International Journal of Paramedicine

Published by the National EMS Management Association (USA)

IMPROVEMENT PROJECT REPORTS

MEETING PATIENTS IN THE FIELD: OPIOID USE INTERVENTION FROM EMERGENCY SERVICE PERSONNEL

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Recommended Citation: Stough, M. & Sutter, R. (2026). Meeting patients in the field: Opioid use intervention from emergency service personnel. *International Journal of Paramedicine*. (13). 145-154. https://doi.org/10.56068/BJDX4322. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3392

Keywords: opioid use disorder, medications, interventions, referral pathways, emergency medical services, EMS, paramedicine

Disclosures: There are no conflicts of interest to declare.

Funding: Funding for this project was internal; no external funding was received.

Received: April 27, 2025
Revised: December 8, 2025
Accepted: December 8, 2025
Published: January 13, 2026

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ABSTRACT

Introduction: Over the past two decades, the opioid epidemic has posed a major public health crisis in the United States, with significant economic, physical, and societal burdens. This quality improvement (QI) initiative aimed to address gaps in opioid use disorder (OUD) management by enhancing emergency medical services (EMS) personnel's ability to support medications for opioid use disorder (MOUD) access and connection to outpatient services.

Methods: The project was implemented in a small suburban fire department in Virginia. Using the Donabedian Model, Theory of Planned Behavior, and Knowledge-to-Action framework, a structured educational intervention was delivered to EMS personnel across four operational shifts. Pre- and post-intervention surveys assessed knowledge, attitudes, and confidence using validated tools. Paired t-tests and descriptive statistics were used for quantitative analysis, and thematic analysis was applied to stakeholder meeting notes and qualitative feedback.

Results: Post-training surveys showed statistically significant increases in EMS provider confidence. Confidence in identifying appropriate patients for MOUD increased by 24.9%, $t(28) = -5.01$, $p < .001$, and confidence in providing resources to patients with OUD increased by 37.5%, $t(28) = -4.93$, $p < .001$. Thematic analysis revealed six primary themes: improved training effectiveness, increased resource awareness, barriers to implementation, sustainability planning, community engagement, and enhanced data tracking.

Conclusion: This QI initiative demonstrated that brief, targeted EMS training on MOUD significantly improved provider confidence and readiness to support OUD patients. The project highlights EMS's potential to act as upstream intervention partners in the continuum of care. Broader implementation and system-level integration are recommended.

INTRODUCTION

Situated at the intersection of public health and hospital care, emergency medical services (EMS) personnel are often the first responders to opioid overdoses. National EMS data shows that the administration of naloxone by EMS personnel has continued to rise, with more than 207,000 naloxone administrations recorded in 2021 alone, a 43% increase since 2017 (CDC, 2023; NEMSIS, 2022). However, a persistent gap remains in EMS protocols and training for managing opioid use disorder (OUD) beyond acute

overdose reversal. While EMS providers are well-equipped to administer naloxone and manage immediate crises, many report limited formal education on the chronic nature of OUD and the use of medications for opioid use disorder (MOUD). In a recent evaluation of EMS personnel in Baltimore County, providers expressed a strong need for additional training on opioid overdose prevention, stigma reduction, and post-overdose care strategies (Ali et al., 2023).

This quality improvement project aimed to address that gap by delivering targeted education and developing system-level supports to expand EMS engagement beyond emergency stabilization and into the continuum of care for individuals with OUD.

METHODS

Setting and Participants

This quality improvement initiative was implemented in a small suburban fire department in Northern Virginia. The setting was selected due to its high burden of opioid-related calls and its commitment to collaborative public health strategies. EMS personnel at this department often serve as first responders to opioid overdoses, placing them in a critical position to bridge emergency care and ongoing treatment. All field paramedics and emergency medical technicians (EMTs) across four operational shifts (A–D) were included. A total of 29 EMS personnel participated in the training and evaluation components of the project.

Ethics and Institutional Review Determination

This project underwent review by the institution's research ethics authority to determine whether it met criteria for human subjects' research. Following consultation and submission of project materials, the initiative was formally classified as a quality improvement (QI) activity and therefore did not require full research ethics board (REB) approval. Participation in pre- and post-surveys was voluntary, anonymous, and included information about the purpose of the project, the option to withdraw, and the absence of anticipated risks. No patient-level data were collected, and no identifying information was obtained from EMS personnel. The QI designation is acknowledged as a limitation in the interpretation of findings, particularly concerning generalizability.

