EMERGENCY MEDICAL CARE COMMITTEE MEETING AGENDA

Thursday, May 15th, 2025, at 8:30 A.M.
2995 McMillan Ave, Ste #178, San Luis Obispo

MEMBERS
CHAIR Chris Javine, *Pre-hospital Transport Providers, 2022-2026*
VICE – CHAIR Matt Bronson, *City Government, 2020-2024*
Dr. Brad Knox, *Physician*, *2022-2026*
Bob Neumann, *Consumers*, *2022-2026*
Alexandra Kohler, *Consumers, 2020-2024*
Jonathan Stornetta, *Public Providers, 2020-2024*
Michael Talmadge, *EMS Field Personnel, 2020-2024*
Jay Wells, *Sheriff's Department, 2020-2024*
Julia Fogelson, *Hospitals*, *2022-2024*
Diane Burkey, *MICNs*, *2022-2026*
Dr. Rachel May, *Emergency Physician*, 2022-2026

EX OFFICIO
Ryan Rosander, *EMS Director*
Dr. Bill Mulkerin, *EMS Medical Director*
Penny Borenstein, *Health Officer*

STAFF
Maya Craig-Lauer, PHEP Representative
Rachel Oakley, *EMS Coordinator*
Eric Boyd, *EMS Coordinator*
Kaitlyn Blanton, *EMS Coordinator*
Alyssa Vardas, *Administrative Assistant*

AGENDA	ITEM	LEAD
Call To Order	Introductions Public Comment	C. Javine
Action/Discussion	Approval of minutes: March 20th, 2025, Minutes (*attached)*	C. Javine
Action/Discussion	Policy Revisions: • 158- APOT Protocol Revisions: • 704- Needle Cricothyrotomy • XXX- Opioid Withdrawal Formulary Revisions/Additions: • Suboxone Bi-Annual LEMSA Training Discussion QI Work Group Modification Discussion	R. Rosander
Action/Discussion	Policy Revisions: • 125 - Pre-Hospital Determination of Death	E. Boyd
Staff Reports	• Health Officer • EMS Agency Director Report • EMS Medical Director Report • PHEP Staff Report	P. Borenstein R. Rosander B. Mulkerin M. Craig-Lauer
Committee Members' Announcements or Reports	Opportunity for Board members to make announcements, provide brief reports on their EMS-related activities, ask questions for clarification on items not on the agenda, or request consideration of an item for a future agenda (Gov. Code Sec. 54954.2[a][2])	Committee Members
Adjourn	**Next Meeting: July 17th, 2025**	C. Javine

COUNTY OF SAN LUIS OBISPO HEALTH AGENCY
PUBLIC HEALTH DEPARTMENT
Nicholas Drews *Health Agency Director*
Penny Borenstein, MD, MPH *Health Officer/Public Health Director*

MEETING DATE	May 15th, 2025
STAFF CONTACT	Ryan Rosander, EMS Director 805.788.2512 rrosander@co.slo.ca.us
SUBJECT	Policy #158: Ambulance Patient Offload Time (APOT) Monitoring
SUMMARY	Ambulance Patient Offload Time (APOT) is the interval from when an ambulance arrives at an emergency department (ED) to when the patient is transferred to hospital staff and the ambulance is available for the next call. Excessive APOT negatively impacts EMS system efficiency, delays emergency responses, and contributes to ambulance shortages. California Health and Safety Code Section 1797.225 mandates that LEMSAs monitor and report APOT data. The California EMS Authority (EMSA) has established standardized reporting requirements and defined "excessive offload delay" as patient transfer times exceeding 30 minutes after arrival at the ED. LEMSAs are responsible for collaborating with hospitals, ambulance providers, and other stakeholders to mitigate delays and ensure timely patient transfer. Furthermore, LEMSAs are responsible for lowering the statutory time of 30 minutes, if it would benefit the LEMSAs EMS system. In the County of San Luis Obispo, all prolonged APOT times negatively impact the system due to the amount of ambulances available, for this reason SLOEMSA is seeking stakeholder feedback for a 20 minute standard.
REVIEWED BY	Dr. William Mulkerin, SLOEMSA Staff, Operations, Clinical Advisory, QI Workgroup
RECOMMENDED ACTION(S)	Policy #158 recommended for approval by EMCC.
ATTACHMENT(S)	Policy #158: Ambulance Patient Offload Time (APOT) Monitoring

POLICY #158 AMBULANCE PATIENT OFFLOAD TIME (APOT) MONITORING:

I. PURPOSE

A. To establish standardized methodologies for collecting and reporting Ambulance Patient Offload Time (APOT) data to the County of San Luis Obispo Emergency Medical Services Agency (SLOEMSA). APOT functions as a crucial metric for evaluating the efficiency of patient care transitions from pre-hospital to hospital settings, ensuring that pre-hospital resources can transfer care effectively and allowing them to return to service.

II. DEFINITIONS

- Ambulance Arrival at ED: The time the ambulance wheels stop at the designated hospital ED offload location.
- Ambulance Patient Offload Time (APOT): The interval between the arrival of an ambulance patient at an emergency department (ED) and the time when the patient is transferred to an ED gurney, bed, chair, or other suitable location, at which point the ED assumes responsibility for the patient's care.
- Ambulance Patient Offload Delay (APOD): Any delay in ambulance patient offload time that exceeds the local standard for ambulance patient offload time, which is 20 minutes. This is synonymous with “non-standard patient offload time” in the Health and Safety Code.

III. POLICY

A. EMS field personnel are obligated to continue delivering and documenting patient care until the patient is transferred to the designated base hospital's Emergency Department (ED) medical personnel. The medical control and management of the EMS system, including EMS field personnel, remain under the jurisdiction of the EMS agency medical director. All patient care provided must adhere strictly to the treatment protocols and policies outlined by SLOEMSA.

B. Ambulance Patient Offload Times should be kept to a minimum to ensure the efficient transfer of patient care from pre-hospital to hospital settings. APOTs exceeding 20-minutes will be considered an Ambulance Patient Off Delay (APOD).

C. Designated base hospitals and EMS field personnel shall follow the APOD Mitigation Procedures detailed in Section IV of this policy when an APOD event occurs.

IV. PROCEDURE

A. Direction of EMS Field Personnel

1. Ambulance Patient Offload Time (APOT) Monitoring

a. If the transfer of care and patient offloading from the ambulance gurney exceeds the 20-minute standard, it will be documented and tracked as an APOD.

b. The transporting EMS field personnel are not responsible for continuing to monitor the patient or provide care within the hospital setting after the patient's care has been transferred to ED medical personnel.

2. APOD Mitigation Procedures

a. Designated base hospitals are responsible for ensuring policies and processes facilitate the rapid and appropriate transfer of patient care from EMS field personnel to ED medical personnel.

b. If APOD does occur, the hospital should make every attempt to:

i. Provide a safe area in the ED within direct sight of ED medical personnel where the ambulance crew can temporarily wait while the hospital's patient remains on the ambulance gurney.

ii. Inform the attending paramedic or EMT of the anticipated time for the offload of the patient.

iii. Provide information to the EMS Field Supervisor regarding the steps the hospital is taking to resolve APOD.

c. If requested, hospitals will provide written details to SLOEMSA of policies and procedures that have been implemented to mitigate APOD and assure effective communication with affected partners:

i. Processes for the immediate notification of the following hospital staff through their internal escalation process of the occurrence of APOD, including but not limited to:

- ED Attending Physician
- ED Nurse Manager/Director or Designee (i.e. Charge Nurse) House Supervisor
  Administrator on-call

ii. Processes for ED medical personnel to immediately respond to and provide care for the patient if the attending EMS field personnel alert the ED medical personnel of a decline in the condition of a patient being temporarily held on the ambulance gurney.

iii. EMS field personnel are directed to do the following to prevent APOD:

- Notify the base hospital ED as soon as possible (call-in) that a patient is being transported to their facility.
- Contact the EMS Field Supervisor for direction if the ED medical personnel do not offload the patient within the 20-minute ambulance patient offload time standard.
- Work cooperatively with the base hospital staff to transition patient care within the timeframes established in this policy.

V. AUTHORITY

- California Health and Safety Code, Division 2.5
- California Code of Regulations, Title 22, Division 9

Approvals:

EMS Agency, Administrator	
EMS Agency, Medical Director	

COUNTY OF SAN LUIS OBISPO HEALTH AGENCY
PUBLIC HEALTH DEPARTMENT
Nicholas Drews *Health Agency Director*
Penny Borenstein, MD, MPH *Health Officer/Public Health Director*

MEETING DATE	May 15th, 2025
STAFF CONTACT	Kaitlyn Blanton, EMS Coordinator 805.788.2513 kblanton@co.slo.ca.us
SUBJECT	Procedure #704 Opioid Withdrawal – implementation of Suboxone and County Plan
SUMMARY	In conjunction with the County's Strategic Plan for 2025, the introduction of Protocol #XXX (no currently assigned numeric) for Opioid Withdrawal has been drafted. This new protocol will include the addition of Suboxone to our County as an ALS pre-hospital medication with Base Orders. Aligned with the California Bridge Program ideals, this draft protocol has been created with the intention of benefiting patients experiencing Opioid withdrawal symptoms with the intent of seeking resources for treatment. Procedure #704 Needle Cricothyrotomy has been updated with language approving ALS providers to follow manufacture guidelines for brand specific instructions on their equipment.
REVIEWED BY	Dr. William Mulkerin, SLOEMSA Staff, Operations, Clinical Advisory
RECOMMENDED ACTION(S)	Listed attachments are recommended for EMCC approval and move to 2025 EMS Update Class agenda
ATTACHMENT(S)	Protocol # xxx – Opioid Withdrawal Suboxone Formulary Procedure #704 Suboxone Literature

OPIOID WITHDRAWAL

ADULT	PEDIATRIC (≤34 KG)
BLS Procedures	
• Universal Algorithm #601 • Pulse Oximetry ○ O_2 Administration per Airway Management Protocol #602	• Universal Algorithm
ALS Procedures	

• If suspected opioid withdrawals, use "COWS" score to determine if patient meets criteria to receive Suboxone
  ○ "COWS" ≥ 7 to qualify
  ○ Patient must be agreeable to treatment with goal of seeking resources and counseling
• If believed that patient will benefit from Suboxone with no contraindications – contact nearest Base Hospital for orders
	• Suboxone is contraindicated in pediatric patients under 18

Base Hospital Orders Only	

• **Suboxone** 16mg SL film (two strips) – reassess after 20 minutes
  ○ Call for secondary 8mg SL dose for persistent or worsening symptoms after 20 minutes
  ○ Give water to moisten mucus membranes prior to SL film administration
	• As needed

Notes

- **SEE PAGE 2 FOR COWS SCORE ASSESSMENT TOOL**
- If Suboxone is administered repeat "COWS" score assessment 20 minutes after initial dose and secondary dose if applicable
- Patients should have history of any one of the following:
  - Recent opioid use
  - Chronic opioid use
  - Evidence of illicit drug use (paraphernalia, needles etc)
  - Prescription narcotics in household or on patient

- Naloxone in Suboxone has a negligible SL absorption and should not be factored into dosing totals. Should a patient present in respiratory distress with suspicion of opioid overdose refer to Protocol #618

Clinical Opioid Withdrawal Scale (COWS)

ANXIETY OR IRRATIBILITY *Visually observed during assessment* **0** None **1** Reports increasing irritability or anxiousness **2** Visually irritable or anxious **4** Too irritable to participate or affecting participation	RESTING HEART RATE *Measured after sitting for one (1) minute* **0** ≤80 bpm **1** 81 to 100 bpm **2** 101 to 120 bpm **4** >120 bpm
BONE OR JOINT ACHES *Only new pain attributed to withdrawal is scored* **0** Not present **1** Mild, diffuse discomfort **2** Reports severe, diffuse aching of joints/muscles **4** Patient rubbing joints/muscles and unable to be still	RESTLESSNESS *Visually observed during assessment* **0** Able to be still **1** Report difficulty being still, but able to do so **3** Frequent shifting or extraneous movement of legs/arms **5** Unable to be still for more than a few seconds
SKIN SIGNS *Visually or physically observed during assessment* **0** Skin is smooth **3** Piloerection of skin – can be felt or visible arm hairs standing up **5** Prominent piloerection – "Gooseflesh Skin"	TREMOR *Observation of outstretched hands* **0** No tremors **1** Tremor can be felt but not observed **2** Slight tremor observed **4** Gross tremor or muscle twitching
GATROINTESTINAL UPSET *Within past 30 minutes* **0** No GI symptoms **1** Stomach cramps **2** Nausea or loose stool **3** Vomiting or diarrhea **5** Multiple episodes of diarrhea or vomiting	SWEATING *Over past 30 – **not** from environment or activity* **0** No reports of chills or flushing **1** Subjective report of chills or flushing **2** Flushed or observable moistness to face **3** Beads of swear on brow or face **4** Sweat streaming off of face
PUPIL SIZE *Visually observed during assessment* **0** Pupil pinned or normal size for ambient light **1** Pupils possibly larger than normal for ambient light **2** Pupils moderately dilated **5** Pupils very dilated	YAWNING *Visually observed during assessment* **0** No Yawning **1** Yawning once or twice during assessment **2** Yawning three or more times during assessment **4** Yawning several times per minute
RUNNY NOSE OR TEARING *Not accounted for by cold symptoms or allergies* **0** Not present **1** Nasal stuffiness or unusually moist eyes **2** Runny nose or tearing **4** Nose constantly running or tears streaming down face	**TOTAL COWS SCORING** **5 - 12** Mild Withdrawal **13 - 24** Moderate Withdrawal **25 - 36** Moderately Severe Withdrawal **>36** Severe Withdrawal

Buprenorphine/Naloxone (Suboxone®)
(Base Hospital Order Only)

Classification: Narcotic analgesic combination (Class III)

Actions:

1. Buprenorphine; partial mu-receptor opioid agonist
2. Naloxone; opioid antagonist

Indications:

1. Management of opioid withdrawal in adults with moderate to severe opioid drug dependence

Contraindications:

1. **Patients under 18 years of age**
2. **Recent methadone use (within 10 days)**
3. **Pregnancy**
4. **No signs of Opioid withdrawal or COWS <7**
5. **Altered mental status – unable to give consent**
6. **Severe medical illness – sepsis, respiratory distress, hypoglycemia etc**

Adverse Effects (Precautions, Side Effects and Notes)

1. Headache
2. Nausea/Vomiting
3. Respiratory Depression

Administration:

ADULT DOSE – Base Hospital Order Only

1. **Suboxone –** 16 mg SL film, reassess after 10 minutes
   a. 8 mg SL tablet secondary dose if ordered by Base Hospital after 10 minute reassessment

PEDIATRIC DOSE

2. **None - Contraindicated in patients under 18 years of age**

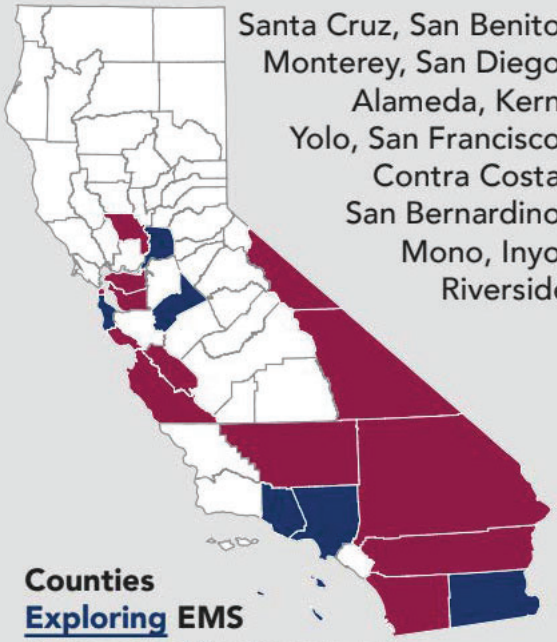
Onset: 20 – 40 minutes
Peak effect 3-4 hours*

Duration: 24+ hours

Notes: Naloxone has a negligible SL absorption and should not be factored into dosing totals. Should a patient present in respiratory distress with suspicion of opioid overdose refer to Protocol #618

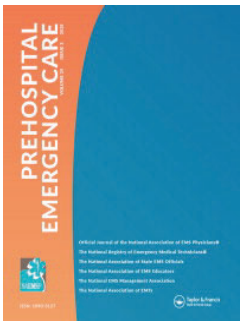
Counties Implementing EMS Buprenorphine Programs

Santa Cruz, San Benito, Monterey, San Diego, Alameda, Kern, Yolo, San Francisco, Contra Costa, San Bernardino, Mono, Inyo, Riverside



Counties Exploring EMS Buprenorphine Programs

San Mateo, Sacramento, Stanislaus, Imperial, Ventura, Los Angeles



Prehospital Emergency Care

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/ipec20

EMS Clinician Perceptions on Prehospital Buprenorphine Administration Programs

Wesley R. Wampler, Mirinda Ann Gormley, Sarah F. Griffin, Jose Correa Ibarra, Parker Bailes IV, Daniel L. Schwerin, Keri Queen, Katy Jones, Sarah B. Floyd, Gerald (Wook) Beltran, Alain H. Litwin & Phillip Moschella

To cite this article: Wesley R. Wampler, Mirinda Ann Gormley, Sarah F. Griffin, Jose Correa Ibarra, Parker Bailes IV, Daniel L. Schwerin, Keri Queen, Katy Jones, Sarah B. Floyd, Gerald (Wook) Beltran, Alain H. Litwin & Phillip Moschella (21 Feb 2025): EMS Clinician Perceptions on Prehospital Buprenorphine Administration Programs, Prehospital Emergency Care, DOI: 10.1080/10903127.2025.2462774

To link to this article: https://doi.org/10.1080/10903127.2025.2462774

PREHOSPITAL EMERGENCY CARE
https://doi.org/10.1080/10903127.2025.2462774

Taylor & Francis
Taylor & Francis Group

EMS Clinician Perceptions on Prehospital Buprenorphine Administration Programs

Wesley R. Wampler[a,b,c], Mirinda Ann Gormley[d,e,f], Sarah F. Griffin[g], Jose Correa Ibarra[d], Parker Bailes IV[a], Daniel L. Schwerin[d,e,f,h], Keri Queen[a], Katy Jones[a], Sarah B. Floyd[g], Gerald (Wook) Beltran[a,d,e,f], Alain H. Litwin[b,e,f] and Phillip Moschella[d,e,f]

[a]Prisma Health Ambulance Services, Greenville, South Carolina; [b]Prisma Health Department of Internal Medicine, Greenville, South Carolina; [c]University of South Carolina Arnold School of Public Health, Columbia, South Carolina; [d]Prisma Health Department of Emergency Medicine, Greenville, South Carolina; [e]University of South Carolina School of Medicine – Greenville, Greenville, South Carolina; [f]Clemson University School of Health Research, Clemson, South Carolina; [g]Department of Public Health Sciences, College of Behavioral, Social and Health Sciences, Clemson University, Clemson, South Carolina; [h]Pickens County Emergency Medical Services, Pickens, South Carolina

ABSTRACT

Objectives: Personal attitudes amongst emergency medical services (EMS) clinicians could influence successful implementation of prehospital buprenorphine administration programs (PBAPs), yet few studies have investigated EMS clinician perceptions concerning these innovative programs. This mixed-methods study assessed EMS clinician perceptions and concerns about PBAPs.

