The Journal of Collegiate Emergency Medical Services

JCEMS

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Featured

2025 College EMS Research Poster of the Year

Analysis and Standardization of Non-Transport Collegiate EMS Unit Verbal Handoffs to ALS

Shepard et al., University of Florida

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

The Journal of
COLLEGIATE EMERGENCY MEDICAL SERVICES

The Journal of Collegiate Emergency Medical Services (*JCEMS*) [ISSN 2576-3687] addresses the distinct needs of collegiate-based emergency medical services (CBEMS) clinicians, medical directors, and their university partners. The field of campus-based prehospital emergency care is concerningly underrepresented in the scholarly literature and in popular sources. We strive to provide a voice to the collegiate EMS community and to spur a revolution in collegiate EMS research. Established in 2017 in affiliation with the National Collegiate Emergency Medical Services Foundation (NCEMSF.org), the journal is oriented for clinicians and researchers alike. *JCEMS* publishes the only scholarly journal and news source dedicated exclusively to the collegiate EMS community.

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Editorial Processes & Review Procedures: *The Journal of Collegiate Emergency Medical Services (JCEMS)* employs a double-blind peer review process for Original Research, Case Reports, and Reviews. The clinical and scientific quality of this publication relies on the rigorous and diligent reviews provided by independent reviewers with subject matter expertise.

To our reviewers: *JCEMS* is grateful for all anonymous independent reviewers who dedicated their time and expertise to the collegiate EMS community. Your contribution helps amplify the voices of the collegiate EMS community.

The Journal of
COLLEGIATE EMERGENCY MEDICAL SERVICES

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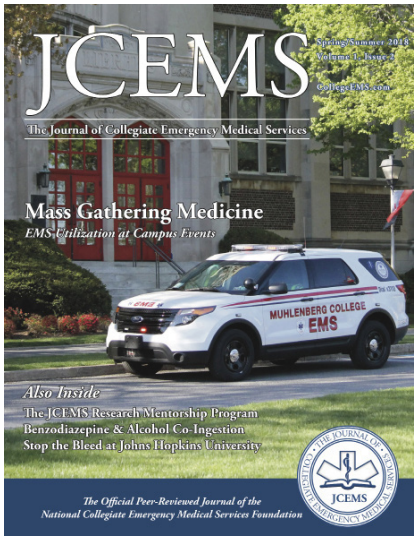
The Journal of Collegiate Emergency Medical Services is the official **scholarly, peer-reviewed journal** of the National Collegiate EMS Foundation.



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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.

Applications to be a JCEMS Research Scholar open each year at the NCEMSF Conference and close on the last Friday of March.

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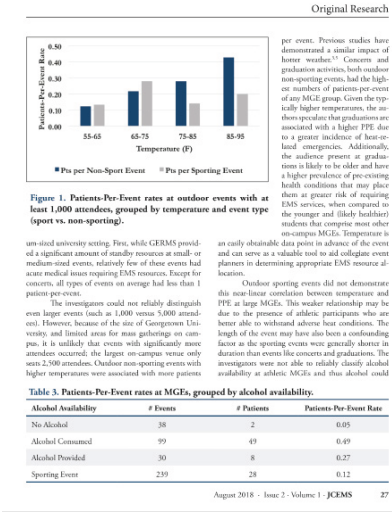

Original Research

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).

per event. Previous studies have demonstrated a similar impact of hotter weather.[33] Concerts 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 authors speculate that graduations are associated with a higher PPE due to a greater incidence of heat-related emergencies. Additionally, the audience present at graduations 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) students that comprise most other on-campus MGEs. Temperature is an 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

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

The investigators could not reliably distinguish even larger 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 venue only seats 2,500 attendees. Outdoor non-sporting events with higher temperatures were associated with more patients

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

Send inquiries to: **JCEMS@JCEMS.org**

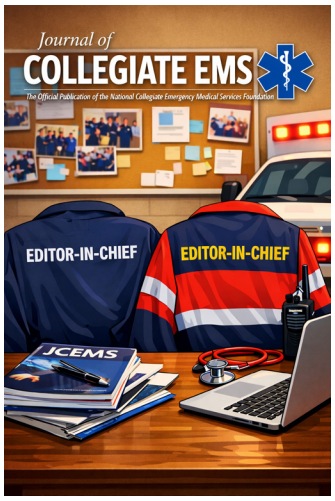
Editorial Leadership Transition at *The Journal of Collegiate Emergency Medical Services*

With this issue, The Journal of Collegiate Emergency Medical Services marks a transition in editorial leadership. After three years of d i stinguished service Editor-in-Chief of JCEMS, Ernest Wang is stepping down from this role. On behalf of the JCEMS staff, editorial board, readership, reviewers, and the National Collegiate Emergency Medical Services Foundation, we share our deepest gratitude to Ernest for his empowering leadership and immense contributions to the journal.

Ernest joined JCEMS in 2021 and was promoted to Managing Editor the same year. Ernest became Editor-in-Chief in 2023. During Ernest's tenure, he oversaw the journal's staff grow to quadruple its size and was pivotal to the editorial production of seven hard-copy editions and over thirty-five articles. Under his leadership, the journal reinforced its commitment to ethically sound, innovative research, reflecting its dedication to high-quality collegiate EMS research. Ernest set an invaluable example for an inspirational, servant leader. His leadership fostered a culture of thoughtful review, fairness, and empowerment. His impact on the JCEMS team and the collegiate EMS community will be felt long after his term ends. Working under his leadership has been a privilege, and the JCEMS team is excited to welcome him to his role serving on our Editorial Board.

We are pleased to announce that Marissa Canty will assume the role of Editor-in-Chief beginning February 25, 2026. Marissa has served as the Managing Editor of JCEMS for the past two years and has overseen the largest growth in editorial operations in our journal's history. In 2025 alone, she, along with our editorial team, oversaw a 50% increase in manuscript submissions and reviews and a fourfold increase in poster submissions. "There is no one more qualified to lead this journal than Marissa, and I'm excited to see the journal's continued growth under her visionary leadership," said Wang.

We thank Ernest Wang for his exemplary service and enduring dedication to JCEMS. The success of this journal rests on the hard work of the JCEMS staff and Editorial Board, and we are confident that the transition to Marissa Canty's leadership will uphold and advance our mission to promote high-quality collegiate EMS research. We look forward to the journal's continued growth during this transition.



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National Recognition of Collegiate EMS Providers

Grace Lu, EMR; **Adhitya Balaji**, BS, NREMT; **Marissa Canty**, MBA, NRAEMT

Since 2000, the second week in November has been dedicated to honoring the contributions of over 8,400 EMS providers across the nation.[1] [2] Officially known as National Collegiate EMS Week, this week, modeled from National EMS Week in May, was a celebration known only amongst collegiate EMS agencies and the founding professional organization known as the National Collegiate Emergency Medical Services Foundation (NCEMSF).

This year, the celebration has received interstate and governmental recognition, marking a significant milestone for hard-working collegiate EMS providers of past and present. On November 05, 2025 in Washington D.C., the Inter-state Commission for EMS Personnel Practice, commonly known as the EMS Compact Commission, adopted Resolu-tion 2025-05, formally recognizing November 10-16, 2025 as National Collegiate EMS Week.

Every year, the week-long dedication kicks off with National Collegiate CPR Day. The 2025 CPR Day Letter written by NCEMSF President, Dr. George J. Koenig, Jr., DO, emphasized the importance of starting the week off with National Collegiate CPR Day. Dr. Koenig describes this observance as an execution day for collegiate EMS clinicians to train and educate as many fellow college students, faculty, staff, and visitors about the life-saving value of CPR as possible.[3]

The remainder of National Collegiate EMS Week consists of a collegiate EMS agency-varied schedule ranging from public health educational events to naloxone and bleeding control trainings, as well as open-house events for the campus community to engage with collegiate EMS professionals, tour their stations, and learn about their day-to-day lives.

The newly adopted resolution honors the dedication and impact of student EMS providers serving through their campus-based EMS programs across North America. The resolution expresses that the "Commission commends the thousands of collegiate EMS clinicians and programs across the nation whose service strengthens the EMS profession, enhances community safety, and fosters the next generation of EMS leaders."[4] By acknowledging the collegiate EMS clinician's role in public safety, leadership development, and emergency care, the Commission's decision validates significance in national recognition for collegiate EMS agencies. Dr. Scott Savett, Ph.D, Vice President and Chief Technology Officer of NCEMSF commented on the resolution via email on November 06, 2025, emphasizing that "NCEMSF is proud to celebrate our collegiate EMS providers who adeptly balance their academic studies with service to their campus community."

The United States EMS Compact Commission is the lead governmental authority responsible for EMS licensure and promotes professionalism, EMS clinician practice accessibility and mobility. This body is responsible for the United States EMS Compact, which is established state law in 25 states across the country, and allows for greater than 400,000 EMS clinicians to provide life-saving care in partnering states.[5] "During school breaks, many [collegiate EMS clinicians] return to their home communities, where they may also serve as EMS providers. The EMS Compact enables providers to deliver EMS care across different jurisdictions without incurring additional administrative burdens, making it a win-win," says Dr. Savett.

The EMS Compact Commission's commendation of National Collegiate EMS Week affirms the essential role collegiate EMS providers play in supporting public safety. This national-level policy is a defining step towards acknowledging the value of investing in student responders whose training, leadership and service form the backbone of many communities' prehospital care.

Grace Lu is currently a student in the Bachelor of Health Sciences (Honours) Program at McMaster University. Lu holds the role of Assistant Editor for The Journal of Collegiate Emergency Medical Services. **Adhitya Balaji**, **BS, NREMT** is a third-year medical student at the Indiana University School of Medicine and serves as the Co-Director of Journal Operations for The Journal of Collegiate Emergency Medical Services. **Marissa Canty**, **MBA, NRAEMT** is a third-year medical student at the University of New England College of Osteopathic Medicine. Canty serves as the Managing Editor of The Journal of Collegiate Emergency Medical Services.

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En Route to Developing UNC Charlotte's Collegiate EMS

Marissa Canty, MBA, NRAEMT

Nearly 600 9-1-1 calls requesting emergency medical services were made within the University of North Carolina at Charlotte (UNC Charlotte) last year, making the university area the busiest servicing area in Mecklenburg County, North Carolina. Despite the demonstrated need for college-based EMS (CBEMS), the UNC Charlotte campus currently lacks such an agency.

Nick Maynard and Davida Ogbar identified the need for CBEMS to serve the second-largest university in North Carolina during the 2024-2025 academic year. Maynard and Ogbar met while volunteer-ing as EMT-Bs at Idlewild Fire Department. Maynard approached Ogbar with the idea of founding UNC Charlotte's EMS agency.

"Some have shared stories of calling 911 and having to wait over half an hour for help to arrive due to county load. They described feelings of powerlessness and anger because they recognized how things could have turned bad had the incident been more seri-ous. We've talked to others who have watched county arrive and have to search through buildings to find the right room because of a lack of familiarity with the layout of the campus," Ogbar has shared.

Since their initial brainstorming session, the National Collegiate EMS Foundation's Start-up Coordi-nator, Dr. Joseph Grover, and the Southeast Regional Coordinator, Sarah Tarzone, have provided strong guidance to the UNC Charlotte Student EMS Initiative. "Dr. Grover even wrote a letter of support for us to show our Chancellor and senior admin," said Ogbar. They stated that the NCEMSF Staff have been a key source of support, helping them connect with other CBEMS at similar universities and access start-up resources and funding.

The UNC Charlotte Student EMS Initiative connected with student leaders at other North Carolina CBEMS agencies, including Mountaineer Medics (Appalachian State University), Duke University EMS, UNC-EMS at Chapel Hill, ECU, and Wake EMS (Wake Forest University EMS).

Marissa Canty, MBA, NRAEMT, serves as the Managing Editor for JCEMS.

Collaborating with other agencies provided insight into various operating models, best practices, and examples of agency documents to build from.

Maynard and Ogbar have been introducing the CBEMS program to key stakeholders, including the Office of Emergency Management at UNC Charlotte, the UNC Charlotte Human Resources Department, the UNC Charlotte Legal Department, and county partners such as Medic, CPCC, and Atrium Health. During meetings with these stakeholders, the primary focus was to demonstrate the need for CBEMS, build community awareness, and brainstorm ways to establish a mutually beneficial relationship among departments and the agency.

Unique to UNC Charlotte is its large student population and urban location with a high call volume. Identifying the best-fitting operating model for the agency was a critical task. "The goal of our program would be to blunt the effects of that high call volume so that our campus community is better protected in times of emergency," said Maynard. They hope to operate within the scope of practice of Basic Life Support (BLS) while serving UNC Charlotte with a brand-new UTV owned by the university's Office of Emergency Management. They share that they are currently working towards a formal agreement with a prospective medical director.

Recruiting enough members has not been a barrier to the agency's development. "Students are in love with this program both from a safety perspective and an opportunity perspective," Maynard shared. They have identified 6-8 certified EMTs/paramedics and several others in the certification process. However, these individuals have been unable to ride with other EMS agencies due to the need to balance academics with an EMS work schedule. If UNC Charlotte developed an EMS agency, these individuals expressed eagerness to join and provide care to their campus. The agency's name will play off the university's team, the 49ers - "Niner-1-1." In the future, they hope the agency can grow to expand its fleet, scope of practice, and membership capacity.

In April 2025, a roadblock was reached for the UNC Charlotte Student EMS Initiative after Maynard and Ogbar met with the Vice Chancellor for Business Affairs, Rich Amon. The two stated that their biggest challenge has been communicating with stakeholders about EMS, the scope of prehospital medicine, and the liability and cost implications for the university in association with the agency.

The UNC Charlotte Student EMS Initiative shared a press release on April 30th stating, "The university has reservations for starting a new program, citing cost, oversight, and liability. Furthermore, the university feels that the data has been relayed to them thus far, but does not adequately demonstrate the need for implementation of this program." Despite the setback, they stated that they look forward to continuing their advocacy for UNC Charlotte CBEMS and to addressing the concerns of the university and students alike. "Because of the work that everyone is doing, the life of a campus community member will be saved."

A past member of the initiative stated that since then, the initiative had continued to advocate for a collegiate EMS agency alongside campus stakeholders and supporters. In August 2025, the initiative officially reached a standstill. When the initiative paused, the UNC Charlotte EMS Club formed as an organization affili-ated with the university, whose mission is to promote EMS careers and education. The UNC Charlotte EMS Club Board shared, "The leaders of the newly formed UNCC EMS Club wish to align with the university in this matter. The future of a campus EMS depends on a relationship with the university where both ends are fully involved and passionate about the cause. The UNCC EMS Club hopes to work with our school's leadership in the future, and does not share the same position on the matter as the EMS Initiative."

How can other collegiate EMS agencies best help sup-port the development of UNC Charlotte's CBEMS agency? Sharing your collegiate EMS experiences on their social media, signing their petition, and "having leaders in business or logistics from other universities with campus EMS programs reach out to our leaders to say 'hey, we were scared too at first, but here's how the program actually served our needs' would mean a lot," Ogbar said, "We can't wait to come back as alumni in 10, 15 years and see the squad working as a robust, integrated part of UNC Charlotte. Having that vision illustrated tangibly by other squads in our state and out of our state helps the admin see the vision."

Acknowledgments

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The New Special Population: College Students

Nate Shore, AEMT

In EMS, we are called to serve a diverse range of patients. This diversity includes special populations that the National Institutes of Health define as "groups of people whose needs are not fully addressed by traditional health services delivery. Greater access to these services, or tailored services, must be provided to reduce inequities in physical and mental healthcare sys-tems."[1] Generally, we consider these populations to be geriatric, pediatric, those who are pregnant, individuals with disabilities, and English language learners.

In collegiate EMS, many of the patients we encounter are college students. A study on a university ambulance service found that among their total call volume, 82% of their patient population were students at the university.[2] College students with on-campus emergencies are often an afterthought in emergency care. While some would argue that college students belong to the cate-gory of young adults, with little to no recognition of special considerations in their care, this could not be further from the truth.
The care of college students often requires additional consideration, communication adjustments, and specialized care strategies due to their distance from support systems, unfamiliarity with healthcare and EMS systems, new risk-taking behaviors, mental health, and social pressures. These are all further exacerbated by the high-pressure academic and social environment of a college campus. To ensure that their needs are met effectively and appropriately, we in EMS must make their demographics a priority in their care plan to communicate with and comfort the patient.

Although college students fall within the same age–range as other young adults, their needs have less to do with their age or independence and more to do with their living and learning environment. College students find themselves in a concentrated, high-pressure environment where social and academic stressors can intensify their vulnerabilities. Additionally, as members of an institution, college students are expected to abide by certain expectations that can also result in stress, which is otherwise not found in peers outside the college environment.

It is time, as an EMS culture, that we start to think of college students as a special population rather than the default of standard adult patients. The reality is that many college students are predisposed to several vulnerabilities that can result in extreme challenges in their care and patient outcomes. On the college campus, this is true for not only the patient but also bystanders and even collegiate EMS providers.

College students are often far away from home and their parents. For some, this means out of state, but for others, this can mean living in a new country or continent. These are patients who are away from their familiar parental, social, and healthcare networks. A recent survey in Washington state found that nearly one-third (32.6%) of college students reported not knowing where to go to seek necessary health-care, 18.2% reported a lack of awareness of what resources they had access to, and 17.9% reported they did not know how to access those options.[3] These statistics illustrate how disconnection from famil-iar health resources upon entering college can leave students vulnerable. Those who are unfamiliar with their healthcare options may be unaware of what their interaction with EMS will mean financially, disciplinarily, and socially. They may not have ever been to the hospital to which they are being transported. This uncertainty may lead to students either not calling EMS out of fear or, unfortunately, calling late into an incident once it has worsened.

College students also heighten their vulnerability by engaging in new activities and social settings. Students often try alcohol, drugs, and sex for the first time, sometimes mixing them together. In a study con-ducted from 2011 to 2014, the Substance Abuse and Mental Health Services Administration found that, "on an average day during the past year [2013], 2,179 full-time college students drank alcohol for the first time, and 1,326 used an illicit drug for the first time."[4] This can create high-intensity environments that have the potential to become challenging scenes. Additionally, fitting into a new environment can be difficult; college students are vulnerable to many social pressures. Actions relating to peer pressure can result in medical or psychiatric complications for students.

Nate Shore, AEMT is a third year student at Bates College in Lewiston, Maine. He serves as the Co-Chief of Service for Bates EMS. He is from Kennebunkport, Maine.

There is also a heightened sense of self-image in col-lege, which can lead to social pressure in the dining halls, leading to eating disorders and mental health problems. In a 2020 report, the National Institutes of Health reported that "an estimated 11% to 17% of females and approximately 4% of males on college campuses in the United States screen positive for clini-cal ED [eating disorder] symptoms."[5]

So What Can We Do?

As EMS providers, we are trained to recognize special populations. When we encounter them, we adjust our care plans accordingly. When we respond to college students, we must also start to analyze them for potential demographic and social constraints that could inhibit quality communication and care in the absence of an adjustment in their care plan. Recognizing that the patient with whom we are interacting may have factors and contextual challenges that complicate their presentation and ability to advocate for themselves is a crucial element of their treatment. This understanding allows us to approach their care with greater appreciation and empathy for their situation. By acknowledging these factors, we can create care plans that help build a better rapport with our patients, improving communication and trust, and in turn, higher quality care.

With these special considerations in mind, as EMS providers, we can intentionally adjust our demeanor to emphasize our compassion towards the patient. We should take time to explain our process to encourage honest disclosure and informed decision-making. Using empathy, we must recognize that our patient may not be informed about the EMS and local healthcare process. We can make extra effort to introduce ourselves, explain every procedure we perform, and paint a picture for them of what to expect from start to finish of their experience with EMS, and then the hospital. We must become active participants and advocates for them in identifying and explaining their best options. This is accomplished through clear communication that avoids implying blame but instead reinforces that our only priority is their safety.

In Collegiate EMS

As collegiate EMS providers, we find ourselves in the extremely rare position of belonging to the same close-knit community as our patients. It is not unusual to treat a friend or acquaintance. We have the rare opportunity to already know our patients' baseline and, for closer friends, what they would benefit from the most.

On-campus EMS provides a unique patient care experience as we are fortunate to maintain a strong institutional knowledge of the campus, students, social happenings, and school policies, procedures, and resources. As fellow students, we can empathize with our patients, as we too have experienced and continue to experience the vulnerabilities they are facing during their emergency.

As collegiate providers, we also have the responsibility to advocate as a peer for our patients and to serve as a more trusted caregiver. As a friendly, familiar face, we can create an environment for our patients in which they are more comfortable communicating their needs.

We can offer them information in context that is more accessible to them. In turn, we can better advocate for them, ensuring that they will receive quality care at the hospital. Responding as part of a campus service also means we are often extremely geographically close to the call, meaning that we can make patient contact with little downtime between the start of their emer-gency.

Perhaps the greatest advantage to collegiate EMS ser-vices is our familiarity with the resources offered by the college or university, in both the short-term, immediate resources available to respond to the scene, and the long-term resources involved in cre-ating a plan for the patient in and out of the hospital. These are resources that a non-campus service may not be familiar with or know how to utilize. From personal experience and institutional knowledge, campus EMTs can access resources like campus safety officers, residential life coordinators, on-call mental health counselors, and student life deans. With access to this network, collegiate EMTs can expand their patient care plans to offer a larger array of options, including referring patients to on-campus clinics, school mental health resources, and other specialty support systems of which they may be unaware. This is not to say that definitive care is not the end goal for all patients, but rather that the best care for the complaints of college students may not come from an emergency room bed.

To best understand the population we are serving, demographic-specific continuing education should be encouraged. Psychology and sociology 101 classes are commonly offered every semester and are great stepping stones into understanding the development of the population that surrounds us. EMS-specific continuing education courses are also offered in topics such as trauma-informed care. Classes like 'Psychological Trauma in EMS Patients' educate providers on "the resources they need to help alleviate patients' hidden wounds" such as stress, fear, and anxiety.[6] Collegiate services should regularly train in identifying special populations and their proper treatment plans in both continuing education lectures and scenario. based training. Scenario-based training on patient communication and bedside manner is as crucial in creating compassionate collegiate EMTs as the pro-ficiency of our technical skills.