Project Design

The project was guided by two sequential Plan-Do-Study-Act (PDSA) cycles following established QI methodology (Taylor et al., 2014). The first cycle ('Cycle 1') focused on establishing baseline understanding and identifying operational gaps. Resources used to shape the intervention included the NACCHO First Responder Substance Use Stigma Toolkit, Washington State DOH stigma modules, and regional harm reduction guidelines. Cycle 1 also involved co-developing the educational curriculum, refining leave-behind materials, and piloting early variations of the referral QR code. The second cycle ('Cycle 2') used feedback from the initial trainings and stakeholder observations to refine content, streamline referral workflows, and prepare for broader adoption. This included updating documentation templates, troubleshooting Narcan distribution delays, and ensuring alignment with leadership priorities.

Stakeholder collaboration was central to the design and execution of the intervention. Meetings with EMS leadership, clinical mentors, and MOUD providers were held regularly to guide planning, adapt content, and ensure operational feasibility. Training sessions were delivered on-site over four consecutive days to ensure coverage across all shifts. Attendance was mandatory per department leadership, while participation in the pre- and post-surveys was voluntary.

Frameworks

Three frameworks informed project development and evaluation. Donabedian's Structure-Process-Outcome Model provided the overarching evaluation framework, emphasizing infrastructure readiness, intervention delivery, and provider-level outcomes (McDonald et al., 2007). The Theory of Planned Behavior (TPB) guided survey development and training content by addressing EMS personnel's attitudes, subjective norms, and perceived behavioral control related to MOUD referrals (Lamorte, 2022). Finally, the Knowledge-to-Action (KTA) framework supported evidence translation into practice and structured iterative feedback and adaptation (University of Illinois Chicago, 2024).

Measures

Quantitative measures included pre- and post-intervention surveys that assessed EMS personnel's confidence, familiarity, comfort, and attitudes regarding OUD and MOUD. Survey items were adapted from the validated First Responder Substance Use Stigma Measures Toolkit developed by the Washington State Department of Health and the National Association of County and City Health Officials (NACCHO, 2025). Following the intervention, participants also completed the Acceptability of Intervention Measure (AIM), Intervention Appropriateness Measure (IAM), and Feasibility of Intervention Measure (FIM) to assess the training's acceptability, appropriateness, and feasibility (Weiner et al., 2017).

Qualitative measures included field notes and transcripts collected during stakeholder meetings and post-training discussions. Observations captured reflections on training effectiveness, barriers to implementation, and suggestions for future adaptation.

Data Analysis

Quantitative survey data were exported from Qualtrics into Microsoft Excel for analysis. Microsoft Excel was selected as a practical and accessible tool for conducting descriptive statistics and paired t-tests, particularly given the small sample size and quality improvement context of the project. Paired t-tests were used to compare pre- and post-training responses for each survey item, with statistical significance set at $p < .005$. Two negatively worded items were reverse-coded to ensure consistency in directional interpretation. Descriptive statistics were also used to analyze responses from the Acceptability of Intervention Measure (AIM), Intervention Appropriateness Measure (IAM), and Feasibility of Intervention Measure (FIM).

Qualitative data were analyzed using an AI-assisted coding tool to support initial theme generation. The tool generated preliminary open codes based on recurring concepts within meeting notes and transcripts, which were then manually reviewed by two independent DNP-prepared reviewers. Reviewers compared code lists, identified areas of

discrepancy, and reconciled differences through discussion. For example, one disagreement involved whether comments such as 'I didn't know what the clinic did' represented a lack of resource awareness or reduced perceived behavioral control; the team ultimately created a merged subtheme to reflect both dimensions. The use of AI assistance accelerated the initial sorting of data, while human-based review ensured analytic rigor. Triangulation was conducted across meeting minutes, post-training discussions, and survey write-in comments to enhance trustworthiness and confirmability.

RESULTS

Quantitative Findings

A total of 29 EMS personnel completed both the pre- and post-training surveys, yielding a 100% response rate. Survey responses were rated on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Paired t-tests were conducted using Microsoft Excel's Data Analysis Toolpak to evaluate changes across key domains: confidence, familiarity, comfort, and attitudes regarding OUD and MOUD. Statistical significance was defined as $p < .005$.

EMS personnel's confidence in identifying patients appropriate for MOUD increased by 24.9%, from a mean of 3.41 (SD = 0.66) pre-training to 4.26 (SD = 0.52) post-training, $t(28) = -5.01$, $p < .001$. Confidence in providing resources to patients experiencing opioid use rose by 37.5%, from a mean of 3.28 (SD = 0.69) to 4.51 (SD = 0.46), $t(28) = -4.93$, $p < .001$. Familiarity with MOUD and comfort in discussing treatment options also demonstrated statistically significant improvements (see Table 1).

