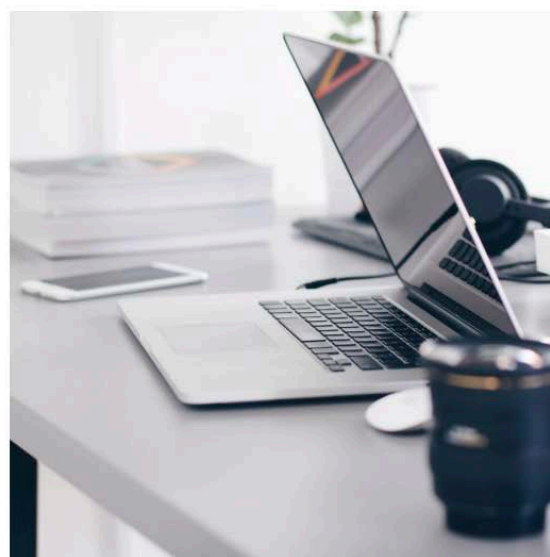
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Increasing the Volume and Reach of Member-Taught Stop the Bleed and First Aid Classes Through Restructuring a Volunteer EMT Student Organization

Vincent Darius Kreft; Amelia Gurley, MD

ABSTRACT

Background: Bystander training in Stop the Bleed (STB) and First Aid (FA) is strongly associated with improved survival from medical emergencies. To better equip the community with these survival tools a student-run EMT organization, at a large public university in California, sought to expand the reach and quality of its STB/FA instruction program. **Case Report:** This project aimed to increase the number of community STB/FA classes delivered per semester, expand instructor participation, ensure consistent internal quality oversight, and strengthen community partnerships. Between Fall 2024 and Fall 2025, the organization restructured its public health leadership by doubling the number of Deputy Directors of Public Health and introducing a new Public Health Officer role focused on logistics, quality control, mentoring, and partner outreach. After these interventions, semester STB/FA classes more than doubled from 14 to 30, while unique community partners expanded from 9 to 24 organizations; internal quality control oversight reached 100% of classes; trained instructors increased from 27.6% to 53.3% of members; and instructors teaching two or more classes per semester increased from 17.5% to 43.8%. **Conclusion:** Overall, under strategic organizational restructuring, it was observed that STB/FA instruction became a core function, enabled scalable growth, noticed improved internal quality assurance, and broadened community impact.

Introduction

The focus of this study is a student volunteer organization comprised of certified EMTs on the campus of a large public university whose membership has ranged between 125 and 150 active members since Fall of 2024. The student-run EMT organization serves three vital functions within the university campus and broader community: (1) provide medical coverage at several different events on campus, such as major sporting events, concerts, and graduation ceremonies, (2) train members in disaster preparedness in order to provide volunteer emergency medical care in the event of a disaster, and (3) teach CPR, Stop the Bleed (STB), and First Aid (FA) classes to the broader community.

This third function is how the student-run EMT organization equips the community with the tools needed to help more patients survive in case of medical emergencies. According to the CDC, heart disease and cardiac arrest and trauma associated with accidents and unintentional injuries remain two of the three leading causes of death in the United States.¹ The AHA have noted bystander CPR as a key factor influencing survival in out-of-hospital cardiac arrest,² and Song et al (2018)'s meta-analysis of 16 studies found that bystander CPR can approximately double the odds of survival in out-of-hospital cardiac arrest (odds ratio 1.95; 95% CI 1.66-2.30).³ According to national data from Denmark, bystander CPR also lowered the 1-year risk of brain damage after a cardiac arrest.⁴ Khan et al (2022) found that training bystanders improved the quality of CPR that bystanders were able to provide, even months after training.⁵ Furthermore, Nofzinger et al (2019) and Khan et al (2022) have found that bystanders were significantly more willing to attempt to help in cases of cardiac arrest after training.^{5, 6}

With regard to STB classes, a systematic review and meta-analysis of 36 publications by Tang et al (2023) found that stop the bleed classes improved students' ability and willingness to intervene in cases of life-threatening hemorrhage.⁷ Consunji et al (2024) conducted a systematic review of several studies that taught STB classes to laypersons and concluded that those receiving STB training experienced significant improvements in willingness, confidence, comfort, and likelihood to respond to a bleeding victim.⁸ The study ultimately concluded that STB classes have a positive impact on preventing deaths occurring from traumatic exsanguination.

Vincent Darius Kreft is a computational chemistry student at the UC Berkeley, integrating scientific research, leadership, and service. He serves as Deputy Director of the Berkeley Medical Reserve Corps (BMRC), leading a group of certified EMT volunteers in emergency preparedness. As a researcher in the Bergner Astrochemistry Group, he analyzes NASA's James Webb Space Telescope observations using radiative transfer modeling and advanced parameter optimization techniques. Committed to equity in STEM, Vincent has invested in his community as a SEED Scholars peer mentor and a peer facilitator with the United Math Circles Foundation. **Dr. Gurley** earned her pre-medical degree at Johns Hopkins University and her medical degree from Brown University's Warren Alpert Medical School. She completed an Emergency Medicine residency at UC Riverside and then pursued an EMS and Disaster Medicine Fellowship at UC San Francisco, focusing on disaster response, medical education, health policy, and quality improvement. Dr. Gurley has published extensively in emergency medicine, public health policy, and information systems, and remains deeply engaged in her community as a volunteer physician, researcher, and educator in her new role as faculty and an emergency medicine attending at UCSF Fresno.

With the literature providing robust evidence that better bystander preparedness saves lives, student-run EMT organizations nationwide in the United States have begun to prioritize delivering more STB/FA classes. However, growth of such classes can oftentimes be limited by structural frictions and administrative barriers in the hierarchy of the organization. Thus, the contribution of this case report is to demonstrate how deliberate organizational restructuring can successfully transform STB/FA class instruction into a core function of a student-run EMT organization, and ultimately enable scalable growth, improved internal quality assurance, and facilitate broader community engagement and impact.

Case Report

STB/FA Class Instruction Performance Goals

In order to better equip community bystanders with lifesaving first responder techniques, the student-run EMT organization undertook this project to expand the volume and reach of volunteer community teaching opportunities. Specifically, the objective of this project was to increase the number of STB/FA classes delivered to community partners each semester, as well as to increase the number of member instructors that are actively involved in delivering such classes. The four quantifiable goals of this project, to be accomplished by the Fall 2025 semester, were the following:

Double the amount of STB/FA classes taught to the community from 14 per semester in Fall 2024 to at least 28 per semester.

Have one instructor that is trained in quality control oversight present at 100% of STB/FA classes taught.

Increase the percentage of club members that are trained to be STB/FA class instructors to at least 50%.

Double the percentage of STB/FA class instructors that teach two or more classes per semester from 17.5% in Fall 2024 to at least 35%.

Bottleneck in Public Health Operations

To accomplish the above project goals, significant restructuring of the executive positions in the public health arm of the organization was conducted to remove the bottleneck in internal instructor training, as well as to broaden the reach in establishing community partnerships. Historically student-run EMT organization had operated as a relatively flat organization, particularly in regard to the hierarchy surrounding member training. To hold STB/FA classes, it was essential to have a number of members with qualification to teach these classes. As shown in Figure 1, in Fall 2024 the one Deputy Director of Public Health was solely responsible for training and supervising all 40 STB/FA class instructors.

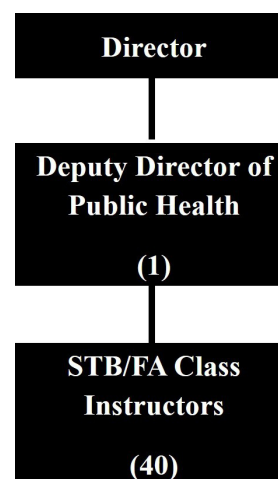


Figure 1: STB/FA Class Instructor Training Hierarchy, Fall 2024

Foss and Klein (2022) argue that flat organizations have weak structural performance monitoring systems and suffer from increased operational inefficiencies brought on from a lack of authority and accountability across operational units.⁹ The vague or distributed authority in flat organizations is often eventually replaced by informal power centers that develop organically and are not supported by formal authority channels, which means they may act as default bottlenecks in operations

due to this lack of and/or conflict with formal authority. Therefore, Flock and Klein (2022) argue that more deliberate structural hierarchy is important in reducing coordination costs across organizational units and facilitating organizational growth while maintaining high quality production standards.

Beyond direct instructor training and supervising, the Deputy Director was also responsible for coordinating all relationships with community partner organizations that enrolled in the STB/FA classes. So, one club member was responsible for not only scaling the input (the number of trained class instructors) but also was responsible for scaling the demand for the output (the number of active community partner organizations) and for daily operations of the Public Health arm of the student-run EMT organization. Having the responsibility of handling both internal and external logistics puts pressure on the Deputy Director and can lead to inefficient scaling and coordination. It was observed that this logistical instability could lead to poor class quality assurance as quality control became dependent on a single individual's capabilities (Flock and Klein 2022). It was difficult to give adequate attention to the matchmaking between class staffing details (based on instructor availability) and class scheduling logistics (based on partner availability).

Having only one Deputy Director also created a choke point in instructor training, which limited the percentage of members that could advance into such positions. In Fall 2024, out of the 145 active members, only 40 (27.6%) were trained to be STB/FA class instructors. This small cohort limited the number of classes that could be offered to community partners. In Fall 2024 only 14 such events were completed with 9 unique community partners.

One Deputy Director also did not have the bandwidth to spot check all the instructors in the act of delivering their class to ensure that best practices were adhered to. In Fall 2024, the Deputy Director was only able to attend four out of the 14 (28.6%) STB/FA classes delivered. This meant any post-class quality assurance efforts relied heavily on self-reporting from the class instructors themselves, as well as voluntary feedback from community partners instead of class observation by the Deputy Director.

Organizational Restructuring in Public Health Leadership

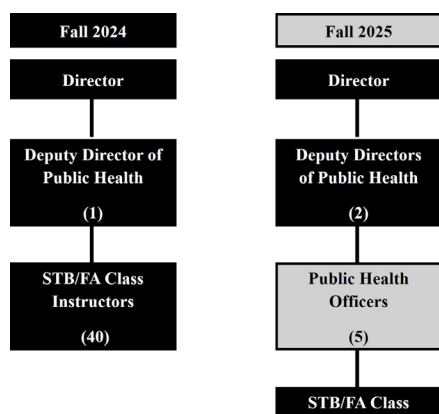


Figure 2: STB/FA Class Instructor Training Hierarchy Changes

As illustrated in Figure 2, by the Fall 2025 semester, two major changes were incorporated into the leadership hierarchy of STB/FA Class Instructor Training. First, the number of appointed Deputy Directors of Public Health doubled from one to two in the Spring 2025 semester. Second, a new executive position was created and put into practice at the beginning of the Fall 2025 semester and titled Public Health Officer. A timeline of all changes is presented in Figure 3.

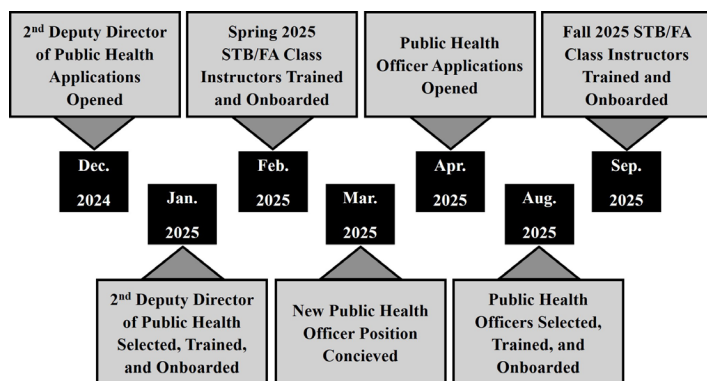


Figure 3: Timeline of STB/FA Class Instructor Training Hierarchy Changes

The two Deputy Directors of Public Health were still responsible for training all of the STB/FA class instructors. However, having two deputy directors meant that the class instructor training effort could be doubled: the number of trained instructors increased from 40 in Fall 2024, to 54 in Spring 2025, to 80 in Fall 2025. Also, the two deputy directors developed more relationships with community partner organizations, leading to higher demand for STB/FA classes.

The Public Health Officer position was seen to both improve internal operations (class logistics and quality oversight) as well as to expand the network of potential community partners. Public Health Officers are required to attend additional class management training provided by the two deputy directors. One trained Public Health Officer is then required to be staffed at each STB/FA class so that they can oversee logistics on the day of an assigned class and provide quality oversight at all classes to ensure instructors are performing at the expected high quality standard and report all observations to the deputy directors (Figure 5). Furthermore, the Public Health Officer is expected to provide mentoring to the class instructors, so that where improvement in instruction is needed, the instructor has an experienced peer resource to learn from.

Focusing on expanding community partners, Public Health Officers are expected to advertise STB/FA classes throughout their existing networks. Many STB/FA classes are taught to other student organizations on campus or to community organizations with ties to students. Ultimately, having two deputy directors and five Public Health Officers together acting as a community partner relations team was associated with the robust growth in the number of partners, which grew from 9 in Fall 2024 to 24 in Fall 2025 (Figure 4).

Performance Improvements from Organizational Restructuring

Doubling the Deputy Directors of Public Health to two and introducing five Public Health Officers was correlated with the accomplishment of all four project goals between Fall 2024 and Fall 2025.

Goal 1: Double the amount of STB/FA classes taught to the community from 14 per semester in Fall 2024 to at least 28 per semester.

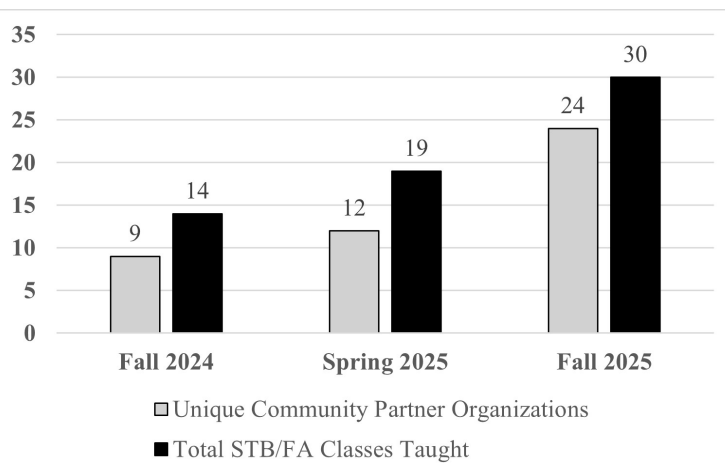


Figure 4: Unique Community Partner Organizations and Total STB/FA Classes Taught

It was noticed that having more members actively engaging with the broader community produced noticeable growth in the number of unique community partners. To be sustainable, this parallel growth required shows that as the number of community partners increased, instructional capacity scaled alongside them.