Even simply learning about social happenings at the lunch table can contribute to our understanding of campus life and how to better communicate and care for our student body.

In Conclusion

With this understanding, we are able to respond with empathy and situational context. By formally acknowledging college students as a special population, we can build care plans that reflect their realities and needs and, in turn, provide informed and compassionate care to our patients.

To best provide high-quality care to college students, it is crucial that we begin to recognize them as a special population. Their distance from their support systems, high-risk exposures, and lack of healthcare planning create a unique set of challenges in their care that require special considerations. As collegiate providers, we have the unique opportunity to stand in our patients' shoes and understand their vulnerabilities firsthand.

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Challenges, Strategies, and Lessons from Implementing Washington State's First Collegiate EMS Agency

Patrick Bi, BS, MBE, EMT*; **Tristan Jafari**, EMT*; **Tanmay Bhanushali**, EMT; **Eric Timm**, BSN, RN; **Catherine R. Counts**, PhD, MHA

Collegiate-based emergency medical services (CBEMS) are on-campus, student-run emergency medical services (EMS) organizations that respond to campus medical emergencies, supplement local emergency services, and offer health education to their communities. These organizations provide unique opportunities to improve response times, cultivate student leadership, and enhance campus safety.[1,2,3,4] Despite their prevalence at over 250 colleges nationwide,[5] such a program had not been successfully implemented in Washington state prior to the current initiative at the University of Washington (UW).

The founding team was composed of two first-year undergraduate Emergency Medical Technicians (EMTs) and a first-year medical student with CBEMS experience. The establishment of the UW Emergency Medical Services (UWEMS), a non-transport, Basic Life Support (BLS) agency, resulted as a culmination of focused advocacy efforts spanning from May 2023 to April 2025.

This manuscript provides a resource to future CBEMS agency founders by describing the genesis, development, and challenges related to the successful launch of UWEMS.

Understanding The Local System

The importance of a thorough understanding of the local EMS system and unique campus elements cannot be overstated. Differences in institution classification, size, and emergency response systems may influence how individual CBEMS agencies operate and, therefore, are established. The NCEMSF Start-up Guide can serve as an excellent foundation,[6] and founders should tailor the recommendations to the specific needs of their institution.

UW is a large, public, R1 institution with over 35,000 undergraduates and 15,000 graduate students.[7] The Seattle Fire Department (SFD) leads the 9-1-1 response for both BLS and Advanced Life Support (ALS) emergencies on the UW campus. Most BLS transports are referred to a local private agency, American Medical Response (AMR), while Seattle Medic One handles ALS transports.8 Law enforcement support, when needed, is provided by the UW Police Department (UWPD) (Figure 1).

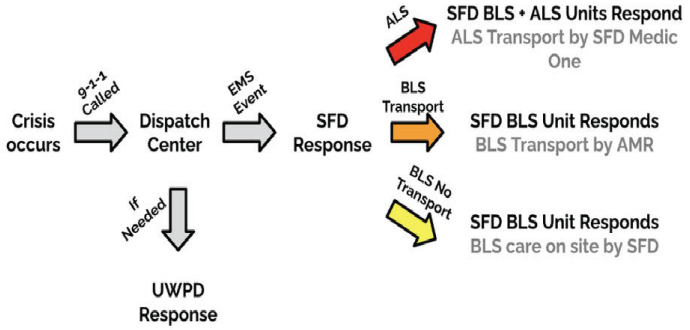

Figure 1. Response Model for On-Campus Emergencies at UW

Using historical data provided by SFDLive,[9] a publicly accessible website logging all SFD responses, 468 medical responses to the university campus over the 2022-2023 academic year (July 1, 2022 – June 30, 2023) were analyzed. The mean response time was 6.6 minutes (standard deviation: 2.1 minutes). While this data is reflective of the unique challenges a large fire department would face in responding to a highly concentrated college campus, it highlighted an opportunity for improvement, as CBEMS agencies report a mean response time of 2.6 minutes (standard deviation: 1.7 minutes) due to their immediate proximity to the site of the emergency call.[10]

Laying a Strategic Foundation

The size of UW immediately limited the number of existing CBEMS models to which meaningful comparisons could be drawn. As such, the first priority was to identify true peer institutions and conduct interviews with their existing CBEMS agencies, emphasizing those founded more recently. This process resulted in relationships with a network of peer agencies who were regularly consulted throughout the implementation process.

Once the founding team could comfortably speak on the merits and practical applications of the CBEMS model, low-stakes conversations with community members were initiated. These individuals included a campus residence hall director, a physician at the on-campus clinic, and student government representatives. Through these discussions, the agency's key characteristics were tailored to meet the unique elements of UW's campus.

Drafting a Proposal and Vision

Creating a comprehensive proposal is the strongest way to communicate an agency's goals and plan of action and can be instrumental to earning meetings and being taken seriously by important stakeholders. These included the Seattle Fire Department, the Central Region EMS & Trauma Care Council (CREMS), the UW, the WA Department of Health (WA DOH), and UW Medicine.[11] In addition, a written document invited feedback from stakeholders in a manner that was productive and useful while respecting time con-straints they may face during face-to-face meetings.

As most CBEMS founders are undergraduate students, demonstrating that the founding team is capable of understanding and proposing solutions to the challenges of CBEMS is essential in gaining trust and confidence from decision-makers. A detailed proposal can be critical in conveying this message. The final UWEMS proposal (see Appendix A) was highly detailed and descriptive. It relied on peer-reviewed literature alongside anecdotal information gathered from other CBEMS agencies. It included justification for the agency, an organizational chart (see Appendix B), a well-informed budget, a phased pilot program, mock shift schedules, a campus response zone (see Appendix C), a quality improvement plan, and liability coverage information.

Gaining Campus Support & Momentum

The most significant challenge faced by the founding team was converting casual intrigue in the mission of the program to truly committed campus support. Through conversations with university administrators, it was determined their reservations stemmed from five main barriers: a large financial burden, no third-party approvals, no political momentum, no liability strategy, and no administrative home (Figure 2).

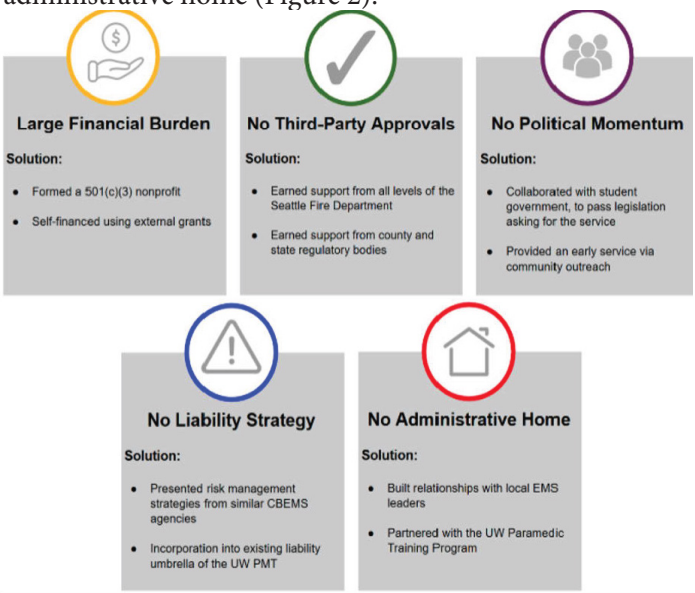

Figure 2. Summary of Barriers

Barrier 1: Large Financial Burden

One of the earliest challenges was to demonstrate the value of a CBEMS agency outweighed the financial risk, as stakeholders were hesitant to invest in a model that appeared costly and unproven. Requests for direct funding from multiple university departments were denied. In response, UWEMS was established as a 501(c)(3) nonprofit and fully financed through external grants and sponsorship to reduce institutional hesitancy and improve the overall risk profile.

Specifically, grants were secured through the Medic One Foundation, a non-profit focused on prehospital care in Northwestern Washington, a local private family foundation interested in promoting increased campus safety, and the CREMS. Additionally, a local bicycle company provided a discounted fleet of electric bicycles. Ultimately, over $60,000 in external funding was secured, enough to entirely finance the program launch and support at least 12-months of full-scale operation.

Barrier 2: No Third-Party Approvals

Early conversations with university administrators often stalled with the same concern: regardless of the new funding status, the proposal could not be considered without demonstrated support from external emergency response stakeholders. Namely, having the support of both SFD leadership and the Seattle Fire Fighters Union (International Association of Fire Fighters Local 27). Stakeholders across multiple levels of SFD's chain of command were engaged, including the Captains at the local SFD station and the Fire Chief. Approaching these discussions by clarifying that UWEMS was intended as a complement to the existing response structure, rather than a replacement, proved important. These conversations also greatly helped in defining the scene of command procedures, scope of practice, and response logistics.

Building support from SFD Leadership and the Seattle Fire Fighters Union enabled further discus-sions with regulatory bodies including the WA DOH and CREMS. Strengthening these relationships early on provided greater leverage when re-approaching university departments.

Barrier 3: No Political Momentum

The founding team also needed to demonstrate that significant demand existed within the campus community for a CBEMS agency. This required strong commu-nity support from the campus at large. Consequently, legislation (Appendix D) was passed by the undergraduate student government supporting the establishment of UWEMS.

Such approved resolutions are considered the official opinion of the entire undergraduate student body, which legitimized the need for a CBEMS agency. Once passed, the resolution was circulated amongst senior administrators, including the UW's President and Provost.

At the community level, free CPR and naloxone training programs were launched, which served over 300 students in the first four months of operation. Providing an initial service to the campus, however small, show-cased the potential of a CBEMS agency to fill campus needs and increased confidence in the program. In addition, the creation and staffing of these trainings helped build a pool of skilled, certified instructors who could also staff community events outside of UW to support external stakeholders.

Barrier 4: No Administrative Home

The founding team approached multiple departments within the university in an attempt to find an administrative home. While various UW stakeholders expressed support for the team's mission, they all declined to serve in such a capacity, ultimately feeling they lacked the staff, infrastructure, or authority to provide ongo-ing oversight for a CBEMS agency. The founding team was frequently redirected to others, a reflection of the uncertain institutional path for integrating novel CBEMS programs.

Ultimately, the founding team was referred to the UW Paramedic Training Program (PMT) within the UW Medicine Department of Emergency Medicine as a potential administrative home. UW PMT holds the Emergency Services Supervisory Organization (ESSO) designation in Washington state and therefore has the legal capacity to adopt and oversee EMS agencies such as UWEMS.[1,2,13] Their willingness to formally incorporate the agency and advocate for its inclusion from within the uni-versity ecosystem marked the key turning point in the agency's trajectory.

The value of having a supportive administrative home and advisors within the university who could strongly advocate for the program cannot be overstated. In the case of UWEMS, these individuals were current and former physicians, paramedics, and nurses, who could draw from firsthand experience in EMS to assess and understand the vision while simultaneously balancing their understanding of the local emergency response ecosystem.

Barrier 5: No Liability Strategy

The final concern voiced by university administrators was the lack of a comprehensive liability strategy. Drawing from peer CBEMS agencies, a multi-model strategy was proposed to mitigate risk including independent emergency service insurance, mandatory liability waivers, and consultation with university legal counsel. Following incorporation with UW PMT, the Department of Emergency Medicine assessed the proposed strategies, and eventually elected to incorporate operations under its existing professional liability coverage and formally recognize UWEMS as a university-sanc-tioned emergency response program.

Implementing the Service

In order to become formally authorized to render care, an agency application was submitted to the WA DOH as an amendment to UW PMT ESSO. To ensure an adequate pool of qualified EMT candidates at the time of recruitment, interested students were directed to a local training program where they could complete their EMT certification. 'Cohort 1' was assembled by prioritizing first and second-year EMTs with external EMS experience and substantial alignment with the UWEMS mission. Recruits were quickly integrated into UWEMS operations and encouraged to take ownership of critical projects in preparation for launch.

The pilot program began with a structured roll-out plan so UWEMS members and stakeholders could grow accustomed to how UWEMS would fit in the existing 9-1-1 response structure. The rollout plan included a preparatory phase, a shadowing phase, and a response phase. During the two-month preparatory phase, members were scheduled for informal, out-of-uniform shifts where they reported to headquar-ters and familiarized themselves with equipment and protocols without the pressure of active response. During the two-week shadowing phase, members began wearing uniforms and were dispatched to 9-1-1 calls, but did not enter the scene until SFD arrival, upon which they served as observers only. This allowed for practice with bike response, campus navigation, and the dispatch system. Finally, during the response phase, UWEMS assumed its intended operational scope, and members began initiating medical care upon arrival even if prior to SFD arrival on scene.

For the duration of the rollout plan, UWEMS scheduled its operational hours to coincide with periods of high campus 9-1-1 call volume. The stepwise rollout was a key component to success, as it allowed for the identification and rectification of pain points before they impacted full operations. In addition, it allowed time for the campus community to gain familiarity with the agency's presence and scope.

Overcoming Setbacks and Challenges

With no precedent in Washington state, the concept of CBEMS was foreign to nearly all involved. Unforeseen challenges required numerous revisions to the original plans. Keeping the mission of UWEMS central to these changes allowed flexibility while maintaining forward momentum. For example, while the initial proposal included golf carts for campus response, logistical barriers like limited storage led to an electric bicycle model. Similarly, the proposed timeline for the pilot program shifted several times to accommodate unexpected delays and evolving circumstances

Founding members of new CBEMS agencies should be prepared for a significant time commitment. It took over two years to get from idea formation to program launch. Early planning and a robust continuity of plans can help avoid disruption as founding members graduate before program launch.

Some of the greatest barriers involved navigating administrative obstacles, particularly in the first year of the founding process. These challenging discussions provided a better understanding of the priorities and concerns of various stakeholders and thus an opportunity to distinguish the proposed CBEMS agency from more traditional student groups. Here, the best approach was to remain patient, professional, and persistent in communications, always circling back to mission.

It is more than likely that founding teams will run into legal and regulatory hurdles unique to their states and universities. Both Washington state and the UW had no prior exposure to CBEMS. Interviewing and sharing resources with multiple CBEMS agencies across the country was incredibly helpful to the team in directing con-versations and overcoming numerous hurdles.

Conclusion

On April 4, 2025, after over two years, UWEMS offi-cially began providing patient care on the UW campus. From the start, the journey has been in firm conviction of the mission statement and the belief that students are capable, and sometimes best positioned, to cre-ate change. Leaning into the discomfort and unknowns that meet many CBEMS agencies, a program emerged that stands as one-of-a-kind in Washington state.

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Supplemental Materials

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A Harm Reduction Blueprint: Partnering with Fraternity & Sorority Life to Expand Naloxone Access

Noor K. Majhail, B.S., NREMT-P; **Sophie Raphael**, B.S., NREMT-B; **Kate Metzendorf**, B.A., NREMT-B

The opioid epidemic has profoundly affected communities nationwaide, and college campuses are no exception. Rising rates of opioid misuse, coupled with the prevalence of fentanyl-laced substances, have ampli-fied the risk of lethal overdoses among young adults. Around 50% of college sophomores report being offered an illicit opioid.[1] Additionally, a review of prescription opioid misuse among universitystudents found lifetime misuse rates ranging from 4% to nearly 20%, with higher rates observed among students experiencing psychological distress, depression, or suicidal thoughts.[2]

Table 1. U.S. Drug Overdose Deaths by Category (2023)

KEY STATISTICS ON DRUG USE AND OVERDOSE AMONG THE U.S. POPULATION

CATEGORY	STATISTIC	SOURCE
Total U.S. overdose deaths (2023)	105,007 deaths	CDC WONDER, 2023; NIDA, 2024
Synthetic opioid overdose deaths (2023)	72,776 deaths	CDC WONDER, 2023; NIDA, 2024
Stimulant overdose deaths (2023)	59,725 deaths; 70% involved fentanyl	CDC WONDER, 2023; NIDA, 2024
Cocaine-involved deaths (2023)	29,449 deaths, with illicit fentanyl as main driver	CDC WONDER, 2023; NIDA, 2024
Prescription opioid deaths (2023)	13,026 deaths (down from 17,029 in 2017)	CDC WONDER, 2023; NIDA, 2024

Summary of overdose-related deaths, with synthetic opioids (mainly fentanyl) as the leading cause.

Overdoses from stimulants like methamphetamine, cocaine, and ecstasy laced with opioids, often without the user's knowledge, are increasingly common. In 2023, nearly 70% of stimulant-involved overdose deaths also involved fentanyl, highlighting the dangers of street drug contamination[3]. Cocaine-involved overdose deaths have quadrupled from 2015 to 2023, which is largely attributed to fentanyl contamination. These trends highlight a shift in the opioid crisis, where fentanyl, frequently undetected, now plays a deadly and growing role, especially on college campuses, where many students are exposed to illicit drugs.

The Michigan Emergency Medical Services Club (MEMSC) provides educational, volunteer, research, and career opportunities for students interested in healthcare and prehospital fields. MEMSC is a team of over 300 members, including 40 licensed EMTs. The development of this initiative was motivated in part by observations from students who work with the local ambulance service. Through their prehospital experi-ence,several students noticed ambulance response times in the area can range from 10 to 15 minutes, depending on call volume and unit availability. In the event of an opioid overdose on campus, delayed ambulance arrival combined with the absence of readily available naloxone could allow respiratory depression to progress to cardiac arrest. These observations motivated students to address a critical win-dow in which early bystander intervention with naloxone could be lifesaving.

Recognizing the growing public health challenge of opioid overdose, the Michigan Emergency Medical Services Club (MEMSC) launched a Naloxone Initiative to increase access to naloxone, a medication that rapidly reverses opioid overdoses. The Naloxone Initiative aims to install naloxone kits in fraternity and sorority houses, addressing the community's elevated risk of substance use, and to empower students to intervene in opioidrelated medical emergencies. The University of Michigan is home to 58 Greek Life organizations. We began the initiative focusing on both affiliated and non-affiliated Interfraternity Council (IFC) chapters and all affiliated Panhellenic Council (PHC) chapters. Our original focus did not include any professional organizations, as these groups are not part of the University of Michigan Fraternity and Sorority Life department, but reaching these communi-ties would be a great next step for future expansion of our initiative.

Noor Majhail, B.S., NREMT-P, graduated from the University of Michigan with a B.S. in Biology, Health, and Society and Spanish Language. She has served on the board of the Michigan Emergency Medical Services Club since 2022, previously as Vice President of Education and as Co-President (2024). Noor has led a variety of campus initiatives, including founding the UM Club Ambulance and teaching AHA BLS Provider courses, Hands-Only CPR, Stop the Bleed, and Narcan training sessions. Noor has been working in EMS for 4 years in Washtenaw County, MI. **Sophie Raphael, B.S., NREMT-B**, graduated from the University of Michigan with a B.S. in Biomolecular Science and a minor in Public Policy. Sophie has served on the Board of the Michigan Emergency Medical Services Club since 2022, previously as the Vice President of Community Outreach before assuming co-presidency in 2024. She has worked on a variety of campus initiatives, including CPR, Stop the Bleed, and Narcan training initiatives. Sophie has worked as an EMT for three years at home in Chicago, IL. **Kate Metzendorf, B.A., NREMT-B**, graduated from the University of Michigan with a B.A. in Sociology of Health and Medicine. She served as the Vice President of Operations for the Michigan Emergency Medical Services Club over the 2024-2025 academic year. In this role, she acted as director of the Narcan Initiative as well as managed the club's Outreach Committee. Kate is a certified American Heart Association BLS Instructor and has taught multiple provider courses for University of Michigan students. She currently holds her New York State and National Registry EMT-B certification.

The initiative followed a four-phase process of development: securing funding, forming relationships, education and training, and implementation. This article outlines the program's development and offers recommendations for other collegiate EMS organizations looking to adopt similar harm reduction strategies.

Although the Naloxone Initiative was initially designed to serve fraternity and sorority communities, its structure can be adapted to other settings, including residence halls, student health centers, and off-campus housing. As opioid overdoses continue to affect various communities nationwide, increasing access to naloxone is a crucial step toward improving campus safety and preventing fatal overdoses.

Phase 1: Securing Funding

Michigan Emergency Medical Services Club is a Voluntary Student Organization (VSO) at the University of Michigan. VSOs apply for funding at the beginning of each semester through the Student Organization Funding Committee (SOFC), which is part of the Central Student Government. VSOs receive access to certain University-controlled benefits and resources, including funding, but are not directly sponsored by a university, school, or department. Grant applications are straightforward and request information about (1) the organization seeking funding, (2) specific information about the event, program, or service, (3) the anticipated impact on the student body, and (4) an itemized list of individual expenses.

Prior to requesting funding, we reached out to Wolverine Wellness, a health promotion program affiliated with the University of Michigan's Student Health Services that supports student well-being. Wolverine Wellness regularly distributes free naloxone as part of its harm reduction efforts and agreed that providing the EMS club with naloxone for the project was feasible and aligned with their mission. Therefore, we acquired naloxone at no additional cost and anticipate being able to replace used or expired naloxone whenever needed.

We requested a total of $938 in funding for this project. All funding was allocated toward acquiring naloxone kits, which included the packaged naloxone as well as a case to hold the medication that would be installed in the chapter house. The grant proposal assumed all 58 chapters would agree to the installation of the kits. First, we determined that external weatherized outlet covers would serve as effective and accessible storage cases for naloxone kits. These are durable covers that snap shut and can be secured with breakaway ties. Installing the kits required screws and a drill. We recommend all of these materials to build effective kits, but acknowledge that financial costs will vary between agencies.

We used a CPR-feedback mannequin, already owned by the club, to run a brief hands-only CPR demonstration, ensuring that trainees were prepared for an opioid-associated cardiac arrest.

Phase 2: Forming Relationships

Strong and collaborative relationships are a crucial part of this initiative. Gaining the support and participation of campus leaders and student organizations was essential to ensuring the initiative reached the communities most likely to benefit. We initially focused on a smaller and more feasible audience, with future expansion plans discussed later in this article to ensure naloxone education ultimately reaches all students and faculty.