Two survey items did not reach statistical significance (list survey items for clarity). Notably, both were negatively worded statements, which may have introduced response bias or participant confusion. This highlights the importance of clear survey construction and supports plans to refine evaluation tools in future phases.

Following the intervention, participants completed the Acceptability of Intervention Measure (AIM), Intervention Appropriateness Measure (IAM), and Feasibility of Intervention Measure (FIM). Responses were overwhelmingly positive, with more than 90% of participants selecting "Agree" or "Completely Agree" across all three domains, indicating that the intervention was viewed as acceptable, appropriate, and feasible for continued integration into EMS practice (see Figure 1).

Qualitative Findings

Thematic analysis was conducted on notes and transcripts from stakeholder planning meetings, post-training discussions, and ongoing implementation check-ins. Open coding, combined with a Theory of Planned Behavior-guided lens, revealed six major themes.

Participants consistently reported that the educational content improved their understanding of MOUD and shifted their perspectives on the treatability of OUD in the field. EMS personnel became more familiar with the MOUD clinic, peer recovery supports, and the local referral network. Several participants noted they "didn't know what the clinic did" prior to the training.

Survey Statement	Pre Mean	Post Mean	t(28)	p-value	Signif-icant?	% In-crease**	Interpretation
I am familiar with Medication Assisted Treatment (MAT) or Medications for Opioid Use Disorder (MOUD).	3.38	4.07	-3.58	<0.01	yes	20.4%	Significant improvement in MOUD familiarity
I am confident in identifying appropriate patients for MAT/MOUD services.	3.34	4.17	-5.01	<0.01	yes	24.9%	Significant gain in confidence identifying patients
I am confident in providing resources for patients with Opioid use Disorder (OUD).	2.93	4.03	-4.93	<0.01	yes	37.5%	Significant improvement in ability to provide resources
I feel comfortable effectively communicating with patients with Opioid Use Disorder (OUD).	3.59	3.97	-2.17	0.04	yes	10.6%	Moderate but significant increase in communication comfort
MOUD is effective at reducing overdoses.	3.41	3.9	-3.13	<0.01	yes	14.4%	Significant increase in belief in MOUD's effectiveness
MOUD is effective at reducing future crime.	3.14	3.83	-3.99	<0.01	yes	22.0%	Significant improvement in understanding MOUD's societal impact
*MOUD puts more drugs on the streets.	3.31	3.48	-0.76	0.46	no	5.1%	No significant change in attitude
*Persons who use heroin/opioids do not need to use MAT to get "clean."	3.1	3.38	-1.19	0.25	no	9.0%	No significant change
MOUD is a good investment for society.	3.52	4.07	-3.42	<0.01	yes	15.6%	Significant improvement in perception of MOUD's societal value

**Reverse-coded item. Higher scores indicate more favorable attitudes.*

***Percent increase calculated using reverse-coded values for negatively worded items. Percent increases represent the relative change in mean score from pre- to post-survey.*

Table 1. Pre- and post-intervention mean scores, paired sample t-test results, and statistical significance for EMS provider survey responses (N=29)

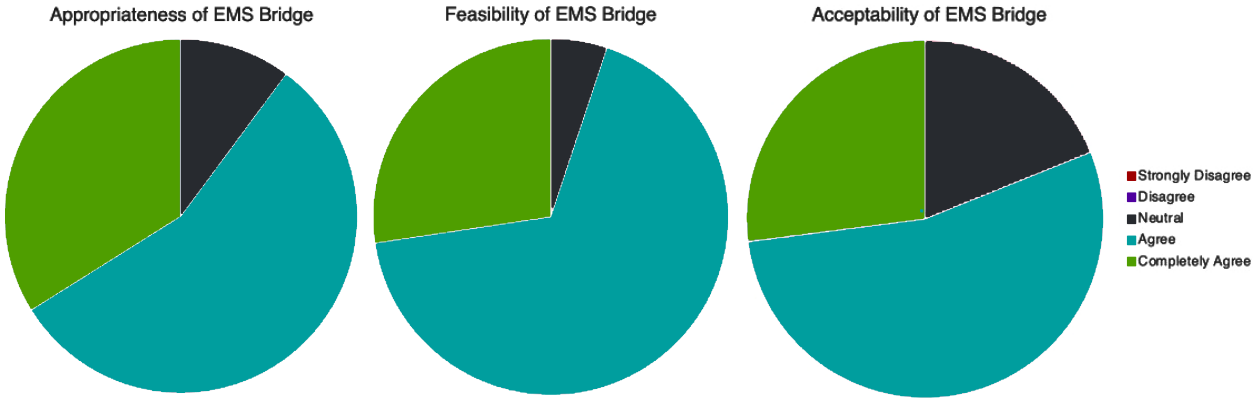

Figure 1. EMS personnel perceptions of the EMS Bridge Program's feasibility, appropriateness, and acceptability (N = 29)

System-level challenges were also identified, including delays in Narcan distribution, incomplete memoranda of understanding (MOUs), and restrictions on patient data sharing. These were perceived as primary barriers to full referral implementation.