If only the number of community partners had increased, the demand for additional STB/FA classes would not have been adequately met. Or, if only the number of trained instructors increased, the limited opportunities for class instruction would have prevented increases in the number of community members getting training. Ultimately, it was essential to simultaneously scale both the number of community partners and the number of trained instructors for sustainable growth.

Goal 2: Have one instructor that is trained in quality control oversight present at 100% of STB/FA classes taught.

Figure 5 shows a dramatic increase in the proportion of STB/FA classes staffed with quality control oversight personnel, rising from 28.6% in Fall 2024 to 31.6% in Spring 2025, and reaching full 100% coverage by Fall 2025. This accelerated progression reflects the intentional creation and formalization of the Public Health Officer role within the organization. The direct quality oversight conducted by Public Health Officers via detailed feedback and continuous observed teaching was correlated with strengthened operational reliability. Specifically, equipping trusted Public Health Officers with official instruction expectations set forth by the Deputy Directors led to the distribution of instruction observation responsibility.

Goal 3: Increase the percentage of club members that are trained to be STB/FA class instructors to at least 50%.

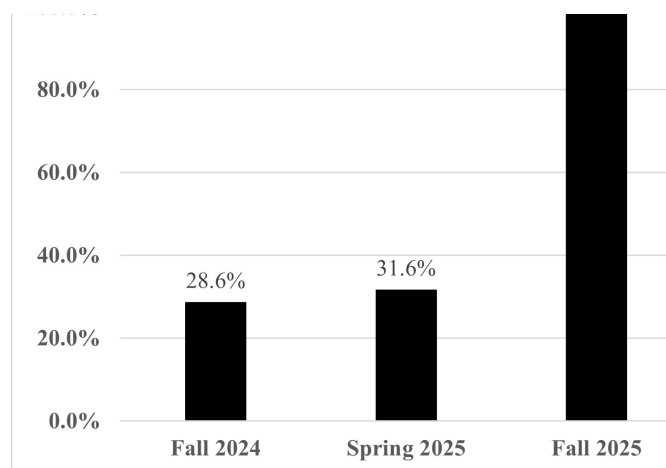


Figure 5: Percent of STB/FA Classes with Quality Control Oversight

Figure 6 illustrates a consistent increase in the proportion members trained to serve as STB/FA class instructors, almost doubling from 27.6% in Fall 2024 to 53.3% in Fall 2025. This upward trend indicates that STB/FA class instruction has become an increasingly central and valued component of membership engagement. As more than half of all members are currently trained to lead STB/FA classes, the data suggests that this arm of the Public Health operations is no longer viewed as peripheral activity, but rather it is now fulfilling a core function within the student-run EMT organization. Specifically, over half of the organization is now personally involved in the mission of disseminating first responder best practices into the community in order to equip more potential bystanders with the means and confidence to respond to medical emergencies.

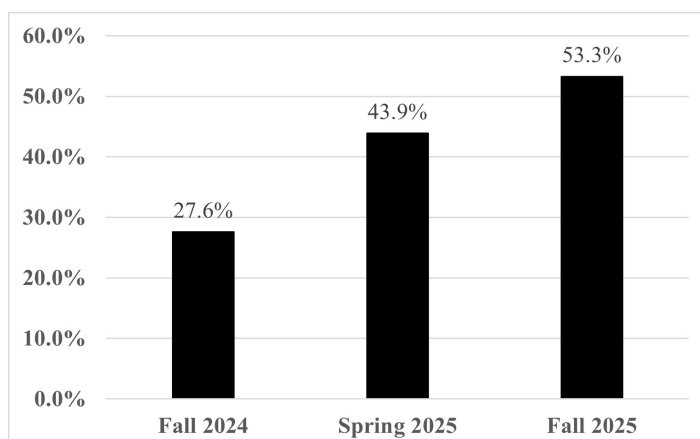


Figure 6: STB/FA Class Instructors as a Percent of Total Members

Goal 4: Double the percentage of STB/FA class instructors that teach two or more classes per semester from 17.5% in Fall 2024 to at least 35%.

Figure 7 shows a steady increase in the proportion of STB/FA class instructors who taught more than two classes per semester, more than doubling from 17.5% in Fall 2024 to 43.8% in Fall 2025. The robust increase in community partners and their demand for classes expanded opportunities for members to take on sustained instructional roles. Teaching multiple classes allowed instructors to refine their communication skills, build confidence in their ability to deliver life saving clinical content, and grow through peer mentoring and teamwork. The routine engagement with all of these experiences is helping members to build personal and professional competencies that are essential for future careers in medicine.

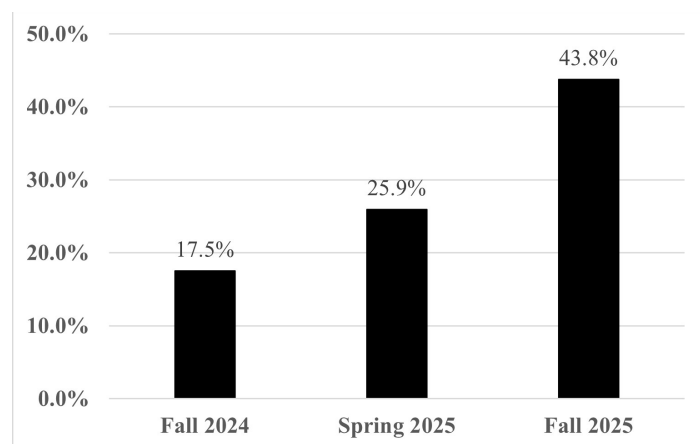


Figure 7: Percent of STB/FA Class Instructors that Taught Two or More Classes

Discussion

The organizational restructuring that added a second Deputy Director of Public Health and also introduced a Public Health Officer role seems to be directly correlated to the transition of STB/FA classes from a peripheral part of student-run EMT organization, into a core function. The increased capacity for instructor training, expanded community partner relations team, full operational quality oversight coverage, and improved instructor engagement have all together produced a robust foundation for continued scalability.

One critical gap that has emerged from this organizational restructuring project is the absence of a formal client feedback system for STB/FA classes. More specifically, this study was limited in scope as it only sought to improve internal quality oversight. It was noticed that through the shared responsibility of instructor monitoring and Deputy Director facilitation of instructor standards, internal quality oversight is now robustly provided through the Deputy Directors and team of Public Health Officers. However, the program lacks a systematic way to capture the perspectives and experiences of community partners and class participants. Implementing a systematic and more standardized client feedback process would provide more consistent and comparable data on instructor effectiveness, class material relevance, and overall community partner satisfaction. This data would complement the existing internal assessments collected by the Public Health Officers and allow the Deputy Directors to better triangulate instructional quality from both internal and external perspectives.

Over time, better understanding the perspective of the existing community partners and class participants would help produce more effective strategies for reaching new community partners. Likewise, with more instructors teaching more classes to more community partners each semester, incorporating real-time client feedback into the existing peer mentoring efforts would only help to facilitate more instructor growth over time. More broadly, client-feedback-informed coaching would help strengthen clinical communication skills between members and better prepare them for careers in medicine. So, establishing a systematic client feedback process should be a high priority of the student-run EMT organization moving forward, as doing so would ensure that the significant growth of STB/FA classes is supported by a robust foundation of community partner accountability and responsiveness.

Conclusion

To better equip the community with Stop the Bleed (STB) and First Aid (FA) survival tools a student-run EMT organization, at a large public university in California, sought to expand the reach and quality of its STB/FA instruction program. This project aimed to increase the number of community STB/FA classes delivered per semester, expand instructor participation, ensure consistent internal quality oversight, and strengthen community partnerships through organizational restructuring. Between Fall 2024 and Fall 2025, the organization restructured its public health leadership by doubling the number of Deputy Directors of Public Health and introducing a new Public Health Officer role focused on logistics, quality control, mentoring, and partner outreach. Overall, the strategic organizational restructuring successfully transformed STB/FA instruction into a core function, enabling scalable growth, improved internal quality assurance, and broader community impact. The student-run EMT organization now has a robust internal foundation upon which to build a systematic client feedback process to ensure that its operational growth is grounded in community responsiveness.

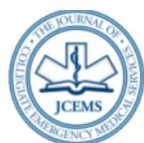
We aim for our organization's public health initiatives to serve as a scalable model for collegiate EMS groups seeking deeper community engagement. Central to this model is a vertical instructor hierarchy that promotes continuity, accountability, and skill development across all levels of involvement. While we acknowledge that our organization's size provides certain advantages, the effectiveness of this structure does not depend on scale alone. Rather, its strength lies in the deliberate distribution of responsibility and the empowerment of highly motivated Public Health officers through robust training, resources, and defined leadership roles.

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Peer Overlap in Collegiate EMS: A Strength That Requires Structural Support

Clara Shin, NRAEMT

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

Shore's recent perspective, "The New Special Population: College Students," highlights collegiate EMS providers as uniquely positioned to deliver empathetic, context-informed care due to their shared identity as students.¹ While this framing is compelling, it under emphasizes an important consequence: the same peer overlap introduces structural psychological burdens that require explicit organizational support.

Collegiate EMS providers often care for peers within their own social and academic networks.¹ Prior work has described the challenges this creates, including emotional entanglement and difficulty navigating the provider–peer role boundary.² In practice, this tension may be especially pronounced when the patient is someone the provider continues to encounter in everyday campus life.

This dynamic also extends beyond patient interactions and into team-based care. Providers frequently work alongside peers who are also close friends or classmates, which can complicate real-time communication, feedback, and post-call debriefing. Hesitation to question decisions, offer critical feedback, or openly discuss mistakes may arise not from lack of insight, but from concern about interpersonal consequences within the team. As a result, opportunities for learning and emotional processing may be diminished.

These interpersonal dynamics highlight why individual resilience alone is not enough to address the challenges of peer-based care and teamwork in collegiate EMS. To support effective learning and provider well-being, collegiate EMS organizations need structures that enable providers to speak honestly about difficult calls and learn from mistakes without fearing social fallout within their team. Practical steps could include routine post-call debriefs that incorporate both emotional and clinical processing, designated peer-support or mentorship roles outside immediate friend groups, and leadership practices that explicitly invite reflection, uncertainty, and constructive feedback.

While Shore emphasizes extending empathy toward student patients, collegiate EMS systems must also direct that same intentionality toward providers. The peer overlap that enhances care also increases provider vulnerability and should be addressed through deliberate organizational design.

Clara Shin, NRAEMT, is a third-year student at the University of Pennsylvania. She serves as a provider and Alumni Relations Officer with the University of Pennsylvania Medical Emergency Response Team (MERT).

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Planning for the crowd: How IC-EMS used FirstNet to elevate game day care at Indiana University

Charles Hardnett

Keywords: collegiate-based emergency medical services, communication, technology

When Indiana University (IU) football entered a historic new era of success, the excitement extended far beyond the field. Sellout crowds, expanded tailgating, and increased national attention transformed game days into complex, campus-wide operations — events that demanded a higher level of coordination and communication.

For the Intra-Collegiate Emergency Medical Service (IC-EMS) at Indiana University, this shift reinforced the principle that effective emergency medical response at large events happens through intentional planning, strong partnerships, and reliable communication.

A student-led organization with a big responsibility

IC-EMS is a fully student-led emergency medical service organization that provides event coverage across campus and throughout the community. While guided by faculty and medical leadership, students manage nearly every aspect of operations — from staffing and training to protocols and logistics.

“All our students typically come in with little to no clinical experience, and IC-EMS trains them to provide event coverage at both IU and Bloomington community events,” said Adhitya Balaji, IC-EMS graduate advisor and third-year medical student.

That responsibility grew significantly during the 2024-2025 football season. IU football games draw tens of thousands of fans to Memorial Stadium and the surrounding tailgate areas, requiring IC-EMS to coordinate closely with the University’s athletic department and multiple public safety partners.

Charles Hardnett is an Applications Architect in the Stakeholder Collaboration Division at the FirstNet Authority. He has more than 25 years of experience in software development, applications architecture, research, software project management, and higher education. He has worked at organizations such as Nortel, Georgia Institute of Technology, Spelman College, and Gwinnett Technical College. Today, his primary responsibilities fall within managing solution experience engagements with public safety and developing technical content for the FirstNet Authority’s stakeholders. In addition, he provides technical expertise to the FirstNet applications ecosystem, which includes mobile, web, and desktop applications, Internet of Things, location-based services, push-to-talk, FirstNet developer program, and FirstNet App Catalog.

Why pre-planning mattered more than ever

The 2025-2026 football season marked a turning point. Success on the field translated into increased attendance and activity well beyond the stadium gates. Recognizing this shift early, IC-EMS began planning nearly a year in advance — well before the season concluded.

“This really started upon the conclusion of the last regular season home game ... we realized that we had a larger responsibility to ensure that we were providing adequate medical coverage at these games,” Balaji explained.

Recognizing the importance of reliable communication, IC-EMS worked with the First Responder Network Authority (FirstNet Authority) to navigate the process of gaining access to FirstNet, the nationwide public safety broadband network.

After presenting their State of Indiana EMS certification, FirstNet Authority, in collaboration with its network partner AT&T, provided demo devices with appropriate licenses, allowing IC-EMS to experience the FirstNet service firsthand. This not only ensured their preparedness for the football season but also allowed them to offer valuable feedback on the FirstNet service.

Through the FirstNet Authority’s pre-planning support, the federal agency worked with IC-EMS to evaluate responder location mapping, assess coverage, and explore broadband solutions that could support expanded operations. These conversations with experts laid the groundwork for integrating FirstNet into IC-EMS’s game-day strategy — which would later help the organization score big wins.

Turning planning into practice with broadband

As crowds grew, so did the strain on commercial wireless networks. Thousands of fans using their devices simultaneously created connectivity challenges, especially inside a large concrete stadium and across sprawling tailgater areas. For IC-EMS, reliable communications were no longer optional but necessary for the task at hand.

“With the capabilities of FirstNet, with priority and preemption, we wanted to make sure we had the best communication possibilities we could ... to make sure the teams could talk with each other and talk with the command center,” said Dr. David Rodgers, IC-EMS faculty advisor.

Through a unique partnership with IU RedLab, a crisis technology research group based at the Luddy School of Informatics, IC-EMS utilized Team Awareness Kit (TAK), which is a mapping and situational awareness tool developed by Air Force Research Library that allowed command staff to see the real-time location of EMS crews across the stadium, parking lots, and tailgate fields. Instead of relying on radio descriptions in a sea of tents and similar jerseys, responders could navigate directly to patients and other units.