Before engaging with our target audience, we formed relationships with key organizations on campus that could connect us with the resources we need. We were very fortunate that many University of Michigan programs, like LSA Student Government and Wolverine Wellness, were willing to provide a steady supply of naloxone to support our initiative. The University of Michigan Student Government also had its own programs dedicated to combating opioid overdose, so the relationships we formed with these student leaders led to an expansion of our initiative.

We identified five areas with potential gaps in access to naloxone where it could be of most value on a college campus: the Greek Life community, freshman residence halls, student health centers, campus security vehicles, and anonymous pick- up stations. The identification of these five areas was informed by an informal needs assessment and environmental scan. We reviewed existing naloxone access points on campus to determine where naloxone was already readily available. Areas with established access, such as campus security, the emergency department, University Health Services, and an off-campus city library, were excluded from further consideration. Remaining areas were identified as potential gaps based on their high student presence, limited existing access to naloxone, and relevance to student safety.

Based on this assessment, our first target audience was the University of Michigan Greek Life community, specifically the IFC and PHC. We introduced the initiative in meetings with IFC and PHC leaders to gain approval and identify collaboration opportunities, and then communicated directly with chapter presidents. In these conversations, we outlined our goals and described how their chapters could participate, which included scheduling training sessions at chapter events to ensure all members received the education.

Entering the houses in person allowed us to build trust with the chapter leaders and members, and approach the sensitive topic of opioid overdose with compassion. Our goal was to promote a sense of shared responsibility and empower members of the Greek life community to make informed, safety-conscious choices.

Some chapters were hesitant, raising concerns that the training might be uncomfortable, that naloxone's presence could reflect poorly on their members, or that it might encourage opioid use. In response to these concerns, we refined our presentation to directly address these concerns and better meet the chapter where they were.

We included information about Michigan's Good Samaritan Law, which protects individuals who provide medical assistance to someone experiencing an overdose from prosecution.[4] We hope that this information encourages individuals to help those in need and relieve pressure associated with these high-stress situations. We also used familiar comparisons to training, such as CPR or fire extinguishers, which helped to emphasize that naloxone was simply another emergency preparedness tool that could help save a life. To make the presentation even more relatable and convincing to our audience, we included local statistics regarding overdoses from Washtenaw County, where Ann Arbor is located. Additionally, we provided contact information during every presentation so that members knew they could reach out with any questions or concerns. Lastly, we emphasized that the Michigan EMS Club does not pass judgment on anyone's personal choices or social activities. Our sole aim is to provide objective information that may save lives and empower students to act in case of an emergency.

Table 2. Strategies for Naloxone Kit Placement and Accessibility on Campus

NARCAN KIT PLACEMENT AND ACCESSIBILITY STRATEGIES

PLACEMENT STRATEGY	DESCRIPTION	CONSIDERATIONS
Common Areas in Fraternity & Sorority Houses	Ensures quick access in high-risk locations.	Coordinate with Greek Life leadership to ensure proper placement, maintenance, and discreet visibility.
Residence Halls & Dormitoties	Expands coverage to broader student populations.	Ensure secure yet 24/7-accessible storage. Clarify liability and communication procedures with residents.
Student Health Centers	Aligns with existing campus healthcare resources.	Offer peer-led training, online modules, and integrate with risk management programming.
Anonymous Pickup Stations (e.g., Vending Machines)	Encourages students to take Narcan without fear of judgement.	Limited by clinic hours & minimize access barriers (e.g., staff interaction)
Campus Security Vehicles	Equips campus first responders with immediate access.	Requires regular monitoring, secure locations, and long-term funding. Requires education on item to ensure proper usage.

Highlights effective placement options, descriptions, and key considerations to ensure timely, discreet, and equitable student access to naloxone.

There is still ample work to be done in combating the opioid overdose problem, so maintaining long-lasting relationships is a priority for us. We will constantly be refining and updating this presentation as we con-nect with more communities to ensure we are always providing the most relevant and up-to-date information to participants.

We also maintain contact with incoming chapter leaders during leadership transitions and promote our initiative amongst MEMSC club members to get younger members involved and ensure continuity of the initiative. We want to ensure our work is sustainable to educate and empower the ever growing community.

Phase 3: Education and Training

Simply placing naloxone in fraternity and sorority houses is not enough; students must feel confident in recognizing and responding to an opioid overdose for the initiative to be effective. The training material was developed to be concise and practical to avoid overwhelming participants while emphasizing the life-saving potential of naloxone.

Scheduling training sessions proved to be a logistical challenge, as chapters often had extensive existing social and philanthropic commitments. We found it most effective to offer training sessions during existing chapter events, rather than trying to coordinate separate sessions. This made participation more convenient, leading to greater attendance.

The Michigan EMS Club developed a 20-minute PowerPoint presentation with a hands-on skills session at the end. The in-person format allowed students to engage in demonstrations, ask questions, and receive direct feedback. The training covers three essential points: recognize the signs and symptoms of an opioid overdose, administer naloxone properly, and respond appropriately following administration. The cur-riculum was developed based on the Overdose Prevention and Response Toolkit, created by the Substance Abuse and Mental Health Services Administration (SAMHSA), a U.S. agency under the Department of Health and Human Ser-vices that addresses substance abuse and mental illness. The toolkit provides best practices recommended for responding to opioid overdose.[5] Par-ticipants were taught to identify critical symptoms of a potentially fatal overdose, such as respiratory depression, loss of consciousness, cyanosis, and pinpoint pupils, and were instructed to call 911 immediately upon suspect-ing an overdose. Instruction on intranasal naloxone administration included positioning the individual supine, tilting the head back, inserting the device into either nostril, and firmly depressing the plunger. This demonstration was conducted using an empty naloxone nasal spray and a CPR mannequin. The training emphasized the importance of updating 911 dispatchers on any changes in the patient's condition following administration and guidance on what to do while waiting for first responders. By discussing the increasing prevalence of fentanyl-related overdoses, partici-pants were encouraged to recognize that opioid overdose risk extends beyond individuals with a known history of opioid use.

Our team ensured that we acquired naloxone from dependable organizations to ensure that the supplies given to each chapter were safe and functional. Our discussion also points out several on-campus loca-tions where students can obtain free naloxone, such as local fire stations and hospitals. We recommend that organizations implementing similar initia-tives identify and share information about available supply hubs within their communities.

Discussions surrounding opioid overdose and naloxone can involve sensitive and high-risk scenarios; risk mit-igation was a central consideration in training devel-opment. Our ultimate priority was to provide evi-dence-based information while clearly defining the limits of participant responsibility. Training content was reviewed by the Michigan EMS Club's physician advisor to ensure appropriateness for a lay responder audience.

Participants were explicitly instructed that they should not enter unsafe environments to administer naloxone. Training reinforced legal protections for bystanders via Michigan's Good Samaritan Law while emphasizing immediate activation of emergency medical services, underscoring that naloxone is an emergency tool and not a substitute for professional medical care. The entire scope of the education was intentionally focused on harm reduction and immediate emer-gency response; it strictly avoided teaching diagnostic guidance or advanced medical decision-making. Our organization worked with the University's Central Student Government in implementing this program. Organizations seeking to replicate this model are encouraged to consult campus health services or institutional leadership as appropriate, based on local policies

Phase 4: Implementation and Future Directions

After training is completed, each participating house is provided with two packaged doses of nal-oxone, ensuring a second dose is available if needed. We aimed to install the naloxone kits in the chapter house within a few days of the training. The naloxone is packaged in a clearly labeled storage container and is either mounted or placed in a secure location in the chapter house. Chapter leaders are responsible for sharing the location with all members. Additionally, some chapters have chosen to select specific mem-bers, deemed "sober monitors," to carry the naloxone during social events. For organizations that are inter-ested in starting this work on their own campuses, but who do not have chapter houses, we recommend storing the naloxone in a safe, accessible place or assigning it to a responsible individual (e.g., a chapter president or risk manager) who can ensure its availability and communicate its location.

Our team conducts annual check-ins with chapters to offer a restock of any needed supplies and to gather updates on program implementation. During these check-ins, fraternity and sorority leaders are encouraged to share qualitative feedback on the program's impact, including compliance with program protocols, any naloxone uses at chapter events, and remaining areas of need or support. Although a formal post-training survey was not administered during the initial implementation phase, we recommend that organizations seeking to replicate this model consider using structured surveys to evaluate participant confidence and preparedness.

We are excited about the future of our Naloxone Initiative. We aim to expand education and awareness surrounding this life-saving topic. We have been invited to collaborate with the IFC to include our presentation in New Member Orientation, an event for all individuals joining Greek Life to learn all about this new community, which will support us in reaching a broader audience within this high-risk group.

We also plan to expand the initiative beyond Greek Life. In collaboration with the University of Michigan's Central Student Government (CSG), we are creating a website with comprehensive resources related to opioid overdose and naloxone. We intend to share this with the Greek Life community and other campus organizations to ensure widespread access to helpful and lifesaving information on opioid overdoses and safe naloxone usage. Ultimately, in partnership with CSG, we hope to incorporate naloxone training into the curriculum for the University of Michigan's freshman orientation.

Conclusion

The Michigan EMS Club's Naloxone Initiative is a proactive response to the growing opioid crisis. Grounded in community trust and public health best practices, the initiative has already resulted in the installation of naloxone kits in 10 sorority and fraternity homes. The EMS Club will continue implementation within the PHC and IFC community and expand outreach to other locations, such as residence halls and off-campus housing, to improve accessibility.

This article outlines the initiative's development and challenges, and we hope that it serves as a guide for other collegiate EMS organizations looking to expand harm reduction efforts. We recognize each campus has its own structure and challenges, so we encourage flexibility when applying this model. More importantly, we hope this initiative inspires others to prioritize student health and safety. For questions, please contact us at umemsclub@gmail.com.

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Implementing a Collegiate Naloxone and Bleeding Control Kit Program

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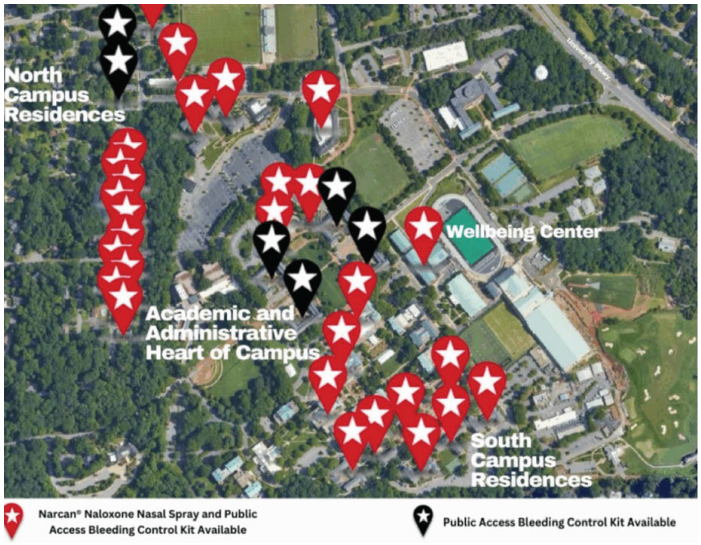
Wake Forest Emergency Medical Services (WFEMS) recently partnered with school administration, community partners, and the Wake Forest University School of Medicine to enhance campus preparedness for victims of opioid overdose and for the possibility of an active shooter. Given the potential for opioid overdose on college campuses and the threat of active shooter emergencies, it is imperative that collegiate EMS agencies be proactive in campus preparedness efforts. Members of our campus community recognized a potential preparedness gap given the lack of community training in opioid overdose management and hemorrhage control. In this report we describe our advocacy efforts to have Narcan® Naloxone Nasal Spray and bleeding control kits co-located in our campus' existing automatic external defibrillator (AED) stations as well as our efforts to provide community-based training programs.

Key elements of our campaign to help prevent opioid- and active shooter-associated morbidity and mortality were making Narcan® Naloxone Nasal Spray as well as bleeding control ("Stop-the-Bleed") kits available throughout campus. Due to the number of readily available AED stations across Wake Forest University's campus that community members are already familiar with and the cost effectiveness of using already installed stations, WFEMS decided that placing both Narcan® Naloxone Nasal Spray and bleeding control kits inside the AED stations would be the best implementation strategy.

To accomplish this goal, WFEMS student leaders partnered with our physician medical director, campus legal counsel, and university administration. Our community partner, Forsyth County Behavioral Health Services, donated 40 4 mg intranasal naloxone kits. We identified 29 AED stations that were in a temperature-controlled environment with high campus visibility and foot traffic. We also campaigned to stock the campus AED stations with bleeding control kits. Wake Forest University School of Medicine's Department of Surgery, Division of Acute Care, donated 35 bleeding control kits.

Each kit contained: 1x C-A-T tourniquet, 1x 6 inch responder emergency trauma dressing, 2x wound packing gauze, 2x pair gloves, 1x trauma shears, 1x survival blanket, and 1x permanent marker. These kits were placed inside all of the temperature- controlled AED stations that also contained Narcan® Naloxone Nasal Spray as well as in 6 additional non-temperature-controlled AED stations. These efforts resulted in Narcan® Naloxone Nasal Spray and bleeding control kits being placed in 23 residential buildings and 6 high traffic academic and recreation buildings. Figure 1 describes the joint AED, Narcan®Naloxone Nasal Spray, and bleeding control kit stations on campus.

Figure 1. A map of Wake Forest's campus



A map of Wake Forest's campus marking all AED stations that have Narcan® Naloxone Nasal Spray and bleeding control kit housed in them.

To help ensure public familiarity and awareness of Narcan® Naloxone Nasal Spray and bleeding control ("Stop-the-Bleed") kits being co-located with the AEDs, stickers were added to the outside of the AED stations. Figure 2 shows a typical AED station with a Narcan® Naloxone Nasal Spray and bleeding control kit setup.

Figure 2. Labeling for Wake Forest University AED

Labeling for the Wake Forest University AED stations with naloxone nasal spray and bleeding control kits.

To ensure that our campus community was familiar with naloxone nasal spray and the bleeding con-trol kits, we hosted multiple training sessions open to all members of our community. In addition to pub-lic training, faculty from the Wake Forest University School of Medicine's Department of Emergency Medi-cine led training events for overdose management and trauma care for all campus EMS members. Faculty from the Department of Surgery also assisted in these trainings by providing expertise in hemorrhage control. Lastly, our campus 911 dispatchers as well as university police and security officers are aware of these AED stations and have rapid access to maps detailing their locations and contents.

As of 5 months after implementation, 91.6% (44/48) of WFEMS members were trained and check-off by the WFEMS medical director for naloxone nasal spray and bleeding control kit use. Of those 44 members, 43.2% (19/44) have been approved by the med-ical director to teach community training pro-grams on how to use the n aloxone nasal spray and bleeding control kits. Those 19 individuals pro-vided 4 official training sessions on campus. WFEMS trained roughly 60 Wake Forest students in those training sessions. These training sessions comprised of individuals 1) learning how to recognize a potential opioid overdose, 2) use naloxone nasal spray on the patient, 3) recognize what constitutes a major bleed, 4) and how to properly address life threatening hem-orrhage. To date, no publicly available naloxone nasal spray or bleeding control kit has been used for clin-ical care at the Wake Forest University campus.

As next steps, WFEMS plans to 1) obtain additional naloxone nasal spray and bleeding con-trol kits in order to stock additional AED stations throughout campus and 2) increase community awareness by conducting additional free, open to the public training sessions on naloxone adminis-tration and hemorrhage control. A key barrier that we are working to overcome is the need for nalox-one nasal spray to be temperature controlled (55-77 °F). Many of our campus AED stations are outside and are unable to be temperature controlled. As the naloxone nasal spray and bleeding control kits expire and are used, WFEMS will replace them with new kits obtained through donations from community partners or purchased with school funds. The use and expiration of said kits will be monitored by the university's emergency management and preparedness team, which will update WFEMS accordingly. Through continued community engagement, public training opportuni-ties, and regular dialogue with administration, we are working to mitigate a perception among com-munity members that having naloxone nasal spray and bleeding control kits available may actually increase risk taking behaviors and place our campus at increased threat of violent acts. It is our hope that our team's efforts will empower other collegiate EMS agencies to engage in similar community preparedness and prevention efforts.

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Redefining Collegiate EMS Practice Through a Trauma Informed Lens

Ellika Greaves, EMR; **Fezan Khokhar**, BSc, EMR

Trauma-informed care (TIC) is increasingly recognized as essential in prehospital settings, but its integration into collegiate Emergency Medi-cal Services (EMS) remains limited. Collegiate responders face the unique challenge of treating peers in moments of crisis, where past trauma can profoundly shape the patient encounter. Traditional EMS training equips students with clini-cal skills but often leaves them under prepared for these human dimensions of care. At McMaster Uni-versity's Emergency First Response Team, a pivotal patient encounter and subsequent responder surveys revealed significant gaps in confidence for TIC delivery. To address this, a structured approach was developed to translate the six principles of TIC outlined by the Substance Abuse and Mental Health Services Administration into three fieldfriendly tenets: Recognition, Reassurance, and Resisting Retraumatization. Designed for adaptability, this approach has been woven into onboarding, continuing education, and team culture, with dissemination to numerous EMS agencies across the National Collegiate EMS Foundation. This article outlines the framework and traces its development. It also offers practical recommendations for collegiate EMS agencies seeking to embed similar principles into hiring, training, and daily response. Early evidence suggests that this approach strengthens patient trust, boosts responder confidence, and supports overall wellbeing.

Ellika Greaves, EMR is an alumna of the McMaster University Emergency First Response Team, where she served as an Emergency Medical Responder for three years. In 2024, she co-founded Trauma-Informed Teams, a resource designed to promote responder well-being and resilience through trauma-informed care practices. Ellika was recognized as the Richard W. Vomacka Student Speaker Award recipient at the 2025 National Collegiate Emergency Medical Services Foundation (NCEMSF) Conference and now serves as NCEMSF's Canadian Regional Coordinator. Ellika is currently pursuing a Bachelor's of Health Science in Biology and Pharmacology at McMaster University and works in healthy aging research at the University of British Columbia. **Fezan Khokhar, BSc, EMR** is a second-year medical student at the University of Toronto and a McMaster University alumnus (B.Sc). He served as an Emergency Medical Responder with McMaster's Emergency First Response Team (EFRT) for four years, including one year as the Program Director. During his time with EFRT, he led initiatives to improve inclusivity and trauma-informed prehospital care and worked to enhance the experience of responders on his team. He is particularly interested in systems design and optimizing healthcare team efficiency, with clinical research interests in emergency medicine and orthopedic surgery.

Background

Trauma-informed care (TIC) is an evidence-based framework that emphasizes safety, trust, empowerment, and collaboration in healthcare encounters.1 It is based on the knowledge that patient responses are shaped not only by current illness or injury, but also by prior adverse experiences, which may include medical mistreatment, discrimination, interpersonal violence, or systemic inequities.[1] A trauma-informed approach acknowledges these influences and seeks to minimize the risk of retraumatization while fostering a sense of agency and partnership in care. Global mental health surveys from the World Health Organization indicate that over 70% of respondents experience lifetime trauma, with an average of 3.2 exposures per person.[2] While hospital medicine has increasingly adopted TIC and peer-support models to support this need, their translation into Emergency Medical Services (EMS) remains inconsistent.

The prehospital environment introduces unique challenges: care often occurs in uncontrolled, public spaces, with limited time, few resources, and high emotional stakes. Evidence from Lee et al. (2023) showed how medical students in acute care recognized psychosocial and TIC as central to patient well-being, yet reported limited confidence in providing such care prior to structured simulation-based training.[3] While research within collegiate EMS is lim-ited, it is reasonable to expect similar barriers given the shared realities of prehospital care: time pressure, limited resources, and minimal exposure to formal trau-ma-informed training. Systematic reviews of TIC interventions in emergency medicine settings echo these findings, indicating that training can improve staff knowledge and attitudes, though consistent uptake into routine practice remains limited.[4] Importantly, TIC is not only patient-centered but also a framework for supporting providers, whose own wellbeing directly shapes care quality EMS clinicians face frequent exposure to critical incidents, shift work, high case volumes, and organizational pressures, all of which elevate risk of posttraumatic stress disor-der (PTSD) and other mental health conditions.[5] Many rely on informal coping mechanisms rather than struc-tured support, and professional help is often underuti-lized.[6] These findings suggest that embedding TIC princi-ples into responder training and organizational culture has the potential to benefit both patients and providers.

For collegiate EMS, the case is particularly compelling. Student responders occupy a dual role: they are both peers and providers, treating classmates and acquaintances in moments of acute vulnerability. Calls often occur in dormitories, classrooms, or social venues where privacy is minimal and bystanders are present. While the peer-to-peer dynamic may foster trust, it also introduces risks. Patients may fear stigma, question confidentiality, or feel embarrassed when disclosing sensitive histories to a peer. For those with prior negative healthcare experiences, a responder's tone, phrasing, or actions may unintentionally echo past harms, leading to mistrust or retraumatization. On McMaster's Emergency First Response Team (EFRT), emotionally charged calls and internal feedback revealed that while responders felt confident in medical protocols, many felt underprepared when patients exhibited panic, dissociation, or mistrust of care. Upon consulting collegiate-aged responders, it was found that most had encountered patients with healthcare-related trauma, yet few felt fully confident in managing such cases.7 These findings underscore the need for a practical, field-ready trauma-informed framework tailored to the collegiate EMS landscape.

Building a Trauma-Informed Resource: A Timeline of Development

Fall 2023 - A Pivotal Call:

We responded to a patient with chronic epilepsy who required emergency care on campus. Although responders managed the medical aspects appropriately, the patient's heightened distress stemmed from prior experiences of medical mistreatment. Routine interventions such as obtaining a history and checking vitals triggered disproportionate fear, leaving responders uncertain of how to proceed without worsening the situation. This encounter underscored the limitations of traditional training for managing TIC in real time.

Fall 2023 to Winter 2024 - Surveying the Gap:

We conducted a survey of 39 collegiate-aged first responders. 85% reported encountering or suspecting trauma-affected patients, yet only 5% felt fully confident addressing their needs. Roughly 41% felt "somewhat confident," and the remainder expressed uncertainty. Qualitative feedback revealed a desire for concrete strategies for recognizing trauma, communication skills for calming patients, and tools for avoiding additional distress.