Methods: Emergency Medical Technicians (EMTs), advanced EMTs and paramedics were recruited for focus groups from Upstate South Carolina. Researchers moderated groups of 12 or fewer and field personnel were interviewed separately from EMS training officers and leadership. Participants took a survey assessing demographic, employment, and contextual information on EMS-led interventions addressing the opioid epidemic. Moderators asked participants to provide confidential responses to four open-ended questions. Thematic analysis was applied to all responses using the framework method. A codebook was modeled using deductive themes from previous literature, while inductive themes and subthemes were added through researcher consensus. Final coding of themes and subthemes was constructed independently by two researchers with disagreements resolved by a third. Descriptive statistics summarized demographic, employment, and contextual information collected from the survey.

Results: The 107 participants were predominantly male (69.2%) and White (96.3%) with an average age of 38.4 years (SD = 11.4). Half were paramedics and 35.5% were EMTs with EMS experience ranging from 3 months to 39 years, median of 10 years. Most (70.2%) heard of buprenorphine and 28.9% received education on medication for opioid use disorder (MOUD). Describing initial reactions to an overdose, themes included overdoses as a routine part of EMS and naloxone distribution changing overdose dynamics. Themes included opioid withdrawal is not a medical emergency, buprenorphine negatively affecting EMS operations, and PBAPs requiring culture shift. Themes surrounding concerns included EMS clinician perceptions of individuals with opioid use disorder (OUD), PBAPs increasing substance misuse, and buprenorphine increasing EMS clinician liability. At the end of the session 45.8% stated they would want their EMS agency to participate in a PBAP, 44.9% would not want their agency to participate, and 8 (7.5%) did not answer.

Conclusions: Emergency medical services clinicians' perceptions toward prehospital buprenorphine administration could influence adoption of PBAP protocols. Findings may inform PBAP educational initiatives which mitigate these concerns and knowledge gaps.

ARTICLE HISTORY
Received 5 September 2024
Revised 14 January 2025
Accepted 21 January 2025

Introduction

As the first medical professionals on scene at an opioid overdose, emergency medical services (EMS) clinicians are at the forefront of the opioid crisis. Recent data shows overdoses are one of the most prevalent EMS activations in the United States (U.S.), accounting for more EMS activations than prevalent chronic conditions such as diabetes (1). Buprenorphine, a medication for opioid use disorder (MOUD), has demonstrated effectiveness at treating opioid use disorder (OUD) by decreasing symptoms of opioid withdrawal and cravings, enabling long term recovery (2,3). Providing buprenorphine in the emergency department (ED) following a nonfatal opioid overdose has been associated with increasing engagement in outpatient MOUD (4). Further, results from pilot prehospital buprenorphine administration programs (PBAPs) have reported promising preliminary results, showing associations between prehospital

CONTACT Wesley R. Wampler Wesley.wampler@prismahealth.org
Supplemental data for this article can be accessed online at https://doi.org/10.1080/10903127.2025.2462774.

buprenorphine administration and decreased withdrawal symptoms (5), and engagement in treatment at 30 days (6–8).

Despite the growing body of evidence supporting buprenorphine use in the prehospital setting (9–11), implementation of PBAPs may be challenging. Existing PBAPs have identified several organizational and logistical challenges to protocol implementation, such as state regulatory requirements (12), limited operational capacity to support services (13), inconsistent training of staff and turnover (14), and lack of training and legal concerns from emergency medicine (EM) physicians (15). Additionally, one critically important but under-investigated component of protocol implementation is the willingness of EMS clinicians to deliver buprenorphine in the field. Emergency personnel may carry stigmatizing opinions of individuals with OUD, largely viewing addiction as a moral failing or a poor choice, rather than a disease, and theorizing that individuals use addiction as an excuse for lack of personal responsibility (16). In one qualitative study of EMS clinicians, repeated encounters with overdose victims were viewed as a "waste of resources" as overdoses were perceived as "irresponsible and self-induced," and not felt to be a "legitimate" illness (17). Emergency medicine physicians also share this hesitancy to administer buprenorphine in the ED setting due to factors such as inadequate education, provider stigma, and insufficient access to outpatient follow-up care (18). Previous studies have hypothesized that EM physician attitudes toward buprenorphine influence the implementation of MOUD programs in the ED (19), underscoring the importance of assessing EMS clinician attitudes and potential concerns about PBAPs.

Few studies have investigated the perspectives of EMS clinicians on EMS-led interventions addressing the opioid crisis (16,17,20–22), with only two investigating perspectives of EMS clinicians on prehospital buprenorphine administration interventions (23,24). One study reported that 60% of EMS clinicians disagreed that initiating a medication that must be taken regularly to treat OUD should be part of the job of EMS personnel (24). Similarly, feedback from 32 first responders revealed concerns about adapting prehospital buprenorphine administration to the rapid service delivery model of EMS, and suggested buprenorphine could further burden an already overburdened system (23).

As risk of mortality is highest in the 30 days following a nonfatal opioid overdose (25), streamlining the pathway from overdose to treatment is of paramount importance. Additional context is necessary to fully understand EMS clinician perceptions and attitudes toward new EMS-initiated interventions utilizing buprenorphine to treat overdose survivors. Concerns regarding prehospital buprenorphine administration must be identified and addressed for successful PBAP implementation. The current study aimed to assess perceptions of prehospital buprenorphine administration programs by EMS clinicians in Upstate South Carolina (SC). The overarching objective of this investigation is to gain insight that could inform strategies to enhance training for PBAPs, ultimately improving patient outcomes and contributing to the broader fight against the opioid crisis.

Methods

Study Design

This mixed methods study utilized a cross-sectional survey and feedback from focus groups to assess EMS clinician perceptions on PBAPs. This study was reviewed and received expedited approval from the Prisma Health Institutional Review Board (IRB# 2066799-2). Methods and findings were reported based upon the Standards for Reporting Qualitative Research (SRQR) (Supplemental File Appendix 1) (26).

Study Settings and Population

Buprenorphine is currently not included in the SC state formulary for EMS. In November of 2022 Prisma Health Ambulance Services was approved by the State EMS Board to perform a pilot program allowing paramedics to provide buprenorphine to eligible patients following a 9-1-1 response for an opioid-related overdose or a response for acute opioid withdrawal. This program was initiated on August 1st 2023 and Prisma Health Ambulance Services shared the protocol with two other agencies within the state of SC, Greenville County EMS, and Charleston County EMS. Only the Prisma Health and Charleston County pilots were underway at the time of the current study.

A convenience sample of SC-certified EMS clinicians were recruited from a regional EMS conference and an EMS agency, both located in Upstate SC. The conference was selected as a site of recruitment due to the variety of participants, different EMS agencies, and different EMS certifications, in the hopes of gathering perspectives from EMS clinicians with diverse experiences. The Swamp Rabbit Emergency Medical Services Conference is held annually in Greenville, SC. This conference attracts individuals from EMS systems throughout SC with an overall enrollment in 2024 of 195, made up of paramedics, EMTs, critical care medics, and nursing or other certifications. Pickens County EMS was purposefully chosen as the second site to gain perspectives from EMS clinicians not currently participating in a prehospital buprenorphine program. Pickens County EMS provides 9-1-1 responses to Pickens County, SC, which encompasses 133,432 residents. The agency has approximately 115 employees, including 63 paramedics and 52 EMTs, with a fleet of 11 ambulances and two quick response vehicles. In 2023 Pickens County EMS responded to 18,007 9-1-1 calls for service, of which, 215 were for patients with nonfatal overdose. Pickens County EMS employees were recruited during their bi-annual in-service training. All participants were incentivized to participate by receiving a challenge coin and had the opportunity to be entered in a drawing for a $50 gift certificate.

Study Protocol and Measures

Six individuals were trained by the primary investigator (PI) (W.R.W.) to moderate each focus group. Moderators included four community paramedics, one research coordinator not affiliated with EMS, and one paramedic primarily working

as an epidemiologist. Two moderators had worked at the same EMS agency as four of the participants, the rest of the moderators were unknown by participants. Prior to the focus groups all moderators went over the focus group questions with the PI. Moderators were granted permission to provide answers to potential participant questions about the formulary or administration of buprenorphine but were asked to withhold sharing their own perceptions on the four focus group questions with group participants. Each moderator was assigned a group of 12 or less participants. The PI or research coordinator circulated to different focus groups during each session to ensure use of the transcription software and answer questions as necessary.

Focus groups were held at the Swamp Rabbit EMS Conference on 5/8/2024 and 5/9/2024 and at Pickens County EMS from 7/15/2024-7/18/2024. Over the course of the study there were 16 focus groups ranging from three to 12 participants in each group. Focus group participants were assigned to different conference rooms based upon occupational status at their primary job. Paramedics and EMTs currently working as EMS clinicians in the field were placed together and EMS operational management were placed into a separate conference room. Moderators used a standardized script to inform participants about the purpose and activities of the study (Supplemental File Appendix 2), reminding individuals that their participation was completely voluntary and that they could pass on any questions that made them uncomfortable or end their participation at any time. To ensure anonymity, each participant was assigned a number and encouraged to identify themselves using that number when providing verbal responses to questions. Moderators also asked that everyone keep the identities and responses of participants confidential.

After providing consent each participant was handed a survey which collected demographics, EMS operational characteristics and addiction-specific training. No names or identifiers were collected, and agency names were de-identified (Supplemental File Appendix 3).

Upon finishing the questionnaire, each moderator initiated the qualitative portion of the focus group. Participant responses were audio-recorded and transcribed using Microsoft Teams. The moderator asked each question and went around the table to allow each individual to answer. The moderator allowed discussion between individuals if there were questions or comments following an answer and continued to solicit input once discussion had ceased. Four questions were asked of each group:

1. EMS has seen a surge of opioid-related overdoses nearly every year for the past ten + years. What are your initial thoughts when you are dispatched to an overdose or when you arrive to the scene of an overdose?
2. Buprenorphine is a medication used to treat opioid use disorder. It can be used to ease opioid withdrawal symptoms without providing a euphoric high. There are currently several EMS programs throughout the United States that enable EMS providers to administer buprenorphine to eligible patients following a nonfatal opioid overdose. Do you believe that EMS personnel can or should administer buprenorphine to patients after a nonfatal overdose?
3. What are your concerns about EMS providing buprenorphine to eligible patients following a nonfatal opioid overdose?
4. Following this conversation, would you want your EMS agency to participate in a protocol that allowed buprenorphine to be administered to eligible patients following a nonfatal opioid overdose?

Upon completion the research coordinator (J.C.I.) input data from all questionnaires into RedCAP (Research Electronic Data Capture) hosted by Prisma Health. The research coordinator also downloaded and listened to all recorded interviews to ensure accuracy of the transcription, correcting any miscommunications between the transcript text and the recording. Instances where the research coordinator could not understand the recording were resolved by consulting a second researcher (M.A.G.).

Data Analysis

Survey responses were analyzed using SAS Enterprise (Cary, NC). Frequency statistics were used to describe the survey population and questionnaire responses. Qualitative analysis was performed using NVivo software. The framework method, commonly utilized for analysis of semi-structured interviews, was utilized for the thematic analysis of focus group transcripts to generate overall themes (27).

The PI and a co-investigator (W.R.W, M.A.G.) assigned codes under advisement of an experienced qualitative researcher (S.G.). The PI has 24 years of EMS experience as a volunteer and career paramedic, critical care paramedic, operations supervisor, and communications supervisor in an urban EMS system, and three years' experience as a community paramedic in a rural EMS system working primarily with individuals with OUD. The co-investigator has 14 years of EMS experience, primarily as a volunteer EMT or paramedic in urban EMS systems, with research expertise on EMS interventions addressing the opioid crisis. The final author is an associate professor and qualitative research expert with 15 years of expertise in qualitative research, no EMS certifications and no previous experience with EMS research.

The codebook was designed to categorize codes into two groups representing two principal questions, beliefs about EMS buprenorphine administrations, and concerns about PBAPs. Codes expected based upon the review of previous qualitative studies of EMS clinicians included (21,22): liability (22), not enough time (21), and potential for misuse (21,22).

Two investigators independently coded all transcripts, applying labels to identify codes in addition to those expected from previous literature. After the first cycle, the investigators reconvened and decided upon the final codes that they would apply to the transcripts. These codes were assessed and agreed upon by the third investigator. The

investigators coded two transcripts together to ensure consistency with the final codes. After a second cycle of independent coding investigators met and assessed agreement, resolving all discrepancies through consensus. The third investigator assessed the codebook and agreed with the coding assignments.

Results

Thirty-six (33.6%) participants were recruited from the conference and 71 (66.4%) were recruited from a local EMS agency. The majority of the 107 participants were male (69.2%) and White (96.3%) with an average age of 38.4 years (SD = 11.4) (Table 1). Most were paramedics (49.5%), or EMTs (35.5%) with an average of 12.5 years (SD = 10.3) of EMS experience, ranging from 3 months to 39 years. The majority were career EMS personnel (96.3%). Those recruited from the conference primarily worked for a government-based EMS agency (52.8%), with 19.4% fire-based, 16.7% private, and 11.1% from a hospital-based EMS agency. The majority of those recruited from Pickens County EMS worked for a government-based EMS agency (93.0%), and 7.0% from a fire-based agency. Within the overall population 7.5% worked for multiple agencies and 75% reported currently working on a 9-1-1 ambulance. Just over a quarter reported attending education on MOUD (28.9%) and 70.2% reported awareness of buprenorphine. Less than half (44.7%) reported working at an agency currently implementing an opioid-related activity.

Table 1. Characteristics of focus group participants ($N = 107$).

Variable	N(%)
Age[a]	38.4 (11.3)
Gender	
Male	74 (69.2)
Female	31 (29.0)
Other	2 (1.9)
Race	
White	103 (96.3)
Black/Hispanic/Other	4 (3.7)
Highest Level of Certification	
EMT	38 (35.5)
AEMT	5 (4.7)
Paramedic	53 (49.5)
Critical Care/Flight Medic	5 (4.7)
Community Paramedic	2 (1.9)
Nurse/Respiratory Therapist	3 (2.8)
Other	1 (0.9)
Years working in EMS[a]	12.5 (9.9)
Type of EMS Agency	
Government	85 (79.4)
Fire-Based	12 (11.2)
Hospital-Based	4 (3.7)
Private	6 (5.6)
Status	
Career	103 (96.3)
Volunteer	4 (3.7)
Currently work on 9-1-1 Ambulance?	
Yes	81 (75.7)
No	26 (24.3)
Ever attended education on MOUD?	
Yes	30 (28.9)
No	74 (71.2)
Have you ever heard of buprenorphine?	
Yes	73 (70.2)
No	31 (29.8)
Agency implementing opioid-related activity?	
Yes	46 (44.7)
No	57 (55.3)
Activities offered by EMS Agencies	
Naloxone Distribution Programs	17 (15.9)
Follow-up following nonfatal overdose	15 (14.0)
Referral literature distribution	13 (9.4)
COPE	15 (14.0)

AEMT: advanced emergency medical technician; COPE: community outreach paramedic education; EMS: emergency medical services; EMT: emergency medical technician; MOUD: medication for opioid use disorder.
[a]Mean(Standard Deviation).

Focus Group Feedback and Themes

Seven themes were identified within the two main categories. Codes which contributed to each theme are included in the final codebook with 1-4 exemplary quotes from each code (Supplemental File Appendix 4).

Should/Could EMS Clinicians Deliver Buprenorphine

When asked if EMS clinicians could or should administer buprenorphine to patients after a nonfatal opioid overdose investigators identified four themes: 1) Opioid withdrawals are not a medical emergency, 2) Providing buprenorphine will negatively affect EMS operations, 3) Buprenorphine could improve quality of patient care, 4) Prehospital buprenorphine programs would require a culture shift.

Opioid Withdrawal is Not a Medical Emergency

Many felt that EMS clinicians should have knowledge about buprenorphine and were willing to educate the patient or refer them to resources. However, many believed it was inappropriate for EMS clinicians to administer buprenorphine, emphasizing that opioid withdrawal was not a medical emergency. Several felt that the EMS mission was to treat the emergency; provide naloxone, reverse the overdose, and restore respiratory function, but not spend additional time on the scene with the goal of convincing an individual to go to treatment.

> We stray a little bit from what Emergency Medicine is. You know, we do have tons of gained general knowledge. We're not specialized in diabetes medicine, but we have basic understanding for emergency care. We're not in addiction medicine, but we have a basic understanding you know, to treat emergencies. I wonder if getting buprenorphine would stray a little bit further from what our mission is and how far do we want to take that?

One individual explained that EMS is a "short-term" solution and should not be used to provide "long-term" medications. One expanded on this point to comment that EMS clinicians respond to provide naloxone so that patients do not go into respiratory and cardiac arrest, whereas trying to alleviate withdrawal symptoms is long-term care. Many stated buprenorphine would be more beneficial in the rehab setting where patients could receive more long-term care. Further, several felt that by receiving buprenorphine in the rehabilitation setting those patients would be more likely to adhere to treatment, because they had more commitment to attend.

Providing Buprenorphine Will Negatively Affect EMS Operations

Nearly all participants expressed concern with the increased workload that buprenorphine would cause to the 9-1-1 system. Field EMS clinicians were concerned about the increased paperwork associated with providing buprenorphine, particularly due to buprenorphine's status as a controlled substance.

While perceptions of EMS supervisors were largely very similar to those expressed by the EMS clinicians who served with them, EMS supervisors were most often the individuals who voiced concern about the impact of PBAPs on EMS operations. Several EMS supervisors were very concerned with the potential for additional time spent on scene. One wondered why EMS should delegate ambulance time to individuals who would not take buprenorphine treatment "seriously" when there were patients with emergency medical conditions that required immediate attention.

> As an emergency 9-1-1 system we can't spend time on scene trying to talk to these people into changing their ways. More than likely they are set in their way of yeah, they want to go down this path of using opioids. But we just don't have the time or the effort or the money or anything like that to just sit there and try to convince them that, hey, let's change right here now, we can give you some medication.

In some groups participants pointed out that buprenorphine could be provided during transport to the hospital, which inspired several others to alter their views, stating they would likely be more willing to provide it if it was "like Narcan", in the sense they could give it and then immediately transport to the hospital. Upon hearing this, one EMS supervisor who initially stated EMS did not have time to provide buprenorphine at the scene stated EMS could engage in a protocol that allowed buprenorphine to be provided during transport, stating they were in favor of providing the medication overall, but felt it would be too much time to stay on scene to administer the medication for a patient who did not wish to be transported to the hospital.