“Deploying TAK, with the help of IU RedLab, really helped us out a lot. TAK relies on a steady broadband connection. And without FirstNet resources, we would not have a stable signal to have that 100% reliability with the system,” Rodgers explained. “There was a lot of versatility when it came to our use of TAK, but it was all dependent upon connectivity.”

Expanding care through technology and partnerships

The enhanced communications environment created the need for an expansion of IC-EMS's role at football games. In addition to providing traditional first aid coverage, IC-EMS deployed multiple basic life support roaming units — using golf carts to respond to calls across a wider geographical footprint, only calling advanced life support resources as needed so they could remain available.

FirstNet-enabled devices also supported on-scene medical diagnostics. IC-EMS used FirstNet phones as hotspots to transmit EKGs from cardiac monitors directly to on-site medical professionals for real-time interpretation; these capabilities would not have been feasible without FirstNet.

“Without FirstNet resources, we would not have a stable signal to have 100% reliability with the system ... and we're able to dispatch resources more efficiently and take care of patients better and faster,” Rodgers said.

Together, these tools improved response times, expanded situational awareness, and elevated patient care for all game-day attendees.

A model for large events and collegiate EMS

IC-EMS's experience demonstrates how early engagement, thoughtful pre-planning, and the right communications tools can transform EMS operations at events. By combining student leadership with advanced technology and strong collaboration, IC-EMS not only met the moment of a historic football season but set a model for how preparedness and connectivity can be scaled to meet the needs of a growing community.

If you are interested in learning more about the FirstNet Authority and how FirstNet may be able to help with public safety's operations on your campus, please email Charles Hardnett at Charles.Hardnett@firstnet.gov.

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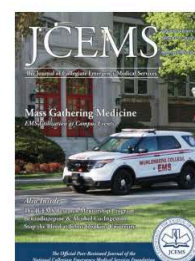
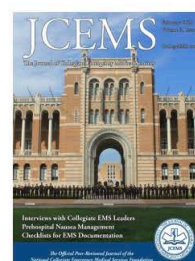
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Implementation of CPR Advocacy Program at CrimsonEMS

Nayan Sapers, NREMT; Ivette Chen, NREMT; Olivia Weber, NREMT; Meng Yang; Isabel Li, NREMT; Sandhya Kumar, NREMT; Himani Yarlagadda, NREMT; Misael De Los Reyes, NREMT; Tyler Nilson, NREMT

Background

Massachusetts is one of only nine U.S. states without a statewide requirement for CPR education in schools. In states with such policies, students need to receive hands-on CPR and AED training in order to graduate high school; these trainings are often non-certifying, and integrated within existing health or physical education curricula. Despite strong evidence that bystander CPR significantly improves survival after cardiac arrest, access to CPR education in Massachusetts has remained inconsistent and largely dependent on individual school districts or community organizations.¹

In Fall 2024, CrimsonEMS launched the CPR Ambassador Program to address this critical policy gap, training high school students to become CPR advocates and peer educators. This paper describes the program's structure, challenges encountered during development, legislative advocacy efforts, evaluation findings, and recommendations for replication.

Program Structure

Advocacy Day

Ambassadors are recruited through outreach to schools and via direct collaboration with Harvard Medical School's Summer MedScience program for high schoolers. Funded by the American Heart Association (AHA), an initial advocacy day is held on Harvard's campus in September. During the day, ambassadors are CPR-certified and taught the basics of effective advocacy, ranging from evaluating stakeholder engagement, understanding the legislative landscape, and learning tactics to teach peers CPR. The advocacy day schedule also prioritizes relationship-building among ambassadors, as peer connections have proven essential for sustained engagement throughout the program year.

Weekly Schedule and HeartWork

Following this initial six-hour training day, ambassadors are separated into groups of 7–8 students ("cohorts") to begin their biweekly assignments, termed "HeartWork." This work provides students with a scaffold to guide their advocacy efforts. For example, a HeartWork assignment may have an objective to identify stakeholders within one's community and

plan an advocacy-related event. In addition to these structured HeartWork assignments, many ambassadors take initiative to expand the program. For example, a current group of returning ambassadors created and distributed a program newsletter. On average, ambassadors report dedicating 3.66 hours a week towards CPR education.

Cohort leaders are either volunteer CrimsonEMS members (such as was the case when the program began) or alumni of the inaugural cohort. Cohort leaders hold weekly check-ins via videoconference, which allow ambassadors to bond and receive guidance. Cohort leaders also hold one-on-one semesterly meetings with each ambassador to reflect on their progress and request feedback on the program.

Events

Each semester, the program plans several events for the ambassadors. The program has organized three in-person visits to the State House, where students lobbied by knocking on the doors of legislators. The program also organized in-person tabling at community gatherings and collegiate and professional sporting events, as well as speaker events with AHA representatives and medical professionals. The program also maintains student-run social media accounts to highlight ambassadors' activities and support outreach to schools and community members.

Advocacy Officers

Internally, beyond the cohort leaders, CrimsonEMS selects five Advocacy Officers to lead the program. These roles range from managing ambassadors and HeartWork assignments to conducting a statewide cross-sectional survey of CPR/AED infrastructure across over 400 Massachusetts high schools. First-authored by a high school ambassador and published as a preprint, this statewide survey revealed significant inequities in CPR education across the state, with implications for survival rates from out-of-hospital cardiac arrest (OHCA).² By surveying school administrators on local instruction and equipment, the study found particularly low training rates in Title I schools.² This data is now driving the program's statewide strategy and informing recent legislative advocacy.³

Legislative Advocacy

Ambassadors and program leaders have worked together to pass seven municipal resolutions for CPR in schools, including in Boston, Cambridge, Somerville, Taunton, Newton, Brockton, and Lowell. The effort began with drafting a model resolution in collaboration with the Cambridge City Council. Program leaders and ambassadors then brought this resolution to municipalities

Nayan Sapers, NREMT, was the founding Advocacy Officer of this program. Ivette Chen, NREMT, and Olivia Weber, NREMT, were the leading Advocacy Officers. Meng Yang is a current high school CPR Ambassador and has been extensively involved in the statewide CPR survey. Isabel Li, NREMT, Sandhya Kumar, NREMT, Himani Yarlagadda, NREMT, Misael De Los Reyes, NREMT, and Tyler Nilson, NREMT, are EMT-Bs who served as CrimsonEMS CPR instructors and outreach leads, coordinating CPR programs within the organization.

across the state, requesting formal support for CPR education in schools. In addition, several ambassadors have spoken to their school committees about implementing CPR in their curricula.

The response was overwhelmingly positive. In meetings with school officials and legislators, the program found that the primary barrier was not opposition but rather a lack of awareness:

many stakeholders were simply unfamiliar with the fact that Massachusetts had no statewide CPR education requirement. Generally, there was no opposition to implementing CPR into school curricula. There were occasional concerns about cost, but this is minimal when teaching Hands-Only CPR, which high schoolers in the program are capable of teaching. Several of the larger municipalities, including Boston, issued press releases in conjunction with their resolutions, further amplifying the campaign's visibility.⁴

Obstacles and Challenges

Funding

As a student organization rather than a registered nonprofit, CrimsonEMS initially faced challenges in receiving and managing funds. The program worked closely with the AHA to receive direct funding for advocacy day operations. Per-student costs for advocacy day were modest: approximately \$50 for CPR certification, \$15 for food, and \$10 for program merchandise. In addition, BJ's Wholesale Club, facilitated by the AHA, sponsored 50 Mini Anne CPR manikins for the program's use.

As the program grew, CrimsonEMS established a gift fund through the university. Since Harvard is a nonprofit, the organization could receive tax-deductible donations through this channel. This opened additional funding streams, including support from Boston Children's Hospital for extracurricular programming such as mini-grants for student projects, branded apparel for all ambassadors, and transportation assistance. Importantly, the program worked with the AHA to create a national grant program that supports awareness of CPR/AEDs, and aids in implementation of Cardiac Emergency Response Plans in high schools across the nation.

Engagement and Retention

While the majority of ambassadors have been deeply engaged, the program has experienced attrition. Each year, approximately 4-8% of students disengage after advocacy day, and roughly 25% stop attending cohort meetings after the first semester. These attrition rates are roughly consistent across cohorts and school semesters. However, the program's impact has been driven less by sheer numbers than by the quality and commitment of those who remain. Ambassadors who persist in the program report teaching hundreds to thousands of individuals in their communities through Hands-Only CPR instruction. Many have founded CPR clubs at their schools, often as AHA Heart Clubs, making them eligible for the national grants described above. Two ambassadors have founded independent nonprofit organizations dedicated to CPR awareness, one in Massachusetts (Vitals) and one in North Carolina (Hearts for CPR). Returning ambassadors have visited the State House multiple times, led community trainings, and gone on to serve as cohort leaders.

Legislation

CPR in Schools legislation has been introduced in Massachusetts for decades without advancing out of committee.

While supportive of CPR education, policymakers remain cautious about changes to graduation requirements, a caution amplified following the 2024 removal of the Massachusetts Comprehensive Assessment System (MCAS) examination as a statewide requirement. Legislative staff also noted that proposals affecting school curricula depend heavily on guidance from education bodies such as the Department of Elementary and Secondary Education and the K-12 Graduation Council.

However, the current session marked a historic turning point: for the first time in over 30 years, the bill received a favorable report from the Senate Committee on Education. Despite this progress, the timeline for statewide implementation remains uncertain. The program therefore also focuses on community engagement, including municipal resolutions and partnerships with local school districts. These local efforts allow communities to formally express support and begin CPR training while the statewide process continues.

Program Evaluation

Now in its second year of operation, the CPR Ambassador Program has grown rapidly. Currently, the program has 120 active ambassadors representing 88 high schools in the nation, with 72 of those high schools in Massachusetts (see Fig. 1). Of these Massachusetts high schools, 74% were public schools and the remaining 26% were private.

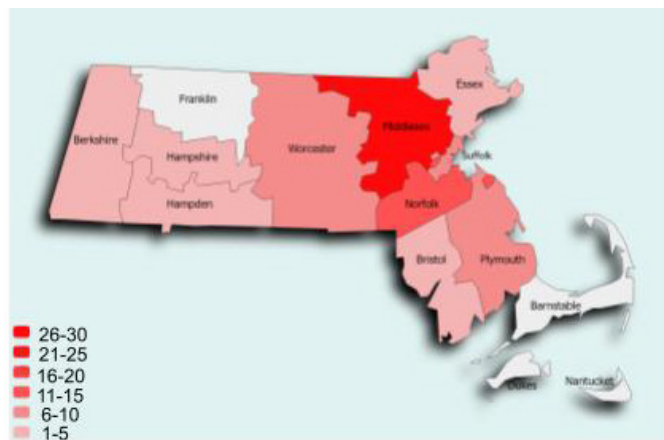


Figure 1. A choropleth map of the number of Massachusetts ambassador schools per county. Each county's color corresponds to a specific range of ambassador schools, with the brightest red corresponding to 26-30 ambassador schools within that county, and white corresponding to zero ambassador schools within that county. Middlesex county held the highest number of ambassador schools (28).

Ambassadors have collectively trained or reached over 8,000 individuals through more than 150 CPR instruction sessions, workshops, and advocacy campaigns. Attendance was tracked using sign-in sheets, registration records, and ambassador-submitted activity logs documenting participation at each event. To guide statewide programming and funding strategy, ambassadors and staff collected data from over 100 public Massachusetts high

schools, the most comprehensive survey of CPR education in Massachusetts to date.

Evaluation surveys were sent to all ambassadors by their respective cohort leaders at the end of the semester. 98% of respondents (n=54) felt comfortable with performing CPR, 100% felt confident advocating for CPR, and 100% said they would recommend the program to a friend. It should be noted that these surveys were administered post-program and do not include baseline measurements, which limits the ability to attribute changes in confidence directly to the program. Future iterations plan to incorporate pre- and post-program assessments to better measure skill acquisition and attitudinal change.

Regarding certification, all ambassadors who attend advocacy day receive CPR certification through the formal AHA Heartsaver course. Ambassadors unable to attend in person complete a virtual training; however, the program acknowledges that virtual training is limited in its ability to develop hands-on skills, and these ambassadors thus do not get certified. The program is currently working with external organizations to secure funding to ensure that all ambassadors, not just those who attend advocacy day, can receive full CPR certification. In addition, ambassadors are provided with a standardized reference document of key talking points and procedural reminders for conducting CPR instruction and community outreach.

Alumni of the inaugural cohort now serve as cohort leaders for new ambassadors, ensuring program continuity and sustainability. Based on the ambassador feedback on the program, Heartwork assignments have been made shorter and more specific, rather than the original format of assigning multiple numbered tasks; leaders also send weekly reminders to complete these assignments, and support ambassadors with more one-on-one meetings, past initiative examples, and rough timelines when they are planning activities for their own communities. Several ambassadors have extended the program's mission beyond Massachusetts, launching CPR clubs in their own schools, and in two cases, founding nonprofit organizations dedicated to CPR awareness.

The CPR Ambassador Program has successfully transitioned from a localized pilot to a scalable advocacy and education model. It now combines evidence-informed training, youth leadership development, and direct policy engagement.

Advice for Replication

For programs interested in integrating youth advocacy, a structured, scalable model is key. An initial training day prepares students, while small cohorts led by volunteers help maintain continuous engagement. For program effectiveness, student ambassadors should be trained in CPR instructorship and advocacy skills and should also be provided the physical materials to teach their peers. Clear timelines and meaningful opportunities (e.g., legislative visits, sporting events) support student growth and overall momentum. In addition, the benefits of joining the program should be made clear: students should know that they can receive community service hours for their participation, and there should be ample opportunities for students to interact with program leaders, to not only

strengthen their CPR knowledge but also to build a network for pre-professional opportunities and mentorship. The CPR Ambassador program has also hosted college admission panels, where 3-4 Harvard undergraduates and active CrimsonEMS members have fielded questions from high school students involved in and interested in their program.

We strongly recommend partnering with a community health organization such as the AHA. In addition to funding support, these organizations provide access to established advocacy networks and structured engagement opportunities for students. For example, many ambassadors are currently participating in the AHA Teen of Impact campaign, raising funds and receiving recognition for their efforts. Students also have opportunities to engage with AHA initiatives, including national and state committees, social media outreach, and interactions with healthcare and public health professionals.

We also found it important to have a consistent point of contact within the partner organization. Regular meetings with a regional grassroots manager helped coordinate events, troubleshoot logistical challenges, and connect the program with similar efforts in other states, supporting continued program development and expansion.