Winter 2024 - Framework Development:

Drawing from SAMHSA's six principles and incorporating frontline responder feedback, we formed three actionable tenets: Recognition, Reassurance, and Resisting Retraumatization. To facilitate adoption, a dedicated curriculum and online training hub titled Trauma-Informed Teams was developed, providing responders with accessible resources and case examples.[7]

February 2024 - Initial Implementation:

The framework was shared with responders on EFRT and presented in poster format at the National Collegiate Emergency Medical Service Foundation (NCEMSF) conference in Baltimore, MD.

Ongoing Integration (2024 - 2025):

The framework has continued to evolve through iterative feedback from EFRT members and external adopters. It was featured in a TIC lecture at NCEMSF 2025 in Pittsburgh, PA. Refinements were guided by responder experiences, patient interactions, and cross-agency discussion. Preliminary feedback suggests measurable benefits, including improved responder confidence and strengthened patient trust.

The Trauma-Informed Teams Framework

The Trauma-Informed Teams Framework condenses SAMHSA's six broad principles of TIC into three field-ready tenets: Recognition, Reassurance, and Resisting Retraumatization. While simplified, these tenets map directly onto the established domains of TIC, ensuring conceptual fidelity while offering responders a model that can be recalled under pressure.

Recognition involves identifying both the visible and less obvious ways trauma can present during an encounter. Some patients may arrive hypervigilant, avoidant, or emotionally reactive, while others may present with flat affect, detachment, or difficulty following instructions. Recognition requires attentiveness not only to behavior but to context, and interpreting responses through the lens of prior adversity, systemic inequities, or historical trauma. This allows responders to shift away from labelling patient behavior as "non-compliant" or "difficult", and respond with empathy as opposed to frustration. In alignment with SAMHSA's principles of safety, trustworthiness, peer support, and cultural awareness (Table 1), recognition also extends to peers. Being able to acknowledge when a fellow responder shows signs of cumulative stress or secondary trauma is an equally important component of TIC.

Reassurance emphasizes the active promotion of psychological safety. Patients often feel vulnerable when being treated by peers or authority figures, especially in urgent or unfamiliar settings.

Responders can provide reassurance by explaining each step of care, offering choices whenever possible, and maintaining a calm, measured tone. Even small gestures, such as asking permission before physical contact or explaining what equipment is being used, can reduce fear and restore a sense of control. Reassurance also strengthens trust and fosters a sense of agency. This corresponds to the TIC principles of transparency, collaboration, and empowerment (Table 1), emphasizing that reassurance is not just comfort but an environment of shared decision-making.

Resisting retraumatization reflects an ongoing responsibility to prevent harm. Many patients bring prior experiences of medical mistreatment, interpersonal violence, or discrimination, and even routine procedures can unintentionally replicate these dynamics. Concrete practices such as seeking consent before physical exams, offering gender-concordant care when feasible, and adjusting assessments to patient comfort can help ensure that interventions do not echo earlier trauma.

This tenet intersects with TIC's emphasis on safety, empowerment, and cultural awareness (Table 1). Resisting retraumatization also extends beyond the patient. Collegiate responders, who often balance academic pressures with emotionally charged clinical work, are themselves at risk of secondary trauma. Structured debriefings, peer support systems, and access to mental health referrals are important safeguards for sustaining responder resilience. Protecting providers in this way is inseparable from protecting patients, since the wellbeing of one directly influences the quality of care delivered to the other.

Taken together, Recognition, Reassurance, and Resisting Retraumatization represent not a dilution but a distillation of SAMHSA's TIC guidelines. As illustrated in Table 1, the three tenets preserve the breadth of the six established principles while packaging them into a usable form for high-pressure collegiate EMS environments.

Table 1. Mapping the Overlap Between SAMHSA's Six TIC Principles and the Tenets of Trauma-Informed Teams

Trauma-Informed Teams Tenet	SAMHSA Principles Covered[1]	Main Idea/Connection
Recognition	Safety	Actively noticing trauma responses and interpreting them in context.
	Trustworthiness and Transparency	
	Peer Support	
	Cultural, Historical, and Gender Issues	
Reassurance	Trustworthiness and Transparency	Building psychological safety by explaining care clearly, validating emotions, and inviting patients into decision-making.
	Collaboration and Mutuality	
	Empowerment, Voice, and Choice	
Resisting Retraumatization	Safety	Proactively working to prevent repeated harm, and addressing factors that may trigger distress.
	Empowerment, Voice, and Choice	
	Cultural, Historical, and Gender Issues	

Example in Practice

Responders are dispatched to a residence room for a student having a panic attack. Upon arrival, the team finds the patient seated on the floor, breathing rapidly, trembling, and avoiding eye con-tact. Attempts to gather a history initially heighten the patient's distress, with the patient flinching when approached and struggling to answer questions. Rec-ognizing possible indicators of trauma, the lead responder adopts a calm tone, introduces themselves clearly, and creates physical space by asking others to step back. They explain each action before proceeding, and offer the patient simple choices, such as where to sit or whether a friend can remain in the room. Through deliberate pacing, transparent communi-cation, and respect for autonomy, the responders help the patient re-establish a sense of safety and control. This scenario illustrates how Recognition, Reassurance, and Resisting Retraumatization can be operationalized in routine collegiate EMS encounters involving acute psychological distress.

Lessons and Recommendations for Implementation

Building and implementing the framework revealed key lessons. First, cultural change is gradual. Some responders may view TIC as "soft" or unrelated to technical proficiency. Sustained buy-in requires leadership modeling. When supervisors frame debriefs around recognition and reassurance, it communicates that TIC is not optional but a core expectation of practice. Next, avoid rigid applications. Early efforts to teach TIC as a checklist risked making responders more mechanical rather than more attuned. Reframing TIC as a mindset can help responders integrate principles into their own style of care. Third, prioritize ongoing reinforcement. One-off sessions are often insufficient. Incorporating TIC into continuing education, annual refreshers, and embedded training scenarios will make the framework more sustainable and resistant to skill fade. Last, and most importantly, protect responder wellbeing. Calls involving peers can be uniquely taxing. Structured debriefs, peer support groups, and clear referral pathways to mental health services proved just as essential as patient care protocols. Recognizing that responder health directly shapes patient care is critical for lasting implementation.

Beyond these lessons, several recommendations can guide successful adoption:

Frame TIC as a valued competency from recruitment onward. Recruitment provides the opportunity to set expectations and shape team culture. Highlighting TIC alongside clinical and technical skills in role descriptions, interviews, and early communications signals that relational competence is integral to the role of a collegiate first responders

Integrate TIC scenarios throughout training. Onboard-ing and continuing education should go beyond theory. Role-play and case-based discussions, such as practicing responses to patients who panic during care or recogniz-ing subtle signs of trauma, equip responders with practical skills. Continued refreshers help sustain competence over time.

Embed TIC into organizational protocol. Policies on confidentiality, consent, and peer interactions should explicitly reflect trauma-informed language. Standard operating procedures can reinforce expectations such as explaining interventions clearly, obtaining consent wherever possible, and respecting boundaries in both patient and team dynamics.

Model trauma-informed practices through leadership. Leaders set the tone for daily practice. Supervisors who normalize check-ins, provide transparent feedback, and validate concerns without judgment create an environment where both patients and providers feel safe and respected.

Strengthen responder wellbeing supports. Responders are vulnerable to cumulative stress and secondary trauma. Peer support programs, structured debriefs after difficult calls, and clear pathways to professional mental health resources

are practical tools to prevent burnout and sustain

Encourage cross-agency knowledge sharing. Traumainformed practice grows stronger when shared. Exchanging training materials, evaluation findings, and lessons learned accelerates innovation and adoption across the field.

Key Takeaways and Future Directions

Collegiate EMS providers are at the front line of traumasensitive care on their campus, yet they have historically lacked tools tailored to their context. The Trauma-Informed Teams Framework offers a practical and memorable way to embed TIC in the field. Early adop-tion demonstrates feasibility, cultural fit, and measurable impact on both patient trust and responder resilience. Collegiate systems are uniquely positioned to lead EMS in operationalizing TIC. Future work should focus on broader adoption across collegiate EMS agencies, rigorous evaluation of patient outcomes and responder wellbeing, and exploration of how this framework can inform the greater EMS community.

Conclusion

TIC represents more than an additional layer of train-ing; it is a cultural shift in how responders engage with patients and with each other. Collegiate EMS, with its distinctive peer-to-peer dynamic, faces unique prov-ocations but also a powerful opportunity to lead by example.

The Trauma-Informed Teams Framework distills complex principles into a field-ready model centered on recognition, reassurance, and resisting retraumatization. Embedding similar principles into recruitment, training, and organizational culture can strengthen trust within campus communities, improve patient outcomes, and model best practices for the wider EMS system.

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Supplemental Materials

Th s Advice and Practices article highlights a resource by Greaves & Khokhar (2024). To access the page, visit https:// sites.google.com/view/trauma-informed-teams/home

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Trainings in Collegiate EMS: Examples from IC-EMS at Indiana University

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Collegiate Emergency Medical Services (EMS) providers often enter the field with limited or no prior clinical experience, relying heavily on "on-the-job training" through direct patient care to build proficiency in EMS skills introduced in the classroom. While direct patient care remains a cornerstone of EMS education, simulation-based learning serves as a critical supplement by offering providers a low-risk environment to develop and refine skills. This approach not only reduces safety risks to patients but also helps standardize clinical exposure across providers.[1]

Although some collegiate EMS agencies operate as transport services, many, including Intra Collegiate Emergency Medical Services (IC-EMS) at Indiana University Bloomington, are non-transport, stand-by-based agencies.[2] These agencies primarily provide services for on-campus events, where call volumes are typically low, limiting exposure to patient care. IC- EMS offers a training model that other collegiate EMS agencies can adapt to enhance provider confidence and clinical competence. The agency is a state-certified Basic Life Support (BLS) organization consisting of Emergency Medical Technicians (EMTs) and First Aid (FA) Providers. EMTs are required to hold Indiana state reciprocity and the American Heart Association (AHA) BLS certification, while FAs are required to hold AHA FA and AHA BLS certifications. Although some IC-EMS providers work part-time for local 911 services, the majority gain clinical experience primarily through their role with IC-EMS.

At a minimum, each event staffed by IC-EMS includes one EMT field supervisor, 1-2 EMTs, and 1-2 FAs, with the number of personnel varying depending on the event. Larger events, such as football games, require multiple crews. While IC-EMS staffs many events throughout the year, exposure to high-acuity patients is limited. In the 2024-2025 academic year, IC-EMS had 211 patient contacts, 74% of which were managed at the FA level.

Given this limited exposure to high-acuity patients, simulation-based EMS education is essential for reinforcing clinical skills and preparing providers for real-world scenarios. Simulation-based learning can be used in two ways: to develop foundational skills in newer providers and to challenge experienced providers with complex or infrequent scenarios.[5] Simulations can be particularly effective for practicing high-acuity prehospital scenarios that are less commonly encountered in the field, known as high-risk, low-frequency events.[3] Simulation-based learning can be adapted based on available resources, including high-technology manikins, simulated patient actors, task trainers, or virtual reality and computer-based simulations.[1] A hybrid approach using both patient actors and manikins can allow educators to assess a provider's communication skills with patients while also testing clinical skills, such as starting an intravascular line on a nearby task trainer, that cannot be simulated with patient actors alone. Simulation-based learning has been shown to enhance clinical skills, improve problem-solving and critical thinking in challenging situations, boost confidence in decision-making, and strengthen communication and teamwork. Collectively, these benefits contribute to improved patient outcomes

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This review outlines the training curriculum used by IC-EMS to enhance provider competence, confi-dence, and field preparedness, offering a model for other collegiate EMS agencies to adopt similar educa-tional practices.

Supervisor Credentialing

IC-EMS staffs every event with a field supervisor, an experienced EMT who oversees operations and leads general member volunteers. To ensure consistent, high-quality care across providers from diverse training backgrounds, IC-EMS has developed a comprehensive supervisor credentialing process to determine baseline provider competency and leadership readiness. This is particularly important given the agency's student-run, volunteer-based structure with rolling admissions, resulting in a high proportion of new and lesser experienced providers.

The credentialing process begins with a one-day training outlining supervisor expectations, operational protocols, event preparation, patient documentation, and medication administration according to IC-EMS protocols. Following this foundational training, each prospective supervisor schedules a 1:1 skills check-off session with the Deputy Chief of Education and Division Chief of Training. This session includes both verbal and hands-on assessments, evaluating the supervisor's response to scenarios such as altered mental status, progressive respiratory distress, chest pain, traumatic injury, and cardiac arrest. Each scenario is graded using a standardized rubric, with candidates being evaluated on a scale from "exceed pass" to "fail." After each scenario, the supervisor will receive a debriefing, covering key considerations and discussing their performance. This rubric is specifically designed to offer constructive feedback, emphasizing areas for growth rather than penalizing mistakes.

If a supervisor fails any aspect of the skills assessment, remediation is required to ensure they meet the required standards. Remediation includes giving the supervisor an opportunity to identify the points they missed and the reasons behind the errors before the debriefing session. If a candidate fails one or two stations, they will receive a "conditional pass" and must complete same-day remediation with the same scenarios. If a candidate fails three or more stations, they will receive a "conditional fail" and must undergo same-day remediation and must reschedule skills assessment for another day with new scenarios.

If the candidate fails all five stations, they will receive a "fail" and will be disqualified from becoming a field supervisor for that academic year.

In addition to the skills assessment, prospective supervisors not currently working for a 9-1-1 ambulance service are required to complete two 12-hour ride-along shifts with the local 9-1-1 transport service. Supervisors who are already working for a 9-1-1 ambulance service outside of IC-EMS service lines must complete one ride-along with the local service. All supervisors must also complete one shadowing shift at an IC-EMS event under the direction of a credentialed supervisor.

This multi-step credentialing process ensures that supervisors are not only proficient in clinical skills and IC-EMS-specific protocols but are also able to effectively communicate, allocate resources, and lead personnel. Supervisors must be able to delegate responsibility to FA providers, communicate with 9-1-1 dispatchers, transport crews, fire or law enforcement agencies, or emergency department physicians, and ensure a smooth transfer of care when necessary. Overall, this process emphasizes honing leadership qualities to ensure supervisors can manage clinical and operational challenges that may arise, particularly since they are often the most experienced provider on scene.

Simulation Training

Throughout the academic year, IC-EMS conducts simulation-based trainings in collaboration with the Interprofessional Simulation Center at the Indiana University School of Medicine – Bloomington. IC-EMS maintains a unique partnership with the medical school which provides access to the simulation center and its associated resources. In return, IC-EMS supports the school by offering clinical and training opportunities for medical students. Additionally, the agency's faculty advisor serves as the director of the simulation center, further facilitating access to these resources.

For organizations without formal partnerships, collaborations with local training institutions and public safety agencies may serve as effective strategies to enhance training opportunities. Such collaborations can expand access to physical space, equipment, and, importantly, shared expertise. Simulation does not necessarily require high-fidelity manikins; modalities such as tabletop scenarios and task trainers for specific skills (e.g., airway management, medication administration) can provide meaningful learning experiences. Emerging technologies, including artificial intelligence, may further increase the accessibility of simulation-based training by supporting

scenario development and structured feedback, particularly in resource-limited settings.[4]

These trainings allow providers to gain hands-on exposure to high-risk, low-frequency medical emergencies using high-fidelity mannikins equipped with computer-controlled simulator technology. To create effective training experiences, educators establish clear learning objectives before each session and conduct debriefings afterward to assess participant performance and reinforce key takeaways. Simulation scenarios are typically chosen based on incidents that are most relevant to the campus and surrounding 9-1-1 response areas.

One example of a simulation conducted focused on opioid overdose management. The session began with an educator-led lecture on the identifying of opioid overdoses based on environmental and physiological cues and appropriate treatment protocols. Following the lecture, a group consisting of one EMT and two FA providers entered the simulation room, where they encountered a manikin simulating an opioid overdose. Meanwhile, the remaining participants concurrently observed the simulation via live video from an adjacent room. The session concluded with a group-wide reflection and discussion, providing an opportunity to assess decision-making, communication, and teamwork.

The combination of an educational lecture and a hands-on simulation component allows providers to apply theoretical knowledge, identify skill gaps, and reinforce retention. The pre-simulation lecture ensures all participants are on the same page, providing a standardized framework, especially beneficial for FA providers. Random team assignments further enable educators to assess communication, role delegation, and team dynamics across varying levels of experience. By recreating high-pressure scenarios in a low-risk environment, these trainings improve team confidence and preparedness for real-world emergencies.

Annual Simulation Exercise

A major event that IC-EMS provides service for is the annual Little 500 bike race, which boasts an attendance of more than 25,000 fans of varying demographics. Due to the event's scale, all providers working the race are required to complete a mass casualty incident (MCI) training and the comprehensive day-long simulation exercise. The goal of these training exercises is to present providers with various medical situations they may encounter and provide them the opportunity to reinforce skills and ask questions.

The MCI training begins with a lecture on incident command systems, triage protocols, and mass casualty management, led by an instructor with experience as a former Fire Chief and current EMS Logistics Coordinator.

The lecture introduces providers to the Simple Triage and Rapid Treatment (START) algorithm, focusing on rapid patient categorization during mass casualty events. This is followed by a scenario-based practice using the commercially available START victim set. Providers are grouped into teams of three to four and must work together to triage mock patients based on acuity and transport priority. This exercise requires providers to think critically on how to best allocate limited resources and identify those requiring the most immediate and advanced care.

In preparation for real-world medical emergencies, IC-EMS hosts a day-long, immersive simulation exercise at the stadium where the Little 500 event is held. Participants are split into squads of three to four providers, including an EMT, a FA Provider, an uncertified member, or a medical student. Each squad is provided a gear bag and radio. IC-EMS Agency Chief serves as dispatch, directing squads to their patients using cardinal directions. Squads are expected to communicate with dispatch throughout the day to inform of their status. All squads are expected to work as a team, within providers' scope of practice, to execute patient care. Due to the variety in providers' EMS background knowledge, the simulation poses a challenge to squad supervisors. They are expected to bridge education gaps by demonstrating clear communication and facilitative leadership.

The exercise includes ten scenario stations spread out around the stadium designed to simulate common medical emergencies that crews may encounter at the Little 500 bike race and at on-campus special events (Figure 1). Each station is equipped with a station educator and patient actors or manikins, including high-technology simulators. At the end of each station, squads debrief with the station's educator on strengths and weaknesses regarding their clinical decision-making and skills performed. Debrief points are standardized ahead of time to emphasize key teaching points or common errors, ensuring active reflection and reinforcing learning objectives. In addition to the ten patient case scenario stations, there is also a skills station that allows both FA and EMT providers to practice skills focused on managing airway, breathing, and circulation. Midway through the day, all squads are dispatched to a staged MCI. An individual from the first squad dispatched acts as incident command, initiating the incident command system and coordinating the START protocol. This exercise aims to assess providers' abilities to manage multiple casualties using available resources, delegate tasks and responsibilities, and operate within the command structure.

Overall, this comprehensive simulation exercise is critical in preparing IC-EMS providers for the Little 500 race and other high-attendance special events by reinforcing clinical protocols and promoting teamwork to deliver quality patient care.

Figure 1. Annual Simulation Exercise Schedule

TIME	Squad 1	Squad 2	Squad 3	Squad 4	Squad 5	Squad 6	Squad 7	Squad 8	Squad 9	Squad 10
0900-0910	INTRO	INTRO	INTRO	INTRO	INTRO	INTRO	INTRO	INTRO	INTRO	INTRO
0910-0920	INTRO/BC	INTRO/BC	INTRO/BC	INTRO/BC	INTRO/BC	INTRO/BC	INTRO/BC	INTRO/BC	INTRO/BC	INTRO/BC
0920-0930	MI	OD	SS	TR	DT	CB	PA	AL	HS	PB
0930-0940	MI	OD	SS	TR	DT	CB	PA	AL	HS	PB
0940-0950	MI(DB)	OD(DB)	WC	TR(DB)	DT(DB)	CB(DB)	PA(DB)	AL(DB)	HS(DB)	PB(DB)
0950-1000	DT	MI	OD	SS	TR	PB	CB	PA	AL	HS
1000-1010	DT	MI	OD	SS	TR	PB	CB	PA	AL	HS
1010-1020	DT(DB)	MI(DB)	OD(DB)	WC	TR(DB)	PB(DB)	CB(DB)	PA(DB)	AL(DB)	HS(DB)
1020-1030	TR	DT	MI	OD	SS	HS	PB	CB	PA	AL
1030-1040	TR	DT	MI	OD	SS	HS	PB	CB	PA	AL
1040-1050	TR(DB)	DT(DB)	MI(DB)	OD(DB)	WC	HS(DB)	PB(DB)	CB(DB)	PA(DB)	AL(DB)
1050-1100	SS	TR	DT	MI	OD	AL	HS	PB	CB	PA
1100-1110	SS	TR	DT	MI	OD	AL	HS	PB	CB	PA
1110-1120	WC	TR(DB)	DT(DB)	MI(DB)	OD(DB)	AL(DB)	HS(DB)	PB(DB)	CB(DB)	PA(DB)
1120-1130	OD	SS	TR	DT	MI	PA	AL	HS	PB	CB
1130-1140	OD	SS	TR	DT	MI	PA	AL	HS	PB	CB
1140-1150	OD(DB)	WC	TR(DB)	DT(DB)	MI(DB)	PA(DB)	AL(DB)	HS(DB)	PB(DB)	CB(DB)
1150-1200	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
1200-1210	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
1210-1220	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
1220-1230	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
1230-1240	MCI	MCI	MCI	MCI	MCI	MCI	MCI	MCI	MCI	MCI
1240-1250	MCI	MCI	MCI	MCI	MCI	MCI	MCI	MCI	MCI	MCI
1250-1300	MCI	MCI	MCI	MCI	MCI	MCI	MCI	MCI	MCI	MCI
1300-1310	MCI (DB)	MCI (DB)	MCI (DB)	MCI (DB)	MCI (DB)	MCI (DB)	MCI (DB)	MCI (DB)	MCI (DB)	MCI (DB)
1310-1320	CB	PA	AL	HS	PB	DT	MI	OD	SS	TR
1320-1330	CB	PA	AL	HS	PB	DT	MI	OD	SS	TR
1330-1340	CB(DB)	PA(DB)	AL(DB)	HS(DB)	PB(DB)	DT(DB)	MI(DB)	OD(DB)	WC	TR(DB)
1340-1350	PB	CB	PA	AL	HS	TR	DT	MI	OD	SS
1350-1400	PB	CB	PA	AL	HS	TR	DT	MI	OD	SS
1400-1410	PB(DB)	CB(DB)	PA(DB)	AL(DB)	HS(DB)	TR(DB)	DT(DB)	MI(DB)	OD(DB)	WC
1410-1420	HS	PB	CB	PA	AL	SS	TR	DT	MI	OD
1420-1430	HS	PB	CB	PA	AL	SS	TR	DT	MI	OD
1430-1440	HS(DB)	PB(DB)	CB(DB)	PA(DB)	AL(DB)	WC	TR(DB)	DT(DB)	MI(DB)	OD(DB)
1440-1450	AL	HS	PB	CB	PA	OD	SS	TR	DT	MI
1450-1500	AL	HS	PB	CB	PA	OD	SS	TR	DT	MI
1500-1510	AL(DB)	HS(DB)	PB(DB)	CB(DB)	PA(DB)	OD(DB)	WC	TR(DB)	DT(DB)	MI(DB)
1510-1520	PA	AL	HS	PB	CB	MI	OD	SS	TR	DT
1520-1530	PA	AL	HS	PB	CB	MI	OD	SS	TR	DT
1530-1540	PA(DB)	AL(DB)	HS(DB)	PB(DB)	CB(DB)	MI(DB)	OD(DB)	WC	TR(DB)	DT(DB)
1540-1550	DB	DB	DB	DB	DB	DB	DB	DB	DB	DB
1550-1600	DB	DB	DB	DB	DB	DB	DB	DB	DB	DB

CODES	
MI	Chest Pain to Cardiac Arrest
OD	Overdose
DT	Diabetic
MCI	Mass Casualty
CB	Combative
SS	Skills Station (Airway, CPR/AED)/W
TR	Trauma Randy
HS	Heat Stroke
PA	Ped Anxiety Attack
AL	Allergic Reaction
PB	Pelvic Binder
DB	Debrief Time

Future Directions

As a growing EMS organization, IC-EMS is continuously evaluating and improving its education initiatives to maximize both provider development and improve patient outcomes. One of our primary goals is to develop a formalized annual curriculum based on key performance indicators derived from previous year's quality assurance data. Th s will allow us to target specific reas for improvement and assess the effectiveness of trainings.