> I think yes in the context of treatment that we can provide on the way to the hospital. It is treatment that we can maybe make a difference and even if it's one person throughout the year. But it doesn't, as long as it's the right kind of protocol, it doesn't take away from what we're doing, we can still do the most good for the most amount of patients, you know, given the opportunity. That's our job at the end of the day no matter what. So the most help we can give, not make the decision that this was not worth it, but like the decision of we're going to give all we can and timeframe we have to dedicate to that person. So yeah, transport and then give them something that's maybe going to help, I'm ok with that.

Many mentioned the maintenance and cost for carrying buprenorphine on the ambulance. Several wondered if buprenorphine would be a federally reimbursable cost, or an additional "burden" that would be taken upon the taxpayers. Others expressed frustration at having to maintain yet another drug.

> One other concern I have with is well, we have to maintain it now on a truck. That's another drug. Is that another expense to our county? You know, budgets are tight. Is this really a necessary drug that we need to put on, right? Is this another drug that we need to keep up with because every year or every other year it seems we're adding more and more on our units to maintain.

Buprenorphine Could Improve Quality of Patient Care

Many sentiments expressed by individuals in favor of PBAPs indicated approval for what they believed was a medication they saw as compatible with their mission to provide the best quality of care to the patient.

> I also think that the opioid epidemic and the people struggling with addiction. They're humans too, and I think in the same way that we give Zofran for nausea instead of just holding a vomit bag. That part of our job as prehospital care providers is to give life saving measures, make them comfortable and take them to definitive care that we could use this drug to make them comfortable with transporting.

One participant stated "If it's beneficial, I don't see why we would withhold it. I mean, this is an ongoing epidemic." Others posited that EMS clinicians should not judge use of prehospital buprenorphine by whether or not the patient would seek treatment, but rather as how it would improve the ability of EMS clinicians to treat and transport this patient population.

> So it's not like you're administering this drug as they would in a suboxone clinic. You're not treating their disease that they have. You are making them more comfortable in the back of the unit. I'll be honest, like for me, if you give me a drug that's going to keep me from having to spray my truck out with puke and not have him fight, not have to, you know, run the risk of Versed, Ketamine, an overdose and then having them go into a Benzo overdose, taking the respiratory drive away.

Several approved of EMS moving in a direction to attempt to prevent further overdoses by increasing the opportunity to address addiction. One individual mentioned that the root cause of overdoses is addiction, and EMS using buprenorphine as a "treatment pathway to move someone away from addiction, it's excellent."

Prehospital Buprenorphine Programs Would Require a Culture Shift

Several participants who offered support for PBAPs stated they would agree with EMS providing buprenorphine if they saw research about the use of buprenorphine in the prehospital environment. One stated they would need to "see more information about downstream effects before releasing it out for field crews". Additional participants were supportive but wary, cautioning that buprenorphine should only be provided under very selective protocols which do not increase EMS time on scene or liability to the EMS clinician, with several stating they could not agree with EMS providing buprenorphine until they saw the written protocol.

All underscored the importance of continued education, specifically to more tenured paramedics who have been working long before the national shift in treatment attitudes toward individuals with OUD. Working with and addressing EMS clinicians who are "set in their ways" was a large point of frustration for several participants. Many of whom stated that if EMS clinicians could not change their ways and adapt

to evidence-based interventions, they should seek employment elsewhere.

> If that's your attitude toward patient care then find a different job. That's my opinion. I still have compassion after 36 years. I don't have compassion for burnout, And I don't like to hear these people saying "Oh, I'm burned out at five years" that's my attitude towards drugs. That's somebody's kid. That's somebody's mother. That's somebody's sister, brother, you know? Absolutely I don't like to hear them talk trash. It bothers me, and if that's your attitude, get out. You don't need to be here anymore.

Concerns about Prehospital Buprenorphine Administrations

When asked about concerns regarding EMS buprenorphine administration three themes were identified: 1) EMS clinician perceptions of individuals with OUD, 2) Prehospital buprenorphine will increase substance misuse, and 3) Buprenorphine will increase EMS clinician liability.

EMS Clinician Perceptions of Individuals with OUD

Several EMS clinicians had perceptions about individuals with OUD that made them less inclined to participate in a PBAP. Several EMS clinicians believed that individuals with OUD did not want help, with one reporting "they just want to survive on Narcan." Most stated they would be unwilling to provide buprenorphine to "frequent fliers", as they felt buprenorphine would simply make them call more often. Additionally, many highlighted patients who they deemed more worthy of receiving buprenorphine compared to others.

> I would like to see exactly what kind of patient it would be used on, if you've got Grandma who is a chronic, you know, chronic patient. She's on all kinds of stuff and she accidentally takes a few because of dementia or whatever and you slam her with Narcan, you rip all that away. Not just pain. Versus, someone whose you know, just got a bad batch of heroin….Well I mean, as unfair and as biased as that statement is, I'd be more willing to give it to Grandma, because she's got long term problems, versus (expletive) that's just looking for a fix.

Prehospital Buprenorphine Will Increase Substance Misuse

Many EMS clinicians were concerned that providing buprenorphine in the prehospital setting would enable opioid misuse and abuse. Some worried that providing this medication following an opioid overdose would lead patients to believe that they could continue to misuse opioids then call EMS to prevent withdrawals.

> It's going to be one of those things once you give somebody something and you give it to them, it's expected all the time. Now it's a drug that we're going to be required to give to everybody because my little Johnny is suffering here. Well, little Johnny needs to suffer. I'm not his mother. I'm not a nurse. I'm here to treat the patient. You need to get off these drugs, man. And I believe this is going to encourage more bad behavior.

Many agreed that buprenorphine would be a crutch that deterred patients from taking the initiative to fix their substance misuse, with one stating "I think they need to show some initiative that they're willing to get help before you have to throw it on".

Further, many participants strongly emphasized that withdrawals were necessary for an individual to understand the "full consequence of what (opioid misuse) is doing" and removing the consequences of going through withdrawal would "do nothing to discourage them from using that in the future".

> I don't agree with Suboxone as a whole for treatment, nor methadone. I think those are stepping stones to continue them on their journey to failure. The true treatment that has been proven to work is to just go through the craziness of withdrawals and cut it off.

Further, many expressed the belief that providing buprenorphine was simply replacing one drug for another. One described it as "taking one addiction and moving it to a different substance". Others wondered how a patient would "come off of" buprenorphine.

> If you give somebody buprenorphine, do they ever come off of it? Is it like a kind of a means to an end or what? Or are we just giving them something else that's just going kind of like, I guess fill that moment?

Buprenorphine Will Increase EMS Clinician Liability

A significant concern was EMS clinician liability, specifically with a patient declining transport to the hospital following administration of buprenorphine. Many agreed that administering buprenorphine would increase a patient's likelihood to decline transport, as removing the patient's withdrawal symptoms would remove any reason for them to want to go to the hospital. Several echoed the sentiments above, that allowing a patient to decline transport would just increase their use of the 9-1-1 system to receive buprenorphine.

> If I administer this and the patient says I don't want to go, you cannot. If they are alert, oriented enough to make this decision, I cannot force them to go, what are the retributions that are going to come back to me for doing that…. .why should I continue to give bup and keep coming back out for the same issue when you know you can do this? I can give you this, you can waiver and do it all over again.

Similarly, many were concerned about providing a controlled substance to a patient who would then decline transport to the hospital. Several worried about potential side effects or harm buprenorphine administration could have on the patient after EMS had left the scene.

> I feel like it also brings some liability too, because you know, if they go out and they hurt somebody else after they've overdosed again and again and again and we fixed the problem, they're not only going to be a nuisance in calling us over and over for the same thing, but if they hurt an innocent person out there, that family could try to find us liable as well.

Nearly all EMS clinicians who expressed hesitation with providing prehospital buprenorphine stated they would need additional information on potential side effects and protocols for non-transport before they would be comfortable providing prehospital buprenorphine.

At the end of each focus group participants were asked if they would want their EMS agency to participate in a PBAP. Nearly half (45.8%) stated they would want their EMS

agency to participate in a PBAP, 44.9% said they would not want their agency to participate in such a program, and eight (7.5%) did not answer.

Discussion

Findings show that EMS clinicians have considerable reservations about PBAPs. Nearly half of the EMS clinicians in these focus groups stated they would not want their EMS agency to participate in a PBAP. The reluctance to implement PBAPs among EMS clinicians is multifaceted and these themes demonstrate important areas for organizations to consider when implementing a PBAP.

One factor which may mitigate negative perceptions of PBAPs is MOUD education. Similar to the initial resistance observed with Narcan distribution (22,28), EMS clinicians expressed considerable reservations about PBAPs. Education on MOUD may address many of the concerns highlighted by EMS clinicians to increase acceptance of PBAPs. For example, concerns about medication-related risk compensation, where patients might engage in riskier behaviors due to the availability of buprenorphine, may play a role in reluctance toward PBAPs. This concern may be dispelled by reporting the results of studies which have shown that buprenorphine can effectively reduce opioid cravings and withdrawal symptoms, leading to better patient outcomes (29). Additionally, the belief that overdose survivors are not ready for treatment or would not follow up with outpatient care may further stem from a lack of understanding initial PBAP results, which demonstrate buprenorphine may be able to stabilize overdose survivors enough to make them amenable to connect to treatment. One PBAP reported a remarkably high 30-day retention rate, consistent with real-world MOUD programs in the ED setting (7). A second MOUD field-initiated pilot program found that 83% of the patients visited the clinic for the first appointment with 68% remaining engaged at 30 days (8). Without adequate training, EMS clinicians may feel unprepared and uncertain about the proper administration and potential side effects of the medication, leading to hesitation and resistance. Addressing misconceptions on treatment success through targeted education that highlights the buprenorphine pharmacology and results of these pilot PBAPs could help shift attitudes and increase acceptance.

Findings of the current study showed that EMS clinician perceptions toward overdose survivors were largely negative, reporting that these patients do not want help or would misuse buprenorphine. These perceptions toward overdose survivors may be driven by burnout and compassion fatigue resulting from an opioid epidemic which oftentimes requires them to treat the same patient repeatedly (16,17,21), and subsequently impacts morale (17,30). Yet, concerns that PBAPs could increase misuse or abuse of 9-1-1 services in order to obtain buprenorphine may be valid. At the time of this writing, only two PBAPs reported the number of patients receiving prehospital buprenorphine who were not transported, with conflicting results. One reported only one of 35 individuals receiving buprenorphine declined transport to the hospital (7), while the other reported those receiving buprenorphine were 47% less likely to accept transport to the ED compared to those who did not receive buprenorphine (6). No studies have yet reported the number of repeated responses to a patient following administration of buprenorphine. Future researchers of PBAPs should take notice and ensure to report operational outcomes that can help determine the impact of PBAPs on the EMS system.

Understandably, EMS clinicians worry about the legal implications of administering buprenorphine, especially if a patient subsequently declines transport to an ED. This theme was expected as previous studies have highlighted EMS liability in overdose-related interventions as a chief concern (22). Although there is little published regarding the morbidity or mortality for patients that who are not transported by EMS following buprenorphine administration, there are several studies that discuss outcomes of patients who receive naloxone from EMS, then subsequently decline transport (31–33). Studies have shown that the mortality rates for patients not transported after receiving naloxone are very low, ranging from 0-0.48% within 24-48 h. As very few negative outcomes were reported, no studies reported issues with liability for EMS clinicians who left individuals on the scene following overdose reversal with naloxone. Adverse events occurring during PBAPs are largely unknown. Of the three peer-reviewed studies on PBAPs, two reported no adverse outcomes occurred following prehospital buprenorphine administration (6,7), and the third did not mention adverse events (8). The frequency and types of adverse outcomes are critical pieces of information to accurately assess the safety of non-transport following prehospital buprenorphine administration. Collection of this information could be used to inform clear guidelines and protocols which could mitigate liability concerns and encourage acceptance and participation in PBAPs.

One large strength of the current study was the use of focus groups to gain perspectives from EMS clinicians on PBAPs. While previous studies have collected EMS clinician perspectives on PBAPs through cross-sectional surveys (24), or structured interviews (23), focus groups enabled our EMS clinicians to interact with one another and participate in a discussion of ideas. Moderators witnessed several individuals change or withhold their opinions based on strongly voiced feedback from one or two members of the group. This information may be more valuable than survey or interview feedback as it reflects how an EMS clinician would support a PBAP in the presence of their colleagues. While participation and results reported for this study were confidential, future focus groups may be used to identify and gain support from influential group members to help inform and implement educational efforts.

This analysis has several limitations. This was a small sample size of EMS clinicians from Southern EMS systems in Upstate SC and are not representative of all EMS clinicians in the U.S. It is possible that there were some perceptions about PBAPs, both positive and negative, that were not captured due to social desirability bias. Individuals in the conference-recruited sample volunteered to participate during their conference lunch break and tended to provide strongly positive or strongly negative perceptions on PBAPs compared

to individuals at the EMS agency who were provided a 45-minute period to participate as a part of their quarterly educational training. Additionally, the majority of the sample size came from an EMS agency with no PBAP in place and few individuals reporting previous MOUD education. Thus, perceptions shared by EMS clinicians recruited from Pickens County were different from the conference-recruited sample. Additionally, as very few of the overall population had education on MOUD or PBAPs, the perceptions of all EMS clinicians included in the sample are likely different from those who work at an EMS agency with a PBAP or those who have received education on MOUD. Further, individuals in both the conference-recruited group and at the EMS agency were predominantly White and male, which is very reflective of the composition of many EMS agencies in Upstate SC, but limits transferability of these results. Finally, while these findings describe the perceptions on PBAPs from EMS clinicians, future studies which include state officials, hospital leadership, EMS medical directors, addiction medicine physicians, and patients are necessary to obtain a comprehensive understanding of perceived benefits and concerns surrounding PBAPs.

Conclusions

Half of the EMS clinicians in this study would not wish to participate in a PBAP. Barriers and concerns reported in the current study may serve as a starting point for EMS agencies working to identify potential concerns and barriers which could impact their own PBAP initiation. Assessing EMS clinician perceptions can be crucially important to identify both education gaps and potential barriers which may influence the implementation of new prehospital interventions. Partnering with EMS clinicians during the development of a PBAP program may decrease barriers to implementation and pave the way for more widespread acceptance, knowledge, and utilization of buprenorphine in the prehospital setting.

Acknowledgments

The authors are grateful to the excellent EMS clinicians that make up Pickens County Emergency Medical Services, Prisma Health Ambulance Services, the Prisma Health Mobile Integrated Healthcare program, and all other participants of the Swamp Rabbit EMS Conference. This manuscript would not be possible without their contributions. We are grateful for the support of Dietrich Easter and Meredith Teske who enabled us to interview and provide education to Pickens County EMS. Finally, we are incredibly grateful for the unwavering support of our prehospital buprenorphine administration program by Prisma Health Ambulance Services leadership, specifically Luke Estes, Kent Whitten and Aaron Dix.

Authors' Contributions

MAG and WRW conceived of the research question and study hypotheses. WRW, MAG, PB, KQ, and KJ served as focus group moderators and collected all data. JCI and MAG transcribed all qualitative content for data analysis and MAG and WW performed the thematic analysis of qualitative data under the supervision of SFG. MAG performed the statistical analysis of quantitative data and structured tables for qualitative and quantitative data. SFG provided subject matter expertise on qualitative data analysis and SBF, GWB, AHL, DLS, and PM provided expert feedback based upon subject matter expertise. All authors provided substantial feedback and contributions during the writing and editing process and had final responsibility for the decision to submit for publication.

Decleration of Generative AI in Scientific Writing

The authors did not use a generative artificial intelligence tool or service to assist with preparation or editing of this work. The authors take full responsibility for the content of this publication.

Disclosure Statement

The authors report there are no competing interests to declare.

Funding

This work was supported in part by an internal seed grant from the Health Sciences Center at Prisma Health, Greenville, South Carolina.

References

1. Ehlers J, Fisher B, Peterson S, Dai M, Larkin A, Bradt L, Mann NC. Description of the 2020 NEMSIS public-release research dataset. Prehosp Emerg Care. 2023;27(4):473–81. doi:10.1080/10903127.2022.2079779.
2. Mattick R, Breen C, Kimber J, Davoli M. Buprenorphine maintenance versus placebo or methadone maintenance for opioid dependence. Cochrane Database Syst Rev. 2014;2014(2):CD002207. doi:10.1002/14651858.CD002207.pub2.
3. Miller JC, Brooks MA, Wurzel KE, Cox EJ, Wurzel JF.III, A guide to expanding the use of buprenorphine beyond standard initiations for opioid use disorder. Drugs R D. 2023;23(4):339–62. doi:10.1007/s40268-023-00443-5.
4. D'Onofrio G, O'Connor PG, Pantalon MV, Chawarski MC, Busch SH, Owens PH, Bernstein SL, Fiellin DA. Emergency department–initiated buprenorphine/naloxone treatment for opioid dependence: a randomized clinical trial. JAMA. 2015;313(16):1636–44. doi:10.1001/jama.2015.3474.
5. Carroll G, Wasserman D, Shah A, Salzman MS, Baston KE, Rohrbach RA, Jones IL, Haroz R. Buprenorphine field initiation of rescue treatment by emergency medical services (BUPE FIRST EMS): a case series. Prehosp Emerg Care. 2021;25(2):289–93. doi :10.1080/10903127.2020.1747579.
6. Carroll G, Solomon KT, Heil J, Saloner B, Stuart EA, Patel EY, Greifer N, Salzman M, Murphy E, Baston K, et al. Impact of administering buprenorphine to overdose survivors using emergency medical services. Ann Emerg Med. 2023;81(2):165–75. doi:10.1016/j.annemergmed.2022.07.006.
7. Hern HG, Hern HG, Lara V, Goldstein D, Kalmin M, Kidane S, Shoptaw S, Tzvieli O, Herring AA. Prehospital buprenorphine treatment for opioid use disorder by paramedics: first year results of the EMS buprenorphine use pilot. Prehosp Emerg Care. 2023;27(3):334–42. doi:10.1080/10903127.2022.2061661.
8. Belden C, Kopak A, Coules C, Friesen T, Hall J, Shukla S. Building bridges to outpatient treatment services for post-overdose care via paramedic buprenorphine field initiation. J Subst Use Addict Treat. 2024;162:209364. doi:10.1016/j.josat.2024.209364.
9. Alter A. Compassion Fatigue: the hidden danger of concurrent national public health emergencies. EMS1. 2010 [accessed 2024 July 14]. https://www.police1.com/health-fitness/articles/compassion-fatigue-the-hidden-danger-of-concurrent-national-public-health-emergencies-izZ3v5feKRtai6TD/.
10. Dowdell E, Alderman S, Foushee N, Holland E, Reedy E. Expressions of compassion fatigue by emergency department