Another critical factor in the program's success has been dedicated leadership. Programs seeking to replicate this model should ensure that at least two to three students are committed to running the program, with each expecting to dedicate roughly 10-15 hours per week.

Currently, our priorities include expanding partnerships with schools and community organizations, implementing standardized evaluation tools, including pre- and post-program assessments, to measure long-term skill retention, and diversifying our funding sources to support sustained growth.

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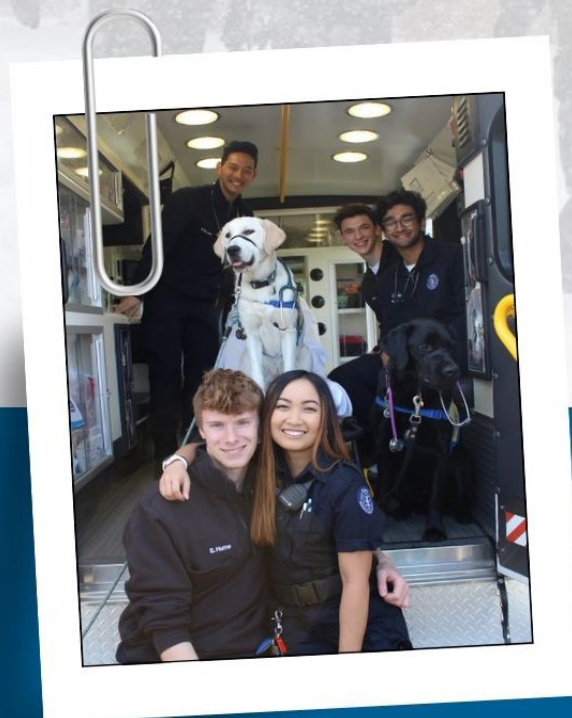
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Efficacy of Peer-Instructed Naloxone and CPR/AED Training in Collegiate Setting

Tristan Jafari, BS, EMT; Shubham Bansal; Patrick Bi, BS, MBE, EMT; Tanmay Bhanushali, EMT; Catherine R. Counts, PhD, MHA

ABSTRACT

Background: Bystander intervention in out of hospital cardiac arrest and opioid overdoses significantly improves survival, yet training opportunities and bystander confidence remain limited. Collegiate-based emergency medical services (CBEMS) agencies may play a key role to address these gaps on college campuses through a peer-led training program. **Objectives:** This pilot study aims to characterize and evaluate free, peer-led naloxone administration and CPR/AED training sessions delivered by a CBEMS agency at a large, public university. **Methods:** We conducted a retrospective analysis of survey responses from participants of naloxone administration and CPR/AED training sessions delivered by a CBEMS agency and assessed self-reported confidence, knowledge, helpfulness, accessibility, and encouragement. **Results:** 301 training session attendees completed the surveys. 14.5% of respondents reported “high” or “very high” confidence in administering naloxone before training, compared to 94.9% ($p < 0.0001$) after training. Similarly, respondents who reported “high” or “very high” confidence in performing CPR increased from 16.6% to 97.5% ($p < 0.0001$). In both the naloxone and CPR/AED training courses, over 90% found the training helpful and the majority of participants indicated they would not have been able to pursue similar training elsewhere. **Conclusion:** CBEMS-led emergency response training delivered through CBEMS agencies may improve self-rated confidence and knowledge in life-saving interventions on college campuses. CBEMS agencies and their sponsoring institutions should consider implementing such programs to enhance campus emergency preparedness.

Introduction

Out-of-hospital medical emergencies, such as cardiac arrest and opioid overdoses, represent critical public health challenges that require immediate intervention. Only 40% of out-of-hospital cardiac arrest (OHCA) patients receive bystander cardiopulmonary resuscitation (CPR) despite its potential to double survival rates.¹ Additionally, opioid overdose rates have risen in recent years,² increasing opportunity for bystander intervention through the administration of naloxone, an over-the-counter medication that acts as an opioid antagonist.³ Thus, expanding access to life-saving bystander training sessions, including CPR/AED and naloxone administration, is essential.

College campuses represent a unique setting for such initiatives due to their dense, interconnected communities and the potential for peer-driven education and engagement. Furthermore, Collegiate-Based Emergency Medical Services (CBEMS) agencies—student-run organizations that provide emergency response services—are particularly well-positioned

to deliver these trainings to large student populations, given their established role in campus emergency response and health education.

While previous studies have illuminated how peer-led bystander training can be effective^{4–6}, little has been done to examine the impact of CBEMS-run programs to fill gaps in training.

This study will evaluate the efficacy of a program administered by a CBEMS agency at a large, public, urban university with an enrollment of over 35,000 undergraduate and 15,000 graduate students. The CBEMS is a non-transporting BLS agency with an annual call volume of 400. On campus, AEDs and overdose reversal kits are readily available in high-traffic zones. By examining changes in participants’ self-reported confidence, knowledge retention, helpfulness, and encouragement, we aim to describe and assess the effectiveness of this novel CBEMS-led training model and its potential application to other institutions.

Methods:

Study Design:

This study was conducted as a retrospective evaluation of quality improvement data gathered from the CBEMS-led bystander training sessions from January to May of the year 2024. The training sessions were administered and managed by a CBEMS agency, as a part of standard offered community outreach services. The overarching program included two distinct courses, a naloxone training and a CPR/AED training, both of which were free and open to all university students, staff, and faculty. Inclusion criteria for the study included participants who completed the course and the end-of-training survey.

Tristan Jafari, BS, EMT, is a MPhil candidate at the University of Cambridge studying population health sciences, an alumnus of the University of Washington, and a founder of the University of Washington Emergency Medical Services. **Shubham Bansal** is a senior earning a B.S. in Neuroscience at the University of Washington and has served as an American Red Cross CPR Instructor for the University of Washington Emergency Medical Services. **Patrick Bi, BS, MBE, EMT**, is a fourth-year medical student at the University of Washington School of Medicine, a founder of the University of Washington Emergency Medical Services, and holds a B.S. and a Master’s in Biomedical Engineering from Rice University. **Tanmay Bhanushali, EMT**, is a senior earning a B.S. in Linguistics at the University of Washington and a founder of the University of Washington Emergency Medical Services. **Catherine R. Counts, PhD, MHA**, is an Assistant Professor within the University of Washington Department of Emergency Medicine, Section of EMS.

Training:

The naloxone training was a one-hour in-person course titled “Opioid Overdose Recognition & Naloxone Administration” and was designed and led by certified Emergency Medical Technicians (EMTs). Participants learned to recognize the signs of opioid overdose and how to administer naloxone, receiving a certificate of completion determined by their active participation. The CPR/AED training was an in-person three-hour course titled “American Red Cross Adult CPR/AED” and was taught by certified American Red Cross (ARC) instructors. Participants learned CPR techniques and AED use, receiving a two-year ARC Adult CPR/AED certification upon completion determined by active participation. Both courses included a combination of lecture-based instruction and hands-on practice. Both courses were held in central campus locations, delivered in small groups (between 10-30 students), and followed a consistent instructional format throughout the data collection period. There was a minimum of one instructor present for every 12 participants, and all instructors were affiliated with the university’s CBEMS agency.

Recruitment & Enrollment:

This study examines data from the courses offered in a four-month period between January 30th, 2024 to May 25th, 2024. A total of eight naloxone and nine CPR/AED courses were held in this timeframe.

The training courses were advertised through the CBEMS agency’s social media channels, emails to students from the student body government, and posters in high-traffic areas. Participants could register for the courses on the website of the CBEMS agency.

Data Collection & Analysis:

Following completion of either training course, participants were invited to complete a single online survey, with no incentive provided for participation. The survey contained 14 total items, of which 11 were included in the present analysis. These included three demographic questions, four stand-alone questions, and two sets of pre- and post-training questions. Demographic and stand-alone items were identical across the naloxone and CPR/AED training sessions, while pre and post-training questions differed by course to reflect skill-specific competencies. Three items were excluded from analysis: two short-response questions soliciting participant feedback on valuable aspects of the training and suggestions for improvement, and one binary item assessing whether participants would recommend the course to others.

Demographic measurements were age, class standing, and race/ethnicity. Stand-alone questions asked participants to report helpfulness of the training session, anticipated retention of knowledge, accessibility of the training relative to other available options, and level of encouragement to pursue additional training. Pre- and post-training questions assessed self-reported confidence and knowledge for course-specific skills and were administered in paired format, with one item requesting participants’ score their perceived confidence or knowledge prior to the training and a corresponding item requesting scores following completion of the training.

All non-demographic questions were organized on a 5-point Likert scale. Accessibility of the courses was assessed based on how likely respondents felt they would seek out a similar course had this session not existed, ranked from “Very Unlikely” (1) “Very Likely” (5). The perceived helpfulness, knowledge retention, and level of encouragement were ranked from “Not At All

Helpful/Not At All Well/Not At All Encouraged” (1) to “Very Helpful/Very Well/Very Encouraged” (5), respectively. Confidence and knowledge before and after the training session were ranked on a scale from “Very Low” (1) to “Very High” (5).

Descriptive statistics were used to summarize all data. Changes in participants’ confidence levels pre- and post-training were analyzed using the Wilcoxon Signed-Rank Test, a non-parametric statistical test suitable for paired ordinal data. For all tested hypotheses, α was set at 0.05. All data analysis was performed using R (version 4.3.3).

Ethical Considerations:

All survey responses were de-identified for the purposes of the study. Participation in the training course and survey was voluntary, and receipt of either certification was not contingent on completion of the survey. The study protocol was reviewed and approved by the local university Institutional Review Board.

Results:

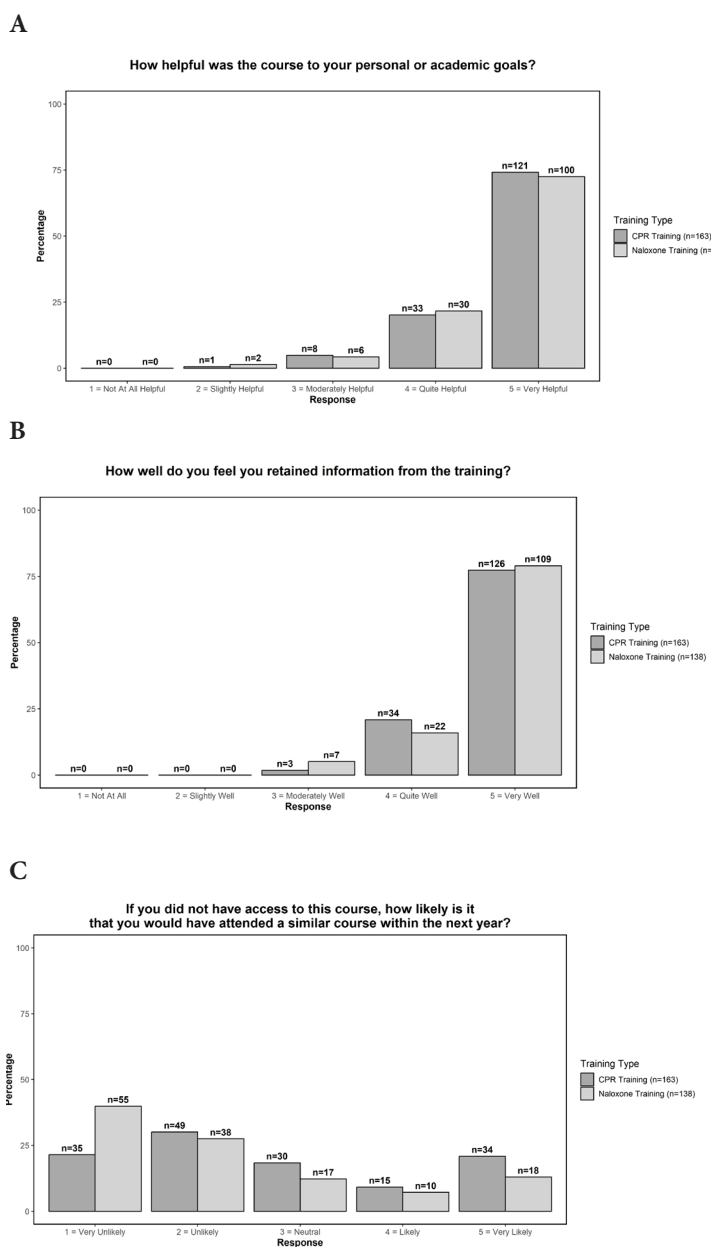
A total of 175 people attended a naloxone training, while 226 attended a CPR/AED training. Of these, 138 (78.9%) and 163 (72.1%) completed an end-of-course survey for the naloxone and CPR/AED training, respectively. The respondents were predominantly undergraduate students, with freshmen (28.3% naloxone, 31.9% CPR/AED) and sophomores (34.1% naloxone, 31.3% CPR/AED) representing the largest groups. The most common age group was 19 years (30.4% naloxone, 34.4% CPR/AED), with few participants over 23 years of age (5.8% naloxone, 5.8% CPR/AED). Table 1 summarizes participant demographics.

Table 1

Demographics		
Category	Percentage (n)	
	Naloxone Training n=138	CPR Training n=163
Total Count		
Age		
18	15.22% (21)	14.72% (24)
19	30.43% (42)	34.36% (56)
20	26.09% (36)	22.09% (36)
21	16.67% (23)	14.11% (23)
22	5.8% (8)	6.75% (11)
23+	5.8% (8)	8.00% (13)
Class Standing		
Freshman	28.3% (39)	31.9% (52)
Sophomore	34.1% (47)	31.3% (51)
Junior	24.6% (34)	19% (31)
Senior	10.9% (15)	13.5% (22)
Graduate	1.4% (2)	2.5% (4)
Staff	0.7% (1)	1.8% (3)
Selected Race/Ethnicity		
Asian/Pacific Islander	47.8% (66)	47.9% (78)
White / Caucasian	22.5% (31)	19% (31)
Black or African American	7.2% (10)	6.1% (10)
Hispanic	12.3% (17)	16% (26)
American Indian or Alaskan Native	0% (0)	0.6% (1)
Mixed/Other	10.1% (14)	4.3% (7)

The naloxone and CPR/AED training courses were perceived as beneficial to respondents, with 94.2% and 94.5% of respondents, respectively, rating the courses as “Quite Helpful” (4) or “Very Helpful” (5) (Figure 1A). Respondents’ self-reported knowledge retention was similarly positive, as 94.9% of naloxone and 98.2% of CPR/AED training course respondents indicated they felt they retained the material “Quite Well” (4) or “Very Well” (5) (Figure 1B). Accessibility emerged as a significant factor, as 67.4% of naloxone respondents and 51.5% of CPR/AED respondents indicated they were “Very Unlikely” (1) or “Unlikely” (2) to attend a similar course elsewhere if this training session had not been offered (Figure 1C). Moreover, the courses fostered interest in further training, with 95.7% of naloxone and 89.0% of CPR/AED respondents feeling “Quite Encouraged” (4) or “Very Encouraged” (5) to pursue additional emergency medical education, such as Basic Life Support (BLS) or EMT certification (Figure 1D).