Th s curriculum will be supported by an expanded and interactive use of the Canvas Learning Management System. Currently, all members are currently enrolled in our Canvas course, which provides access to clinical and operational protocols and practice scenarios. However, we aim to further leverage Canvas through structure modules, including video instruction, quizzes, and discussion boards, to encourage active learning and engagement.

As IC-EMS expands its presence within the community, we recognize the importance of training for the diverse patient populations we may encounter. While our primary patient population consists of college-aged individuals, future training modules will include content focused on pediatric, geriatric, and special needs populations. These additions will help providers better understand how examination, treatment, and diagnosis may vary across different demographic groups.

Furthermore, we plan to incorporate a standardized onboarding process for general member EMTs. Th s will require the completion of a Canvas module that assesses provider readiness through scenario-based evaluations in areas such as medical, trauma, and cardiac arrest management, as well as protocols for medication administration, equipment usage, and patient documentation. Th s initiative enhances our current open admissions model by introducing accountability and competency verifi ation in skills and protocols, ensuring all providers are adequately prepared prior to working events.

By leveraging an online educational platform, IC-EMS can provide more flexible and accessible training opportunities, which is especially beneficial for college-aged providers who may have scheduling constraints with in-person events. As many other collegiate EMS programs face similar challenges, implementing structured educational initiatives like these can ensure that all providers are adequately prepared for real-world emergencies.

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Training Student EMTs to Support Mobile Community Support Program

Jack Fagan, NREMT; **Lisa Mills**, MD

In 2023, the University of California Davis Fire Department (UCDFD) developed a unique service to create wellness in the collegiate campus community through a mobile community response program. This program is called Health34. The vision is to be a model organization through innovative delivery of services that will enhance campus community well-being.

Health34 accomplishes this vision by performing two major services: navigating clients to resources and bridging care until resource acquisition. Health34 provides crisis avoidance through layperson counseling and navigation to resources. The program is a mobile service navigation unit that responds to any person in their time of need. The resource navigation addresses housing, basic needs, mental health, education resources, social support, and transportation. The program serves all members of the campus community, including students, staff, and vis-itors. It has some foundations in mobile crisis response, but actively engages the community at a point prior to crisis with a novel crisis avoidance model. We are not aware of another mobile campus response program that takes the stance of crisis avoidance. Health34 is operational twenty-four hours a day, seven days a week, including holidays and weekends. The community accesses Health34 via a 7-digit phone number. Health34 is staffed with a paramedic provider (H34 provider) and an EMT partner. The EMT partner has several roles. The clientfacing roles include answering the phone when the provider is not available and guiding clients to resources. Administrativeroles include documentation, driving, equipment checks, and restocking.

Jack Fagan, NREMT, is a Senior Student EMT for the University of California – Davis Fire Department and has been serving in this role since March of 2023. He has been a member of the Health34 team since its inception and organizes Student EMT trainings. In addition to his work at the fi e department, he is a 4th-year Cognitive Science Major with a computational emphasis. **Lisa Mills, MD** is the Medical Director for the University of California – Davis Fire Department since 2018. In this role, she refi ed the vision for an intrepid mobile community response service and brought this to implementation as Health 34. She continues to oversee and develop the operational guidelines for Health 34. She is also a member of the JCEMS Editorial Board.

For Health34, the EMT partner is a member of the UCDFD Student EMT (SEMT) program. The SEMT program consists of UC Davis students who are also licensed EMTs and employed by UCDFD. Prior to the launch of Health34, the SEMT work included event standby, health education, and teaching in the UCDFD AHA training center.

With the launch of Health34, the job scope of the SEMTs increased to include the role of Health34 EMT partner. This scope was novel and required training. The program has been operational for one year. With the anticipation of training another group of SEMTs, the effectiveness of the training protocol was evaluated. This paper will discuss the steps the Fire Department took to train SEMTs to fulfill a role on the Health34 team and critically appraise the effectiveness of the training.

Logistics

The vaccine clinic administered its first vaccine in February 2021. The clinic was open seven days per week from 8:30 AM to 4 PM with a 45-minute midday closure. Vaccinator shifts were broken into 3.5-hour morning shifts and 3.25hour afternoon shifts. An online shift scheduling program was established for open sign-up.

The clinic required a large space to accommodate the staff and the patient group while maintaining the requisite 6 feet of personal space required for social dis-tancing. The campus was closed for in-person instruc-tion and research beginning in March 2020, leaving the large UCD Activities and Recreation Center ballroom available for the clinic. Parking, usually pay by hour or permit, was made unrestricted and free to all patients during the vaccination clinic.

Training Overview

SEMT training was multifaceted, placing emphasis on crisis de-escalation, safety, resource navigation, and logistical functions. These training sessions were accomplished in a way that reinforced our standard operating guidelines.

The goal of SEMT training was to train skills and standard operating guidelines. In order to train these skills, SEMT training was broken down into three major steps: conceptual presentations, interactive experiential training with a collaborator from another mobile health service, and on the job administrative training under the supervision of the H34 provider.

Conceptual Presentations

The conceptual presentation stage of training was broken into two presentations created by the H34 providers, and a virtual presentation by a collaborator from a mobile crisis unit. The first presentation provided an overview of the program's goals and mechanics. The objective was for SEMTs to understand the purpose of the program, the need in the community, and the expected delivery method of the services.

The second presentation introduced the SEMTs to the concept of lay counseling support through theoretical foundations. During this presentation, specific implementation strategies were not provided. This is left to later practical stages of training. The focus areas included open-ended questions, asymmetry, empathetic reflection, bias, and other miscellaneous communication strategies. The goal was to enable the SEMT to actively engage with the client in a supportive fashion.

Experiential Interactive Training

The presentation then introduced SEMTs to the concept of asymmetry under which SEMTs should minimize sharing information about their own personal experiences or thoughts. A key point stressed by the presentation was that this form of communication can be challenging because it differs from standard interpersonal communication. The importance of this intentional communication is to leave space for the client to share their experience without limitation of the perceived boundaries of societal standards. This model enhances the perception of a nonjudgmental space in which to receive support.

Empathic reflection was another strategy the presen-tation introduced. The goal is to not convey under-standing or judgment but, instead, to reflect back the language used by the client while prompting them to further explain their perspective. Empathetic reflection encourages further reflection in a non-judgmen-tal environment. The presentation addressed attitudes and biases, and how, even unconsciously, these attitudes can conflict with empathy, compromising the trust between the client and provider. Strategies to counter bias were introduced.

The third presentation was delivered on a virtual platform. The facilitator was an experienced provider from a mobile crisis unit in a different region that uses sim-ilar methods to H34. This training session discussed de-escalation and safety. The presenter drew on experience to help the SEMTs synthesize the theoretical information through case examples and discussion.

In summary, the presentations formed a foundation for the principles of lay counseling and support. The goal of this training stage was to create a conceptual framework to support experiential training.

Next, the SEMTs began experiential training. The in-person training environment provided an opportunity for SEMTs to observe a strong implementation of the conceptual training applied by an experienced provider on calls. The SEMTs participated in client interaction in a graduated role. After each call, the provider conducted a debrief which was struc-tured by the provider and intended to explicitly acknowledge the tools employed in the interaction and discuss the foundation for their use. The focus was justification of actions and pertinent feedback on topics, interaction style, and word choice. This training stage also provided the SEMTs with an opportunity to ask questions about the practical aspects of lay counseling and support.

Lastly, the SEMTs completed the University of California standard safety driver training allowing them to operate the Health34 van.

Administrative Tasks

Administrative task training occurred on the job. During the first few shifts that an SEMT had, when the Health34 team was not responding to calls, the H34 provider instructed the SEMT on tasks including note-taking, answering the phone, campus resources, on-shift expectations, and documentation. The H34 provider presented each the ideal interaction flow for a phone call.

The flow begins with getting the caller's name, and determining if the caller's request. The SEMT should gather demographics, contact information, and location. Then in consultation with the H34 provider, the client is notified of an estimated arrival time.
Documentation training included the expected data to collect, including student ID number, loca-tion of call, chief complaints, resource utilization and service navigation. The role of the SEMT is to collect during a client interaction to allow the H34 provider to focus on the client.
SEMTs were assigned daily maintenance roles. They perform vehicle inspections, cleanings, and restock-ings. Instructions regarding the checklist and location of supplies for restocking were provided.

Lessons Learned

Overall, the training was successful at conveying the process and vision for H34 and client interaction. That being said, there are some places where the efficacy of the training can improve.
One improvement would be conducting in-person group training. In-person group training would have given the SEMTs the additional opportunity to perform supervised role play to demonstrate skills with phone calls and in person client interactions. The virtual platform was not effective for role play. In person training would also provide the opportunity for feedback and allow repeated attempts.
Video examples of aspirational client interactions would have enhanced the SEMT's understanding of layperson counseling and support. These videos could be integrated into virtual or asynchronous training.
A further improvement would be to create written standard operating guidelines as reference charts. The high volume of information in the training could not be integrated into practice immediately. To enhance consistent practice and promote retention of key information, documentation of processes and procedures was necessary. This gives the SEMTs the opportunity to familiarize themselves with the information and perform more consistent work.

Conclusion

With the genesis of Health34, the UC Davis Fire Department had to greatly expand the knowledge and skill set of its SEMTs to accommodate the increase in job scope. To do this, it created a multistage training program meant to provide foundations in lay counseling techniques, a knowledge of new Health34 procedures, and an awareness of local resources. This paper has outlined the structure of our training process and detailed some of the lessons we learned undertaking this first-of-its kind program in the campus community.

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

Priya Darbha, EMT-B; **Hitankshini Pranav Pandya**, BS, EMT-B; **Tisha Smitha Gautam**, BS, EMT-B; **Divya Arivalagan**, EMT-B

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. Th s 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 signifi ant 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.

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.

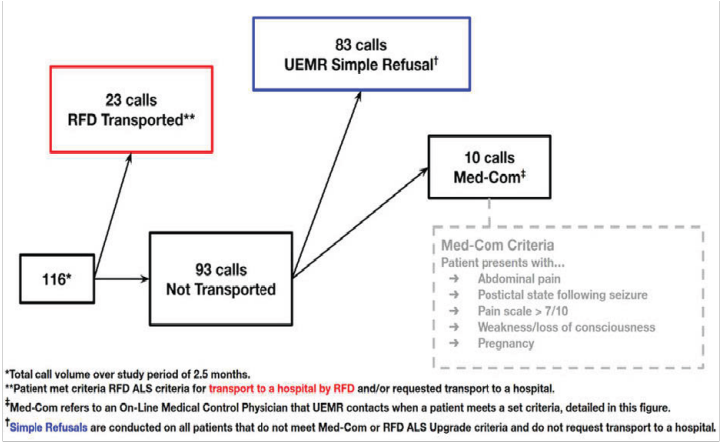
The LIFEPAK 15 and similar devices are utilized by emergency medical services (EMS) nationwide for their all-in-one advanced cardiac monitoring, defibrillation, and vital sign assessment capabilities[1]. By automating blood pressure and heart rate measurements, providers are instead able to focus more 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" designa-tion. This was done in order to avoid any potential risk to patients as presentation and "noncritical" 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 non-critical 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.

Priya Darbha, EMT-B, is a volunteer EMT with University of Texas at Dallas University Emergency Medical Response and serves as the current Research Lieutenant for the organization. **Hitankshini Pranav Pandya, BS Neuroscience, EMT-B**, is a volunteer EMT with University of Texas at Dallas University Emergency Medical Response and is the former Research Lieutenant for the organization. **Tisha Smitha Gautam, BS Biology, EMT-B**, is a volunteer EMT with University of Texas at Dallas University Emergency Medical Response and is the former Administrative Chief for the organization. **Divya Arivalagan, EMT-B**, is a volunteer EMT with University of Texas at Dallas University Emergency Medical Response and serves as the current Administrative Chief for the organization.

This was study 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.

Data Analysis

A threshold of $p < 0.05$ was established for a broad examination of the significance of the numerical differences between systolic blood pressure (SBP), diastolic blood pressure (DBP), and heart rates (HR) obtained manually and with the LIFEPAK 15. As mentioned, a paired t-test was conducted using Google Sheets once the data was revealed to exhibit normal behavior. Further analysis was conducted by evaluating the differences between manually obtained vitals and LIFEPAK 15 measurements within both the 95% confidence interval and a novelly defined clinical significance range of ±10 mmHg for blood pressure measurements and ±10 bpm for heart rate measurements.

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[4], with each range indicating a different level of risk for conditions such as cardiovascular disease, stroke, and aneurysms.

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 t-Test

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

*α = 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

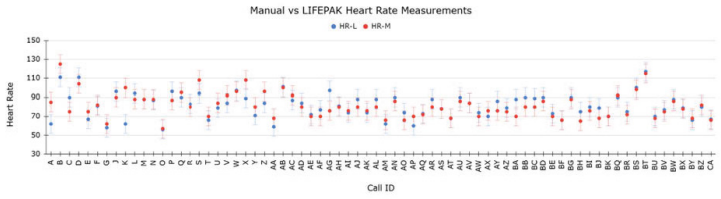


Figure 2: Manual (HR-M) and LIFEPAK-Measured (HR-L) Heart Rates per Incident. ± 10 bpm is Shown from Each Measurement.

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

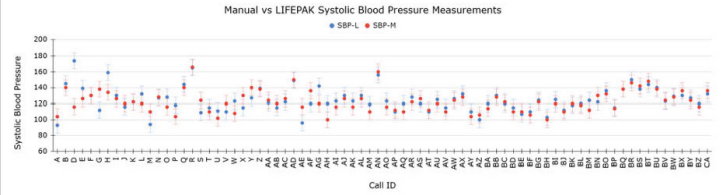


Figure 3: Manual (SBP-M) and LIFEPAK-Measured (SBP-L) Systolic Blood Pressures per Incident. ± 10 mmHg is Shown from Each Measurement.

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

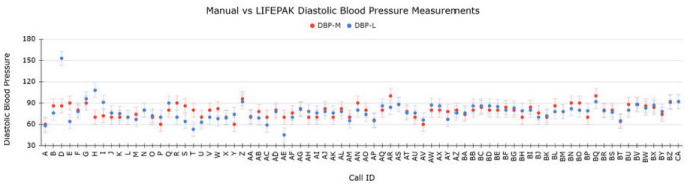


Figure 4: Manual (DBP-M) and LIFEPAK-Measured (DBP-L) Diastolic Blood Pressures per Incident. ± 10 mmHg is Shown from Each Measurement.

Upon analysis of the calculated 95% confide ce interval, it was observed that blood pressure differences of up to approximately 20 mmHg remained within the interval's boundaries. Th ese points were outside the range of what UEMR classifies s consistent, however, they would not be considered to display signifi ant differences from the confi-dence interval alone. Th s necessitated the establishment of the novel boundaries, described previously, as the threshold for "Clinically Signifi ant Differences." As mentioned, this interval was chosen based on the assumption that differ-ences of 10 mmHg or greater may result in differences to treatment strategies, as well as increases in levels of risk for adverse health outcomes. [78910]

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

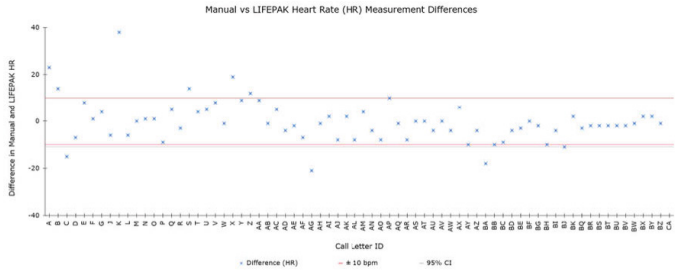


Figure 5: Difference Between Manual and Automatic Heart Rate Measurements per Incident. Data Points are Compared Against the 95% Confidence Interval and the Novel ± 10 bpm Clinical Significance Interval.

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

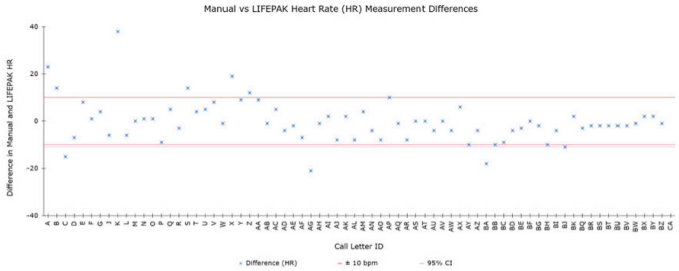


Figure 5: Difference Between Manual and Automatic Heart Rate Measurements per Incident. Data Points are Compared Against the 95% Confidence Interval and the Novel ± 10 bpm Clinical Significance Interval.

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

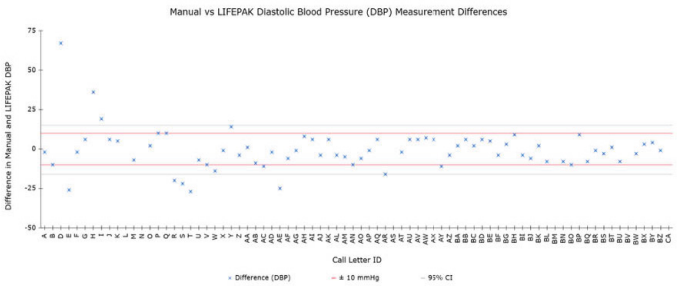


Figure 7: Difference Between Manual and Automatic Diastolic Blood Pressure Measurements per Incident. Data Points Compared Against the 95% Confidence Interval and the Novel ± 10 mmHg Clinical Significance Interval.

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 main-taining 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 main-tain 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. 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 non-transporting 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-ef-fective 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 appropri-ate replacements both in terms of accuracy and effi-ciency.

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 equip-ment 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 mea-sure 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 lost[14].

It should be noted that this study assumes equal pro-vider competency across non-transporting BLS agencies in the United States, and results should not be extrapo-lated 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 mea-surements, 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 feasibil-ity 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 differ-ences 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 devicemea-sured 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 partic-ular 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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Assessing Characteristics and Best Practices in Responding to Psychiatric EMS Calls in a College Student Population

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ABSTRACT

Background: Collegiate emergency medical technicians (EMTs) frequently respond to EMS calls with psychiatric emergency components. EMTs can influence whether a patient receives further mental health evaluation and care. However, studies investigating the factors that influence EMTs in such emergencies are limited. **Objectives:** To investigate how psychiatric emergency call characteristics impacted collegiate EMT decision making at Rice University in Texas. **Methods:** Rice Emergency Medical Services (REMS) prehospital care reports (PCRs) from psychiatric emergency calls (n=115) from 2011 to 2024 were analyzed, collecting data regarding patient demographics, psychiatric & medication history, call details, call outcomes, and documented referrals to mental health profession-als. **Results:** Patients who were male, under the influence of substances, or not connected with a mental health provider prior to the EMS call were less likely to be informed by EMTs about on-campus mental health resources. Additionally, patients under the influence of sub-stances and those lacking an established mental health provider were less likely to be encour-aged to seek further care or successfully establish follow-up plans with a mental health provider after an EMS call. **Conclusions:** These fi dings suggest multiple factors influence EMT responses to psychiatric-related calls and help to identify target populations that may benefit from improved follow up.

Mental illness and its impact on overall well-being have become increasingly prominent and better understood on college campuses. An increasing number of college students meet the criteria for at least one mental health concern.[1] The 2023-2024 Healthy Minds Study, which surveys over 100,000 college students over the age of 18, reports that 19% of college students meet the criteria for severe depressive symptoms (PHQ-9>=15) and 34% of college students meet the criteria for moderate or severe anxiety symptoms (GAD-7>=10).[1] Additionally, of the students who received positive depression or anxiety screens in the past year, only 61% of these students reported receiving any mental health therapy, counseling, and or psychiatric medication.[1] This sharp rise in incidence of mental illness amongst college students may in part be attributed to an increased awareness and identification of mental health issues in childhood and adolescence, as well as an increased willingness to report mental illness on surveys. Regardless, collegiate emergency medical technicians (EMTs) can play a vital role in recognizing and helping to treat this population.