nurses caring for patients with opioid and substance use disorder. J Emerg Nurs. 2022;48(6):688–97. doi:10.1016/j.jen.2022.07.006.
11. Evans E, Wilson D, Friedmann P. Recidivism and mortality after in-jail buprenorphine treatment for opioid use disorder. Drug Alcohol Depend. 2022;231:109254. doi:10.1016/j.drugalcdep.2021.109254.
12. Davis CS, Carr DH, Glenn MJ, Samuels EA. Legal authority for emergency medical services to increase access to buprenorphine treatment for opioid use disorder. Ann Emerg Med. 2021;78(1):102–8. doi:10.1016/j.annemergmed.2021.01.017.
13. Shukla S, Hubbard C. Buncombe bridge to care (BB2C): post-overdose buprenorphine field initiation buncombe county, NC. Oral presentation presented at: the prehospital treatment for opioid use disorder conference held by the national institute on drug abuse's national drug abuse treatment clinical trials network. 2022.
14. Waller MW. Paramedic-administered buprenorphine as a bridge to MOUD. Oral presentation at: the prehospital treatment for opioid use disorder conference held by the national institute on drug abuse's national drug abuse treatment clinical trials network. 2022.
15. Bailes P. Misadventures in Buprenorphine: the initiation of an intervention. Oral presentation presented at: mobile integrated health and community paramedicine clinical and leadership summit. March 22; Nashville, TN, 2024.
16. Metcalf SA, Saunders EC, Moore SK, Walsh O, Meier A, Auty S, Bessen SY, Marsch LA. Compassion, stigma, and professionalism among emergency personnel responding to the opioid crisis: an exploratory study in New Hampshire, USA. J Am Coll Emerg Physicians Open. 2022;3(1):e12641. doi:10.1002/emp2.12641.
17. Won NY, Palamar JJ, Mike SA, Fitzgerald ND, Cottler LB. A qualitative analysis of emergency medical services (EMS) personnel experiences and perceptions responding to drug overdoses in the United States (US) during the COVID-19 pandemic. J Health Res. 2023;37(4):270–9. doi:10.56808/2586-940x.1045.
18. Hughes T, Nasser N, Mitra A. Overview of best practices for buprenorphine initiation in the emergency department. Int J Emerg Med. 2024;17(1):23. (doi:10.1186/s12245-024-00593-6.
19. Sokol R, Tammaro E, Kim JY, Stopka TJ. Linking MATTERS: barriers and facilitators to implementing emergency department-initiated buprenorphine-naloxone in patients with opioid use disorder and linkage to long-term care. Subst Use Misuse. 2021;56(7):1045–53. doi:10.1080/10826084.2021.1906280.
20. Saunders E, Metcalf SA, Walsh O, Moore SK, Meier A, McLeman B, Auty S, Bessen S, Marsch LA. "You can see those concentric rings going out": emergency personnel's experiences treating overdose and perspectives on policy-level responses to the opioid crisis in New Hampshire. Drug Alcohol Depend. 2019;204:107555. doi:10.1016/j.drugalcdep.2019.107555.
21. Maragh-Bass AC, Fields JC, McWilliams J, Knowlton AR. Challenges and opportunities to engaging emergency medical service providers in substance use research: a qualitative study. Prehosp Disaster Med. 2017;32(2):148–55. doi:10.1017/S1049023X16001424.
22. Tobin KE, Gaasch WR, Clarke C, MacKenzie E, Latkin CA. Attitudes of emergency medical service providers toward naloxone distribution programs. J Urban Health. 2005;82(2):296–302. doi:10.1093/jurban/jti052.
23. Fockele CE, Frohe T, McBride O, Perlmutter DL, Goh B, Williams G, Wettemann C, Holland N, Finegood B, Oliphant-Wells T, et al. Harm reduction in the field: first responders' perceptions of opioid overdose interventions. Western J Emerg Med. 2024;25(4):490–9. doi:10.5811/WESTJEM.18033.
24. Hudson T, Hudson DR, Beshears J, Han X, Wilson MP. EMS personnel's perspectives on buprenorphine for opioid use disorder. J Emerg Med Serv. 2024. [accessed 2024 July 30]. https://www.jems.com/patient-care/ems-buprenorphine-opioid-use-disorder/#:~:text=Approximately%2066%25%20of%20respondents%20agreed,general%2C%20were%20less%20likely%20to.
25. Weiner SG, Baker O, Bernson D, Schuur JD. One year mortality of patients after emergency department treatment for nonfatal opioid overdose. Ann Emerg Med. 2020;75(1):13–7. doi:10.1016/j.annemergmed.2019.04.020.
26. O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. Acad Med. 2014;89(9):1245–51. doi:10.1097/ACM.0000000000000388.
27. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework methods for the analysis of qualitative data in multi-disciplinary health research. BMC Med Res Methodol. 2013;13(1):117. doi:10.1186/1471-2288-13-117.
28. Agley J, Xiao Y, Eldridge L, Meyerson B, Golzarri-Arroyo L. Beliefs and misperceptions about naloxone and overdose among U.S. laypersons: a cross-sectional study. BMC Public Health. 2022;22(1):924. doi:10.1186/s12889-022-13298-3.
29. León-Barriera R, Zwiebel SJ, Modesto-Lowe V. A practical guide for buprenorphine inititiation in the primary care setting. Cleve Clin J Med. 2023;90(9):557–64. doi:10.3949/ccjm.90a.23022.
30. Bergstein RS, King K, Melendez-Torres GJ, Latimore AD. Refusal to accept emergency medical transport following opioid overdose, and conditions that may promote connections to care. Int J Drug Policy. 2021;97:103296. doi:10.1016/j.drugpo.2021.103296.
31. Zozula A, Neth MR, Hogan AN, Stolz U, McMullan J. Non-transport after prehospital naloxone administration is associated with higher risk of subsequent non-fatal overdose. Prehosp Emerg Care. 2022;26(2):272–9. doi:10.1080/10903127.2021.1884324.
32. Stam NC, Pilgrim JL, Drummer OH, Smith K, Gerostamoulos D. Catch and release: evaluating the safety of non-fatal heroin overdose management in the out-of-hospital environment. Clin Toxicol (Phila). 2018;56(11):1135–42. doi:10.1080/15563650.2018.1478093.
33. Willman MW, Liss DB, Schwarz ES, Mullins ME. Do heroin overdose patients require observation after receiving naloxone? Clin Toxicol (Phila). 2017;55(2):81–7. doi:10.1080/15563650.2016.1253846.

HHS Public Access

Author manuscript

Subst Abus. Author manuscript; available in PMC 2023 January 01.

Published in final edited form as:

Subst Abus. 2022 ; 43(1): 99–103. doi:10.1080/08897077.2020.1748163.

One Year Mortality of Patients Treated with Naloxone for Opioid Overdose by Emergency Medical Services

Scott G. Weiner,
Brigham and Women's Hospital, Boston, MA

Olesya Baker,
Brigham and Women's Hospital, Boston, MA

Dana Bernson,
Massachusetts Department of Public Health, Boston, MA

Jeremiah D. Schuur
The Warren Alpert Medical School of Brown University, Providence RI

Abstract

Study objective: Prehospital use of naloxone for presumed opioid overdose has increased markedly in recent years because of the current opioid overdose epidemic. In this study, we determine the one-year mortality of suspected opioid overdose patients who were treated with naloxone by EMS and initially survived.

Methods: This was a retrospective observational study of patients using three linked statewide datasets in Massachusetts: emergency medical services (EMS), a master demographics file, and death records. We included all suspected opioid overdose patients who were treated with naloxone by EMS. The primary outcome measures were death within 3 days of treatment and between 4 days and 1 year of treatment.

Results: Between July 1, 2013 and December 31, 2015, there were 9,734 individuals who met inclusion criteria and were included for analysis. Of these, 807 (8.3% (95% confidence interval (CI) 7.7%-8.8%)) died in the first 3 days, 668 (6.9% (95% CI 6.4%-7.4%)) died between 4 days and 1 year, and 8,259 (84.8% (95% CI 84.1%-85.6%)) were still alive at one year. Excluding those who died within 3 days, 668 of the remaining 8,927 individuals (7.5% (95% CI 6.9%-8.0%)) died within one year.

Conclusion: The one-year mortality of those who are treated with naloxone for opioid overdose by EMS is high. Communities should focus both on primary prevention and interventions for this patient population, including strengthening regional treatment centers and expanding access to medication for opioid use disorder.

Corresponding Author: Scott G. Weiner, MD, MPH, Department of Emergency Medicine, Brigham and Women's Hospital, 75 Francis Street, NH-224, Boston, MA 02111, sweiner@bwh.harvard.edu.

Preliminary results of this work were presented at the American College of Emergency Physicians Scientific Assembly, October, 2017, Washington DC.

The authors declare no relevant financial conflicts of interest.

Keywords

naloxone; opioid overdose; emergency medical services

Introduction

The opioid overdose epidemic continues to take thousands of lives in the United States each year and has been called a nationwide public health emergency (1). Emergency medical service (EMS) providers are at the front-line of this epidemic. From July 2016 to September 2017, ED visits for suspected overdose increased 35% (2), and it is likely that most of these patients were transported via ambulance. In fact, EMS providers have had to increase their use of naloxone markedly in response to the epidemic. In a national sample from 2012 to 2016, EMS naloxone administration increased 75.1% (3). Additionally, whereas naloxone was once reserved for advanced life support (ALS) paramedics, now basic life support (BLS) medics administer the antidote in some jurisdictions (4-6). With more potent opioids being used, multiple naloxone administrations by EMS providers are increasing (7).

In Massachusetts, 2,099 people lost their lives to opioid-related overdose in 2016, more than doubling the number in 2013 (8). The state has experienced a disproportionate share of opioid-related deaths in recent years (9). As part of its response to this crisis, the state legislature passed Chapter 55 of the Acts of 2015, which allowed linkage of several previously disparate datasets held by the state for the purpose of learning more about the opioid epidemic (10). The database includes a master demographic file, an EMS incident database (the Massachusetts Ambulance Trip Record Information System, or MATRIS), and death records from the Registry of Vital Records and Statistics. In prior work, we used this resource to determine that the one-year mortality of individuals who were treated for opioid overdose in the emergency department and then were discharged was 5.5% (11).

In this study, we aimed to evaluate individuals treated with naloxone by EMS for suspected opioid overdose. Despite the rising number of EMS naloxone administrations, death due to opioids are also increasing, indicating a need to do something more. Although patients who receive naloxone and are subsequently released from EMS care without transport to an ED are at low risk for immediate mortality, the longer term mortality of these patients is not well-defined (12-14). Reporting a one-year mortality rate to a patient who has received naloxone by EMS, in the setting of a potential near-death experience, may also be the motivation a patient needs to seek help for their opioid use disorder, especially if enhanced community services are available.

In this study, we use Massachusetts' multiple linked datasets to determine the mortality of patients who were treated with naloxone for opioid overdose by EMS. We also evaluate the subsets of those who died within 3 days and those who died between 4 days and one year, to assess both near-term and long-term mortality after the intervention. Finally, for those who died, we aimed to describe demographics and circumstances surrounding the deaths.

Materials and Methods

This was a population-based retrospective cohort study using a linked dataset as part of an epidemiologic study of opioid-related morbidity and mortality that was legislatively mandated in Massachusetts (10). In this analysis, we combined a master demographics list with EMS transports (MATRIS) and death records from the Registry of Vital Records and Statistics that included data from the entire state based on death certificate and medical examiner determinations. The databases were maintained by the Massachusetts Department of Public Health (DPH), who performed a conservative matching procedure to ensure alignment between datasets. To protect patient confidentiality, investigators were provided with a dummy data set that was used to create statistical analysis code that was then provided to DPH, who in turn returned the anonymized results. The linkage process used a nine step deterministic process, which used first name, last name, social security number, date of birth, sex, address, and zip code. A complete description of the overall project, including the patient matching procedure, data dictionaries, and characteristics of the datasets is available online (15). This work was mandated by Massachusetts law using a deidentified dataset and was deemed exempt from review by the Massachusetts DPH Institutional Review Board.

We included patients who received at least one naloxone administration by EMS between July 1, 2013 and December 31, 2015 but did not receive naloxone between January 1, 2013 and June 30, 2013. Since we did not have data prior to January 1, 2013, our data was left-censored so we chose a 6-month exclusion period, in which we ensured that no patient in the cohort had received naloxone by EMS for a minimum of 6 months within Massachusetts. Death records were evaluated until December 31, 2016 to capture the one-year mortality of individuals in the cohort. In our initial work, published previously as an abstract, we evaluated patients who received naloxone by EMS and did not die the same day as EMS administration (16). In that study, we found that 6.5% died the same day as naloxone administration, 9.3% died within one year and 84.3% were alive at one year. Excluding those who died the same day as naloxone administration, 9.9% died within one year. After that publication, we discovered that a) many patients may have received naloxone for other purposes, such as altered mental status due to hypoglycemia or another intoxicant such as alcohol, and b) if someone received naloxone near the end of one calendar day and then died even minutes into the next day, that patient would have been included in the one-year mortality cohort.

For this study, we therefore performed a more in-depth analysis on patients who received naloxone and were also considered to have a suspected opioid overdose based on run sheet descriptive criteria (Appendix 1). We stratified patients with a cut-off of surviving at least the first three days, as opposed to just one day, as patients may have received naloxone, been admitted, and then died within the next 3 days in-hospital. This was consistent with our prior work with the ED cohort that showed the largest incidence of deaths was in the first 3 days after treatment. Also, as we were not able to determine the ED disposition of the included patients (e.g. admitted vs. discharged), surviving the first 3 days was used as a surrogate. We performed a separate sensitivity analysis using 7 days as a cut-off, and the results were not substantially different (8.3% died within 3 days and 9.2% died within 7 days), so we decided

upon 3 days as the cut-off point. The primary outcome measure was death from any cause after the first recorded EMS naloxone administration during the study period.

A master demographics file was merged with EMS transport and death record data. Age was defined as the age of the patient in years as reported as of December 31, 2015, regardless of age at time of overdose or death. Mortality rates were computed for those who died within 3 days and those who died between 4 and 365 days. Descriptive statistics are reported for demographic characteristics and death data, and comparisons between the two cohorts of individuals who died were compared. Analysis was performed using SAS Studio 3.5 (SAS Institute, Cary, NC).

Results

Between July 1, 2013 and December 31, 2015, there were 9,734 unique individuals who met inclusion criteria for analysis (Figure 1), indicating an average of 324.5 first-time naloxone administrations for opioid overdose per month over the 30 months of the study. Of the included patients, 807 (8.3% (95% confidence interval (CI) 7.7%-8.8%)) died in the first 3 days, 668 (6.9% (95% CI 6.4%-7.4%)) died between 4 days and 1 year, and 8,259 (84.8% (95% CI 84.1%-85.6%)) were still alive at one year. Excluding those who died within 3 days, 668 of the remaining 8,927 individuals (7.5% (95% CI 6.9%-8.0%)) died within one year. Figure 2 demonstrates the number of deaths per months in the cohort that died between 4 and 365 days. The highest mortality occurred in the first month, and then was stable over the remaining 11 months.

Table 1 demonstrates the differences between the individuals who died within 3 days and those who died between 4 and 365 days after first recorded naloxone administration. Those who died within 3 days were more likely to be younger (median age 46.0 vs 54.0 years) and male (67.8% vs 61.1%). There was no difference in the race/ethnicity of the decedents or the recorded rate of homelessness. Those who died within 3 days were more likely to have an opioid-related cause of death recorded than those who died between 4 and 365 days (46.6% vs. 36.8%). The manner of death (more likely accidental if within 3 days) and location of death (much more likely in the hospital if within 3 days) were also significantly different.

Limitations

The data in this study were provided by a single state and relied on details from large administrative datasets that were not originally collected for the purpose of research. It is possible that there were errors in the dataset linkages or omissions in data capture. Although the criteria for EMS treatment of overdose were developed in a rigorous fashion, we are not able to validate them. Since fewer than 50% had death records indicating opioid-related overdose as the final cause of death, misclassification is possible. Likewise, as we could not detect the disposition of patients after EMS treatment, we used a cut-off of 3 days after overdose to determine if the individual survived that initial overdose. It is possible that patients were admitted to the hospital and died in the hospital after three days as a result of their initial overdose, which would also be a misclassification error. That 96.8% of individuals who died within 3 days had a location of death in a hospital likely indicates that

our determination is accurate. If patients were treated for overdose or were not a resident of Massachusetts and died in other states, it would not have been captured in our data. Finally, because of our data was left-censored, we excluded 819 individuals (7.7%) who had EMS naloxone administration in the 6 months prior to the start of the study. These individuals are high risk with repeat naloxone administration and may have influenced the results had they been included.

Discussion

Our study demonstrates that the one-year mortality of patients who received naloxone by EMS is quite high. About 1 in 12 people (8.3%) died within 3 days, and an additional 1 in 15 (6.9%) died between 4 days and 1 year. These numbers underscore what a serious medical problem opioid use disorder is, and how fatal it can be. As comparison, a study of patients with ST-segment elevation myocardial infarction (STEMI) who received primary percutaneous coronary intervention found a one-year mortality rate of 7.3% (17). Yet, the way we treat overdose victims is quite different than those who suffer other medical problems. For a STEMI, patients who call 911 are brought by ambulance to a designated center of expertise, rushed to the catheterization lab by a multidisciplinary team that is available at any time of the day or night, and then treated aggressively with medications that lower risk and provided with close follow up. Contrast that to the experience of a typical overdose victim who may be observed in the hallway of an ED for a few hours and is then discharged with a list of detoxification centers which often have limited bed availability.

Another tragic statistic is comparison of death rates for patients who received naloxone for opioid overdose compared with the general population. For 2017, the average life expectancy in the United States was 78.6 years, with a death rate of 863.8 deaths per 100,000 population (18). In our cohort, the median age of those who died within 3 days was 46 years, and just 54 years for those who died between 4 and 365 days. Drug overdose deaths are now a significant reason why the U.S. annual life expectancy has dropped for the past three years (18).

Several findings from our study are of interest beyond the one-year mortality rate. First, the median age of patients who died was higher than expected. Our prior work looking at one-year mortality of patients who were treated in the ED for opioid overdose showed a lower median age of 39 years, and the significance is unclear. It is also of interest that many patients treated with naloxone by EMS (3,818 of 14,407, or 26.5%) did not ultimately have an opioid-related issue and were excluded from analysis. These instances could indicate times when EMS administered naloxone treatment for a patient with altered mental status which could have been from a separate reason, like alcohol intoxication.

Compared with the general population, a disproportionately high number of people who died were homeless, highlighting homelessness as a significant risk factor associated with death within a year. For those who died within 3 days, the vast majority (97%) died in the hospital. However, for those who survived at least 3 days beyond an initial overdose, about one-quarter had a location of death reported as a private residence, likely representing individuals who used drugs alone. For harm reduction purposes, education is needed to

reinforce that people who misuse opioids should never use alone, and family and peers of people who misuse opioids should have ready access to a naloxone rescue kit at their place of residence. It is also important to acknowledge that, when combining all deaths within 1 year, 2.3% (n=34) were deemed due to suicide, highlighting that overdose survivors should be screened for suicide risk.