Figure 1



D

Rate how encouraged you feel to pursue additional training in emergency medical services?

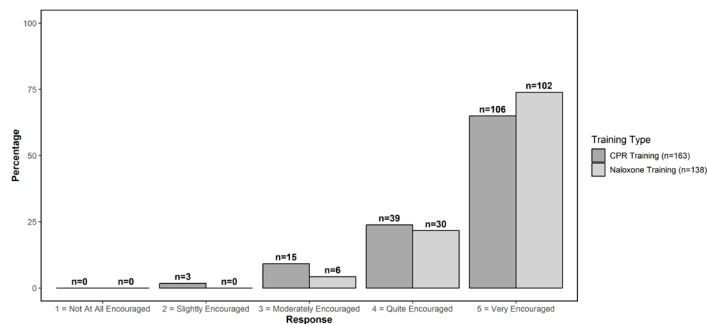


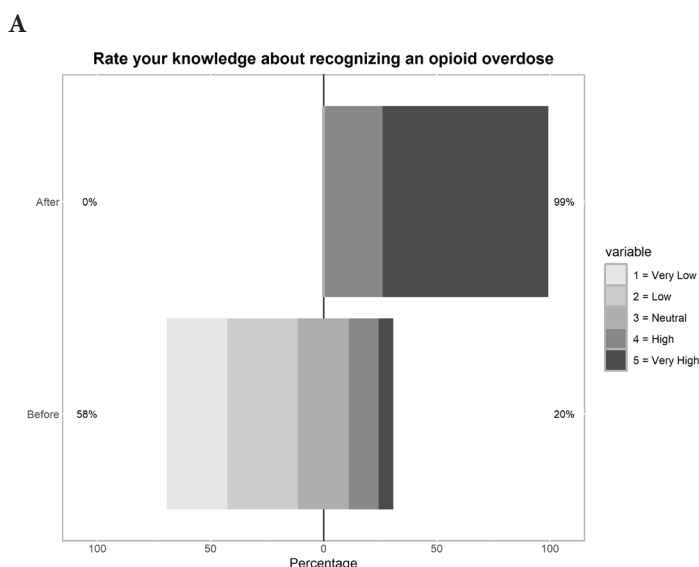
Figure 1. Post-course survey responses. (A) Bar chart of likert distributions for helpfulness (B) Bar chart of likert distributions for perceived retention (C) Bar chart of likert distributions for likelihood of taking a similar course elsewhere (accessibility) (D) Bar chart of likert distributions of the level of encouragement to pursue more training

Only 19.6% of respondents felt their knowledge about how to recognize an opioid overdose was “High” (4) or “Very High” (5) before the naloxone training course, compared to 98.6% after the training (Figure 2A). Similarly, “High” (4) or “Very High” (5) self-reported levels of confidence in administering naloxone rose from 14.5% pre-training to 94.9% post-training (Figure 2B).

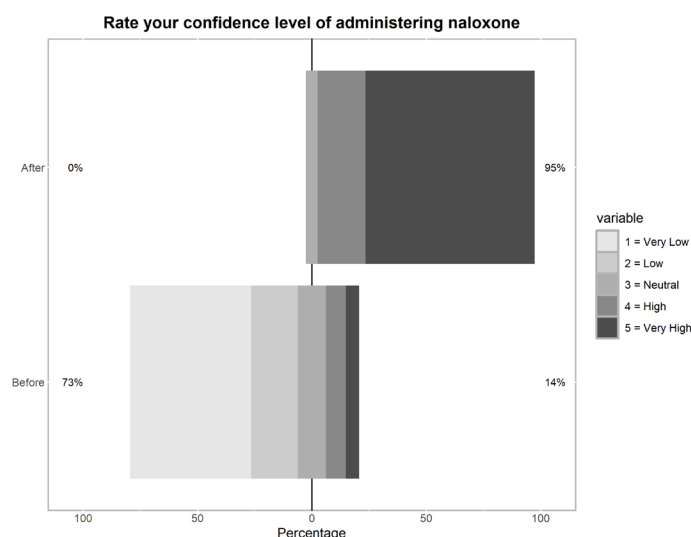
For the CPR/AED training, respondent reports of “High” (4) or “Very High” (5) confidence in performing CPR increased from 16.6% pre-training to 97.5% post-training (Figure 2C). Perceived “High” (4) or “Very High” (5) levels of knowledge about using an AED improved from 16.3% to 94.5% of respondents (Figure 2D).

Analysis of post-course responses indicating perceived confidence and knowledge pre- and post-training by Wilcoxon Signed-Rank Test revealed a statistically significant positive change in self-reported confidence or level of knowledge across all four measured domains of emergency response skills ($p < 0.0001$ for each).

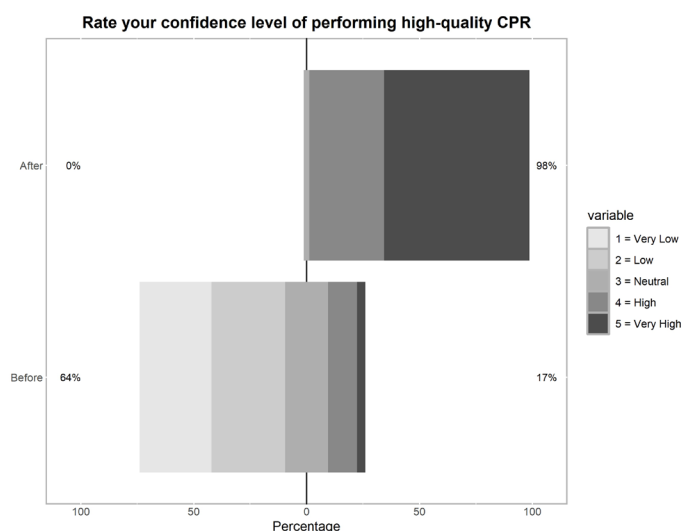
Figure 2



B



C



D

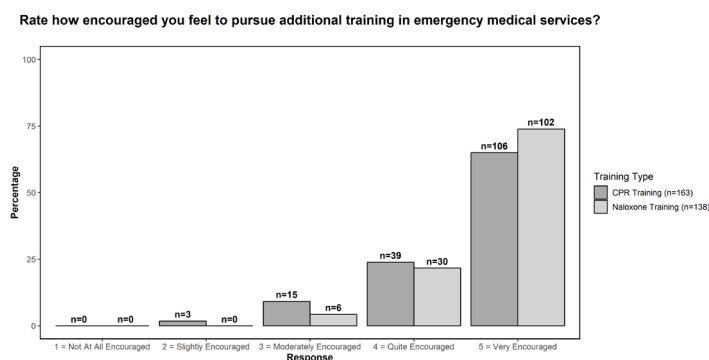


Figure 2. Pre-post changes in self-reported confidence/knowledge (A) Stacked bar chart showing Likert responses of “Before” vs “After” for knowledge of recognizing an opioid overdose (B) Stacked bar chart showing Likert responses of “Before” vs “After” for confidence administering naloxone, (C) Stacked bar chart showing Likert responses of “Before” vs “After” for confidence performing CPR (D) Stacked bar chart showing Likert responses of “Before” vs “After” for knowledge of how to use an AED. Percentages indicate the rounded proportion of respondents rating their knowledge as low (“Very Low” or “Low”) on the left and high (“High” or “Very High”) on the right. Values are rounded in the figure for readability; exact percentages are reported in the text.

Discussion:

This pilot study is the first to provide preliminary evidence for the effectiveness of CBEMS-led naloxone and CPR/AED training sessions on improving self-reported participant confidence and knowledge in life-saving interventions. Existing literature suggests significant benefits in self-confidence and knowledge are conferred to participants of naloxone and CPR/AED training courses.^{5,7,8} As such, training programs that allow for early bystander intervention are encouraged as public health initiatives to address the opioid epidemic and improve OHCA outcomes.⁹ Implementing systems that incorporate peers as instructors, particularly within educational institutions, have been proposed as a promising means to improve accessibility, lower costs, and circumvent challenges associated with bystander training while maintaining efficacy.^{6,10–12} Taken together, this suggests CBEMS-led training may represent a feasible and beneficial instance of peer-led bystander education within collegiate settings.

Beyond its role in delivering proper training, the program examined in this study provided additional benefits by being held in centrally located campus venues that minimized logistical barriers to attendance, offering structured teaching opportunities that allowed peer instructors to develop instructional and leadership skills, and eliminating financial barriers to participation through a no-cost model. The no-cost model was possible because all instructors volunteered their time, rooms were provided at no cost by the university, and funding for reusable equipment was acquired through a one time grant from the university. The only expenses incurred were the recurring purchases of disposable personal protective equipment and the certification fees paid to the ARC.

Although longitudinal data is necessary for corroboration, these findings suggest that participants’ self-perceived encouragement to pursue additional training may increase their likelihood of enrolling in future medically oriented education. In other words, a highly-accessible collegiate bystander training program may act as a ‘stepping stone’ for future engagement. Amid concern for widespread shortages in the EMS workforce^{13–17}, these programs may serve as a potential pipeline for recruiting young individuals into emergency care roles, including participation in EMS agencies.

Accessibility was another critical factor in this program’s impact, with over half of survey respondents indicating they were unlikely to seek similar training elsewhere, likely due to the time and effort required to attend external courses. This is consistent with previous research citing financial cost and lack of awareness of local courses as major barriers to attending emergency response training.^{18–20}

Limitations:

The scope of this study was limited to survey data from training sessions on a single university campus within a relatively short timeframe, introducing a potential for selection bias. The majority of respondents in both the naloxone and CPR/AED training programs were freshmen and sophomores, with students identifying as Asian/Pacific Islander being overrepresented in the sample. This limits the generalizability of the findings to the broader collegiate population and to campuses with different demographic compositions.

Participant sex or gender identity and prior emergency response certification were not assessed, which may have presented additional context for data interpretation.

Survey responses were collected through a single end-of-training survey, which may have introduced response bias, particularly recall bias, as participants could have misassessed their pre-training confidence and knowledge.

Without longitudinal data, it is difficult to determine the long-term effectiveness of the training in real-world scenarios. Additionally, while self-reported measures of self-efficacy, such as confidence and knowledge, were high immediately after training, these subjective assessments may not accurately reflect actual performance, and the retention of these skills over time remains uncertain.

Conclusion:

This pilot study offers preliminary evidence that CBEMS-led naloxone and CPR/AED training sessions are associated with significant increases in participant self-rated confidence and knowledge to administer intranasal naloxone and deliver high-quality CPR. Furthermore, given the cost-effectiveness and accessibility of the described training program, similar bystander training programs may be effective models for other college campuses to adopt, particularly those with CBEMS agencies capable of managing and administering the training sessions. Additional research using objective assessments of skill performance and longitudinal follow-up at other institutions is needed to validate these findings and further evaluate the impact of CBEMS-led naloxone and CPR/AED training.



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An Analysis of the Utility of the LIFEPAK Device in Collegiate Emergency Medicine

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ABSTRACT

Background: With an ever-growing need for efficiency in emergency medicine, especially at the collegiate level, there has been some debate about the necessity of carrying large machines such as the LIFEPAK to calls involving “non-critical” patients. Despite the numerous applications of the LIFEPAK – for example, cardiac monitoring and taking automatic blood pressure readings at precise time intervals – its price may be beyond the budget of many collegiate EMS crews, and its weight can make it a burden to haul, slowing response times in emergent situations. This potential decrease in efficiency may not be necessary, especially if the LIFEPAK is only used to obtain patient vitals, which crews are trained to obtain manually. **Objectives:** The purpose of this study was to answer the following question: do manual blood pressure and heart rate measurements differ substantially from those obtained using the LIFEPAK? By answering this question, it may be possible to evaluate whether the LIFEPAK is a worthwhile investment for collegiate EMS crews who don’t often use its more advanced features. **Methods:** Crews measured heart rates and blood pressures of student volunteers manually and using the LIFEPAK 15 device. These student volunteers were assumed to be proxies for patients meeting the criteria for a “non-critical” designation, made when a patient does not meet University Emergency Medical Response upgrade criteria for the Richardson Fire Department’s Advanced Life Support (ALS) Unit. Crews were asked to document blood pressure and heart rate readings using each method on a designated form. **Results:** It was concluded that there was no significant difference between the manual vitals and LIFEPAK vitals obtained by crews throughout the duration of this study. Therefore, manual vitals can be said to be a numerically consistent alternative to those taken using the LIFEPAK. **Conclusions:** As a result, we recommend that collegiate EMS crews conduct further cost-benefit analyses to assess if this substitution can improve the efficiency, response time, and satisfaction of crews, while reducing their physical burden.

Keywords: collegiate-based emergency medical services, equipment

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Campus-based emergency medical services (CBEMS) are becoming increasingly common as universities recognize the value of timely emergency responses on collegiate campuses. However, one of the challenges that these organizations often encounter is attempting to maximize crew efficiency while operating within the financial constraints of their annual budgets.

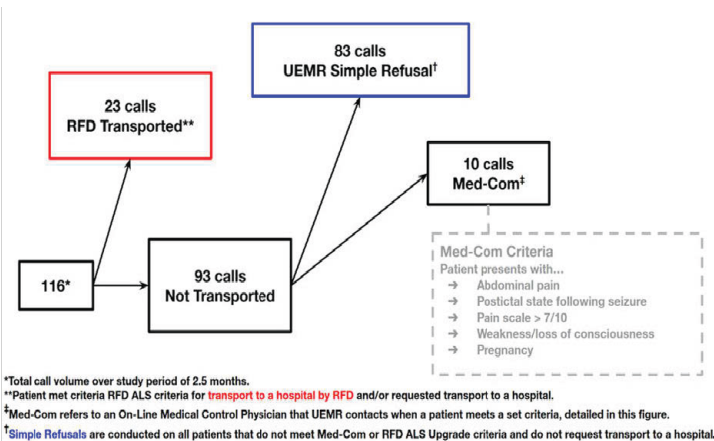
The LIFEPAK 15 and similar devices are utilized by emergency medical services (EMS) nationwide for their all-in-one advanced cardiac monitoring, defibrillation, and vital sign assessment capabilities (Stryker, 2009)¹. By automating blood pressure and heart rate measurements, providers are instead able to focus more on administering treatments and ensuring patient comfort throughout their calls. Despite these advantages, however, the LIFEPAK 15’s size and weight may make it a burden for crews to transport, and its price may present a significant financial challenge for organizations on strict annual budgets.