Collegiate EMTs are uniquely positioned to support members of their college community, as their roles as students as well as EMTs fosters a sense of familiarity and trust among their peers. Furthermore, recent studies have shown that there is a rising trend in the rate of alcohol-related ED visits among young people 20–24 years of age, with 35% of ED visits in this age group having a co-occurring mental illness.[2] Beyond EMS care, many universities offer free or low-cost therapy services to their students, making their resources reasonable options for most of their students regardless of financial status.[3] As such, collegiate EMTs have the ability to connect their university-affiliated patients with these mental health resources and establish continuity of mental healthcare. Collegiate EMTs are likely one of the first and often only medical professionals a patient on campus will confide in about mental health concerns. As a result, collegiate EMTs can play a critical role in bridging the gap between a patient receiving adequate mental healthcare and going without necessary support.

Despite the growing incidence of mental illnesses amongst the collegiate population in the United States, collegiate EMTs' responses and decisions in EMS calls with

psychiatric emergency components have not been extensively studied in the literature. Biases in the prehospital setting can influence patient care decisions in psychiatric emergencies and can be associated with prematurely closing encounters, delaying or failing to provide necessary exams, and diagnostic overshadowing. In addition, biases may cause a provider to attribute physical symptoms to mental illness without a thorough consideration of other differentials.[4] The purpose of this study was to identify variables that impacted collegiate EMT decision-making during psychiatric emergency EMS calls. Identifying these variables will allow collegiate EMTs to implement best practices and be aware of factors that influence their decisions when responding to emergency calls with mental health concerns, ultimately leading to better patient outcomes.

Methods

Study Design

REMS uses ZOLL® emsCharts® reporting software to store patient charts, called prehospital care reports (PCRs), and call details. Using filtering features on ZOLL® emsCharts®, REMS charts between March 8, 2011 to June 20, 2024 were searched for calls containing a psychiatric emergency component. The inclusion criteria utilized was REMS PCRs with a clinical category (selected by the in-charge who responded to the call) listed as "Psychological/Behavioral/Suicidal," "Cardiac Related," "Alcohol Intoxication," "Ingestion/Poisoning," "Breathing Problems," or "Chest Pain" with a behavioral/psychiatric disorder impression category. Charts that met these initial inclusion criteria were then reviewed according to the following exclusion criteria: patient age less than 18, patient status as not an undergraduate, graduate, or faculty member of Rice University, patient pregnant, prisoner, or in police custody. This study was reviewed and approved by the Rice University Institutional Review Board (IRB).

PCR Selection

An inclusion criteria was used to select which charts would be initially reviewed from the REMS database. This inclusion criteria included REMS PCRs with a clinical category listed as "Psychological/Behavioral/Suicidal." The inclusion criteria also included REMS PCRs with a clinical category listed as "Cardiac Related," "Alcohol Intoxication," "Ingestion/Poisoning," "Breathing Problems," or "Chest Pain" with a behavioral/psychiatric disorder impression category. Charts that met these initial inclusion criteria were then reviewed for a secondary inclusion criteria that included patients if they were over the age of 18, an undergraduate, graduate, or faculty member of Rice University, not pregnant, not a prisoner, and not in police custody. Charts that did not fit both inclusion criteria were not included in data collection and analysis.

Data Collection

Thirty different variables were extracted for analysis from charts that were included in the study analysis. These variables were chosen to extract the clinical, operational, and mental health components of each case. Patient demographic data including patient age, month and year of the incident, and sex was collected. Race and ethnicity were not collected in this study because race/ethnicity is not recorded in our electronic medical record. Regarding the context of the call, variables including the chief complaint (as reported by the patient or bystander), number of bystanders on scene, whether the patient was determined to have capacity, and disposition (refusal, hospital transport by ambulance, hospital transport by private vehicle, hospital transport by Rice University Police Department, and refusal against medical advice) were collected. Medical information of the patient during the call, including the initial level of consciousness (LOC), initial respiratory effort, presence of drugs or alcohol on scene, and past medical history were collected. Detailed mental health information was also collected (directly from the patient or bystanders) regarding the call, including whether the patient had a known psychiatric diagnosis, whether the patient takes psychiatric medications, whether the patient has an established mental healthcare provider, whether REMS or police department attempted or successfully contacted on-campus 24/7 Wellness Hotline during EMS call, whether REMS informed the patient of mental health resources on campus, and whether the patient was encouraged and agreeable to make an appointment with a mental health provider after the EMS call by the EMT (collected via manual review of the call activity log, in which providers document all interventions provided to the patient during the call). All data extracted in deidentified format for analysis and stored securely on the Box platform (www.box.com).

Statistical Analysis

Data analysis involved calculating p-values through chi-square tests on R programming. Odd Ratio was calculated on relationships that were statistically significant p-values ($p<0.05$).

A total of 163 charts met the inclusion criteria for the study across REMS charts from March 8, 2011, to June 20, 2024. Of these charts, 48 were excluded based on the study exclusion criteria, leaving 115 charts for data collection and analysis (see exclusion criteria in study design section). Statistical analyses of the 115 REMS PCRs indicate that patients who were already connected with a mental healthcare provider prior to the EMS call were significantly more likely to be informed by collegiate EMTs about mental health resources available to them on campus ($p = .022$). Specifically, patients who were already connected with a mental health provider prior to the EMS call had 2.52 times higher odds of being informed of mental health resources available to them (OR = 2.52, 95% CI [1.13, 5.6]).

Patients who already had a mental healthcare provider prior to the EMS call were also significantly more likely to be encouraged and agreeable to either make or ensure that they had an upcoming appointment with a mental healthcare provider following the conclusion of the EMS call ($p = .002$). Moreover, these patients had 4 times higher odds to be encouraged and agreeable to connect with a mental health provider (OR = 4.00, 95% CI [1.58, 10.12]).

Patients who were under the influence of drugs or alcohol were significantly less likely to be informed by college-based EMT providers about mental health resources that were available to them ($p = .002$), with an odds ratio of 0.29 (95% CI [0.13, 0.64]) compared to patients who were not under the influence of drugs or alcohol. Likewise, patients who were under the influence of drugs or alcohol were significantly less likely to be encouraged and agreeable to make an appointment with a mental healthcare provider ($p = .013$), with an odds ratio of 0.27 (95% CI [0.09, 0.79]) compared to patients who were not under the influence.

Male patients were significantly less likely than female patients to be informed by collegiate EMTs about mental health resources available to them on campus ($p = .029$). Male patients had 36% of the odds of being informed about mental health resources available to them compared to female patients (OR = 0.36, 95% CI [0.14, 0.92]).

Patients taking psychiatric medication were significantly more likely to be transported for further medical evaluation ($p = .015$). These patients were 2.65 times more likely to be transported for further care compared to patients who were not on psychiatric medication (OR = 2.65, 95% CI [1.2,5.86]).

Figure 1. Chief Complaints and Demographics of Emergency Calls: Distribution by Age, Sex, and Presenting Chief Complaint

Characteristic	Calls (n)	% of Total Calls
Age		
18	27	23.5 %
19	30	26.1 %
20	19	16.5 %
21	16	13.9 %
Above 21	23	20.0 %
Sex		
Female	86	74.8 %
Male	28	24.3 %
Chief Complaint		
Panic Attack	23	20.0 %
Intoxication	20	17.4 %
Suicidal Ideation	14	12.2 %
Breathing Problems	11	9.6 %
Chest Pain	7	6.1 %
Overdose	7	6.1 %
Anxiety	5	4.3 %
Self-Injury/Cutting	4	3.5 %
Suicide Attempt	4	3.5 %

Discussion

Our study revealed that collegiate EMTs were significantly more likely to refer patients to additional mental health resources if the patient was already connected with a mental health provider prior to the EMS call. It is possible that it is easier for collegiate EMTs to identify a mental health component to an EMS call if the patient is already connected with a mental health provider. Additionally, bringing up the topic of mental health with patients who are already connected with a provider may be perceived by EMTs as being less likely to cause emotional distress to the patient. Moreover, it is also likely easier for EMTs to ask relevant follow-up questions regarding a patient's mental health if the patient has already revealed they are engaged with mental health services. Ultimately, awareness of these trends can help EMTs make better decisions for their patients. Though questions surrounding mental health may be perceived as being easier to be asked for any of these reasons, this trend is particularly concerning in cases where EMS is dispatched to cases where mental health components are not extremely apparent.

It is imperative for EMTs to identify such components as it may be a patient's first and only time of reaching out for help in regards to their mental health. In these cases, it is possible that identifying a mental health component can lead to better patient outcomes because collegiate EMTs are able to refer patients to available mental health resources on campus, often available to university affiliated individuals for free or low-cost.[2] Collegiate EMTs should ensure that the mental health resources and questions they discuss during an EMS call are not influenced by whether or not the patient is already connected with a mental healthcare provider.

An important consideration is standardizing the approach to mental health emergencies on campus. Our campus EMS standard operating procedures (SOPs) state providers "can utilize counseling resources for assistance" when responding to psychiatric emergencies. Furthermore, every member of our campus EMS organization undergoes four hours of psychiatric emergency and on-campus mental health resource training as a prerequisite prior to joining the organization. This helps to standardize the treatment approach in each call. Additionally, our SOPs state providers can "utilize QPR for suicidal patients: Question, Persuade, Refer" and encourage providers to ask pertinent questions for psychiatric emergencies. Despite these measures, it is difficult to determine how accurately these SOPs are followed. Standardizing treatment can help to ensure every patient is given resources to follow up after a psychiatric emergency call.

Our study showed that patients under the influence of drugs or alcohol were less likely to be encouraged to seek further mental healthcare and successfully establish plans with a mental health provider for further care following an EMS call. College campuses generally have a significant number of alcohol-related EMS calls. Studies show that around 17 to 44% of collegiate-based ambulance transportations involve alcohol intoxication.[5] [6] It is well–established that acute alcohol ingestion can contribute to psychiatric emergencies.[7] Despite Rice's available resources such as the Rice Counseling Center and the SAFE office (Interpersonal Misconduct and Intervention Support), it is possible that collegiate EMTs do not address mental health components fully with patients under the influence due to difficulty in communicating effectively with intoxicated patients and decreased comprehension from the patient. Additionally, it may be difficult for EMTs to obtain a comprehensive past medical history, specifically a mental health history in patients who are under the influence. However, despite these factors, it is important for EMTs to not overlook mental health in patients under the influence. Questions such as "what is your reason for drinking tonight?" and "do you usually drink this amount of alcohol" can start the conversation on any underlying mental health components.

Additionally, a partnership between campus mental health services and campus EMS agencies can implement a streamlined system to follow-up with patients. With this program, if an EMT identifies that there are mental health components to a call, but the patient is under the influence and not able to comprehensively communicate about such issues at that moment, the EMT can leave a mental health resource card which can be used by the patient to follow-up with campus resources the next day. From an EMS-level, it is important that EMTs ask mental health questions and do not overlook intoxicated patients. In the same regard, establishing partnerships between collegiate EMS agencies and campus mental health resources can encourage patients to seek help and recognize resources available to them after EMS calls.

Notably, our study demonstrated that patients taking psychiatric medications were significantly more likely to be transported for additional medical evaluation compared to patients who were not taking psychiatric medications. It is possible that collegiate EMTs recommend transport more strongly because psychiatric medications increase case complexity and may warrant medical resources and services not available in the prehospital setting. Transportation decisions are largely made at the discretion of the provider team and police on scene in collaboration with the patient's desires. The standard operating procedures (SOPs) stipulate patients who may be a harm to themselves or others, and those without capacity must be transported for further evaluation. Ultimately, EMS transportation to a medical facility during psychiatric emergency calls is a complex decision that requires EMTs to consider factors such as intoxication, agitation, pain, psychosis, and/or other mental illness, and patient and provider safety.[8] It is important to note that all charts reviewed in this study had a mental health component. Of these charts, approximately 16% involved patients who either recently started a physician-prescribed psychiatric medication or altered the dose of their prescribed psychiatric medication without physician approval. This trend along with leading research suggest that changes in medication regimens can exacerbate mental health problems.[9] Greater emphasis on understanding patient medication adherence when obtaining patient medical history can help EMTs identify potential mental health components in EMS calls. Specifically, if a patient reports taking a psychiatric medication such as Fluoxetine or Escitalopram, EMTs should ensure they obtain information on whether the patient takes the medication as prescribed and whether they recently changed their medication dosage, which can support EMTs when deciding the best course of action for a patient.

Our study also revealed that male patients were less likely to be informed of mental health resources available to them compared to female patients. This disparity in mental health information given to male patients may be partially attributed to a combination of societal and cultural influences. Mainly, it is possible that cultural and

societal expectations surrounding masculinity discourage male patients from expressing mental health problems they may be facing.[10] For these reasons, male patients may be less inclined to share mental health problems with EMTs, and EMTs themselves may also shy away from the discussion of mental health with male patients. Research on this specific sector of EMS is extremely limited. Additional research on the barriers that male patients feel when discussing their mental health with EMTs can be beneficial. Additionally, research on the barriers EMTs feel they face when discussing the topic of mental health with their male patients can also be beneficial. Currently, EMTs can decrease this disparity between male and female patients by being cognizant of these societal and cultural influences to ensure that they do not avoid topics of mental health with their male patients.

Lastly, of the 115 PCRs analyzed, 3.5% of calls presented with a chief complaint of suicide attempt, 12.2% presented as suicidal ideation, 6.1% presented as overdose, and 20% presented as a panic attack, accounting for 41.7% of the EMS calls analyzed in this study. However, the remaining 58.2% of calls were of chief complaints that did not outright indicate a psychiatric emergency, but ended up having a mental health component. Specifically, 17.4% of calls presented as intoxication, 9.6% presented as breathing problems, and 6.1% presented as chest pain. Hence, while it is important to focus on chief complaints, it is also beneficial to consider other contributing factors as well. It is possible that physical complaints such as breathing problems may be manifestations of an underlying psychiatric illness, highlighting the overlap between mental health and physical health. Recognizing these overlaps is important for collegiate EMTs as they emphasize that the two are not mutually exclusive, highlighting the need for EMTs to be thorough in their questioning and assessment regardless of chief complaint or initial dispatch information.

Limitations

One limitation of the study is the small sample size. A total of 163 charts met initial inclusion criteria, but ultimately only 115 charts were analyzed after applying exclusion criteria. This sample size was sufficient to analyze trends and statistical significance, but limits the study's generalizability for all collegiate EMS agencies. Future research will benefit from a larger sample size. Moreover, all charts analyzed were EMS calls responding to Rice University and neighboring areas. Rice University is a private institution located in Houston, Texas; therefore, our findings are of limited generalizability given differences in EMT training and campus culture at other institutions. Similar research in other collegiate EMS settings is required to generalize these findings to the general collegiate EMS population.

This study initially used the ZOLL® emsCharts® filtering function to select the 163 charts from the REMS database that were reviewed for analysis. Due to this selection process, only charts where EMTs recognized and documented mental health components were flagged by the filtering function. It is likely that there were cases where collegiate EMTs did not recognize mental health components or did not document such components. Moreover, it is possible that there were PCRs with mental health components, but were not assigned to one of the categories used to filter charts. These charts were not used in the study because they were not flagged by the filtering system.

Due to the retrospective chart review design of the study, the study was dependent on the overall quality and consistency of how REMS EMTs charted. Th s study focused on REMS charts spanning from 2011 to 2024. In this 13 year span, the REMS Charting Guidelines have been modified multiple times. As such, this likely changed the way charts with mental health components were charted and categorized. Future studies may benefit from standardizing charting across the several years of data analyzed.

Lastly, because the study solely focused on information that had been provided in the charts, there was no way to track long-term outcomes for patients. Specifically, this includes if patients followed through with appointments they were encouraged to make with a mental healthcare provider.

Conclusion

Our data suggests that patients who are already connected with a mental healthcare provider prior to an EMS call are more likely to be informed by colle-giate EMTs about mental health resources available to them. Similarly, these patients are also more likely to be encouraged to seek further mental healthcare and successfully establish plans with a mental health provider for further care following an EMS call. Additionally, patients who were under the influence of drugs or alcohol are less likely to be informed by collegiate EMTs about mental health resources that are available to them. Likewise, these patients are also less likely to be encouraged to seek further mental healthcare and successfully establish plans with a mental health provider for further care following an EMS call.

Lastly, male patients are less likely than female patients to be informed by collegiate EMTs about mental health resources available to them on campus, and patients taking psychiatric medication are more likely to be transported for further medical evaluation in a collegiate EMS setting.

Considering that these trends were identified in a retrospective case review, it is important that collegiate-based EMS agencies are aware of these findings to promote best practices in responding to psychiatric emergencies on college campuses. We propose that this awareness among EMTs along with partnerships between collegiate-based EMS agencies and campus mental health resources can lead to better patient outcomes in psychiatric emergencies. Additional research on this topic by other collegiate EMS organizations is necessary.

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Factors Associated with Requests for Non-Collegiate EMS Resources by Collegiate EMTs

Anthony Rink, EMT-B

ABSTRACT

Background: Collegiate Emergency Medical Services (EMS) differ from non-collegiate services in many ways. Th s is especially true for smaller collegiate services that lack transport capabilities or advanced life support (ALS) treatment. The decision by non-transporting agencies to request noncollegiate resources may be influenced by factors that transporting services do not have to consider. Objectives: Th s study aims to determine the factors associated with requests for support from municipal, non-collegiate EMS by collegiate-EMTs. **Methods:** Retrospective analysis was conducted on 1,230 EMS call logs from a collegiate EMS service. The factors associated with requests for support from non-collegiate EMS are investigated using logistic regression analysis. **Results:** Altered mental status, reported alcohol use (OR = 3.63, 95% CI: 2.404–5.488), and male (OR = 1.86, 95% CI: 1.313–2.650) or non-binary patients (OR = 3.26, 95% CI: 1.614–6.433) were signifi antly associated with requests for non-collegiate EMS resources. **Conclusion:** Many of the factors associated with requests for non-collegiate EMS are also transport indicators for transporting EMS agencies. Increased rates of support requests for male and non-binary patients may be related to sex-based biases seen in healthcare. High rates of support requests for alcoholrelated issues demonstrate an area of high reliance on transporting agencies that collegiate EMS agencies could take on.

Collegiate-based EMS (CB-EMS) systems are widespread in the US, but the vast majority lack transport capability (80%) and ALS (88%).[1]

CB-EMS agencies that are unable to transport their patients to the hospital rely on NC-EMS to provide transport services. Th s process alleviates some stress on NC-EMS agencies by allowing collegiate EMTs to provide care to patients who do not require transport, but this places the responsibility to discern whether to request (NC-EMS) support on collegiate EMTs. These decisions are influenced by both clinical and non-clinical factors, such as college policies, campus security personnel, and provider experience and confidence. Th s research explores the clinical factors associated with the decision to request NC-EMS support. Th s analysis is primarily descriptive and seeks to understand the factors associated with support requests. It aims to identify opportunities for more efficient cooperation between non-transporting CB-EMS agencies and the external NC-EMS agencies that support them.

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Methods

IRB and Ethics Statement

For this study, data were extracted retrospectively from the CB-EMS service call log. The extraction included all EMS calls from January 2015 to September 2024. All data was extracted by an approved service member and was deidentified prior to any analysis being performed. All data points, other than identifying variables, were extracted from the database. Given that the dataset contained case data, additional privacy measures were taken to ensure confidentiality. Primarily, these measures take the form of data suppression. The results, written or otherwise, include only aggregate data, with individual cases being suppressed into tables, figures, or averages. This project was approved by the host institution's IRB.

Dataset Information

This study used EMS run reports from a small rural college with a non-transporting CB-EMS to identify factors potentially predictive of a request for NC-EMS support. A logistic regression was used to identify those factors that are statistically significant predictors.

Requests for municipal NC-EMS are made at the discretion of the responding collegiate EMTs or public safety officers. Public safety officers operate independently but in partnership with the CB-EMS agency. Public safety officers can transport patients following a call, only if they can be released to themselves and require no medical intervention. This service has forty-nine volunteer members, all at the level of EMT. Shifts are assigned on a volunteer basis, with 2 EMTs on duty from 4 pm until 7 am the following day. Some members carry "daytime radios" which allow them to respond to medical calls between 7 am and 4 pm, as they are able. This is known as "unofficial coverage." Following a medical call, all run reports are submitted to a secure online database for collection and storage. The refusal of service policy is set by the college, which requires a student to be fully aware of the risks of refusal, with no impairment to their orientation.

The dataset contained all EMS calls from January 2015 to September 2024. To account for cases that contained missing data, a multiple imputation approach was used for continuous variables. This approach generates plausible estimates for missing values based on the rest of the dataset. Categorical variables with missing data were simply labeled as "Not Reported". Patient outcomes are recorded as "release to self", "released to NC-EMS", "Transported by public safety", or "refused care". Refusal of care cases were removed from the study as they are not relevant to modeling the factors associated with NC-EMS support requests. Those transported by public safety were treated as "Release to Self" cases, as the release criteria are identical in both cases. Public safety officers can only transport a patient after collegiate EMTs have been released to themselves. Collegiate EMTs have no role in the decision-making process to transport by public safety; however, they do report whether it occurred.

Variables were adjusted to fit the limitations of logistic regression. For instance, allergies were transformed into two categories: no known allergies or allergies reported. This was done for any variable that was not already a categorical one. Independent variables included Age, Gender, Airway Status, Circulation, Level of Consciousness (LOC), Skin Appearance, Skin Moisture, Known Allergy, Alcohol Use, Heart Rate, Respiratory Rate, Systolic Blood Pressure, O2 Saturation, Lung Sounds, Blood Glucose, Pupils, Time of Day, Chief Complaint, and EMS coverage level.

Skin moisture was reported as "normal", "dry", or "diaphoretic". This is a qualitative assessment of the skin. The variable of lung sounds, which is an open-ended response in run reports, was classified as one of three levels: "Clear-Bilaterally", "Abnormal", or "Not Reported".