Fortunately, there are new models being created that are cause for optimism. A study from Yale determined that immediately starting buprenorphine for patients who seek help in the emergency department for opioid use disorder results in a markedly increased 30-day treatment retention rate (19). This practice is also cost effective (20). Another model is to have a follow-up visit by EMS and/or police in the days after a naloxone reversal, which has the benefit of directing people to harm reduction services, providing naloxone rescue kits, and enhancing community engagement (21). Expansion of programs like these that shepherd patients directly into treatment from the emergency department and increase community resource may ameliorate the opioid overdose crisis.

In conclusion, the one-year mortality of those who are treated with naloxone for opioid overdose by EMS is high. Survivors of opioid overdose should know this important mortality statistic. Communities should focus both on primary prevention and interventions for this patient population, including strengthening regional treatment centers, community-based outreach for opioid overdose survivors, and expanding immediate access to medication for opioid use disorder.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Dr. Weiner is supported by the National Institute on Drug Abuse of the National Institutes of Health under award number R01DA044167. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The funding organization had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

References

1. U.S. Department of Health and Human Services. HHS Acting Secretary Declares Public Health Emergency to Address National Opioid Crisis. October 26, 2017. Available at: https://www.hhs.gov/about/news/2017/10/26/hhs-acting-secretary-declares-public-health-emergency-address-national-opioid-crisis.html. Accessed January 31, 2020.
2. Vivolo-Kantor AM, Seth P, Gladden RM, Mattson CL, Baldwin GT, Kite-Powell A, Coletta MA. Vital Signs: Trends in Emergency Department Visits for Suspected Opioid Overdoses - United States, July 2016-September 2017. MMWR Morb Mortal Wkly Rep. 2018 Mar 9;67(9):279–285. [PubMed: 29518069]
3. Cash RE, Kinsman J, Crowe RP, Rivard MK, Faul M, Panchal AR. Naloxone Administration Frequency During Emergency Medical Service Events - United States, 2012-2016. MMWR Morb Mortal Wkly Rep. 2018 Aug 10;67(31):850–853. [PubMed: 30091966]
4. Davis CS, Southwell JK, Niehaus VR, Walley AY, Dailey MW. Emergency medical services naloxone access: a national systematic legal review. Acad Emerg Med. 2014 Oct;21(10):1173–7. [PubMed: 25308142]

5. Weiner SG, Mitchell PM, Temin ES, Langlois BK, Dyer KS. Use of Intranasal Naloxone by Basic Life Support Providers. Prehosp Emerg Care. 2017 May-Jun;21(3):322–326. [PubMed: 28166446]
6. Gulec N, Lahey J, Suozzi JC, Sholl M, MacLean CD, Wolfson DL. Basic and Advanced EMS Providers Are Equally Effective in Naloxone Administration for Opioid Overdose in Northern New England. Prehosp Emerg Care. 2018 Mar-Apr;22(2):163–169. [PubMed: 29023172]
7. Faul M, Lurie P, Kinsman JM, Dailey MW, Crabaugh C, Sasser SM. Multiple Naloxone Administrations Among Emergency Medical Service Providers is Increasing. Prehosp Emerg Care. 2017 Jul-Aug;21(4):411–419. [PubMed: 28481656]
8. Massachusetts Department of Public Health. Data Brief: Opioid-Related Overdose Deaths Among Massachusetts Residents. February, 2019. Available at: https://www.mass.gov/files/documents/2019/02/12/Opioid-related-Overdose-Deaths-among-MA-Residents-February-2019.pdf. Accessed January 31, 2020.
9. Scholl L, Seth P, Kariisa M, Wilson N, Baldwin G. Drug and Opioid-Involved Overdose Deaths - United States, 2013-2017. MMWR Morb Mortal Wkly Rep. 2018 Jan 4;67(5152):1419–1427. [PubMed: 30605448]
10. The 190th General Court of the Commonwealth of Massachusetts. Chapter 55: An act requiring certain reports for opiate overdoses. Available at: https://malegislature.gov/Laws/SessionLaws/Acts/2015/Chapter55. Accessed January 31, 2020.
11. Weiner SG, Baker O, Bernson D, Schuur JD. One-Year Mortality of Patients After Emergency Department Treatment for Nonfatal Opioid Overdose. Ann Emerg Med. 2020 Jan;75(1):13–17. [PubMed: 31229387]
12. Greene JA, Deveau BJ, Dol JS, Butler MB. Incidence of mortality due to rebound toxicity after 'treat and release' practices in prehospital opioid overdose care: a systematic review. Emerg Med J. 2019 Apr;36(4):219–224. [PubMed: 30580317]
13. Willman MW, Liss DB, Schwarz ES, Mullins ME. Do heroin overdose patients require observation after receiving naloxone? Clin Toxicol (Phila). 2017 Feb;55(2):81–87. [PubMed: 27849133]
14. Wampler DA, Molina DK, McManus J, Laws P, Manifold CA. No deaths associated with patient refusal of transport after naloxone-reversed opioid overdose. Prehosp Emerg Care. 2011 Jul-Sep;15(3):320–4. [PubMed: 21612385]
15. The Commonwealth of Massachusetts. An assessment of fatal and nonfatal opioid overdoses in Massachusetts (2011-2015). Massachusetts Department of Public Health. 2017. Available at: https://www.mass.gov/doc/legislative-report-chapter-55-opioid-overdose-study-august-2017/download. Accessed January 31, 2020.
16. Weiner SG, Baker O, Bernson D, Schuur JD. One-year mortality of opioid overdose victims who received naloxone by emergency medical services [abstract]. Ann Emerg Med. 2017; 70(4s):S158.
17. Doost Hosseiny A, Moloi S, Chandrasekhar J, Farshid A. Mortality pattern and cause of death in a long-term follow-up of patients with STEMI treated with primary PCI. Open Heart. 2016 Apr 15;3(1):e000405. [PubMed: 27099764]
18. Murphy SL, Xu JQ, Kochanek KD, Arias E. Mortality in the United States, 2017. NCHS Data Brief, no 328. Hyattsville, MD: National Center for Health Statistics. 2018.
19. D'Onofrio G, O'Connor PG, Pantalon MV, Chawarski MC, Busch SH, Owens PH, Bernstein SL, Fiellin DA. Emergency department-initiated buprenorphine/naloxone treatment for opioid dependence: a randomized clinical trial. JAMA. 2015 Apr 28;313(16):1636–44. [PubMed: 25919527]
20. Busch SH, Fiellin DA, Chawarski MC, Owens PH, Pantalon MV, Hawk K, Bernstein SL, O'Connor PG, D'Onofrio G. Cost-effectiveness of emergency department-initiated treatment for opioid dependence. Addiction. 2017 Nov;112(11):2002–2010. [PubMed: 28815789]
21. North Carolina Harm Reduction Coalition. Post Overdose Follow Up. Available at: http://www.nchrc.org/programs-and-services/post-overdose-follow-up. Accessed January 31, 2020.

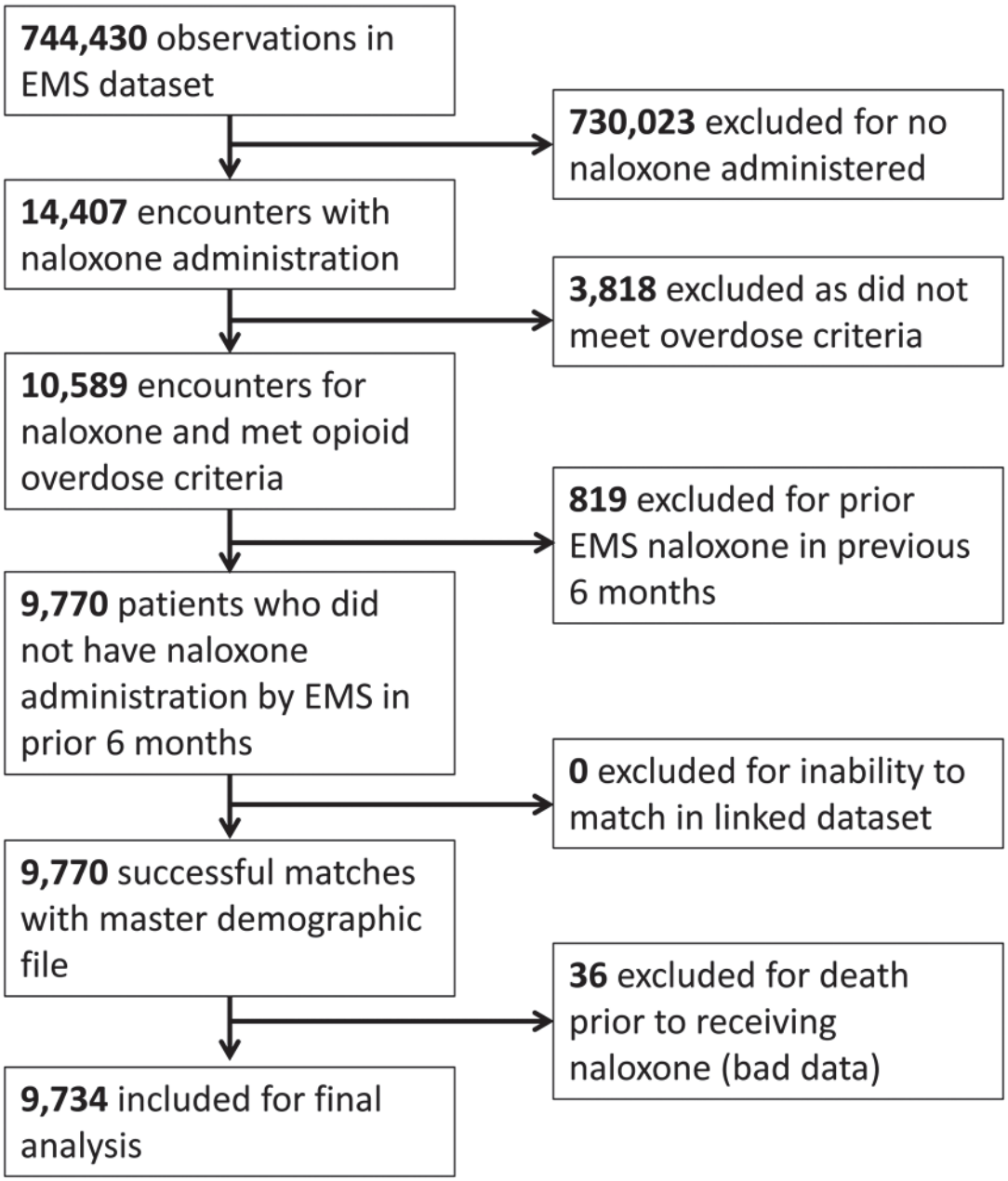


Figure 1:
Flow diagram of included and excluded subjects.

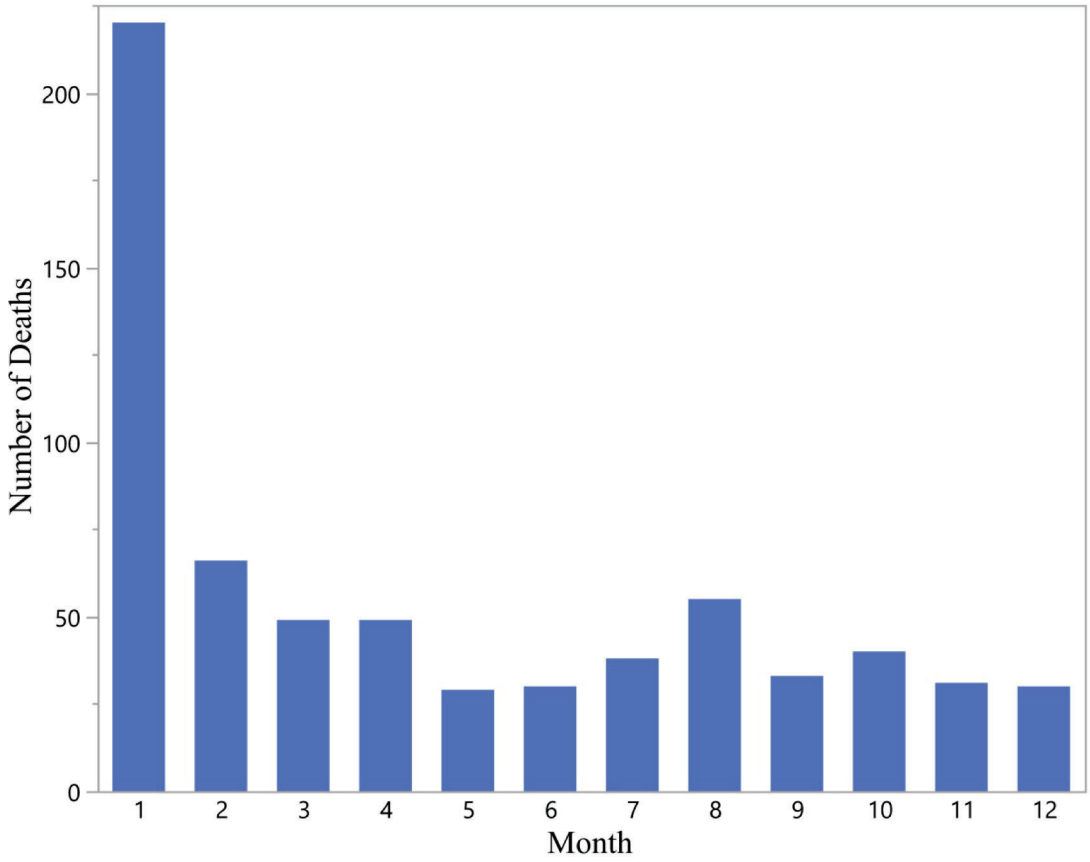
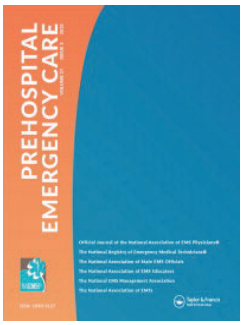


Figure 2:
Number of deaths per month for patients who died between 4 and 365 days of prehospital naloxone administration (n=668).

Table 1:

Comparison of demographic and death data records for individuals who died within 3 days and those who died between 4 and 365 days. P values <0.05 (in bold) are considered statistically significant.

Cohort (n)	Died within 3 days (n=807)	Died between 4 and 365 days (n=668)	p value
Age, years (median <interquartile range>)	46.0 <33.0-58.0> years	54.0 <36.0-71.0> years	**p<0.01**
Gender (from death records)	67.8% (n=547) male	61.1% (n=408) male	**p<0.01**
Race/ethnicity (from death records)	86.1% (n=695) white 4.6% (n=37) black 6.3% (n=51) Hispanic 3.0% (n=24) other	88.9% (n=594) white 3.1% (n=21) black 5.8% (n=39) Hispanic 2.1% (n=14) other	p=0.32
Homeless	6.6% (n=53) homeless	8.5% (n=57) homeless	p=0.15
Opioid-related overdose (from death record)	46.6% (n=376) opioid-related	36.8% (n=246) opioid-related	**p<0.01**
Manner of death	41.9% (n=338) natural causes 50.7% (n=409) accidental 2.7% (n=22) suicide 4.7% (n=38) other/pending investigation	53.4% (n=357) natural causes 39.5% (n=264) accidental 1.8% (n=12) suicide 5.2% (n=35) other/pending investigation	**p<0.01**
Location of death	96.8% (n=781) hospital 1.4% (n=11) residence 1.7% (n=14) nursing home/other/unknown	50.2% (n=336) hospital 25.4% (n=170) residence 24.1% (n=161) nursing home/other/unknown	**p<0.01**



Prehospital Emergency Care

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/ipec20

Prehospital Buprenorphine Treatment for Opioid Use Disorder by Paramedics: First Year Results of the EMS Buprenorphine Use Pilot

H. Gene Hern, Vanessa Lara, David Goldstein, M. Kalmin, S. Kidane, S. Shoptaw, Ori Tzvieli & Andrew A. Herring

To cite this article: H. Gene Hern, Vanessa Lara, David Goldstein, M. Kalmin, S. Kidane, S. Shoptaw, Ori Tzvieli & Andrew A. Herring (2023) Prehospital Buprenorphine Treatment for Opioid Use Disorder by Paramedics: First Year Results of the EMS Buprenorphine Use Pilot, Prehospital Emergency Care, 27:3, 334-342, DOI: 10.1080/10903127.2022.2061661

To link to this article: https://doi.org/10.1080/10903127.2022.2061661

Published online: 13 May 2022.

PREHOSPITAL EMERGENCY CARE
2023, VOL. 27, NO. 3, 334–342
https://doi.org/10.1080/10903127.2022.2061661

Taylor & Francis
Taylor & Francis Group

FOCUS ON PHARMACOLOGY

OPEN ACCESS Check for updates

Prehospital Buprenorphine Treatment for Opioid Use Disorder by Paramedics: First Year Results of the EMS Buprenorphine Use Pilot

H. Gene Hern[a], Vanessa Lara[b], David Goldstein[c], M. Kalmin[d], S. Kidane[c], S. Shoptaw[d], Ori Tzvieli[e], and Andrew A. Herring[a]

[a]EMS Project Director, CA Bridge, Emergency Medicine, Alameda Health System – Highland Hospital, Oakland, California; [b]CA Bridge, Emergency Medical Services Division, Oakland, California; [c]Emergency Medical Services, Contra Costa County, Martinez, California; [d]UCLA Center for Behavioral and Addiction Medicine, Los Angeles, California; [e]Public Health Agency, Contra Costa County, Martinez, California

ABSTRACT

Background: Prehospital initiation of buprenorphine treatment for Opioid Use Disorder (OUD) by paramedics is an emerging potential intervention to reach patients at greatest risk for opioid-related death. Emergency medical services (EMS) patients who are at high risk for overdose deaths may never engage in treatment as they frequently refuse transport to the hospital after naloxone reversal. The potentially important role of EMS as the initiator for medication for opioid use disorder (MOUD) in the most high-risk patients has not been well described.

Setting: This project relies on four interventions: a public access naloxone distribution program, an electronic trigger and data sharing program, an "Overdose Receiving Center," and a paramedic-initiated buprenorphine treatment. For the final intervention, paramedics followed a protocol-based pilot that had an EMS physician consultation prior to administration.

Results: There were 36 patients enrolled in the trial study in the first year who received buprenorphine. Of those patients receiving buprenorphine, only one patient signed out against medical advice on scene. All other patients were transported to an emergency department and their clinical outcome and 7 and 30 day follow ups were determined by the substance use navigator (SUN). Thirty-six of 36 patients had follow up data obtained in the short term and none experienced any precipitated withdrawal or other adverse outcomes. Patients had a 50% (18/36) rate of treatment retention at 7 days and 36% (14/36) were in treatment at 30 days.