University Emergency Medical Response (UEMR) at The University of Texas at Dallas is a 24/7 BLS (Basic Life Support) QRS (Quick Response Service) volunteer collegiate EMS agency that actively serves a population of around 30,000 people, including students, faculty, and campus visitors. In 2024 alone, UEMR crews, typically composed of two providers in a golf cart and one field captain in an SUV, provided care for a total of 394 patients. The standard equipment load of UEMR crews includes the LIFEPAK, in addition to two large bags, each containing equipment such as medical and trauma kits, oxygen tanks, and oxygen delivery devices.

Crews are required to bring the LIFEPAK device to every call which, at 18.5 lbs., may be cumbersome for them to transport along with all this essential medical equipment. For example, when attempting to reach a patient on the upper floor of a building without elevator access, crews may quickly fatigue from their nearly-50 lb. load, which might negatively impact their performance and efficiency while caring for a patient,

though future studies would need to be conducted to determine this effect with certainty. Furthermore, in other collegiate EMS agencies where a full set of equipment may not be mandated, the added weight of the LIFEPAK and similar devices could lead crews to leave behind other equipment, which could negatively impact patient care if essential items are omitted.

Figure 1. UEMR Call Volume During Study Duration



Approximately 71% of CBEMS report an annual budget of under \$30,000; though most of these funds come from the institutions themselves, the rest must be secured from external sources beyond the host university². The LIFEPAK 15 and other similarly functioning devices can frequently cost up to \$48,000, meaning they can consume well over a CBEMS's entire yearly budget³. This can leave the organization with insufficient funds to sustain continued provider education, equipment maintenance, transportation, and operational sustainability, especially for newly established CBEMS.

This study provides an analysis of the numerical differences between device and manual vital sign measurements to determine if a substitution of the latter would significantly affect patient care and treatment outcomes. The goal of this project is to assess if manual vitals may be an accurate, effective, and appropriate alternative for collegiate EMS crews seeking to improve their efficiency or re-prioritize their budget.

Methods

Inclusion and Exclusion Criteria

Blood pressure and heart rate measurements were obtained from student volunteers that served as proxies for patients meeting criteria for a “non-critical” designation. This was done in order to avoid any potential risk to patients as presentation and “non-critical” status may change throughout a medical emergency. “Non-critical” patients are operationally defined as patients who consent to treatment by UEMR and do not meet the Richardson Fire Department’s (RFD) Advanced Life Support (ALS) upgrade criteria (Table 1).

Seventy-nine student volunteers that consented to participation and met the above inclusion criteria were selected at locations around campus that UEMR crews are commonly dispatched to. This was done in an attempt to mirror the true number of noncritical patients and environments that UEMR would be dispatched to throughout the study duration (true call volume from the study duration is outlined in Figure 1).

Manual blood pressures were measured with a sphygmomanometer placed on bare skin. Crews alternated manual and LIFEPAK blood pressure measurements on the same arm at five-minute intervals. The measurement process proceeded as follows: crews took the first manual blood pressure measurement, then the first automated measurement five minutes later, and so on. All blood pressures were measured at the brachial artery. These measurements were obtained on consecutive volunteers with verbal consent obtained before each reading. This numerical data was collected and submitted to a Google Form that included a section where crews could note unique environmental conditions, device failures, user errors, and other disturbances or distractions that might have influenced the readings.

One patient’s measurements were excluded due to reported extreme background commotion that could have influenced the accuracy of the crew’s manual blood pressure readings. Additionally, seven volunteers’ heart rate measurements were excluded due to malfunctions of the LIFEPAK device: for example, a faulty connection between the pulse oximeter and the LIFEPAK that rendered an “error” reading for automatic heart rate measurements.

Table 1. Richardson Fire Department Advanced Life Support Unit Upgrade Criteria Examples

Patient (Pt) presents with non-traumatic/cardiac chest pain	Pt presents with sustained decreased level of consciousness or altered mental status
Pt requires an EKG or other ALS intervention	Pt requires spinal motion restriction
Pt presents with unresolved breathing difficulties	Pt presents with sustained abnormal vitals or is actively seizing

If a patient meets these criteria, UEMR crews are required to upgrade the call to Richardson Fire Department.

This study was approved by our Institutional Review Board under Exemption Category 2(i) as no patient records were accessed, the study posed no risk to student volunteers, and no identifiable personal information was recorded.

Data Collection

All measurements were first obtained manually, followed by corresponding readings using the LIFEPAK 15. Manual heart rates were assessed as a radial pulse. Blood pressures were collected using the method described previously.

Both manual measurements and those recorded using the LIFEPAK 15 were collected using a Google Form that crews completed while collecting this data from student volunteers. The results were subsequently tabled in a Google Sheets spreadsheet. The timestamp column recorded by the Google Form upon submission was deleted and the data rows were shuffled weekly using randomized sort functions in Google Sheets to avoid potential bias during analysis. Upon the conclusion of data collection, each data set was assigned a unique Call ID letter for ease of comparison.

Numerical differences between vitals obtained manually and using the LIFEPAK device were calculated and assessed. All of the data obtained followed a normal distribution, allowing for statistical analysis using a paired-sample t-test to assess potential differences between the two measurement methods.

Establishing the Clinical Significance Range for Blood Pressure and Heart Rate Measurements

UEMR crews define a consistent blood pressure as one that varies less than 10 mmHg and a consistent heart rate as one that varies less than 10 to 15 bpm between measurements throughout the duration of a call, taking into account variation due to patient stress levels and incident severity. Variation beyond this may dictate varying courses of treatment and/or necessitate contacting our on-line medical control or upgrading our patient for transport to a hospital by RFD. Additionally, blood pressure ranges are defined in 10 mmHg intervals by the Cleveland Clinic, with each range indicating a different level of risk for conditions such as cardiovascular disease, stroke, and aneurysms.⁴

Since these ranges of ± 10 mmHg and ± 10 bpm also fell within the limits of our calculated 95% confidence intervals, and appeared to be the most restrictive boundaries for what is considered a consistent, these were established as our “boundaries of clinical significance” for differences in blood pressure and heart rate measurements.

A Bland-Altman plot was selected to display this data as well as the two intervals chosen to highlight significance or lack thereof.⁵

Results

The LIFEPAK 15 Operating Instructions⁶ provided by Stryker indicate that an acceptable mean difference between non-invasive blood pressure (NIBP) readings and auscultatory readings was ± 5 mmHg with a standard deviation of 8 mmHg (corresponding guidelines for differences in automated and manual heart rate measurements was ± 3 bpm). Thus, as indicated by the results in Table 2, it was concluded that there was no significant difference between the numerical values obtained using each method. The specific results of the paired t-test are shown in Table 3. These findings provide evidence that manual methods produced measurements comparable to the readings from the LIFEPAK device for these parameters.

Table 2. LIFEPAK Operational Standards Differences Compared to Study-Calculated Results

(A)		LIFEPAK 15 Indicated Accepted Mean Difference	Study-Calculated Mean Difference
	Systolic BP	± 5 mmHg	+ 2 mmHg
	Diastolic BP	± 5 mmHg	- 1 mmHg
	Heart Rate	± 3 bpm	- 1 bpm
(B)		LIFEPAK 15 Indicated Accepted Standard Deviation of Differences	Study-Calculated Standard Deviation of Differences
	Systolic BP	8 mmHg	7.80 mmHg
	Diastolic BP	8 mmHg	7.42 mmHg

Stryker's Operating Instructions for the LIFEPAK 15 included acceptable mean values for differences between LIFEPAK-measured and manually auscultated blood pressures. This figure shows the (A) mean differences and (B) standard deviations obtained from this study compared to the accepted mean and standard deviations specified by the manufacturer.

Table 3. Results of the Paired

Parameter	Test Statistic	Critical Value	p-Value*
HR	t(72, N = 73) = 0.24	1.667	0.16
SBP	t(77, N = 78) = 1.41	1.665	0.68
DBP	t(77, N = 78) = 0.45	1.665	0.81

* $\alpha = 0.05$ significance level used; p-value less than 0.05 indicates significant difference
HR = Heart Rate SBP = Systolic Blood Pressure DBP = Diastolic Blood Pressure

Table 3: Results of the Paired t-Test that Indicate No Significant Numerical Differences Between LIFEPAK Device and Manually Measured Vitals.

Figure 2. Manual (HR-M) and LIFEPAK-Measured (HR-L) Heart Rates per Incident

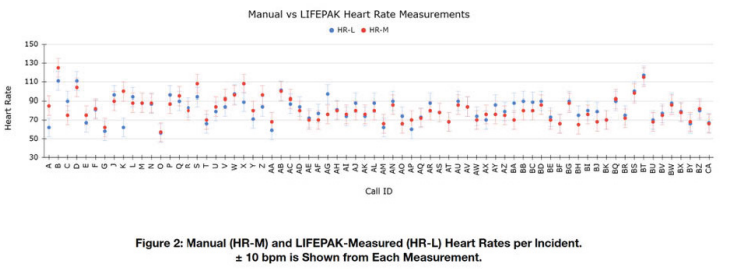


Figure 3. Manual (SBP-M) and LIFEPAK-Measured (SBP-L) Systolic Pressures per Incident

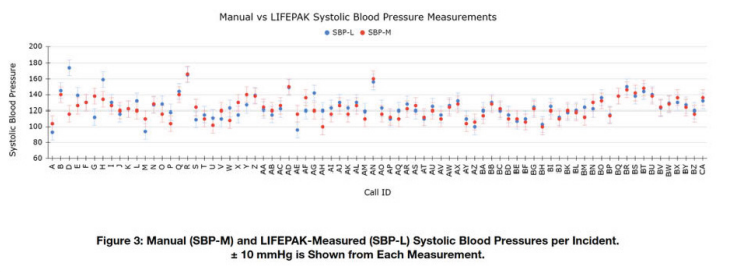


Figure 4. Manual (DBP-M) and LIFEPAK-Measured (DBP-L) Diastolic Blood Pressures per Incident

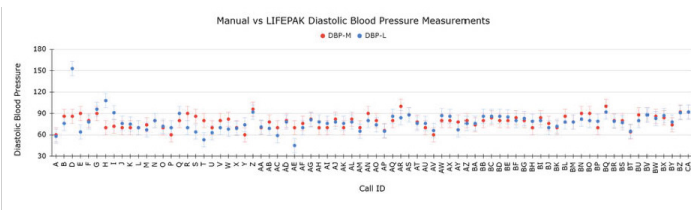


Figure 4: Manual (DBP-M) and LIFEPAK-Measured (DBP-L) Diastolic Blood Pressures per Incident. ± 10 mmHg is Shown from Each Measurement.

Upon analysis of the calculated 95% confidence interval, it was observed that blood pressure differences of up to approximately 20 mmHg remained within the interval's boundaries. These points were outside the range of what UEMR classifies as consistent, however, they would not be considered to display significant differences from the confidence interval alone. This necessitated the establishment of the novel boundaries, described previously, as the threshold for "Clinically Significant Differences." As mentioned, this interval was chosen based on the assumption that differences of 10 mmHg or greater may result in differences to treatment strategies, as well as increases in levels of risk for adverse health outcomes.⁷, □, □, □

Figure 5. Difference Between Manual and Automatic Heart Rate Measurements per Incident

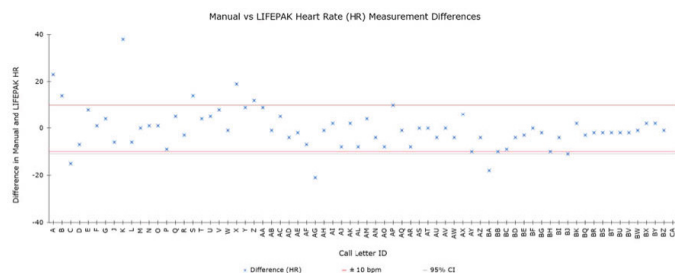


Figure 5: Difference Between Manual and Automatic Heart Rate Measurements per Incident. Data Points are Compared Against the 95% Confidence Interval and the Novel ± 10 bpm Clinical Significance Interval.

Figure 6. Difference Between Manual and Automatic Systolic Blood Pressure Measurements per Incident

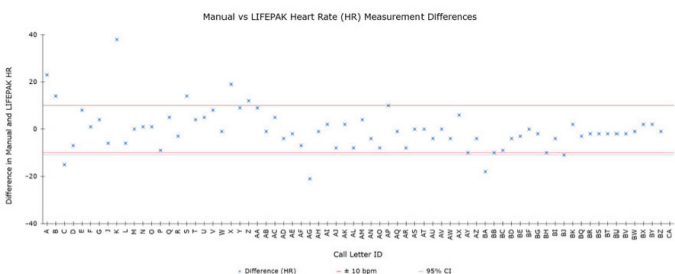


Figure 5: Difference Between Manual and Automatic Heart Rate Measurements per Incident. Data Points are Compared Against the 95% Confidence Interval and the Novel ± 10 bpm Clinical Significance Interval.

Figure 7. Difference Between Manual and Automatic Diastolic Blood Pressure Measurements per Incident

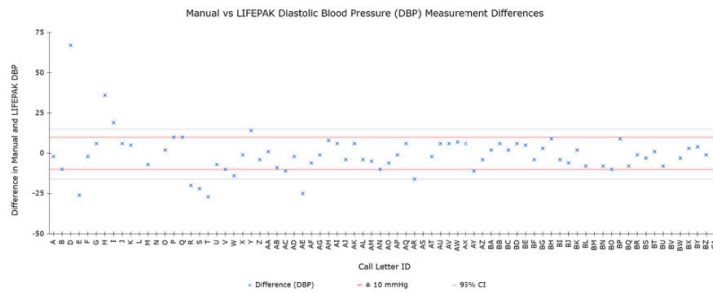


Figure 7: Difference Between Manual and Automatic Diastolic Blood Pressure Measurements per Incident. Data Points Compared Against the 95% Confidence Interval and the Novel ± 10 mmHg Clinical Significance Interval.

Our results indicate that there is no statistically significant difference between the two methods of vital sign monitoring. In addition, it was determined that most differences across all parameters measured fell within the clinically significant boundaries of ± 10 mmHg and ± 10 bpm for blood pressures and heart rates, respectively. These results can be seen in Table 4.