Many EMS staff expressed interest in sustaining the initiative and incorporating OUD training into ongoing departmental education. Participants also valued the harm reduction focus of the leave-behind materials and expressed interest in outreach-based roles through community paramedicine. Additionally, staff emphasized the need for stream-

lined documentation processes, requesting integration of referral and Narcan tracking fields into existing EMS reporting software.

These themes align with constructs of the Theory of Planned Behavior. Improvements in attitudes toward MOUD, evolving departmental norms, and increased perceived behavioral control suggest greater readiness for behavior change.

Coder discrepancies were resolved through consensus meetings in which both reviewers compared interpretations and justified code assignments. When disagreements arose, such as classifying comments about confusion over treatment resources, the team revisited transcript excerpts together and examined contextual cues. These discussions led to the creation of blended subthemes, ensuring that themes accurately reflected EMS personnel's perspectives while honoring TPB constructs. This approach strengthened the reliability of the qualitative findings.

Integration of Findings

Quantitative and qualitative results jointly suggest that the intervention successfully enhanced EMS provider confidence, preparedness, and openness to adopting new OUD protocols. Survey improvements were supported by stakeholder feedback, which highlighted personal growth as well as structural needs for sustainability. Together, these findings indicate that targeted training combined with workflow-integrated tools has strong potential to shift EMS practice toward upstream intervention.

DISCUSSION

This quality improvement initiative demonstrated that targeted training for emergency medical services (EMS) personnel on opioid use disorder (OUD) and medications for opioid use disorder (MOUD) can significantly improve provider confidence, knowledge, and readiness to engage in upstream interventions. Statistically significant improvements across key survey domains—especially confidence in identifying appropriate patients for MOUD and providing resources—are consistent with prior evidence that EMS personnel are both capable of, and willing to, expand their role in addressing the opioid crisis when adequately supported (Ali et al., 2023; Barefoot et al., 2021; Hern et al., 2023).

The findings suggest that brief, evidence-informed educational sessions, when paired with operational tools such as leave-behind resource kits and referral QR codes, can meaningfully influence EMS personnel's attitudes and behaviors. These results align with evaluations of other EMS-led harm reduction efforts, which similarly found that targeted education contextualized to local practice, combined with practical pathways for action, increased provider readiness (Belden et al., 2024; Dahlem et al., 2021).

The Theory of Planned Behavior (TPB) provided a valuable framework for interpreting these changes. Post-training feedback reflected a shift in provider mindset, with participants describing an enhanced sense of responsibility to connect patients with ongoing treatment rather than focusing solely on immediate crisis management. Increased familiarity with community MOUD resources and growing support for post-overdose care reflect progress across all three TPB domains—attitudes, subjective norms, and perceived behavioral control—reinforcing existing literature that highlights the critical

role of stigma reduction and systemic support in facilitating provider behavior change (Ali et al., 2023).

The Knowledge-to-Action (KTA) framework similarly highlighted the importance of stakeholder engagement and iterative adaptation throughout the project. Regular meetings with EMS leadership, paramedics, and clinical mentors enabled the team to adjust the training content and workflows based on real-time feedback. This approach strengthened implementation fidelity and helped identify key operational barriers, such as delays in Narcan distribution and limited data-sharing infrastructure, that may have otherwise gone unaddressed. These experiences mirror findings from other EMS-based initiatives emphasizing the need for strong administrative support and ongoing quality feedback loops (Hern et al., 2023).

Donabedian's Structure-Process-Outcome model also framed the project's successes and ongoing challenges. Structural interventions—such as the introduction of updated leave-behind kits, referral QR codes, and stakeholder partnerships—produced measurable improvements in process outcomes at the provider level. Although patient-level outcome data could not yet be collected due to legal and technological barriers, the foundation for future outcome evaluation has been laid through planned documentation templates, reporting dashboards, and enhanced peer recovery integration efforts.