Abnormal lung sounds, which include any kind of abnormal noise reported, unilaterally or bilaterally, were combined due to there being only ten instances of these cases. Each pupil can be charted as PERRL (equal, round, and reactive to light), sluggish, fixed-dilated, fixed-constricted, or unreactive. Due to the size of the sample and the lack of sufficient cases in each of these categories, all patients without PERRL pupils were treated as "abnormal pupils". Level of consciousness is reported as "Alert", "Responds to Voice", "Responds to Pain", and "Unconscious".

Statistical Analysis

All statistical analysis for this project was done using R Studio v. 4.4.1. Prior to model creation, univariate statistics were calculated for each predictive variable, shown in Table 1. Continuous variables were analyzed for mean values, range, means for cases resulting in release to self and those resulting in request for NC-EMS support, and outcome of a t-test for significance. A Mann-Whitney U-test was used to determine significance in O2 saturation due to the ceiling effect of the measurement (100%). Categorical variables were analyzed for the number of cases for each category, the number of those released to self, and those that resulted in requests for NC-EMS support, and the results of the Chi-Square or Fisher's Exact Test. Chi-Squared was used unless otherwise denoted. Fisher's Exact Test was used for variables that contained relatively few cases within a class. The data were then analyzed using a logistic regression, which measures the level of association between variables and a binary outcome. For this regression analysis, the binary outcome was released to NC-EMS or released to self. All p-values < 0.05 are considered to be statistically significant.

Validity Measures

Prior to model creation, the dataset was validated to ensure that the assumptions of logistic regression were satisfied. To assess linearity, all continuous variables were categorized into bins. The proportion of the outcome within each bin was used to calculate the odds and log-odds for each category. Log odds were plotted against continuous variables to visually evaluate whether a linear relationship existed. It was confirmed that an acceptable level of linearity was present for all continuous variables. To ensure independent variables were not highly correlated, a correlation matrix of variables was produced. There were no variable correlations that warranted adjustment or removal from the model. Following model creation, the variance inflation factor (VIF) was used to evaluate multiple-variable correlation. All variables were below the threshold of 5, indicating no significant multicollinearity. Outlier effects were assessed using Cook's distance. Observations with Cook's distance values exceeding the threshold of 4/n, where n is the sample size, were reviewed for their impact on the model. No significant outliers were identified that would warrant the removal or adjustment of variables.

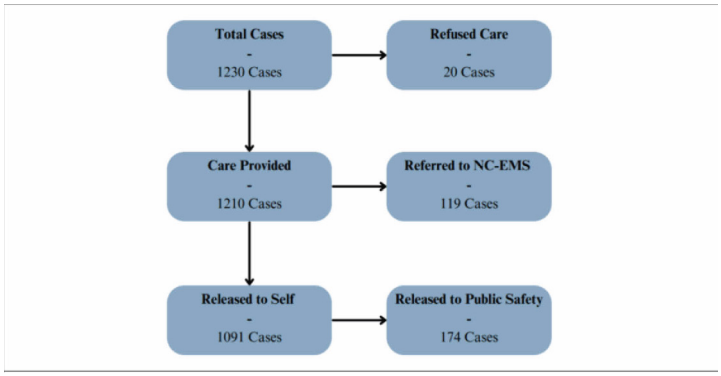
Model Development

Using the above independent variables, a regression model was created. Th s initial model contained all possible variables. The model then underwent stepwise variable selection. After stepwise selection, a fi al model was created. The fi al model was then measured for its validity and accuracy. Accuracy was assessed using a prediction test that compared outcomes predicted by the model as compared to actual values. Additionally, a McFadden's pseudo-R-squared (MF R-Squared) test was used, along with a Homer-Lemeshow test to assess model quality.

Results

1230 CB-EMS encounters were extracted during the studied timeframe. Figure 1 shows the organization and distribution of cases. Out of 1230 cases that were extracted, 1210 were included in the analysis. 119 (~10%) resulted in a request for NC-EMS support. The remaining 1091 (~90%) did not result in NC-EMS support request and were released to themselves.

Figure 1. Case Organization



Out of 1230 cases, 1210 were included in analysis. 119 of those cases were referred to NC-EMS. 1091 were not referred to NCEMS and were released to themselves. Out of those released to themselves, 174 were transported by public safety. These cases were treated as releases to self.

Table 1 shows the results of univariate statistical analysis. Heart rate and oxygen saturation are both signifi antly associated with the outcome. Higher heart rates and lower oxygen saturation were reported on average for NC-EMS requests. All categorical variables except for known allergy status and blood glucose showed a statistically signifi ant relationship with the outcome.

Table 1A and 1B.

Tables 1a, 1b. Descriptive statistics for each potential predictor variable. 1a. Continuous variables are presented with their mean values, range, mean among cases resulting in both release and transport, and outcome of a t-test. 1b. Categorical variables are presented with the number of cases for each category, the number released and transported, and the results of Chi-Square or Fischer's Exact Test. Chi-Square cases are denoted with a coefficient whereas Fischer's Exact is denoted by N/A (FE). Significant p-values (<0.05) are bolded.

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a.

Variable	Mean	Range	Mean of Released to Self	Mean of NC-EMS Support Requested	t-value	p-value
Age (Years)	19.9	Dec-77	19.8	20	-0.53	0.601
Heart Rate (Beats/Min)	89.1	40-223	87.9	92.7	-3.15	**0.002**
Respiratory Rate (Breaths/Min)	16.1	Jun-50	16.1	16.1	-0.05	0.963
Systolic BP (mmHg)	125.9	90-188	126	125.6	0.5	0.62
O2 Saturation (%)	97.50%	59-100%	97.70%	97.10%	165571**	**<0.001**

** Mann-Whitney U-Test used for O2 Saturation due to ceiling of O2 measurement.

b.

Variable	Number	Number of Released to Self	Number of NC-EMS Support Requested	Chi-Square/ Fischer's Exact Test	p-value
Gender					
Male	392	270	122	20.97	**<0.001**
Female	763	602	161		
Non-Binary	54	34	20		
Not Reported	21	19	2		
Airway					
Normal	1216	919	297	N/A (FE)	**0.009**
Partially Obstructed	14	6	8		
Circulation					
Normal	1076	849	227	N/A (FE)	**<0.001**
Irregular	5	2	3		
Weak/Thready	31	9	22		
Rapid	118	65	53		
Level of Consciousness					
Conscious	1098	889	209	N/A (FE)	**<0.001**
Responds to Voice	93	25	68		
Responds to Pain	19	4	15		
Unresponsive	20	7	13		
Skin Appearance					
Normal	918	739	179	55.23	**<0.001**
Pale	122	70	52		
Flushed	112	67	45		
Not Reported	78	49	29		
Skin Moisture					
Normal	1110	854	256	18.36	**<0.001**
Diaphoretic	53	31	22		
Dry	67	40	27		
Reported Allergies					
Yes	827	306	97	0.17	0.732
No	403	619	208		
Known Alcohol					
Yes	211	98	113	111.1	**<0.001**
No	1019	827	192		
Lung Sounds					
Clear-Bilaterally	253	193	60	N/A (FE)	0.435
Abnormal	10	6	4		
Not Reported	967	726	241		
Blood Glucose					
Normal (70-100 mg/dL)	43	34	9	N/A (FE)	0.063
High (>100 mg/dL)	35	20	15		
Low (<70 mg/dL)	4	4	0		
Not Reported	1148	867	281		
Pupils					
Normal	790	616	174	66.49	**<0.001**
Abnormal	77	28	46		
Not Reported	363	281	82		
Time					
Day (6am-9:59pm)	680	553	127	29.82	**<0.001**
Night (10pm-5:59am)	550	372	178		
Official Coverage					
Yes (4pm-7am)	990	728	262	7.12	**0.008**
No (7am-4pm)	240	197	43		
Chief Complaint					
Abdominal	45	36	9	N/A (FE)	**<0.001**
Allergic	28	24	4		
Breathing/Airway	71	50	21		
Chest Pain	41	37	4		
Concussion/Head Pain	48	43	5		
Dizzy/Syncope	194	116	78		
Headache	21	19	2		
Orthopedic Injury	298	267	31		
Mental Health	43	35	8		
Nausea/Illness	183	127	56		
Other	198	148	50		
Overdose	5	1	4		
Seizure	18	6	12		
Unresponsive	37	16	21		

Descriptive statistical analysis showed that female patients were the majority (62%) of patients. The mean vitals within the data set are present within normal physiological ranges. Level of consciousness (LOC), circulation, and airway were predominantly reported as normal. In most cases, neither blood glucose nor lung sounds were reported.

Table 2. Chi Square Analysis of Patient Outcome and Chief Complaint

	Transported by Public Safety		NC-EMS Support Requested		Released to Self (No Public Safety Transport)	
	Observed	Expected	Observed	Expected	Observed	Expected
Abdominal	15	6	9	11	21	27
Allergic	8	4	4	7	16	17
Breathing/Airway	13	10	21	18	37	43
Chest Pain	13	6	4	10	24	25
Concussion/Head Injury	12	7	5	12	31	29
Dizzy/Syncope	11	27	78	48	105	118
Headache	3	3	2	5	16	13
Orthopedic/Injury	57	42	31	74	210	182
Mental Health	4	6	8	11	31	26
Nausea/Illness	18	26	56	45	109	112
Other	15	28	50	49	133	121
Overdose	1	1	4	1	0	3
Seizure	2	3	12	4	4	11
Unresponsive	2	5	21	9	14	23

Table 2.

Chi Square Analysis of Patient Outcome and Chief Complaint. This analysis shows the observed and expected outcomes for all three patient outcomes. While "transport by public safety" is combined with "release to self" for the purposes of regression modeling, this analysis was done to determine the types of calls most associated with transport by public safety.

$X^2 = 171$, df = 24, p = <0.001

The distribution of chief complaints across patient outcomes was determined, shown in Table 2. Transport by public safety is observed signifi antly less often for calls reporting the chief complaint of syncope/dizziness, with NC-EMS support being requested for these patients at a higher rate. Abdominal-related calls were transported by public safety at a higher-than-expected rate, however cases involving an illness or nausea were transported less than expected. Orthopedic injuries were overrepresented in the transport by public safety group and released to self group and were underrepresented in request for NC-EMS support group.

Table 3. Logistic Regression Analysis

Variable	OR	95% CI	p-value
Gender (Compared to Female)			
Male	1.86	(1.313, 2.650)	**<0.001**
Non-Binary	3.26	(1.614, 6.433)	**0.001**
Not Reported	0.48	(0.067, 2.048)	0.383
Alcohol Use (Compared to No Alcohol)			
Alcohol Reported	3.63	(2.404, 5.488)	**<0.001**
Pulse (Quality) (Compared to Normal)			
Irregular	7.45	(0.890, 68.037)	**0.055**
Rapid	1.68	(0.986, 2.829)	**0.054**
Weak/Thready	4.93	(1.862, 13.535)	**0.001**
Level of Consciousness (Compared to Normal)			
Responds to Voice	7.14	(4.098, 12.756)	**<0.001**
Responds to Pain	4.99	(1.387, 21.68)	**0.019**
Unresponsive	4.66	(1.430, 16.224)	**0.012**
Skin Color (Compared to Normal)			
Flushed	1.98	(1.164, 3.339)	**0.011**
Pale	1.41	(0.834, 2.371)	0.193
Not Reported	1.51	(0.753, 2.990)	0.237
Heartrate (Beats per min)	1.01	(1.005, 1.022)	**0.002**
Pupils (Compared to Normal)			
Abnormal	3.53	(1.878, 6.688)	**<0.001**
Not Reported	1.19	(0.822, 1.707)	0.358
Coverage (Compared to No Official Coverage)			
Official Coverage	1.56	(1.007, 2.465)	0.051
Chief Complaint (Compared to Orthopedic Injury)			
Abdominal	1.73	(0.668, 4.137)	0.236
Allergic	0.98	(0.248, 3.094)	0.977
Breathing/Airway	2.67	(1.317, 5.325)	**0.006**
Chest Pain	0.94	(0.258, 2.691)	0.921
Concussion/Head Pain	1.02	(0.313, 2.747)	0.977
Dizzy/Syncope	2.06	(1.177, 3.648)	0.012
Headache	0.76	(0.097, 3.377)	0.756
Mental Health	1.44	(0.524, 3.626)	0.454
Nausea/Illness	1.4	(0.784, 2.518)	0.255
Other	1.24	(0.692, 2.214)	0.47
Overdose	16.59	(2.071, 350.843)	**0.018**
Seizure	21.6	(7.342, 69.236)	**<0.001**
Unresponsive	2.12	(0.756, 5.825)	0.147

Logistic Regression Analysis. Results of the final logistic regression model are shown here. Variable selection was done using stepwise variable section, based on AIC values. Results are displayed with odds ratio (OR), 95% confidence interval, (95% CI), and p-value. Significant variables, at the >.05 level, are bolded.

Table 3 summarizes the results of the logistic regression. Signifi ant factors associated with the outcome include gender, with male (OR = 1.86, p = <0.001) and non-binary (OR = 3.26, p = 0.001) patients having a positive association with requests for NC-EMS support. Reported alcohol use was also associated with the request for NCEMS support (OR = 3.63, p = <0.001). All pulse quality descriptors had a positive association with requests for support compared to normal pulse quality. Level of consciousness was also signifi antly associated with support requests, with responds to voice (OR = 7.14, p = <0.001), responds to pain (OR = 4.99, p = 0.019), and unconsciousness (OR = 4.66, p = 0.012) as compared to normal level of consciousness.

Model accuracy was determined by modeling requests for NC-EMS support decisions using the regression model. These results were then compared to actual outcomes in a confusion matrix.

Shown in Table 4, accuracy results show an overall model accuracy of 82.4%. The cut-point for the confusion matrix was set at .35, which is the cut-point that maximized accuracy of the model. The model was more accurate in its prediction of cases that resulted in no support requested from NC-EMS. Additionally, MF R-Squared value was equal to .280, which demonstrates the model is signifi ant at fitting the data.

Table 4. Model Accuracy Results

		Actual	
		Released to Self	Request for NC-EMS
Predicted	Released to Self	827	119
	Request for NC-EMS	98	186
	Class Accuracy	89.40%	61.00%
	Overall Accuracy	**82.40%**	

Model Accuracy Results. Accuracy of the model is shown as a function of the percentage of cases correctly predicted by the model. Accuracy is shown for both release to self cases and request for NC-EMS cases. Overall accuracy is also shown.

Results of the Hosmer-Lemeshow Test are shown in Figure 2. Points all fall along the diagonal line, which indicate a high-quality model fit (p = 0.6). All methods used to verify model fit and validity indicate that the regression model is significant.

Figure 2. Results of Hosmer-Lemeshow Goodness-of-Fit Test

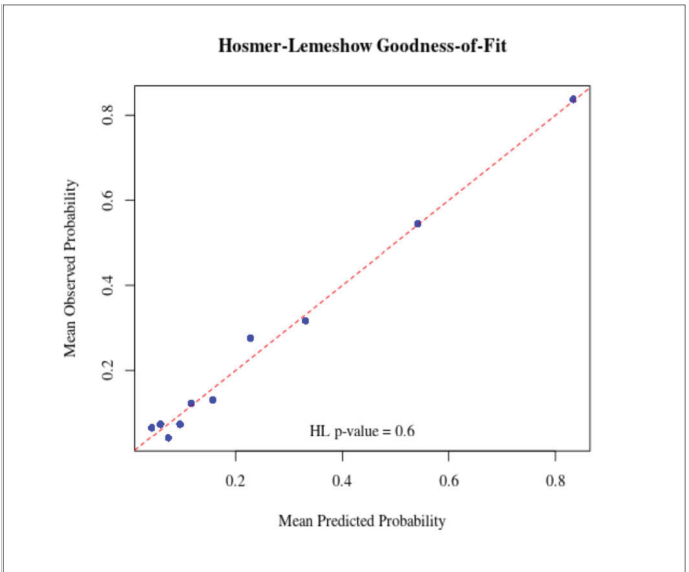

Figure 2. Results of Hosmer-Lemeshow Goodness-of-Fit Test. Plot displays predicted probability verses the observed probability of request for NC-EMS. The relationship between predicted and observed probabilities shows the quality of the regression model, with dots clustered along the diagonal line indicating a high degree of model quality.

Discussion

This collegiate EMS agency is a non-transporting, BLS service and covers a campus in a predominantly rural community. Because it lacks transport services, collegiate providers must rely on an outside transporting EMS agency. The transport agency is a noncollegiate, municipal EMS service (NC-EMS). As a rural college campus, the municipal NC-EMS agency is susceptible to the limitations seen in rural EMS, including long transport times, low staffing, and lower funding.[2,3]

Diminished level of consciousness, chief complaint of seizures or overdose, and indication of alcohol consumption were all positively associated with requests for NC-EMS support. Additionally, it was determined that support was requested for male and non-binary patients disproportionately compared to female patients.

Non-transporting CB-EMS agencies often rely on transporting NC-EMS agencies for patient transport. Therefore, these CB-EMS providers do not make the determination of whether a patient needs to be transferred to a facility for further treatment. Rather, they make the determination of whether additional NC-EMS may be necessary to continue care or provide transport. Cases of request for transport-capable NC-EMS do not guarantee transport. Collegiate EMTs may request NC-EMS support to obtain a second opinion on whether a patient requires transport to a hospital by ambulance. Th s study investigated factors associated with requests for NC-EMS support by collegiate EMTs.

Level of consciousness (LOC) was strongly associated with NC-EMS support requests. Compared to Alert and Oriented, all other LOC levels (responds to voice, responds to pain, and unresponsiveness) were found to be significantly associated with the outcome. It was also determined that unresponsiveness had the lowest association with support requests. Th s is contrary to the expectation that patients with the most diminished consciousness, LOC = unresponsive, would have the highest association with NC-EMS support requests. A possible explanation for this phenomenon lies in the charting procedure for the CB-EMS service. Patients presenting with an altered mental status could potentially be labeled as "unresponsive", despite not meeting the technical standard, which defines unresponsiveness as a complete lack of response to stimulus[4]. Thus, collegiate providers may be mistakenly defining altered and diminished mental status as "unresponsive". Further inspection of the call log showed that there were at least six patients of the total 19 that were charted as unresponsive and had chief complaints that only specified altered mental status, fainting, or dizziness.

The chief complaint was found to be associated with support requests in the case of seizures, overdoses, and breathing/ airway cases. All the other chief complaint categories were not found to be associated with this outcome. Th s is possible due to the organization of the chief complaint categories, which may group cases of varying severity together. Th s is not the case specifi ally for overdoses and seizures, which are very specific chief complaints, whereas abdominal complaints may be more varied in their severity, thus dimin-ishing the significance of their association with an outcome.

Alcohol consumption was seen to be among the stron-gest associated variables for NC-EMS support requests. The study CB-EMS agency's guidelines stipulate specific release criteria for patients known to have consumed alcohol.This is due to the diminished level of consciousness associated with alcohol consumption and the requirement for patient orientation to release patients.

For a patient to be released to themselves, the collegiate providers must ensure that the patient is A&Ox4 (Alert and Oriented times 4), has stable vitals, has not consumed other dangerous substances, last consumed alcohol at least 90 minutes prior, can walk with a stable gait, and can communicate risks of continued consumption. If these criteria are not met, collegiate providers request NC-EMS support, where custody of the patient can be transferred to the ALS providers.

Cases involving male patients were more associated with NC-EMS support requests, compared to female patients, and non-binary patients had an even higher likelihood of NC-EMS support. The gender distribution of this school is 41.4% male and 56.9% female, with 1.7% identifying as non-binary/ non-gender-conforming. It is possible that male and non-binary patients presented with more severe symptoms that were not captured by the regression variables. This is always possible for any regression, as a binary model cannot totally capture the nuance of complex cases. However, there is a known trend of implicit biases in healthcare changing the way in which symptoms are reported and perceived across different genders[5]. Women are more likely to experience discrim-ination in their healthcare and are also more likely to have their symptoms dismissed[6]. Thus, these factors may be influ-encing female patients' forthrightness, which may ultimately impact care decisions. It is additionally possible that non-binary patients experience increased support requests because EMTs exhibit more conservative care decisions due to uncertainty or sensitivity around treating patients with diverse gender identities.

An interaction term was also considered between gender and alcohol usage. Stepwise selection of vari-ables removed any interaction between the levels of either variable. Th s indicates that both alcohol and gender have a strong impact on model outcomes, independently.

Th final regression model has a predictive accuracy of 82.4% overall. However, there is a strong difference in the model's ability to predict support request cases (61.0%) vs. release to self cases (89.4%). Due to the simplicity of logistic regression, there is a limit on how much nuance can be captured by a regression model. Th re may be variables outside of the call log that would remedy this predictive gap.

The findings of this study highlight areas that are applicable to other non-transporting CB-EMS agencies. Especially in rural communities, it may be beneficial to reduce the reliance on NCEMS. In this study service specifically, it may be possible to transport some cases involving alcohol to the local hospital by CBEMS. This is currently unavailable due to requirements for transporting services to provide mutual aid to the surrounding community. This service currently does not have an ambulance and is unable to respond to medical emergencies in a trans-porting capacity.

Limitations

Th s analysis has limitations in both accuracy and applicability. Much of the nuance of a case was categorized into broad groups for the sake of reducing overfitting. The study sample contained 1230 cases, which, given the number of variables, reduces model specificity. Because the campus is rural and has only one NC-EMS agency supporting it, the results may not be applicable to all collegiate services. The cases from this study spanned a long time frame (2015-2024), during which the service went through growth, both in terms of scope of practice and in terms of the number of members. In recent years, EMTs have begun carrying more medications such as naloxone and epinephrine. There have also been organizational and leadership changes, which may have had an impact on the outcome.

Conclusion

The factors associated with requests for NC-EMS support by collegiate EMTs were analyzed in one non-transporting collegiate EMS agency. Situated within a rural community, both the non-collegiate and collegiate-EMS systems are subject to the limitations that are present in rural healthcare. Some of the factors associated with requests for NC-EMS support include male and non-binary patients, alcohol use, and the chief complaints of seizures, overdose, and airway/ breathing-related issues. These factors highlight cases of serious medical emergencies requiring further support from transporting EMS agencies, but they also highlight differences in support requests for patients of different genders. These differences may demonstrate a need for continued education surrounding gender in EMS.