Table 4. Percent of Data Within the Clinically Significant Boundary

Parameter	Percent of Data within the Clinically Significant Boundary
HR	82.72%
SBP	74.36%
DBP	75.32%

Table 4: A Majority Percentage of Data Points Fell within the Clinically Significant Boundaries of ± 10 mmHg and ± 10 bpm for Blood Pressures and Heart Rates, Respectively.

Discussion

CBEMS are a relatively recent addition to the EMS community with the first CBEMS organization established in 1968 at Cedarville University¹¹. These organizations differ significantly in their operational scope: for example, in whether they function at the basic life support (BLS) or advanced life support (ALS) level, whether they transport patients directly to a local hospital rather than treating patients on-site, and the extent of financial support they receive from their respective institutions.

Notably, CBEMS that are required to secure external funding from sources outside their universities may face financial challenges including those involved in maintaining a stable or consistent annual budget that affect the organization's ability to properly allocate its resources and preserve long-term stability. Given this, it is critical for CBEMS to adopt carefully structured financial plans that prioritize the allocation of sufficient resources to maintain and repair essential crew equipment, while ensuring that funds are sustained for ongoing provider education and training to maintain appropriate and efficient crew responses to calls.

Our analysis provides compelling evidence that there is no clinically significant numerical difference between vitals measured using the LIFEPAK and those obtained manual

This substitution may be particularly beneficial for nontransporting BLS agencies that do not typically utilize the LIFEPAK's advanced functionalities such as cardiac monitoring and capnography. For CBEMS agencies that prefer automated vital sign monitoring or those that require functions beyond basic vital sign monitoring such as cardiac monitoring, capnography, and 12-lead capabilities, more cost-effective alternatives to the LIFEPAK also exist: external electrocardiogram (EKG) machines are available at a fraction of both the cost and weight of the LIFEPAK, for example. However, further studies are necessary to determine if such external EKG machines are appropriate replacements both in terms of accuracy and efficiency.

For established agencies that are financially stable and/or those that already own a LIFEPAK or similar device, there are still substantial benefits to reconsidering its use and favoring smaller, handheld devices such as a pulse oximeter and sphygmomanometer. Not only does this substitution significantly reduce the weight of equipment that crews must carry to patients, but it may also allow for an enhancement of crew mobility, potentially improving operational efficiency, crew performance, and response times, though further research is necessary to determine whether this improvement is significant. Additionally, encouraging providers to manually measure and monitor vital signs may enhance clinical skills and promote provider accountability^{12, 13}.

Despite these benefits, the substitution of manual for automated monitoring may reduce provider satisfaction as the convenience of gathering and transmitting measured vital signs to other agencies or hospitals is lost¹⁴.

It should be noted that this study assumes equal provider competency across non-transporting BLS agencies in the United States, and results should not be extrapolated to ALS or transporting agencies. Furthermore, the results of this study are applicable only to the LIFEPAK 15: though all FDA-approved automated vital sign monitoring devices must meet industry standards and should be expected to result in relatively consistent measurements, it is possible that older, refurbished editions may have sustained slight calibration shifts that could produce variation by a few units. Further studies using other devices would be needed to ascertain the feasibility of manual vital signs monitoring as an alternative for these.

Furthermore, the population for most CBEMS is largely younger, generally healthy patients; therefore, the results of this study are not generalizable outside of this population. Vital signs beyond blood pressure and heart rate were not addressed.

It should be noted that studies have indicated that discrepancies between manual and automated blood pressure measurements may be amplified in patients admitted to intensive care and other specialty units.¹⁵ Therefore, further studies are required to assess whether this conclusion is maintained in patients designated as critical.

Because the designation of a patient as "non-critical" is made throughout the duration of a call, it is important to note that devices such as AEDs that are utilized at the BLS level should still be carried by crews, even if a full ALS monitor is not required for the agency's scope of practice.

Conclusion

This study examined the discrepancies between manual and automated blood pressure and heart rate readings, revealing no significant difference between the two methods. Additionally, no clinically significant differences between the two methods of vital sign monitoring were observed. Therefore, we conclude that manually auscultated blood pressures and radial heart rates are viable alternatives for automatic, LIFEPAK device-measured NIBPs and heart rates. As a result, we recommend other CBEMS operating at a BLS-QRS level evaluate the feasibility of this substitution for their agency's particular clinical and operational needs. Further studies will be conducted to ascertain if this substitution results in a difference in crew efficiency and/or satisfaction.

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Comparison of blind insertion advanced airway devices on patients during out-of-hospital cardiac arrest (OHCA)

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ABSTRACT

Background: Effective airway management is critical during out-of-hospital cardiac arrest (OHCA), yet comparative data on blind insertion airway device (BIAD) placement success in rural prehospital settings are limited. **Objectives:** The study aims to address the literature gap in BIAD success by EMS providers in a rural county, providing preliminary evidence to inform airway equipment usage and BIAD funding decisions. **Methods:** A convenience sample was taken from January 2024 to April 2024 for King Airway usage and from April 2024 to July 2024 on Air-Q3-ILA. Device success was confirmed by auscultation and visual chest rise per EMS protocol at the first attempt. Device success was compared using Fisher's Exact Test with a p-value ($P < .05$). **Results:** Twenty-seven ($N=27$) patients received either King Airway ($n=13$) or Air-Q3-ILA ($n=14$) device. First-attempt placement success rate was 92.6% overall. Two failures (7.4%), both with the King Airway, were due to incorrect sizing. No significant association was found between device type and first-attempt placement success rate ($\chi^2(1, n=27), p=.259$). **Conclusion:** This study provided an initial insight into BIAD literature. Future research with a larger sample size may provide greater understanding into resource management for EMS providers.

Out-of-hospital cardiac arrest (OHCA) is a dominant public health problem, with high mortality rates observed globally.¹ Emergency medical services (EMS) play a critical role in providing initial treatment for patients with OHCA, as part of the American Heart Association six-step chain of survival.² Prehospital care entails a multifaceted approach, encompassing sequential and simultaneous resuscitation interventions, such as chest compressions, defibrillation, advanced airway management, and medication administration. In the United States, the incidence of OHCA is 357,000 cases annually, of which, 90% are fatal, 10.6% survive initial hospitalization, and 8.2% recover with good functional status.^{3,4}

A strong chain of survival can improve one's chances of survival and recovery for victims of OHCA. Early and efficient cardiopulmonary resuscitation (CPR) with a rate of 100 to 120 per minute compresses the heart, allowing the circulation of blood and the delivery of residual oxygen to vital organs. Effective ventilation during CPR maintains arterial oxygenation and tissue perfusion. The use of a Blind Insertion Airway Device (BIAD) facilitates uninterrupted ventilation with supplemental oxygen, optimizing the physiological benefits of continuous chest compressions. High-quality CPR and early defibrillation are essential treatment steps in increasing the individual's chance of

survival; adequate oxygenation and ventilation prevent hypoxic injury, increase neurological survival, and decrease morbidity and mortality.³ Basic Life Support (BLS) guidelines state that the rate of rescue breathing should be 10 breaths per minute or every 6 seconds while using supraglottic airway devices.³

Out-of-hospital supraglottic airway interventions are less invasive than endotracheal intubation and allows for rapid placement with minimal interruption to chest compressions, thereby maintaining coronary perfusion during resuscitation.⁶ No prior studies have directly compared the King Airway and the Air-Q3 ILA devices in cardiac arrest, leaving a notable gap in EMS literature. Although the King Airway has been compared with other BIAD devices, including the i-Gel, it has not been directly compared with the Air-Q3-ILA within the same operational setting.⁷ This pilot study aimed to address the gap and provide EMS agencies with preliminary evidence to support funding decisions for Blind Insertion Airway Devices (BIADs) in rural counties. In this study's southeastern state, seventy-eight of 100 counties are classified as rural, where EMS systems face limited funding, staffing shortages, and longer response times.⁸ This study was conducted in Franklin County, North Carolina, with a population of 70,000, including the largest town of 3,000, dispersed over 491 square miles (139 residents per square mile).⁹ Educational attainment is limited, and approximately 10% of residents living below the poverty line. The economy relies on trade, construction and manufacturing, and the county lacks a level 1 trauma center, with the nearest facility 55 minutes away.⁹ Given these constraints, identifying airway devices that are efficient, reliable and cost-effective is essential and evaluating device performance in a rural prehospital setting may serve as a model for similar communities.

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The King Airway and Air-Q3 ILA are supraglottic airway devices designed to permit fiberoptic-guided and blind endotracheal intubation. The devices have contrasting engineering designs in terms of form, length, material, sizing guidelines, and anatomical coherence. Once blindly inserted, the King Airway simultaneously inflates the proximal and distal balloon cuffs, occluding the oropharynx and upper esophagus to enable effective positive-pressure ventilation while reducing gastric insufflation and aspiration. According to the manufacturer, the device features a straightened, beveled distal tip that directs the airway posterior to the larynx and into the upper esophagus.¹⁰ It also includes a dedicated airway passage and a separate gastric channel, allowing ventilation while minimizing the risk of inadvertent tracheal insertion.¹⁰

Placement guidelines are height-dependent, and while the design supports blind insertion and effective ventilation, initial placement may not always achieve optimal positioning, and there is limited evidence to support consistent performance across EMS personnel of varying credential levels.

The Air-Q3 ILA is a full silicone advanced airway device designed with an anatomical curve and epiglottis elevator, lifting the epiglottis for maximized cuff placement. The oval-shaped self-pressurizing cuff allows for a direct seal. As stated by the manufacturer, the ventilating pressure—whether from a ventilator, resuscitation device, or spontaneous breathing—will allow the mask to inflate and seal the airway during inspiration.¹¹ On exhalation, the mask maintains a seal and matches the airway pressure, Positive End-Expiratory Pressure (PEEP), with the self-pressurizing feature allowing the pressure to change between inspiration and expiration.¹¹ Bilateral and distal gastric inlets protect against gastric insufflation and regurgitation. Placement guidelines are weight dependent. The Air-Q3 ILA design enhances placement and ventilation, but initial blind placement may not always be successful, and there is limited evidence to support consistent performance across EMS personnel of all credential levels.

The present study aimed to compare the placement success rate of the King Airway and the Air-Q3 ILA devices. No prior studies have investigated these two devices regarding placement success during OHCA. Our hypothesis was the success rate of blind insertion with the Air-Q3 ILA would be higher than that of the King Airway, given the Air-Q3 ILA's anatomical curve, epiglottis elevator, and self-pressurizing cuff are designed to facilitate placement and optimize ventilation, whereas the King airway relies on esophageal placement and manually inflated cuffs. Patient demographics, BIAD failure, and transport disposition data were collected to explore this sample population, reasons for BIAD failure, and the frequency of transport.

Methods

A comparative analysis of supraglottic blind insertion airway management procedures was performed by emergency medical staff on prehospital patients in a rural southeastern county in the U.S. This study was approved by the Meredith College

institutional review board (IRB #2064). Written consent for this study was granted by the collaborating emergency medical service that included twenty-two ground emergency response paramedic units in a southeastern rural area, with approximately 7,000 advanced life support (ALS) patient contacts per year. Provider-level data (e.g., paramedic, advanced EMT, or EMT) was not shared with the investigators. There is no evidence to determine which provider level was on scene at the time of the BIAD placement. Patients with one attempt at airway management in a cardiac arrest from January to July 2024 were eligible for inclusion. Only the first placement attempt was analyzed. Successful advanced airway placement was primarily confirmed with chest auscultation, with secondary confirmation being visual equal chest rise per the EMS county protocol. Cases requiring multiple attempts or contraindications due to facial trauma were excluded. This exclusion was intended to prioritize the one attempt, as time is crucial during a cardiac arrest. Additional insertion attempts prolong inadequate oxygenation which can lead to tissue hypoxia and rapid organ damage.

The collaborating EMS county established protocols for both blind insertion airway devices based on each design and the manufacturer's directions. Below are the EMS county procedures, which were approved and shared with the authors.

EMS BIAD Procedures

EMR		
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

BIAD King Procedure

1. Pre-oxygenate the patient with 100% oxygen.
2. Select the appropriate tube size based on the patient's height.
3. Lubricate the tube according to the manufacturer's recommendations.
4. Grasp the patient's tongue and jaw and gently pull forward.
5. Insert the tube, rotated laterally 45-90 degrees, ensuring the blue orientation line touches the corner of the mouth. Once the tip is at the base of the tongue, rotate the tube back to midline. Advance airway until the base of the connector aligns with the teeth and gums.
6. Inflate the pilot balloon with 45-90mL of air, depending on the size of the device.
7. Ventilate the patient while gently withdrawing the airway until effective ventilation is achieved.
8. Auscultate for bilateral breath sounds and for sounds over the epigastrium, and observe for adequate chest rise and fall.
9. Confirm tube placement using end-tidal CO₂ detector.
10. EtCO₂ monitoring is mandatory following placement of a BIAD on scene- **A or P**

BIAD Air-Q3 ILA Procedure

1. Pre-oxygenate the patient with 100% oxygen.
2. Select the appropriate device size based on the patient's weight and mouth opening.
3. Apply a small amount of water-soluble jelly in the middle of the protective cradle.
4. Lubricate the posterior surface of the Air-Q3 ILA of the cuff, ensuring no lubricant enters the airway lumen.
5. Grasp the device at the integral bite block and orient cuff towards the patient's chin.
6. Insert the Air-Q3 ILA into the mouth, directing it toward the hard palate.
7. Guide device down and back along the hard palate with continuous, gentle pressure until properly seated.
8. Ventilate the patient, auscultate for bilateral breath sounds and over epigastrium, and observe for the chest to rise and fall.
9. Confirm tube placement using end-tidal CO₂ detector.
10. EtCO₂ monitoring is mandatory following placement of a BIAD on scene- **A or P**

Figure 1. Franklin County EMS BIAD Procedures: King Airway and Air-Q3 ILA

Prehospital placement procedures for BIAD devices, comparing the King airway and Air-Q3 ILA according to EMS protocols. Placement of the BIAD was verified using clinical indicators according to county protocol. The first two steps of this county's protocol state: "Ventilate patient, auscultate for breath sounds and sounds over the epigastrium. Examine for chest rise and fall.

If breath sounds are positive and epigastric sounds are negative, continue ventilation. Confirm tube placement using end-tidal carbon dioxide (EtCO₂) detectors or esophageal bulb device following placement of the BIAD once available on scene.”¹⁰ EtCO₂ data were not shared with investigators as not all provider levels are trained to interpret capnography.