Conclusion: In this small pilot project, paramedic-initiated buprenorphine in the setting of data sharing and linkage with treatment appears to be a safe intervention with a high rate of ongoing outpatient treatment for risk of fatal opioid overdoses.

ARTICLE HISTORY
Received 8 February 2022
Revised 14 March 2022
Accepted 15 March 2022

Background

Prehospital initiation of buprenorphine treatment for opioid use disorder (OUD) by paramedics is an emerging potential intervention to reach patients at greatest risk for opioid-related death. Emergency medical services (EMS) patients who are at high risk for overdose deaths may never engage in treatment as they frequently decline transport to the hospital after naloxone reversal (1–3). Not only is there a high level of stigma in treating these patients, but also there is a lack of training and education among EMS personnel about the acute treatments for OUD in the emergency department (ED) (4). While there has been substantial policymaker interest in increasing ED access to buprenorphine treatment for OUD, the potentially important role of EMS as the initiator for medication for OUD (MOUD) in the most high-risk patients has not been well described.

Since 2011, death by overdose is the leading cause of accidental death in the United States; two-thirds of all overdose-related deaths involve opioids (5, 6). According to recent data from the Centers for Disease Control, in the 12 months ending in October 2021, the number of overdose deaths increased to more than 100,000. This estimate represents the highest number of deaths ever recorded in a 12-month period, with ongoing dramatic increases year after year (7). Fentanyl and its analogues have been the largest drivers of overdose deaths in the United States (8). Fentanyl has several characteristics that put patients at higher risk for fatal overdose. Primarily, it is highly lipophilic with more rapid onset than even injected heroin, substantially reducing the time from use to critical respiratory depression. Potency is not easily determined by the appearance and can vary widely between batches and dealers such that regular fentanyl users may still overdose with the "same" amount they might regularly use (9, 10). Hence, as fentanyl becomes the most prevalent illicit opioid in use, overdoses have predictably increased. Consequently, the ideal public health

CONTACT H. Gene Hern Emergentt@gmail.com

response should focus not only on those at risk for overdose, but also overdose survivors.

Recent data have demonstrated a significant increase in both short- and long- term mortality following opioid overdoses. Weiner et al. reported 5.5% 1-year mortality in a cohort of patients discharged from the ED after non-fatal opioid overdoses. Of those who died in the first month after discharge, many (22.3%) died within the first 48 hours (11). Survivors of non-fatal opioid overdoses who decline EMS transport are at an even higher risk (2). A total of 30% of patients who die from overdose have been shown to use EMS services in the year prior to their death (12). Additionally, despite its life-saving characteristics, it has been shown that fewer than 8% of non-fatal narcotic overdose patients leave the ED with prescriptions for naloxone (13). The increasing trend in overdose deaths, coupled with the large risk of overdose death among those with prior overdoses, highlights the need for innovations and treatment services for these particularly vulnerable patients with OUD.

Strong evidence suggests that the initiation of MOUD is the single most effective intervention to prevent overdose deaths in patients with OUD and that increasing access to medication should be a national public health priority. Evidence suggests that ED and acute care hospital-based delivery of MOUD has strongly positive outcomes (14, 15). These facilities can serve as access portals to expand the use of buprenorphine and methadone.

Integrating EMS into ongoing efforts to increase access to OUD treatment through EDs and hospitals is a potentially high-impact and scalable treatment strategy. This intervention, if implemented widely, could reach a large population of at-risk persons with OUD who may otherwise face substantial barriers to receiving OUD treatment.

CAL OMRI

Several EMS agencies have developed novel interventions to combat the overdose epidemic. These may include increased screening and education for OUD, harm reduction techniques, treatment initiation, and active referral. After partnering with the California Bridge Program (CA Bridge) (16) and the California Department of Public Health (CDPH), Contra Costa County launched an innovative, multi-pronged California Opioid Multi-agency Response Intervention project (Cal-OMRI).

This project relies on four interventions. First, a public access naloxone distribution program was funded through the CDPH. Second, an electronic trigger and warm handoff program was established through CDPH for patients experiencing overdoses or at high risk of opioid-related overdoses. These patients receive phone outreach calls and referral to outpatient treatment from substance use navigators. Third, a hospital was designated as the overdose receiving center (ORC) as a preferred transport destination with resources and personnel specifically trained in the treatment of OUD (17). The ORC has two full-time navigators, access to a DEA X waivered clinician at all times for follow-up prescriptions, and low-friction access to follow-up clinic appointments for OUD treatment. Fourth, 9-1-1 responding paramedics were trained to initiate MOUD with buprenorphine in the field for patients experiencing withdrawal symptoms either independently or following naloxone reversal. This program is known as the EMS Buprenorphine Use Pilot (EMSBUP) program (18).

Setting

Contra Costa County in Northern California has a population of approximately 1.2 million individuals. The EMS system is a two-tiered service with first responder advanced life support (ALS) fire agencies and ALS transport agencies responding to 9-1-1 activations. There were over 100,000 9-1-1 activations in 2020, and over 1,500 were categorized as overdose/ingestion. There were 1,089 doses of naloxone administered by EMS in 2020.

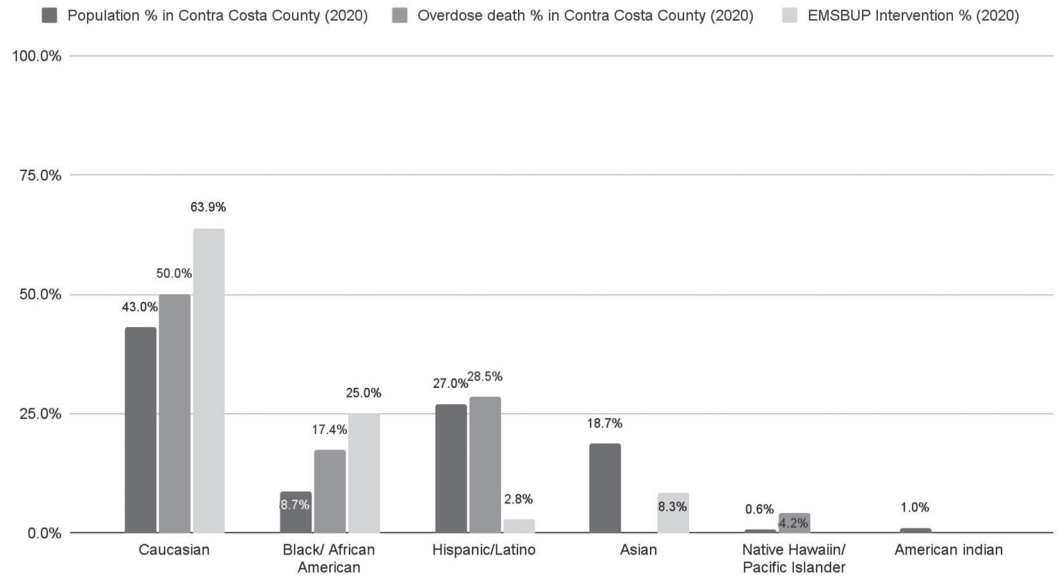
Training in OUD and Buprenorphine

For the EMSBUP pilot program, we established a limited geographical region in the county and trained approximately 180 full- and part-time 9-1-1 paramedics in the treatment of OUD using buprenorphine. The training consisted of lectures, surveys, case scenarios, clinical opiate withdrawal scale (COWS) scoring, and training in motivational interviewing. Each paramedic received approximately four hours of training in small group settings. The training materials were developed in conjunction with the CA Bridge and are available online at www.cabridge.org.

Process to Implementation

Protocol Approval

The intervention in Contra Costa County had many challenges to address prior to implementation. In California, the paramedic scope of practice is determined by the state Emergency Medical Services Authority. It authorizes changes based on recommendations from the Emergency Medical Directors Association of California's Scope of Practice Committee. New medications can be authorized in one of two ways. First, the Scope of Practice Committee can review an application from a local EMS agency (usually country-level administration) and determine if the new drug is appropriate to be added to the paramedic scope of practice. It then can recommend approval to the EMS Authority. If the Scope of Practice committee feels the medication is unproven or not appropriate for paramedics, it can refuse to approve and suggest a trial study. This "trial study" process is how the EMS buprenorphine pilot in Contra Costa County was initiated. It involved a separate application to the state EMS Authority for approval under trial study status and the results of the study will be reviewed after 18 months, at which time an extension or expansion may be considered. The study was approved by the Public Health Institute Institutional Review Board and by the California Health and Human Services Agency Committee for the Protection of Human Subjects.



United States Census Bureau. Contra Costa County, California (2020).

Figure 1. Racial/ethnic differences in overdose deaths vs. Emergency Medical Services Buprenorphine Use Pilot (EMSBUP) Intervention.

Medication Process Approval

The national director for the 9-1-1 transport agency's controlled substances program had to approve the protocol. This involved multiple discussions and forwarding the study protocol to the national research director for the 9-1-1 agency. In addition, the distribution company that provides all controlled substances to the 9-1-1 transport agency nationally had to be convinced of the utility and necessity of having buprenorphine in a 9-1-1 system. This also involved discussions and forwarding the sample protocols and the approval from the state EMS Authority to high-level executives at the pharmaceutical distribution company. Furthermore, tracking, storage, and distribution of a new pharmaceutical to patients required an additional investment of administrative time for paramedic education specialists and supervisors.

Protocol

Naloxone Administration

The established paramedic protocol in Contra Costa County for naloxone reversal is not to fully reverse all opioid effects. The protocol for naloxone states that reversal is "Titrated to effect of adequate ventilation and oxygenation (not administered to restore consciousness)" (19). Therefore, not every patient with an overdose is a candidate for buprenorphine administration. However, if the paramedic or someone else (e.g., bystander or law enforcement) inadvertently reverses the overdose fully, the patient may become a candidate.

Buprenorphine Administration and Referral

The protocol for opioid withdrawal treatment with buprenorphine begins with exclusion criteria (Figure 1), including age under 18, pregnancy, any recent methadone use, altered mental status, severe medical illness, other intoxicants suspected, or the patient being unable to comprehend the risks and benefits of treatment. If the patient has no exclusions, the paramedic administers the COWS electronically, which records the score in a database. If the score is greater than 7, the paramedic then determines if the patient is interested in initiating buprenorphine, and if so, contacts the opioid withdrawal protocol physician. This physician is an "on-call" physician with knowledge of the project, and familiar with and experienced in buprenorphine administration. If the physician confirms the exclusion criteria and that there is chronic OUD, he or she approves administration. The paramedic then administers 16 mg of buprenorphine sublingually and reassesses the patient. After 10 minutes, if withdrawal symptoms persist, the paramedic may administer an additional 8 mg of buprenorphine. The paramedic then informs the patient that CDPH will initiate contact to offer additional outpatient treatment and further resources. Finally, the paramedic recommends transport to the designated ORC to provide further treatment, counseling, and resources specifically for patients with OUD. The "warm handoff" is accomplished via an electronic trigger from the EMS agency to the public health agency, and the navigator contacts the patient within 1 to 2 days. A patient handoff occurs for all overdose triggers, not just patients who receive buprenorphine. The navigator also monitors the patient retrospectively for acute clinical outcomes and 7- and 30-day engagement with treatment programs. The buprenorphine intervention was available to all patients served by the 9-1-1 transport agency. There was a phased rollout to one-third of the county in September 2020, and then the remainder of the county in February 2021.

Regulatory and Legal Considerations

The administration of buprenorphine does not require a Drug Addiction Treatment Act of 2000 X-waiver. Neither

Table 1. Demographic and treatment characteristics of EMSBUP patients.*

	ORC (n = 27) n (%)	Non ORC (n = 9) n (%)	Total (n = 36) n (%)
Age			
<18	1 (3.7)	0 (0.0)	1 (3.0)
20–29	9 (33.3)	4 (44.4)	13 (36.0)
30–39	10 (37.0)	3 (33.3)	13 (36.0)
40–49	6 (22.2)	0 (0.0)	6 (17.0)
50+	1 (3.7)	2 (22.2)	3 (8.0)
Sex			
Male	17 (63.0)	8 (88.9)	25 (69.4)
Female	10 (37.0)	1 (11.1)	11 (30.6)
Race/Ethnicity			
Caucasian	18 (66.7)	5 (55.6)	23 (64.0)
Black or African American	6 (22.2)	3 (33.3)	9 (25.0)
Asian/Pacific Islander	2 (7.4)	1 (11.1)	3 (8.0)
Hispanic Latino	1 (3.7)	0 (0.0)	1 (3.0)
Narcan Administration Route			13
Intranasal			
1–4 mg	5 (55.6)	2 (50.0)	7 (53.8)
8 mg	2 (22.2)	0 (0.0)	2 (15.3)
10 mg	1 (11.1)	0 (0.0)	1 (7.7)
12 mg	1 (11.1)	1 (25.0)	2 (15.4)
16 mg	0 (0.0)	1 (25.0)	1 (7.7)
Intravenous			4
2 mg	2 (66 .6)	1 (100.0)	3 (75.0)
4 mg	1 (33 .3)	0 (0.0)	1 (25.0)
Narcan Dose			
High dose (> 5 mg)	4 (33.3)	2 (60.0)	6 (35.3)
Low dose (< 5 mg)	8 (66 .6)	3 (40.0)	11 (64.7)
Average Initial COWS score	17	13	16
Average Repeat COWS score	8	7	8
Buprenorphine			
8 mg	3 (11.1)	0	3 (8.33)
16 mg	21 (77.7)	9 (100.0)	30 (83.3)
24 mg	3 (11.1)	0	3 (8.33)

EMSBUP, Emergency Medical Services Buprenorphine Use Pilot; ORC, overdose receiving center; COWS, clinical opiate withdrawal scale.
*(N = 36).

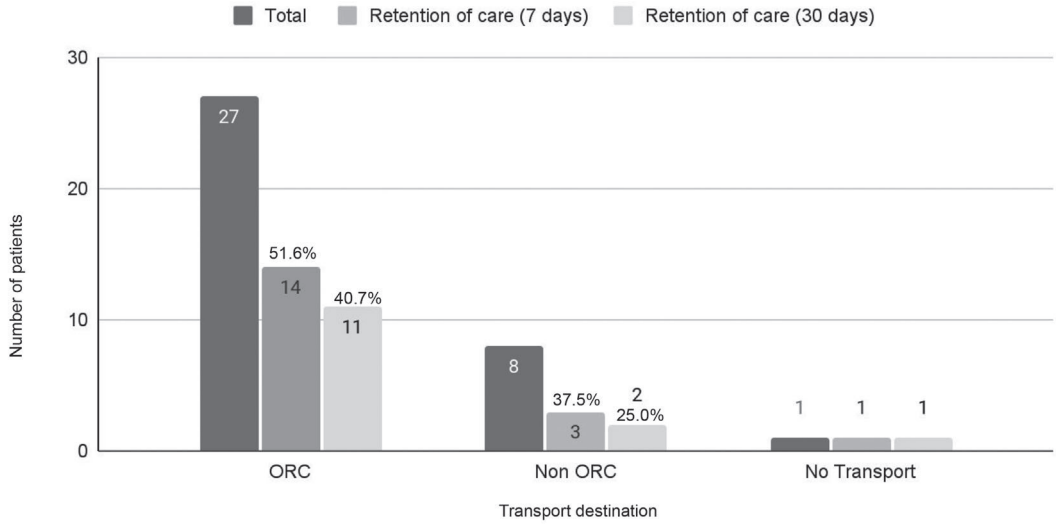
the paramedic nor the supervising physician requires additional regulatory certification, and buprenorphine can be administered similarly to other opioids commonly used by EMS. The X-waiver is required for the prescription of buprenorphine for the treatment of OUD only. The "3-day rule" (Title 21, Code of Federal Regulations, Part 1306.07) is normally applicable to ED practice and permits discharged hospital patients to return for repeat maintenance doses of buprenorphine for three consecutive days pending entry into a treatment program.

Quality Assurance

To ensure consistent application of the study protocol, a quality assurance team was assembled for weekly reviews of potential cases. This team consists of the navigator at the ORC (17), the clinical education specialist at the 9-1-1 transport agency, the research associate for the EMSBUP project, and the EMS medical director for the 9-1-1 transport agency. This team met on a weekly basis and reviewed two distinct types of cases: potential overdose cases and actual buprenorphine administrations. All overdoses in the 9-1-1 system are flagged via an electronic data monitoring system (FirstWatch™, Carlsbad, CA) and sent to the quality assurance team once the 9-1-1 call has been dispatched. Additionally, all patient care reports (PCRs) with the word buprenorphine, fentanyl, heroin, and their common misspellings were also flagged and sent to the quality assurance team. The quality assurance team reviews each PCR to assess whether the patient was an appropriate candidate for buprenorphine administration, was appropriately eliminated from the protocol for protocol exclusions, or was a potential case that was not administered buprenorphine. The individual paramedics involved in each missed potential case are then educated by the clinical education specialist for future cases. Additionally, all buprenorphine cases are reviewed by the EMSBUP oversight team on a biweekly basis. The oversight team consists of the medical directors of the public health department, the local EMS agency, the 9-1-1 transport agency, the director of the California Bridge program, and program coordinators from the local EMS agency and other interested parties.

Results

In the first year, 36 patients received buprenorphine (Table 1). Of patients receiving buprenorphine, 63.9% were White, 25% were African American, 2.8% were Latinx, and 8.3% were Asian (Figure 1). Most patients who received buprenorphine were experiencing withdrawal symptoms because they had been abstinent from opioids for long enough to experience withdrawal symptoms (22/36, 61%) rather than experiencing withdrawal symptoms as a result of receiving naloxone. All patients were transported to the ED, except for one who declined transport against medical advice. Additionally, most patients (27/36, 75%) were willing to be transported to the designated ORC within the EMS service area.



ORC Overdose receiving Center *is a designated hospital best equipped to care for patients that have experienced an opioid overdose by following a post-overdose protocol, consultation with a substance use navigator, and providing other MAT resources (19).*
***Retention of care** is defined as a patient that has either attended a follow-up MAT appointment, self reports continuing MAT treatment, an active MAT prescription, or a combination of the three.*

Figure 2. Retention of care by transport destination.

Data on clinical outcomes as well as 7- and 30-day follow-ups were obtained for all 36 patients. No precipitated withdrawal or other adverse outcomes were documented or observed in the immediate period after receiving buprenorphine. Among patients who received buprenorphine from EMS, there were no cases of precipitated withdrawal. All patients had improved COWS scores (29/36) or no change in their symptoms (7/36). Review of the PCRs from EMS and subsequent emergency department care revealed no cases of any worsening withdrawal symptoms or precipitated withdrawal.