Findings should also be considered within the broader variability of EMS treatment authority across jurisdictions. While some EMS agencies are authorized to initiate buprenorphine or provide comprehensive post-overdose interventions, others may face regulatory or scope-of-practice constraints. Treatment availability, naloxone access, referral pathways, and MOUD clinic partnerships differ widely across states and regions. Future researchers should explore how models like the EMS Bridge Program can be adapted across diverse operational contexts and potentially standardized to support generalizability.

Overall, the results demonstrate the potential for EMS to serve as a critical bridge between overdose reversal and sustained treatment engagement. As public health approaches to the opioid epidemic evolve, integrating EMS personnel into broader systems of care will be essential to improving access to treatment and reducing overdose-related morbidity and mortality.

LIMITATIONS

Several limitations must be considered when interpreting the results of this quality improvement initiative. First, the project was implemented at a single suburban fire department in Northern Virginia, limiting generalizability. Although the department's high call volume and leadership engagement made it an ideal pilot site, broader implementation across diverse EMS systems—particularly in rural or urban settings—may reveal different challenges and outcomes.

Second, although all 29 EMS personnel participated in the training, the small sample size limits the statistical power of the quantitative findings. Future phases would benefit from multicenter participation and a larger cohort to strengthen external validity and allow for subgroup analyses.

Third, due to legal and technological constraints, patient-level outcome tracking was not feasible during the intervention period. At the time of implementation, formal data-sharing agreements and memoranda of understanding (MOUs) between the EMS agency and the outpatient MOUD clinic had not been finalized. As a result, the number of patients referred via the QR code and their subsequent engagement in treatment could not be monitored in real time. Addressing this limitation remains a priority for future project phases, with ongoing collaboration focused on secure data dashboard development and information-sharing agreements.

Additional logistical barriers included delays in distributing updated leave-behind kits containing naloxone and referral materials, which limited the synchronization of training with immediate field deployment. Furthermore, some survey items—particularly negatively worded statements—may have introduced participant confusion or response bias, potentially affecting internal consistency. Revisions to these items are planned for future iterations to improve reliability.

It is also possible that the Hawthorne effect influenced participants' survey responses, with EMS personnel reporting greater improvements in confidence and attitudes because they were aware of being observed and evaluated during the intervention period (Oswald et al., 2014).

While qualitative data collection provided important insights into implementation experiences, it was limited to field notes and informal discussions rather than structured interviews or focus groups. Expanding qualitative inquiry methods in future phases could deepen understanding of EMS perspectives and inform further adaptations to training and referral processes.

Finally, although the project underwent formal ethics consultation and was deemed exempt as a QI initiative, this determination limits the extent to which findings can be generalized or replicated using research-level conditions. The absence of patient-level data, restrictions related to data-sharing agreements, and voluntary survey participation further constrain interpretation. Future evaluations incorporating REB-approved protocols and patient outcome tracking could strengthen rigor and expand understanding of the program's impact.

Despite these limitations, the project successfully established a strong foundation for continued evaluation and expansion. The barriers encountered, particularly those related to legal infrastructure and referral tracking, underscore the importance of system-level alignment when implementing EMS-public health partnerships.

CONCLUSION

This quality improvement initiative demonstrated that equipping EMS personnel with targeted education and practical referral tools can significantly improve their confidence and preparedness to support patients with opioid use disorder (OUD). By addressing gaps in knowledge, reducing stigma, and enhancing perceived behavioral control, the intervention positioned EMS providers not only as emergency responders but as proactive agents in connecting patients to long-term care.

The project advances the role of EMS in harm reduction and public health, showing that with the right training, resources, and system-level support, field personnel are well-positioned to bridge the gap between overdose reversal and treatment engagement. Although full implementation of the EMS-to-clinic referral pathway was limited by infrastructural and legal barriers, the groundwork for sustainable change has been established through the development of leave-behind kits, a secure data tracking framework, and plans for ongoing quality assurance.

Implications for practice include the integration of OUD and MOUD education into routine EMS onboarding and annual recertification processes, as well as formal incorporation of referral documentation into existing EMS reporting systems. The initiative also highlights the importance of strong interagency collaboration, policy alignment, and the use of structured implementation frameworks—such as Donabedian's model, the Theory of Planned Behavior, and the Knowledge-to-Action cycle—to guide adaptation and scale.

Future efforts should focus on evaluating patient-level outcomes following EMS engagement, refining referral workflows, and expanding into community paramedicine models that allow EMS personnel to follow up with high-risk patients outside of acute emergencies. As overdose-related morbidity and mortality continue to pose critical public health concerns, integrating EMS personnel into long-term solutions remains essential.

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