Chart identification was obtained from electronic patient care records (PCR) from ESO software from the EMS collaborator. All HIPAA-related information was excluded before the principal investigator (PI) received data; thus, etiology and epidemiology were excluded. A three-month collection period per device was conducted. The King Airway data was collected from January 2024 to April 2024, and the Air-Q3 ILA data was collected from April 2024 to July 2024. Data for both devices was not collected during the same months due to the collaborating EMS county having transitioned from the King Airway to the Air-Q3 ILA in April 2024. Neither device was used in the field during the same period.

The data was initially obtained and independently verified with PCR data by the EMS collaborator. Data was extracted into an Excel spreadsheet from the EMS county database. Data was analyzed using SPSS software for patient demographics (i.e., sex, age, race, and weight), device placement, and transport disposition. A Fisher’s exact test was calculated due to the small sample size and to examine the association between the success rate of each advanced airway. The one-tailed p-value, (P<.05), represented the hypothesis that the Air-Q3 ILA was predicted to have a higher success rate than the King Airway.

Results

Twenty-nine patient charts were recorded. Two Air-Q3 ILA cases were excluded due to severe facial trauma with obstructed oral access. No BIAD was used in either case. The twenty-seven out-of-hospital cardiac arrest cases (n=27) were studied using two devices: the King Airway (n=14) and Air-Q3 ILA (n=13) supraglottic airway devices.

Table 1. Frequency Distribution of Case Demographics.

		Frequency	Percent
Sex	Female	10	37.0
	Male	17	63.0
Age	>0-25 years old	1	3.7
	25.1-50 years old	5	18.5
	50.1-75 years old	16	59.3
	75.1-100 years old	6	22.2
Race	White	15	55.6
	African American	11	40.7
	Native American	1	3.7
Weight	50-100lbs	2	7.4
	100.1-150lbs	4	14.8
	150.1-200lbs	10	37.0
	200.1-250lbs	7	25.9
	250.1-300lbs	1	3.7
	300.1-500lbs	3	11.1

Table 1. Frequency Distribution of Case Demographics.

Patient demographics represented 63% males (n=17) and 37% females (n=10), with a median age of 67.5 (19) [IQR: 11-95] years. Race results were 55.6% white (n=15), 40.7% African American (n=11), and 3.7% Native American (n=1). The mean patient weight was 91kg or 200lbs (72) with a range from 43kg - 172.7kg or 95lbs - 380lbs. The most frequently reported demographic information were males, between the ages of 50.1 – 75 years old, white, and weighed 68.3kg – 91kg or 150.1 – 200lbs. Only one pediatric (3.7%) cardiac case occurred during the time of data collection. Further characteristics of patient demographics are presented in Table 1.

Fourteen patients (51.9%) received the King Airway device, while thirteen (48.1%) received the Air-Q3 ILA airway device. The Air-Q3 ILA recorded an 100% placement success rate (13/13), while the King Airway had an 85.7% success rate (12/14), with all observed failures occurring with the King Airway. One case reported an unsuccessful first attempt due to incorrect BIAD size used. The second attempt was successful after size correction was made. The other case had incorrect BIAD size on first attempt, tube failure on second attempt, and a successful third attempt. Size failure was a factor in both King Airway cases which may indicate that Air-Q3 ILA might have been easier or responded better for the providers. Further characteristics of device success are shown in Table 2.

Table 2. Placement Success Frequency and Type by Device.

			Success		
			Success	Failure	Total
Devi ce	King	Count	12	2	14
		% within Device	85.7%	14.3%	100%
		% within Success	48.0%	100.0%	51.9%
		% of Total	44.4%	7.4%	51.9%
	Air-Q3 ILA	Count	13	0	
		% within Device	100.0%	0.0%	100%
		% within Success	52.0%	0.0%	48.1%
		% of Total	48.1%	0.0%	48.1%

Table 2. Placement Success Frequency and Type by Device.

Transport Disposition

Nine patients were transported (33.3%), and eighteen patients were not transported (66.7%). Of the transported nine patients, only one of the failed first-attempt placement King Airway case was transported. County protocol indicated transport of OHCA due to the return of spontaneous circulation (ROSC). No ROSC scores were provided to the investigators.

Table 3. Frequency and Distribution of Transport Disposition.

	Frequency	Percent
Transport	9	33
Air-Q3 ILA	5	55.6
King Airway	4	44.4
No Transport	18	66.7
Air-Q3 ILA	8	44.4
King Airway	10	55.5

Table 3 Frequency and Distribution of Transport Disposition.

Device Placement Success Rate

Total successful first attempt placement of either advanced airway device occurred in twenty-five cases (92.6%), while first attempt device failure which needed additional attempts occurred in two King Airway cases (7.4%). Two King Airway cases reported placement failure at first attempt. Failures were due to the incorrect sizing of the King Airway device. Air-Q3 ILA had all successful placements at the first attempt with no issues. Further characteristics of device placement and success are shown in Table 4.

Table 4. Frequency and Distribution of Device and Placement Success Rate.

		Frequency	Percent
Device	King Airway	14	51.9
	Air-Q3 ILA	13	48.1
Success	Success	25	92.6 ($\phi = -0.273$)
	Failure	2	7.4

Table 4. Frequency and Distribution of Device and Placement Success Rate.

Association of Placement Success Rate and Device

Fisher's Exact Test was used to assess the relationship between placement success rate and device type. No significant association was found, $p = 0.259$ (one-tailed). The hypothesis that the Air-Q3 ILA would be more successful than the King Airway device was rejected. The corresponding phi coefficient was $\phi = -0.273$, suggesting a weak, negative association with a small-moderate effect size. It appears that the success of BIAD placement may not be associated with the type of device. This outcome is possibly due to the small sample size population. See Table 5 for BIAD and placement success rate association measures.

Table 5. Fisher's Exact Test for Association Between BIAD device and placement success rate.

Device		First-Attempt Success	First-Attempt Failure	Total
King Airway	Count	12	2	14
	% within Device	85.70%	14.30%	100.00%
	% within Success	48.00%	100.00%	51.90%
	% of Total	44.40%	7.40%	51.90%
Air-Q ILA	Count	13	0	13
	% within Device	100.00%	0.00%	100.00%
	% within Success	52.00%	0.00%	48.10%
	% of Total	48.10%	0.00%	48.10%
Total	Count	25	2	27
	% within Device	92.60%	7.40%	100.00%
	% within Success	100.00%	100.00%	100.00%
	% of Total	92.60%	7.40%	100.00%
Outcome				Value
Fisher's Exact Test (1-sided)				0.259
Phi				-0.273

Table 5. Fisher's Exact Test for Association Between BIAD device and placement success rate.

While there was no significant association between BIAD and placement success rate, it is important to note that the Air-Q3 ILA had no placement failures, and the King Airway did have placement failures. Future research with a larger sample size may indicate a stronger association between BIAD device and placement success rate.

Discussion

The intention of this study was to compare the King Airway and the Air-Q3 ILA in a rural prehospital setting, addressing a notable gap in airway management research. Existing literature has not yet established a comparison of placement success rates between the King Airway and the Air-Q3 ILA advanced airway devices. While previous studies have compared the King Airway against other BIAD devices, such as comparison with the i-Gel or explored BIADs more broadly in relation to endotracheal intubation, no research to date has evaluated these two devices directly within the same operational environment.^{7,13} By providing a comparison in a rural EMS system, this study offers novel evidence with potential implications for EMS protocol development and provider training.

A 2016 revised systematic review comparing blind insertion of the Air-Q3 ILA to endotracheal intubation–facilitated placement of the Air-Q3 ILA found that blind Air-Q3 ILA insertion was successful in all patients (100%), whereas endotracheal intubation–assisted placement was successful in most patients (76.7%).¹⁴ The review highlighted differences in hemodynamic response between the Air-Q3 ILA and tracheal intubation, showing reliability, safety, and consistent ventilation of the supraglottic airway device.

Evidence from the broader prehospital airway literature indicates that airway management performance is strongly influenced by provider training, device familiarity, and system-level practice patterns, regardless of the specific advanced airway technique used. These factors are particularly relevant in rural EMS systems, where staffing models often differ significantly from those in urban settings. National data show that more than 50% of rural EMS agencies rely primarily on volunteer personnel, compared with approximately 14% of urban agencies.¹⁵ In specific southeastern regions of the United States, more than 160 EMS agencies operate with volunteer staffing, with considerable variability in the number of service hours contributed per provider.¹⁵ Reliance on volunteers—combined with limited funding and lower call volumes typically of rural counties—may reduce opportunities for continuous airway skills practice and competency maintenance.

Results from this southeastern rural OHCA study indicated nominal differences in the success rate of the King Airway and Air-Q3 ILA airway devices; however, the study was underpowered and therefore not capable of detecting a statistically significant association between them. The observed placement success rate (100% of the Air-Q3 ILA and 85.7% of the King Airway) should be interpreted as descriptive rather than inferential. Although the Air-Q3 ILA anatomically contoured design and reduced number of preparatory steps may theoretically facilitate higher first-attempt success, the limited sample size constrains the extent to which definitive conclusions can be drawn from these data.

Limitations

The study has several limitations. Data were collected only over a three-month period, resulting in 27 patient charts and a small sample size, limiting the ability to evaluate device performance over a prolonged period. Due to the limited scale of the study, results are not representative of device consistency over a prolonged period. The database came from a single EMS system in a rural southeastern area. Given the significant heterogeneity in EMS services in the United States, these results are not generalizable to systems in other geographic regions. The data analyzed was not randomly collected but at the discretion of EMS personnel under medical direction, potentially introducing confounding by indication. The study consisted of only two advanced airway devices. Thus, limitations were consistent with a comparison of the two devices.

Due to cardiac arrest occurring unpredictably and including cases representing OHCA incidents within the study period, data were documented as part of routine clinical care rather than under standardized research conditions, introducing variability in reporting and the potential for additional confounding. ROSC data were not provided to the researchers; only transport data was available. Future studies may include ROSC scores to confirm a proper circulatory intervention.

The absence of quantitative waveform capnography (EtCO₂), the current standard for objective confirmation of airway placement, reduces the accuracy of the documented success rates and

constrains both the internal validity and generalizability of the findings. Future investigations and quality-assurance processes should incorporate objective capnography verification to ensure reliable assessment of supraglottic airway performance. Although patient demographic data were collected, the small sample size limited evaluation of how demographic factors such as age, sex, and physical characteristics may influence BIAD placement success. Further studies with larger samples should examine the impact of patient characteristics on airway device outcomes. These findings underscore the need for larger, more rigorous studies incorporating broader patient populations, multiple EMS systems, and objective verification of airway placement to more definitively assess device performance and support sustainable, high-quality prehospital care.

Conclusion

This pilot study provides preliminary data on the performance of the King Airway and Air-Q3 ILA supraglottic airway devices during OHCA. Both devices demonstrate high observed success rates, with the Air-Q3 ILA showing no failures in this small sample. Given operational and financial constraints common to rural EMS systems, identifying airway devices that are efficient, reliable, and cost-effective is critical. Evaluating device performance in this context offers a practical model for other rural or resource-limited communities and can inform evidence-based procurement and protocol decisions.

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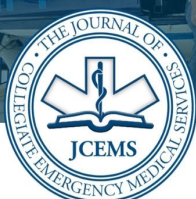
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Event Context Matters: Injury and Transport Patterns in Collegiate EMS

Tyler N Nilson, BA, EMT; Sandhya Kumar, BA, EMT; Isabel Li, EMT; Alex O'Donnell, BA, NRP; Jad Yacoub, AM, EMT

2026 College EMS Research of the Year Award Recipient Abstract | Program Development & Evaluation

Collegiate-based emergency medical service (CBEMS) providers frequently encounter medical complaints shaped by campus athletic events, social gatherings, and student activities. Many CBEMS agencies operate in a standby capacity with limited on-scene resources, making accurate anticipation of event-based clinical demand essential. While prior studies of mass gatherings have identified associations between CBEMS utilization, patient acuity, and factors such as event size, alcohol presence, and temperature, much less is known about epidemiological patterns and transport disposition at smaller-scale campus events, including intramural athletics and social gatherings.

In this retrospective observational study, we evaluated whether injury type and ambulance transport likelihood vary by campus event type, and whether environmental and temporal factors predict injury rates at intramural athletic games. Among 150 standby CBEMS encounters, events included club/varsity athletics (n = 48), intramurals (n = 42), parties (n = 40), and other campus events (n = 20), with clinical presentations varying markedly by event type. Overall, extremity injuries were the most common (43.3%), followed by alcohol intoxication (22.0%), head injury (12.7%), and bleeding (11.3%). Transport likelihood differed significantly by event type, with the highest ambulance transfer rate at parties (70.0%) compared with other events (25.0%) and athletics (7.8%) (Fisher's exact test, $p < 0.001$), and by mechanism, with alcohol intoxication associated with the highest transport rate (81.8%). Among intramural athletic events, injury rates did not differ significantly by precipitation or twilight conditions but varied by hour of event start time (likelihood ratio test, $p = 0.025$), with the highest rate observed during the latest games (10 PM).

These findings demonstrate meaningful heterogeneity in patient presentation and transport outcomes across campus event types, with temporal variation in intramural injury rates, suggesting opportunities for event-specific operational planning and targeted clinical training. Generalizability may be limited by the single-agency, retrospective study design.

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Development and Evaluation of a Facial Action-based Pain Assessment Training

Elisabeth Chai, NREMT

2026 College EMS Research of the Year Award Recipient Abstract | Original Research

Accurate pain assessment is a critical skill for EMS providers, yet traditional training paradigms emphasize verbal self-report, which may be unreliable in patients who are nonverbal, cognitively impaired, or emotionally distressed. Provider biases related to gender and race may further complicate recognition and interpretation of pain, possibly resulting in underestimation or delayed intervention.

The Facial Action Coding System (FACS) is recognized as a valid and reliable method in objectively describing facial expressions, as well as monitoring pain-related facial expressions in various populations. Fifty New York State EMTs were randomly assigned to participate in one hour of didactic instruction in either standard patient assessment or FACE-IT. The FACE-IT training included (1) foundations in FACS and pain-related action units and (2) image-based exercises using the SynPAIN dataset, which provides synthetic and demographically balanced facial images annotated for pain expression. Then, trainees were randomly assigned to two adult simulation scenarios varied by pain expression, gender, and race.

Cohort outcomes were compared for absolute differences in trainee and standardized pain labels, demographic effects, and self-reported confidence. Trainees who received the FACE-IT training demonstrated higher accuracy in identifying pain expressions across all demographic categories and reported increased confidence in assessing nonverbal pain compared to the standard training group.

These findings support the integration of facial action recognition into EMS assessment training to improve accuracy, equity, and confidence in pain evaluation. Further research is needed to assess the generalizability of the program to non-adult patients and the extent of longitudinal retention.

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