The majority of patients were discharged from the ED (31/36, 86%). Of the five patients (14%) who were admitted, none were admitted for worsening withdrawal symptoms. One patient was admitted for opioid withdrawal symptoms of ongoing nausea and vomiting, but the clinical scenario did not indicate the symptoms were worse than when the patient activated the 9-1-1 system. Two patients were admitted to the psychiatric unit for suicidal ideation. One additional patient had cellulitis. The final admitted patient presented with hypoxia and an inability to walk with a steady gait.

All overdoses in the county were followed and the PCRs were evaluated to see if they were candidates for buprenorphine administration based on the protocol. Of the 587 total patients who had overdosed, 79 fit possible inclusion criteria established by the protocol, and 36 of those (45.6%) were included in the buprenorphine study protocol. Of the patients in the study, 23 of 36 reported known fentanyl usage to paramedics.

Patients who received buprenorphine were followed for 30 days by the navigator to see if they were in treatment for OUD and if they filled outpatient buprenorphine prescriptions. A patient was counted as "in treatment" if he or she had both a clinic visit and an outpatient prescription for buprenorphine filled. Half of the patients (18/36) were in treatment at 7 days and 36% (14/36) were in treatment at 30 days. Of the patients who were transported to the ORC, 11 of 27 (40.7%) were in treatment at 30 days, compared to the 2 of 8 (25%) who went to other receiving centers (Figure 2). Some differences in retention by race were observed. Of the white patients who received buprenorphine, 12 of 23 were in care at 30 days but only 1 of 9 black patients was. Further stratification of the patients by age, ethnicity, amount of naloxone administered, and amount of buprenorphine administered as a function of whether they went to an ORC can be seen in Table 1.

Patients were further stratified into naloxone exposure (Figure 3) and ethnicity (Figure 4) with respect to long-term treatment outcome. Of the 19 patients who did not receive naloxone as part of their EMS intervention, 7 were in care at 30 days. Of the 17 patients who did receive naloxone, 7 patients were in care at 30 days. The naloxone dosing and COWS scores as well as retention in treatment are shown in Table 2.

Based on navigator follow-up, all of the overdose patients enrolled in paramedic-initiated buprenorphine administration were still alive 30 days after the initial buprenorphine encounter.

Discussion

Our results add to the growing evidence that EMS-administered buprenorphine is a pragmatically feasible and well-tolerated intervention for OUD patients who were in withdrawal. Our findings should be considered in the context that most overdose survivors receive no interventions that promote the most effective treatment proven to reduce mortality—initiation of MOUD. Our pilot did not observe any clinical events to support potential concerns for safety. This is not surprising as buprenorphine has already established a strong safety record in the ED setting.

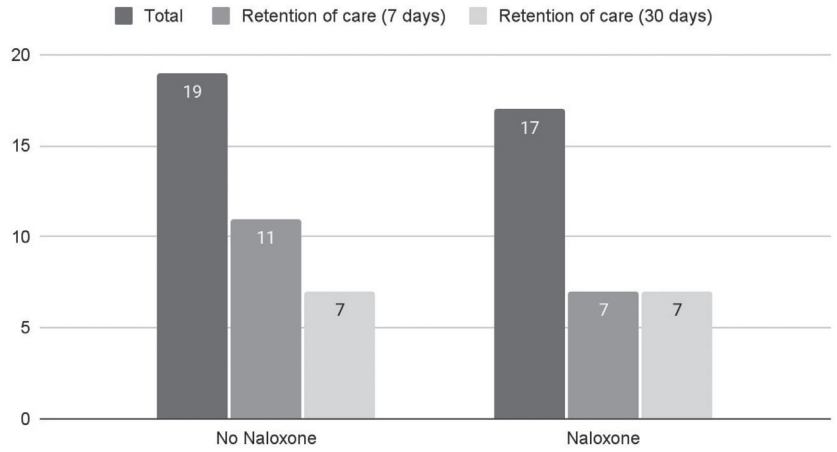


Figure 3. Retention of care by naloxone administration.

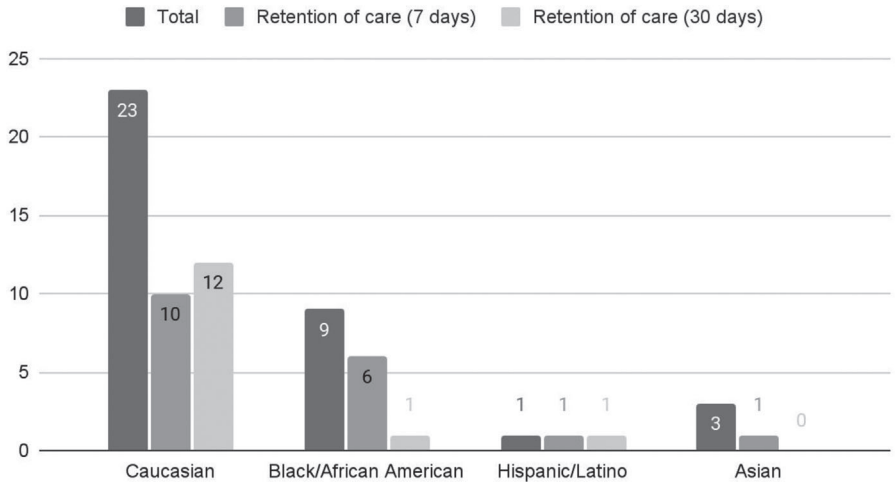


Figure 4. Retention of care by race/ethnicity.

Table 2. Retention and outcomes by naloxone dose administration.

	No Naloxone n = 19	Naloxone High Dose n = 6	Naloxone Low Dose n = 11
Retention of care			
7 days	11	6	6
30 days	7	1	5
COWS score			
Initial range	7–36	7–21	3–30
Average initial score	15	14	17
Repeat range	0–36	1–21	3–24
Average repeat score	7	9	7

COWS, clinical opiate withdrawal scale.

All patients were followed for clinical outcomes by the navigator, including the patient who had signed out against medical advice. In no case did a patient experience any precipitated withdrawal or worsening of symptoms due to paramedic-administered buprenorphine. Six patients did not have improvement of their COWS score while still in the paramedic's care, but no patient appeared to experience an adverse event attributable to buprenorphine treatment. Importantly, the majority (23 of 36, 64%) of the treated patients reported primarily using fentanyl.

Either abstinence from opioids or naloxone administration after an opioid overdose can cause withdrawal symptoms. In this study, over 60% of patients were in withdrawal and received buprenorphine as a result of abstinence, rather than naloxone-induced withdrawal symptoms. This was an unexpected finding and signals the high community demand for emergency treatment of opioid withdrawal. This finding is unique to this pilot intervention as it is the only EMS project of which we are aware to include non-naloxone associated withdrawal in the eligibility criteria. This finding highlights the persistence of barriers to access and the frequency of withdrawal crises in the OUD population. Interestingly, this occurred before widespread community knowledge that EMS buprenorphine was available. Public education campaigns could dramatically increase utilization, which, given the value of a single buprenorphine start, could potentially further expand the use of EMS in reducing overdose deaths. The first EMS system to implement an MOUD

treatment option for patients in withdrawal allows paramedics to administer buprenorphine to patients but only if in withdrawal due to post naloxone administration (14). Our intervention allows for the alleviation of withdrawal symptoms and pain through buprenorphine administration regardless of the cause of withdrawal. The current EMS protocol suggests titrating low doses of naloxone to minimal sustainment of sufficient respiratory function. There is widespread debate on the risks and benefits of alternative naloxone dosing protocols that also target reversal of sedation. Having a viable rescue medication (buprenorphine) for unpleasant withdrawal symptoms is an interesting new component of this discussion.

Long Term Treatment Retention

Contrary to some existing perceptions in the treatment community that overdose victims are "not ready" to engage in treatment, we found a remarkably high 30-day retention rate in treatment of 36%, consistent with similar real-world MOUD programs in the ED and ambulatory setting. This finding in an EMS system is remarkable in that, if confirmed, it could potentially lead to earlier buprenorphine administrations, shortened ED length of stays, larger catchment areas, and reaching patients who might not go to EDs with established OUD and substance use navigator programs. Of note, the percentage achieved in the published literature for outpatient clinics with motivated, potentially more resourced patients is 52.6% at 1 year (20). Subsequent studies are urgently needed to confirm the finding that for every three EMS patients treated with buprenorphine, one remains in treatment at 30 days.

Addressing Racial Inequities in Overdose Deaths

While affecting all racial and social boundaries, overdose deaths have disproportionately affected some racial and ethnic groups. The growing racial disparity has been well-documented with one recent study noting the majority of the increase in overdose visits to EDs in 2020 was among African American and Latinx patients (21). In Contra Costa County, African Americans make up 9.3% of the county population but 21.5% of the overdose deaths (22) (Figure 1). Remarkably, African Americans accounted for 25% of the buprenorphine pilot program patients, which might be an indication EMS is an effective means of reaching these patients. These findings suggest that this EMS intervention has potential to effectively engage with high-risk patients and reduce disparities in OD for some communities.

Overdose Center Destination Decision

It is not clear which factors influenced the destination decision to go to an ORC. Transport to an ORC was not a requirement but a suggestion for both EMS clinicians and patients. It may be that EMS clinicians who thought the patient was willing to accept treatment would be a good candidate for the ORC. It may also be that patients who had been in treatment already and had accepted buprenorphine were also willing to accept the destination decision where more treatment and counseling would be available, as described by the paramedic. While the ORC is centrally located in the county, some patients would have to bypass the closest facility to arrive at the ORC.

EMS System of Care for OUD

The intervention collaborators decided early in the process that an EMS-initiated buprenorphine program would only be successful with the additional outreach processes in place. The results shown in the buprenorphine intervention must not be taken out of context as there were four overlapping pilots (including buprenorphine) occurring at the same time. The additional interventions included a leave-behind naloxone program, a designation of an ED as an ORC, and a warm data handoff between the EMS agency and the public health substance use navigator counseling program. This multifaceted approach was necessary to ensure adequate patient follow-up and linkage to additional outpatient care. It may not always be possible to have a multifaceted program, but such integration in this setting achieved remarkable results. However, it is possible that such results are only possible with all four pilot projects in place. More study is needed to understand the isolated effects of EMSBUP from the other components.

The literature indicates that buprenorphine has a clear mortality benefit (23). Often the challenge for patients with OUD is access to outpatient clinics and other resources. The use of EMS in this pilot system allows for the expansion of access for patients who might otherwise not engage w with the health care system. These patients are traditionally disadvantaged, marginalized, and face significant hurdles to access clinic and treatment resources (24). This program allows EMS clinicians to not only treat these patients for OUD but connect them to services and counseling resources.

The multi-pronged intervention described here to help reduce opioid-related overdose and death is an example of integrating the EMS workforce with public health efforts. Looking toward the future, EMS systems may be uniquely positioned to form a similar bridge between traditional EMS and hospital system interventions like trauma, stroke, or myocardial infarction care and more public health-based measures such as pediatric safety and elder health issues, as well as broader social themes such as harm reduction and hospice awareness (25). EMS can reach almost all patients; its reach extends across racial, social, political, insurance, and economic divides. A joint partnership of EMS and public health colleagues can form the foundation for a host of novel interventions with lasting health effects across societal domains, with a large potential to reduce health disparities.

Limitations

The findings reflect results from one site over a limited period of time, thus generalizability may be limited until further research is performed. It is not clear if the results

found are the result of the four projects implemented at the same time, or just the buprenorphine intervention. Treatment retention rates are possibly affected by high motivation for patients who agreed to buprenorphine treatment. Additionally, while no adverse outcomes or precipitated withdrawal events were observed in this limited study, instances of buprenorphine-induced withdrawal or other side effects may be observed in larger scale implementation.

Conclusions

These results after one year of study implementation and the evolving literature on alternative settings for buprenorphine treatment provide opportunities for further research. Future trials might use the controlled implementation protocols piloted in this intervention to assess for sustained engagement in treatment services and determine any mortality benefit for EMS-based encounters with patients who have OUD. EMS administered buprenorphine is possible, safe, and results in significant retention in care at 30 days. A future multi-center randomized controlled trial comparing buprenorphine to standard care (no buprenorphine) and measuring treatment retention and mortality would provide further insight into this novel treatment modality for EMS.

Disclosure Statement

All authors have no conflicts of interest to disclose.

Funding

The California Department of Public Health provided startup funding for the multi-pronged intervention in Contra Costa County. The CARESTAR Foundation provided significant research support for this project. CA Bridge is a program of the Public Health Institute, funded through California Department of Health Care Services.

References

1. Rock P, Singleton M. EMS heroin overdoses with refusal to transport & impacts on ED overdose surveillance. Online J Public Health Inform. 2019;11(1):e430. doi:10.5210/ojphi.v11i1.9917.
2. Zozula A, Neth MR, Hogan AN, Stolz U, McMullan J. Non-transport after Prehospital Naloxone Administration Is Associated with Higher Risk of Subsequent Non-fatal Overdose. Prehosp Emerg Care. 2022;26(2):272–279. doi: 10.1080/10903127.2021.1884324.
3. Glenn MJ, Rice AD, Primeau K, Hollen A, Jado I, Hannan P, McDonough S, Arcaris B, Spaite DW, Gaither JB, et al. Refusals after prehospital administration of naloxone during the COVID-19 pandemic. Prehosp Emerg Care. 2021;25(1):46–54. doi:10.1080/10903127.2020.1834656.
4. Hawk KF, D'Onofrio G, Chawarski MC, O'Connor PG, Cowan E, Lyons MS, Richardson L, Rothman RE, Whiteside LK, Owens PH, et al. Barriers and facilitators to clinician readiness to provide emergency department-initiated buprenorphine. JAMA Netw Open. 2020;3(5):e204561. doi:10.1001/jamanetworkopen.2020.4561.
5. Leading causes of death and injury—PDFs|injury center|CDC. Cdc.gov.; 2020 Jul 10 [accessed 2019 Oct 1] https://www.cdc.gov/injury/wisqars/LeadingCauses.html.
6. Scholl L. Drug and opioid-involved overdose deaths—United States, 2013–2017. MMWR Morb Mortal Wkly Rep. 2019;67(5152);1419–1427. doi:10.15585/mmwr.mm6751521e1.
7. Centers for Disease Control and Prevention. Products—vital statistics rapid release—provision drug overdose data. Centers for Disease Control and Prevention; 2022 Jan 12 [accessed 2020 May 21]. https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm.
8. Han Y, Yan W, Zheng Y, Khan MZ, Yuan K, Lu L. The rising crisis of illicit fentanyl use, overdose, and potential therapeutic strategies. Transl Psychiatry. 2019;9(1):282. doi:10.1038/s41398-019-0625-0.
9. Somerville NJ, O'Donnell J, Gladden RM, Zibbell JE, Green TC, Younkin M, Ruiz S, Babakhanlou-Chase H, Chan M, Callis BP, et al. Characteristics of fentanyl overdose—Massachusetts, 2014-2016. MMWR Morb Mortal Wkly Rep. 2017;66(14):382–6. doi:10.15585/mmwr.mm6614a2.
10. Mars SG, Rosenblum D, Ciccarone D. Illicit fentanyls in the opioid street market: desired or imposed? Addiction. 2019;114(5):774–80. doi:10.1111/add.14474.
11. Weiner SG, Baker O, Bernson D, Schuur JD. One-year mortality of patients after emergency department treatment for nonfatal opioid overdose. Ann Emerg Med. 2020;75(1):13–7. doi:10.1016/j.annemergmed.2019.04.020.
12. Barefoot EH, Cyr JM, Brice JH, Bachman MW, Williams JG, Cabanas JG, Herbert KM. Opportunities for emergency medical services intervention to prevent opioid overdose mortality. Prehosp Emerg Care. 2021;25(2):182–90. doi:10.1080/10903127.2020.1740363.
13. Chua K-P, Dahlem CH, Nguyen TD, Brummet CM, Conti RM, Bohnert AS, Dora-Laskey AD, Kocher KE. Naloxone and buprenorphine prescribing following US emergency department visits for suspected opioid overdose: August 2019 to April. Ann Emerg Med. 2022;79(3):225–236. doi:10.1016/j.annemergmed.2021.10.005.
14. Carroll GG, Wasserman DD, Shah AA, Salzman MS, Baston KE, Rohrbach RA, Jones IL, Haroz R. Buprenorphine Field Initiation of ReScue Treatment by Emergency Medical Services (Bupe FIRST EMS). A case series. Prehosp Emerg Care. 2020;25:289–293. doi:10.1080/10903127.2020.1747579.
15. D'Onofrio G, O'Connor PG, Pantalon MV, Chawarski MC, Busch SH, Owens PH, Bernstein SL, Fiellin DA. Emergency department-initiated buprenorphine/naloxone treatment for opioid dependence: a randomized clinical trial. JAMA. 2015;313(16):1636–44. doi:10.1001/jama.2015.3474.
16. Snyder H, Kalmin MM, Moulin A, Campbell A, Goodman-Meza D, Padwa H, Clayton S, Speener M, Shoptaw S, Herring AA. Rapid adoption of low-threshold buprenorphine treatment at California Emergency Departments participating in the CA Bridge Program. Ann Emerg Med. 2021;78(6):759–772.
17. Hern HG, Goldstein D, Tzvieli O, Mercer M, Sporer K, Herring AA. Overdose receiving centers—an idea whose time has come? Prehosp Emerg Care. 2021;2:1–4. doi:10.1080/10903127.2020.1864073.
18. Hern HG, Goldstein D, Kalmin M, Kidane S, Shoptaw S, Tzvieli O, Herring AA. Prehospital initiation of buprenorphine treatment for opioid use disorder by paramedics. Prehosp Emerg Care. 2021;22:1–7. doi:10.1080/10903127.2021.1977440.
19. Contra Costa County Emergency Medical Services. Suspected opioid overdose; [accessed 2021 Jun 4] 2020. https://cchealth.org/ems/pdf/2021-tg/4A13aSuspectedOpioidOverdose.pdf.
20. Montalvo C, Stankiewicz B, Brochier A, Henderson DC, Borba CPC. Long-term retention in an outpatient behavioral health clinic with buprenorphine. Am J Addict. 2019;28(5):339–46. doi:10.1111/ajad.12896.
21. Soares WE, 3rd, Melnick ER, Nath B, D'Onofrio G, Paek H, Skains RM, Walter LA, Casey MF, Napoli A, Hoppe JA, et al. Emergency department visits for nonfatal opioid overdose during the COVID-19 pandemic across six US health care

systems. Ann Emerg Med. 2022;79(2):158–67. doi:10.1016/j.annemergmed.2021.03.013.
22. California Department of Public Health. California Overdose Surveillance Dashboard—Contra Costa County, 2021; [accessed 2021 Oct 1]. https://skylab.cdph.ca.gov/ODdash/.
23. Wakeman SE, Larochelle MR, Ameli O, Chaisson CE, McPheeters JT, Crown WH, Azocar F, Sanghavi DM. Comparative effectiveness of different treatment pathways for opioid use disorder. JAMA Netw Open. 2020;3(2):e1920622. doi:10.1001/jamanetworkopen.2019.20622.
24. Kalmin MM, Goodman-Meza D, Anderson E, Abid A, Speener M, Snyder H, Campbell A, Moulin A, Shoptaw S, Herring AA. Voting with their feet: social factors linked with treatment for opioid use disorder using same-day buprenorphine delivered in California hospitals. Drug Alcohol Depend. 2021;222:108673. doi:10.1016/j.drugalcdep.2021.108673.
25. Breyre AM, Bains G, Moore J, Siegel L, Sporer KA. Hospice and comfort care patient utilization of emergency medical services. J Palliat Med. 2022;25(2):259–264. doi:10.1089/jpm.2021.0143.