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Investigating the Role of Public Assistance Programs in Responding to Cardiovascular Emergencies in Rural Areas

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ABSTRACT

Background: While public assistance (PA) has been shown to increase access to EMS care for underserved rural populations, few studies document the effect of PA on the outcome of cardiovascular emergencies. Objectives: Th s study aims to investigate the association between cardiac emergency outcomes and PA usage in rural areas. **Methods:** A retrospective crosssectional analysis of cardiac patient encounters was performed utilizing data from the 2021 NEMSIS database. Patient encounters were separated based on acuity level into minor, emergent, and critical. To determine if PA and 911 respond to signifi antly different acuity calls, a twosample Z-test of proportions was conducted. A $\chi 2$ test of independence was performed to determine whether statistically signifi ant variations in acuity exist as a result of PA and 911response differences. **Results:** The two-sample Z-test of proportions indicated a statistically signifi ant difference in the proportion of acuity levels between PA and 911-response ($p<0.01$). The $\chi 2$ test of independence ($\chi 2=0.797$, $p=0.6713$) suggested that there is no signifi ant association between change in acuity and the presence of PA. **Conclusion:** Th proportion of critical acuity cardiac encounters is higher amongst 911-responses, while minor acuity encounters are more common in PA-responses. The presence of PA has no signifi ant relationship with the improvement or deterioration of acuity.

Individuals in rural areas often have worse health outcomes compared to those in urban communities. Rural populations are characterized as older, sicker, and poorer than their urban counterparts.[1]

In general, residents in rural areas experience health disparities that result in higher incidence of disease, worse chronic health conditions, and lower life expectancies.[2] These health outcomes can be attributed to systemic factors including higher rates of poverty, social and physical isolation, and transportation limitations.[3,]

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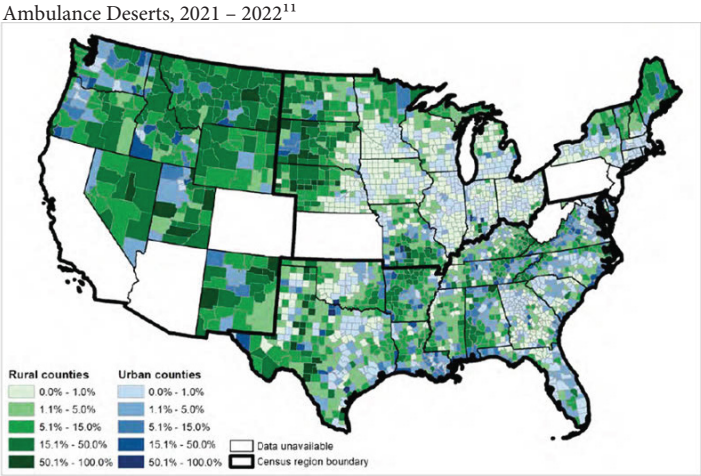
These barriers to healthcare access have contributed to higher morbidity and mortality in rural areas. In 2019, rural locations had a 20% higher death rate than urban areas, with the largest differences in deaths resulting from heart disease, cancer, and unintentional injuries.[5] Heart disease is a leading cause of death among rural residents.[6] In particular, rural populations experience an increased burden of heart attack and heart failure mortality compared with urban populations.[7] There is an urgent need to address the rural-urban disparities influencing the outcomes of cardiovascular emergencies.

Rural emergency medical services (EMS) provide critical care for remote and isolated communities.[8] However, they are often overstretched, understaffed, and under-funded. Rural EMS is faced with unique challenges like rural geography, workforce shortages with declining volunteerism, and higher fixed costs. In particular, some rural areas are characterized by "ambulance deserts", which are defined as populated census blocks with

geographic centers outside of a 25-minute ambulance service area.[8] Ambulance deserts have been shown to prevent rural EMS from providing timely care to stabilize and transport sick patients.[9] The delay in EMS response can be especially problematic for cardiac emergency patients that require rapid treatment and potential transport.[10]

Figure 1. Percent of Rural and Urban County Populations Living in Ambulance Deserts, 2021 – 2022[11]



The map in Fig. 1 designed by the Rural Health Research Center presents the percentage of rural and urban county populations that reside in ambulance deserts. The proportion of rural counties that have over 15% of the population living in an ambulance desert is noticeably higher than urban locations.[11]

Public assistance (PA) efforts have been shown to fill in the gaps in EMS and increase access to care for underserved rural populations.[12] While public assistance programs encompass a broader range of social safety net interventions, this study focuses on community paramedic programs and their role in responding to cardiovascular emergencies in rural areas. Rather than providing a direct solution to a lack of EMS resources in a life-threatening emergency, community paramedicine programs serve as a critical pathway to home-health visits with a primary care approach for these rural residents. These regionally-based programs have improved health outcomes in rural communities by helping people manage their conditions, avoid the need for acute emergency care, and reduce their ED and inpatient use.[13]

However, few studies document the association between public assistance and the outcomes of cardiovascular prehospital emergencies. The association between cardiac emergency outcomes and public assistance usage in rural areas across the United States has not been widely studied or documented. Investigating the effectiveness of public assistance programs can better inform initiatives to expand such programs. Specifically, elucidating the role that public assistance plays in managing cardiac emergencies can support efforts to improve the health outcomes of marginalized communities.

Methods

A retrospective cross-sectional study of EMS encounters was performed utilizing a convenience sample of EMS encounters in the 2021 National Emergency Medical Services Information System (NEMSIS) Version 3.4.0 of the public release research data set.14 NEMSIS provides a framework for collecting, storing, and sharing standardized EMS data across the United States. The 2021 data set included 48,982,990 EMS activations submitted by 13,949 EMS agencies in 53 states and territories. The data set is deidentified and organized by individual EMS encounters rather than individual patients. Thus, this study was exempt from review by the institutional review board.

The data analysis was limited to the first 1 million activations in the NEMSIS database due to limited technological capabilities. From these 1 million activations, inclusion and exclusion criteria narrowed down the sample size. Firstly, only EMS reports that included a primary cardiac impression were included in the study. Primary cardiac impression was defined by a range of cardiac-related emergencies including the following conditions: angina, arrhythmia, cardiac arrest, myocardial infarction, heart failure, and hypertension.

Next, only reports that were made in rural settings were included. The sample was further narrowed down to focus only on EMS reports that involved 911-response or public-assistance-(PA)-response. The most common mechanisms for activating PA-response include: (1) direct activation through 911 call triage, where dispatchers identify cases appropriate for community paramedic response rather than traditional emergency transport; (2) referral-based activation, where healthcare providers, hospital discharge coordinators, or social workers can request community paramedic follow-up for high-risk patients; and (3) dedicated non-emergency lines that residents can call directly for assistance that falls within community paramedicine scope. This particular analysis includes encounters initiated through all three pathways.

Additionally, this study excluded EMS responses to mass casualty incidents, air or water rescues, and EMS calls with no patients. To remove potential data entry errors, the top 0.1% of longest response time, on-scene time, and transport time were excluded, as well. Upon accounting for these inclusion and exclusion criteria, a total of 9,195 EMS activations remained.

The NEMSIS data set is based on EMS activations, which means that multiple emergency resources may have responded to the same call, potentially resulting in multiple PCR submissions to the dataset. The incident identification PCRkey was used to link individual EMS activations across different tables within the database.

The following NEMSIS tables were linked together by PCRkey: ComputedElements, FACTPCRMEDICATION, FACTPCRPRIMARYIMPRESSION, FACTPCRSCENEDELAY, GROUP_PCRPATIENTRACEGROUP, Pub_PCRevents.

Standard definitions were taken from the NEMSIS Data Dictionary. As defined by NEMSIS, public assistance refers to the unit that responded to provide non-traditional or EMS services (e.g., community paramedicine, mobile integrated healthcare, elderly or disabled patient assistance, public education, injury prevention). NEMSIS defines the acuity level of a particular emergency using the following descriptions:

- Critical (red): patient is critical, but has a chance of survival, and cannot survive without immediate treatment.
- Emergent (yellow): patient condition is stable but serious and they are not in immediate danger of death. These patients should be able to follow a simple command.
- Minor (green): patient is ambulatory and may need medical care at some point, after more critical injuries have been treated. Generally, these patients will have been escorted to a staging area to await delayed evaluation and transportation.
- Dead (black): individual who has no clinical signs of life and/or obviously fatal injuries.

To determine whether PA-calls and 911-calls differ significantly, the two sample Z-test of proportions was conducted. The relationship between public assistance and acuity level was further investigated using the Chi-Square Test of Indepdencence, which determined if there

Table 1: Demographic Characteristics of Cardiac Emergency Patients Evaluated by Public Assistance and 911 in Rural Areas

		PA-Response (%) (N = 40)	911-Response (%) (N = 971)
Age (Years)			
	0-25	7 (18%)	29 (3%)
	25-50	8 (20%)	139 (14%)
	50-75	14 (35%)	490 (50%)
	75+	11 (28%)	313 (32%)
Sex			
	Male	22 (55%)	501 (52%)
	Female	18 (45%)	470 (48%)
Race			
	Asian	0 (0%)	2 (0%)
	African American	5 (13%)	162 (17%)
	Hispanic or Latino	3 (8%)	44 (5%)
	White	32 (80%)	763 (79%)
Census Region			
	Northeast	1 (3%)	40 (4%)
	Midwest	1 (3%)	133 (14%)
	South	32 (80%)	693 (71%)
	West	6 (15%)	105 (11%)

Results

After accounting for the inclusion and exclusion criteria, a total of 9,195 EMS activations remained. Of these EMS activations, 1,011 activations were rural (40 were PA-response; 971 were 911-response). To begin, demographic information was collected to characterize the population of rural communities that utilize PA- and 911-response (Table 1). In all groups, the age range 50-75 had the highest proportion of cardiac emergencies, with White males having a higher proportion than females. Geographically, the South consistently had the highest incidence of cardiac EMS activations.

Next, specific call data for PA-response and 911-response calls were analyzed (Table 2). The proportion of primary cardiac impressions varied across the four groups. In PA-response activations, hypertension presented as the highest proportion in rural areas. In 911-response activations, arrhythmia presented as the highest proportion. Medications were never given during PA-responses. In 911-responses, however, medication for managing a cardiac emergency was given 83% of the time. Lastly, initial and final acuity were also documented. In general, PA-responses were activated most commonly for minor acuity Green calls.

Table 2. Count and Percentage of Primary Cardiac Impression, Medication Usage, Medication Response, and Initial/Final Acuity

		PA-Response (%) (N = 40)	911-Response (%) (N = 971)
Primary Cardiac Impression			
	Angina	2 (5%)	216 (18%)
	Arrhythmia	0 (0%)	317 (27%)
	Cardiac arrest	0 (0%)	262 (22%)
	Myocardial infarction	0 (0%)	1 (0%)
	Heart failure	0 (0%)	120 (10%)
	Hypertension	38 (95%)	259 (22%)
Medication			
	Medication given	0 (0%)	246 (83%)
	Medication not given	40 (100%)	52 (17%)
Medication Response			
	Improved	--	110 (57%)
	Unchanged	--	83 (43%)
	Worse	--	0 (0%)
Initial Acuity			
	Critical (red)	3 (5%)	220 (20%)
	Emergent (yellow)	8 (13%)	428 (40%)
	Minor (green)	48 (80%)	406 (38%)
	Dead (black)	1 (2%)	25 (2%)
Final Acuity			
	Critical (red)	2 (4%)	178 (17%)
	Emergent (yellow)	6 (12%)	383 (36%)
	Minor (green)	42 (82%)	478 (45%)
	Dead (black)	1 (2%)	26 (2%)

To determine whether the proportion of calls responded by public assistance and 911 differ signifi antly, the two sample Z-test of proportions was conducted (Table 3). At the 0.05 signifi ance level, the results of the two-sample Z-test of proportions indicate a statistically signifi ant difference in the proportion of activations with Red initial acuity between those with a PAresponse and those with a 911-response ($p = 0.0038$). The proportion of Red acuity activations is higher amongst 911responses.

This statement holds true for all Red and Yellow initial/ finnal acuities, but not Green acuities. At the 0.05 significance level, the results indicate a statistically significant difference ($p = 0.0001$) and suggest that the proportion of Green acuity activations is higher amongst PA-responses. For Black acu-ity activations, the data was not statistically significant ($p > 0.05$), as indicated by the red text.

Table 3. Two sample Z-test of proportions

		PA-Response (%)	911-Response (%)	Standard Error	Z-Score	P-Value (< 0.05)
Initial Acuity						
	Critical (Red)	4.9%	19.9%	0.05	2.89	0.0038
	Emergent (Yellow)	13.1%	38.7%	0.06	4.02	0.0001
	Minor (Green)	78.7%	36.7%	0.06	-6.55	0.0001
	Dead (Black)	1.6%	2.3%	0.02	0.32	0.7489
Final Acuity						
	Critical (red)	3.3%	16.4%	0.05	2.75	0.0059
	Emergent (yellow)	9.8%	35.3%	0.06	4.09	0.0001
	Minor (green)	68.9%	44.1%	0.07	-3.78	0.0002
	Dead (black)	1.6%	2.4%	0.02	0.38	0.7039

The relationship between public assistance and acuity level was further assessed using the Chi-Square Test of Independence (Table 4). At the 0.05 signifi ance level, the results of the chisquare test for independence do not provide sufficient evidence to reject the null hypothesis ($\chi^2 = 0.797$, $p = 0.6713$). Th s suggests that there is no signifi ant association between the presence of PA and change in acuity.

Table 4. Two sample Z-test of proportions

	PA-Response	911-Response
Improved Acuity	3	114
No Change	36	818
Worsened Acuity	2	39
Chi-Square Test of Independence	X-squared = 0.797, df = 2, p-value = 0.6713	

Discussion

The findings of this study reveal a significant difference between activations with a PA-response and 911-response in the proportion of minor, emergent, and critical acuity patients. The proportion of emergent and critical acuity activations is higher amongst 911-responses. In general, 911-responses are equipped with more experienced personnel and a wider breadth of medical equipment to be able to handle higher acuity emergencies. On the other hand, the proportion of minor acuity activations is found to be higher in PA-responses. Th s suggests that community paramedics and other public assistance responders are most often being dispatched to lower acuity calls that they are more equipped to effectively manage. Public assistance calls usually involve incidents that are non-life-threatening but still require prompt medical attention. The findings of this study can inform efforts to allocate resources accordingly and optimize the distribution of personnel and vehicles to address specific l w acuity cardiac health needs, especially in rural areas that are characterized by ambulance deserts.

Analyzing the change from initial to fi al acuity can provide insight into whether patient health outcomes improved or deteriorated throughout the course of a call. The results of this study indicate that there is no signifi ant association between the presence of PA and change in acuity. Th s suggests that PAresponse and 911-response do not see different changes in acuity. For the lower acuity incidents like hypertension that PA responds to, the changes in acuity are comparable to the outcomes of the higher acuity calls that traditional 911 responds to.

Limitations

This study has several limitations that should be acknowledged. Firstly, its retrospective data analy-sis relies on the accuracy of EMS provider documentation, which is susceptible to missing or erroneous information. Additionally, a smaller amount of data was available for PA responses ($N = 40$) relative to 911-responses ($N = 971$). Th s may have impacted data robustness and the quality of data comparisons.

The NEMSIS dataset utilized in this study has inherent limitations. While NEMSIS provides a large convenience sample of EMS encounters across the United States, it is not a population-based, nation-ally representative sample. The dataset includes data submitted voluntarily by participating EMS agencies within states and territories. Thus, the data may contain potential selection bias. A significant limitation pertains to the classification of "public assistance" as a response type in the NEMSIS dataset. Th s broad category encompasses a wide range of ser-vices, including elderly assistance, injury prevention, immunization efforts, and community paramedicine. Unfortunately, the NEMSIS database does not allow precise filtration for community paramedic encounters as distinct from other public assistance responses. Th s lack of specific ty makes it challeng-ing to determine which cardiac incidents were directly addressed by community paramedicine programs versus other public assistance programs. Our analysis attempted to identify likely community paramedicine cases through multiple identification methods including service codes, provider classifications, and intervention types, but some misclassification may have occurred. Th s limitation highlights the need for more specific coding mech-anisms within national EMS databases to support research on evolving care models like community paramedicine. Future iterations of the NEMSIS data-base would benefit from incorporating variables that clearly distinguish community paramedicine responses from other types of public assistance, enabling more targeted analysis.

As outlined in the methods section, the PCRkey code was used to link individual EMS activations across the NEMSIS database. While this method prevented duplicate counting of EMS activations, it did not account for instances where multiple EMS agencies (e.g., a BLS transport unit and an ALS intercept) responded to the same patient. In such cases, these responses may have been recorded as separate EMS activations with different PCRkeys, potentially leading to double counting of individual patients.

From a clinical perspective, there are notable limitations in the role of community paramedics in managing cardiac emergencies. Many cardiac patients need time-sensitive interventions that only hospital staff and equipment can provide in an emergency department (ED). Consequently, these patients often require transport via ambulance to the ED. Current community paramedicine models, which do not include patient transport capabilities, are therefore not well-suited to manage high-acuity cardiac emergencies. Furthermore, even in pre-hospital settings, community paramedics may lack the advanced life support resources necessary for many cardiac conditions. As a result, community paramedicine programs may be better suited toward lower acuity medical presentations.

Finally, due to technological constraints, it was not feasible to select a completely random subset of 1 million activations from the entire database. Instead, the first 1 million activations were used. Despite this limitation, the sample size is sufficiently large to provide a representative selection for analysis.

Conclusion

This study investigated the relationship between public assistance response and cardiac patient acuities. There is a significant difference in the proportion of acuity activations between those with a PA-response and those with a 911-response. The proportion of emergent and critical acuity activations is higher amongst 911-responses, while minor acuity activations are more common in PA-responses, particularly in rural areas. Moreover, public assistance is suggested to produce an acuity outcome akin to the outcome of a 911-response. The findings of this study can encourage the allocation of resources towards public assistance programs in rural areas.

Future research could examine the longitudinal impact of community paramedic programs on population health outcomes, particularly in rural areas with limited healthcare infrastructure.

A comprehensive evaluation would compare cardiovascular morbidity and mortality rates over time between demographically similar regions with and without established community paramedic programs. Such studies could determine whether improved access to preventative care, medication management, and early intervention through community paramedicine translates to meaningful reductions in adverse cardiovascular events and overall mortality. Additionally, cost-effectiveness analyses comparing program investment against potential savings from reduced emergency department utilization and hospitalization would strengthen the case for sustainable funding models for these alternative care pathways in rural communities. It would also be valuable to examine the role of public assistance in lower-acuity emergency settings, such as the treatment of a "sick person". This would highlight the broader applications of public assistance and yield important insights into the types of incidents these programs address and their associated outcomes.

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Analysis and Standardization of Non-Transport Collegiate EMS Unit Verbal Handoffs to Responding ALS

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2025 College EMS Research Poster of the Year Award Recipient Abstract | ORIGINAL RESEARCH

The quality and consistency of patient handoff reports are critical for effective communication between basic life support (BLS) collegiate emergency medical services (EMS) and advanced life support (ALS) units. Miscommunication during handoffs risks omitting vital information, potentially delaying treatment as non-transport units add another layer to patient care. Th s study evaluates the content and quality of oral patient handoff reports by Gator Emergency Response Unit (GEMRU) leads, licensed EMTs serving as touchpoints between the Unit and responding ALS teams. Present on every shift, these leads are cleared by supervisors for mastery in assessments, treatments, and operations within GEMRU protocols.

A survey of EMS professionals, including emergency medicine physicians and paramedics, identified essential components for patient care reports: patient demographics, chief complaint, signs and symptoms, vitals, interventions, response to treatment, and pertinent medical history. Trauma and medical scenarios were developed to test leads' ability to prioritize critical details and adhere to medical protocols. The recorded handoff reports were analyzed for inclusion of these components and consistency.

Despite professional consensus on critical components, GEMRU leads frequently omitted essential details, including demographics, vitals, and chief complaints, while averaging quick delivery times of 27 seconds. No signif-icant similarities were observed in report delivery based on call type (medical or trauma) and leads often included extraneous information not deemed important by higher levels of care. These fi dings highlight gaps in training and the absence of a standardized approach to handoff communication.

To address these gaps, a structured mental training checklist tailored to call type is proposed. Such a checklist would serve as a cognitive framework for leads, guiding them to deliver a structured and concise report to ALS for medical and trauma calls. Implementing this training protocol could signifi antly improve the quality and consistency of collegiate EMS handoffs, enhancing ALS readiness and improving patient outcomes.

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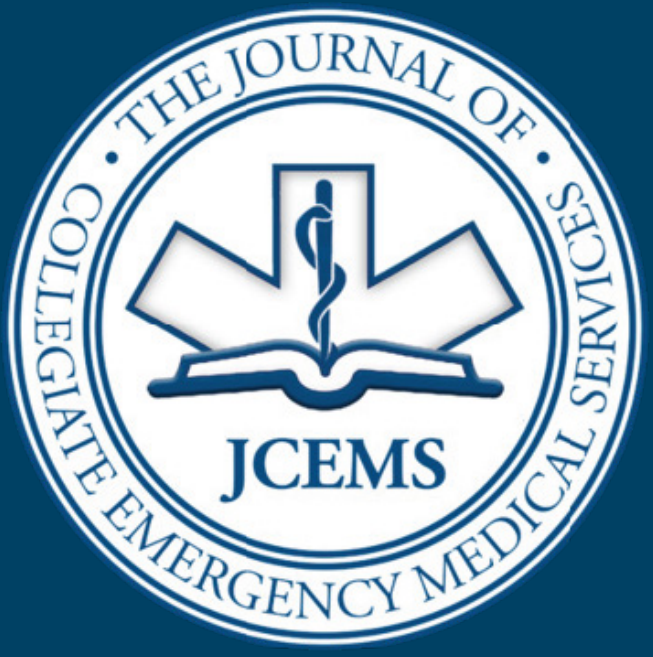
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