ACMT | American College of Medical Toxicology

ACMT Position Statement
Buprenorphine Administration in the Emergency Department

The position of the American College of Medical Toxicology (ACMT), endorsed by the American College of Emergency Physicians (ACEP), is as follows:

ACMT supports the administration of buprenorphine in the emergency department (ED) as a bridge to long-term addiction treatment.

Furthermore, ACMT supports the administration of buprenorphine to appropriate patients in the ED to treat opioid withdrawal and to reduce the risk of opioid overdose and death following discharge.

Background

In response to escalating opioid-related ED visits and fatalities across the nation, there is a pressing need for the expansion of treatment and recovery opportunities for patients suffering from the consequences of long-term opioid use, which include dependence, abuse, hyperalgesia, and addiction [1,2].

Within the healthcare community, it is widely agreed that opioid use disorder (OUD) is a chronic disease with medical and social components and that the best practice for management of OUD includes opioid agonist therapy (OAT) [3].OAT uses evidence-based approaches with either buprenorphine or methadone to allow patients to minimize the use of illicit opioids, prevent overdose, and improve overall health and functioning. For most patients, providing an initial dose of buprenorphine (also called initiation or induction) can be easily and safely performed in the ED or on an outpatient basis, with close follow-up or a “warm hand-off” with a long-term treatment provider. OAT is generally supplemented with other long-term supportive measures such as group- and community-based or intensive outpatient programs. Although methadone and naltrexone are also used for addiction treatment, this statement focuses on buprenorphine due to its safety profile and ability to be both administered in and prescribed from the ED. Methadone may be administered to patients already managed in opioid treatment programs that use methadone but may not be prescribed.

Buprenorphine in the ED

Buprenorphine (in combination with naloxone in outpatient setting) has been utilized for nearly 20 years in an office- or clinic-based setting that allows for either observed or home initiation of therapy [4]. Providing an initial dose of buprenorphine during an ED visit after an overdose, or during an ED visit for opioid withdrawal, for OUD improves success in engagement of patients into medication assisted therapy (MAT, also called medication for addiction treatment) [5,6,7]. Furthermore, in the United States, any licensed prescriber of controlled substances can administer a dose of buprenorphine in the hospital/ED daily for up to three days, if desired [8]. (Outpatient prescription requires a Drug Addiction Treatment Act of 2000 ”X-waiver” on their DEA controlled substance registration [9].) Outpatient prescription may help patients avoid return ED visits during the bridge period to a long term treatment program.

The ED can play a crucial role in the lives of patients with OUD and their families by offering treatment with buprenorphine. Such treatment needs to be supported by prompt access to ongoing treatment with buprenorphine. There are several for this:

- The ED sees a large number of patients presenting with opioid overdose, opioid withdrawal, or OUD.
- For many patients at high-risk for overdose, the ED is their primary access point to health care and treatment.
- Evaluation in the ED represents an opportunity to engage patients in a discussion of OAT and harm reduction strategies to mitigate risk from the continued use of illicit drugs after discharge.
- Following initiation of buprenorphine in the ED, a bridge clinic or "warm handoff" to a treatment provider will improve engagement into long-term treatment.
- Screening for OUD in patients who present to the ED for other medical reasons provides an important opportunity to begin intervention immediately for those who screen positive.
- Buprenorphine is relatively safe even in high doses and has a substantially lower abuse potential than full agonist opioids.

ACMT supports the administration of buprenorphine in the ED as a bridge to long-term addiction treatment and ACMT supports the administration of buprenorphine to ED patients to treat opioid withdrawal and to reduce the risk of opioid overdose and death following discharge.

Disclaimer

While individual practices may differ, this is the position of the American College of Medical Toxicology (ACMT) at the time written, after a review of the issue and pertinent literature.

1. Hedegaard H, Miniño AM, Warner M. Drug overdose deaths in the United States, 1999-2017. NCHS Data Brief. 2018;329:1-8.
2. Vivolo-Kantor AM, Seth P, Gladden RM, et al. Vital Signs: Trends in Emergency Department Visits for Suspected Opioid Overdoses - United States, July 2016-September 2017. MMWR Morbidity and Mortality Weekly Report. 2018;67(9):279-285.
3. Kresina TF, Lubran R. Improving public health through access to and utilization of Medication Assisted Treatment. Int J Environ Res Public Health. 2011; 8(10): 4102–4117.
4. Martin SA, Chido LM, Bosse JD, Wilson A. The next stage of buprenorphine care for opioid use disorder. Ann Intern Med. 2018;169(9):628-635.
5. D'Onofrio G, O'Connor PG, Pantalon MV, Chawarski MC, Busch SH, Owens PH, Bernstein SL, Fiellin DA: Emergency department-initiated buprenorphine/naloxone treatment for opioid dependence: a randomized clinical trial. JAMA. 2015;313(16):1636-1644.
6. D'Onofrio G, McCormack RP, Hawk K. Emergency departments-A 24/7/365 option for comabating the opioid crisis. NEJM. 2018;379(26):2487-2490.
7. Love JS, Perrone J, Nelson LS. Should buprenorphine be administered to patients with opioid withdrawal in the emergency department? Ann Emerg Med. 2018;72(1):26-28.
8. Substance Abuse and Mental Health Services Administration. Special Circumstances for Providing Buprenorphine. www.samhsa.gov/medication-assisted-treatment/legislation-regulations-guidelines/special-circumstances-providing-buprenorphine Accessed December 11, 2018.
9. Substance Abuse and Mental Health Services Administration. Qualify for a Physician Waiver. www.samhsa.gov/medication-assisted-treatment/buprenorphine-waiver-management/qualify-for-physician-waiver. Accessed December 11, 2018

Impact of Administering Buprenorphine to Overdose Survivors Using Emergency Medical Services

Gerard Carroll, MD*; Keisha T. Solomon, PhD; Jessica Heil, MS; Brendan Saloner, PhD; Elizabeth A. Stuart, PhD; Esita Y. Patel, PhD; Noah Greifer, PhD; Matthew Salzman, MD; Emily Murphy, MD; Kaitlan Baston, MD; Rachel Haroz, MD

*Corresponding Author. E-mail: Carroll-Gerard@cooperhealth.edu.

Study objective: To evaluate the efficacy and safety of utilizing emergency medical services units to administer high dose buprenorphine after an overdose to treat withdrawal symptoms, reduce repeat overdose, and provide a next-day substances use disorder clinic appointment to initiate long-term treatment.

Methods: This was a retrospective matched cohort study of patients who experienced an overdose and either received emergency medical services care from a buprenorphine-equipped ambulance or a nonbuprenorphine-equipped ambulance in Camden, New Jersey, an urban community with high overdose rates. There were 117 cases and 123 control patients in the final sample.

Results: Compared with a nonbuprenorphine-equipped ambulance, exposure to a buprenorphine-equipped ambulance was associated with greater odds of engaging in opioid use disorder treatment within 30 days of an emergency medical services encounter (unadjusted odds ratio: 5.62, 95% confidence interval, 2.36 to 13.39). Buprenorphine-equipped ambulance engagement did not decrease repeat overdose compared to the comparison group. Patients who received buprenorphine experienced a decrease in withdrawal symptoms. Their clinical opiate withdrawal scale score decreased from an average of 9.27 to 3.16. buprenorphine-equipped ambulances increased on-scene time by 6.12 minutes.

Conclusion: Patients who encountered paramedics trained to administer buprenorphine and able to arrange prompt substance use disorder treatment after an acute opioid overdose demonstrated a decrease in opioid withdrawal symptoms, an increase in outpatient addiction follow-up care, and showed no difference in repeat overdose. Patients receiving buprenorphine in the out-of-hospital setting did not experience precipitated withdrawal. Expanded out-of-hospital treatment of opiate use disorder is a promising model for rapid access to buprenorphine after an overdose in a patient population that often has limited contact with the health care system. [Ann Emerg Med. 2023;81:165-175.]

Please see page 166 for the Editor's Capsule Summary of this article.

Readers: click on the link to go directly to a survey in which you can provide **feedback** to *Annals* on this particular article.
A **podcast** for this article is available at www.annemergmed.com.

0196-0644/$-see front matter

https://doi.org/10.1016/j.annemergmed.2022.07.006

INTRODUCTION

Background

Emergency medical services (EMS) patient encounters involving an opioid overdose have risen alongside the national opioid use disorder crisis in the United States, with mortality in that population approaching 5% to 10% in the first year.[1] After an overdose, the best practice is to initiate patients on medication for opioid use disorder, manage withdrawal symptoms, and provide a path to long-term treatment.[2] While medication for opioid use disorder is extremely effective and can reduce overdose mortality by two-thirds,[3] treatment initiation rates remain low among overdose survivors.[4-7] After an overdose, US hospital emergency departments (EDs) are increasingly initiating medication for opioid use disorder,[8-10] but this treatment has yet to be applied widely in the out-of-hospital setting.[11]

Importance

Resuscitation of patients with opioid overdose commonly includes the opioid antagonist naloxone. While effective, it rapidly induces a route and dose-dependent withdrawal, causing discomfort and immediate craving for opioids.[12] Postoverdose patients in withdrawal often refuse EMS transport or leave the hospital prior to engaging in treatment.[13-15] Across the US, patients who receive naloxone, are refusing hospital transport at higher rates. During the current pandemic, refusal rates increased

Editor's Capsule Summary

What is already known on this topic

Patients with naloxone-precipitated withdrawal often refuse EMS transport and the opportunity to receive buprenorphine.

What question this study addressed

In patients with naloxone-precipitated withdrawal, does the out-of-hospital administration of buprenorphine have beneficial effects on clinical outcome measures.

What this study adds to our knowledge

Prompt administration of buprenorphine by a specially trained paramedic improves withdrawal symptoms and engagement in subsequent treatment.

How this is relevant to clinical practice

Initiating buprenorphine in patients with precipitated opioid withdrawal in the out-of-hospital environment is practical and valuable.

dramatically in some areas rising from 15% to 36% in one study.[1,16,17] Additionally, those who are being transported often leave the ED prior to physician evaluation.[18] These events are missed opportunities where buprenorphine and long-term care should be initiated.

To provide rapid access to opioid use disorder care for patients postoverdose, Cooper University Health Care developed and implemented a novel protocol: Buprenorphine Field Initiation of Rescue Treatment by EMS.[19] Cooper University Health Care provides EMS for Camden, New Jersey, an urban community with high overdose rates. Ambulances are staffed by emergency medical technicians (EMTs) or paramedics with additional support from supervisors and EMS physician response units. For the Buprenorphine Field Initiation of Rescue Treatment program, paramedics received opioid use disorder education through a combination of lectures, literature review, clinic observation, counseling training, written and scenario testing, and direct field observation by EMS physicians.

The program was gradually implemented on advanced life support (ALS) ambulances over 13 months, referred to as buprenorphine-equipped ambulances. Patients who encountered a buprenorphine-equipped ambulance and regained full decisional capacity after an overdose resuscitation, including naloxone, were assessed for on-site buprenorphine treatment. To qualify for buprenorphine, patients needed a naloxone-induced clinical opiate withdrawal scale (COWS)[20] score of more than 5 or were opioid-free for 72 hours prior to this overdose. Patients were ineligible, based on provider interview, if they ingested methadone in the past 48 hours (high-risk of precipitated withdrawal), were pregnant, younger than 18 years old, or were unwilling to provide their name and date of birth for follow-up and tracking. Naloxone was only indicated for respiratory depression or arrest and could only be administered, not dispensed. After assessing a patient, paramedics discussed the case with an EMS physician. If the physician approved, paramedics administered 16 mg of sublingual buprenorphine immediately and monitored the patient for a change in withdrawal symptoms. In addition, paramedics could administer 4 mg ondansetron for nausea and an additional 8 mg sublingual buprenorphine for patients with continued withdrawal symptoms after the initial dose.

Only patients treated with buprenorphine received a substance use disorder clinic appointment for the same or next business day. Paramedics recorded the follow-up appointment on the EMS chart. The substance use disorder clinic provided addiction, psychiatry, social work, and counseling services. Further details on the protocol have been published previously.[19] Polysubstance use is common in the response area in this study and frequently contributes to the patient not fully regaining capacity after naloxone administration. Therefore, it was not used as exclusion criteria or recorded as part of the data set. Instead, its clinical relevance was accounted for by the patient regaining decisional capacity and demonstrating opiate withdrawal. Nonbuprenorphine-equipped ambulance units could not offer substance use disorder clinic appointments, and only patients eligible and agreeable to receiving buprenorphine had a COWS score documented. Prior to this program, EMS could only offer printed materials with outpatient resources. Leave-behind naloxone is now authorized for EMS in our system but was not allowed during the study period.

Goals of This Investigation

This study evaluates the results of EMS buprenorphine and prompts substance use disorder treatment in the out-of-hospital setting. We hypothesized that patients who encountered a paramedic trained in patient engagement, who could initiate medication for opioid use disorder and provide a next-day appointment after an acute overdose, would demonstrate decreased opioid withdrawal symptoms, decreased subsequent overdoses, and increased outpatient follow-up rates versus standard care.

MATERIALS AND METHODS

Study Design and Setting

This was a retrospective comparison group study on implementing the buprenorphine-equipped ambulance intervention. The buprenorphine-equipped ambulance protocol was introduced in August 2019 and was initially implemented on 1 ALS ambulance. It was expanded in a staggered nature to all 5 ALS units by November 2020. EMS dispatches for suspected opioid overdose events were made based on the proximity and availability of an ALS ambulance, and the buprenorphine-equipped ambulance was not prioritized for these encounters. Buprenorphine training and the ability to arrange next-day substance use disorder follow-up were the only differences between ALS units. This method of dispatching the ALS units to encounters provides a natural experiment to evaluate the influence of the buprenorphine-equipped ambulance on opioid use disorder-related outcomes.

Data Collection

To examine the association between exposure to the buprenorphine-equipped ambulance intervention and opioid use disorder-related outcomes, we used patient-level data from the EMS electronic health record to identify out-of-hospital opioid overdose responses requiring naloxone administration during the study period of August 2019 to December 2020. Data included sociodemographic characteristics, EMS provider level, scene time, buprenorphine dose, refusal or ED transport, and clinic follow-up. For patients transported to Cooper University Health Care, data were supplemented by information from the hospital's electronic medical record: Epic to identify the patient's comorbid medical conditions, health insurance coverage, subsequent opioid-related overdoses within 24 hours and 7 days, and subsequent engagement in substance use disorder treatment. For patients transported to other hospitals in Camden, we supplemented their data with information from the Camden Coalition Health Information Exchange: a database with patient-level data from area health care entities. We used medical record numbers to match participants across datasets. When medical record numbers were unavailable, we used names and dates of birth. Matching was biased toward confirming a match either through medical record number or date of birth whenever possible. The Institutional Review Boards at Johns Hopkins School of Public Health and Cooper University Health Care approved this project. The final dataset was deidentified before the analysis began.

Selection of Participants

During the study period, 1,841 opioid overdose ALS encounters requiring naloxone administration were recorded in EMS electronic health record. Overall, 1,230 were treated by a buprenorphine-equipped ambulance, and 611 were treated by a nonbuprenorphine-equipped ambulance ALS unit. The buprenorphine-equipped ambulances saw a larger number of overdoses because the protocol was implemented gradually, focusing on dayshift units first. As the study period progressed, an overdose patient became more likely to encounter a buprenorphine-equipped ambulance. Among individuals treated by the buprenorphine-equipped ambulance, 94 were identified as receiving buprenorphine under the protocol.

To select the study sample, we used a matching procedure that allowed us to determine the consequences of 2 interventions: (1) being "exposed" to a buprenorphine-equipped ambulance unit and (2) receiving buprenorphine in the field. We also could extract full records for only a subset of individuals and so needed a matching procedure that would allow us to answer both questions. Comparison groups were selected thoughtfully and carefully to reduce confounding and with a feasible amount of data extraction. Notably, there are fewer confounding concerns when comparing patients seen by buprenorphine-equipped ambulances and nonbuprenorphine-equipped ambulances, given the way ALS units are dispatched to encounters. Thus, we used the buprenorphine-equipped ambulance versus the nonbuprenorphine-equipped ambulance comparison as the primary comparison. Second, we compared individuals who were offered buprenorphine in the field and received it with those who had the opportunity to receive buprenorphine but did not receive it in the field. Finally, we used this comparison as the secondary analysis because we were also interested in treatment with buprenorphine.

Given that we had limited resources for data extraction, we oriented our matching and sample selection around the smallest group of interest (ie, the individuals who were seen by a buprenorphine-equipped ambulance and received buprenorphine). First, we included all 94 individuals in our study period seen by a buprenorphine-equipped ambulance who received buprenorphine. Second, we selected a random sample of 100 buprenorphine-equipped ambulance cases that did not receive buprenorphine. We chose 100 patients to have a group similar in size to group one. Random sampling was used at this step to obtain a representative sample of the individuals who could have but elected not to receive buprenorphine in the field. Third, we performed matching to identify 194 cases seen by nonbuprenorphine-equipped ambulances with similar age,

sex, and race/ethnicity distributions as the 194 buprenorphine-equipped ambulance cases (the 94 who had received the protocol and 100 who had not). After the initial selection of controls, an additional round of sample exclusions was performed to remove cases with incomplete records in the electronic health record or health information exchange that would prevent complete follow-up. This yielded a final sample of 74 cases that received buprenorphine under the buprenorphine-equipped ambulance protocol, 43 cases that were seen by the buprenorphine-equipped ambulance and did not receive buprenorphine, and 123 cases from a nonbuprenorphine-equipped ambulance unit. Figure 1 displays the data filtering approach. The appendix section includes more details on the matching process and the demographics of the full sample before matching occurred (additional statistical information is provided in Appendix E1 and Table E1, available at http://www.annemergmed.com).

Outcomes and Measures

The primary outcomes of interest were reduction in withdrawal symptoms, opioid use disorder treatment engagement, and subsequent opioid overdose. To measure opioid use disorder treatment engagement, we tracked substance use disorder clinic attendance by recording any clinic visits that occurred within 30 days of the encounter. Subsequent opioid-related overdoses were tracked using data from EMS electronic health records on overdoses within 24 hours and 7 days of the encounter. We also

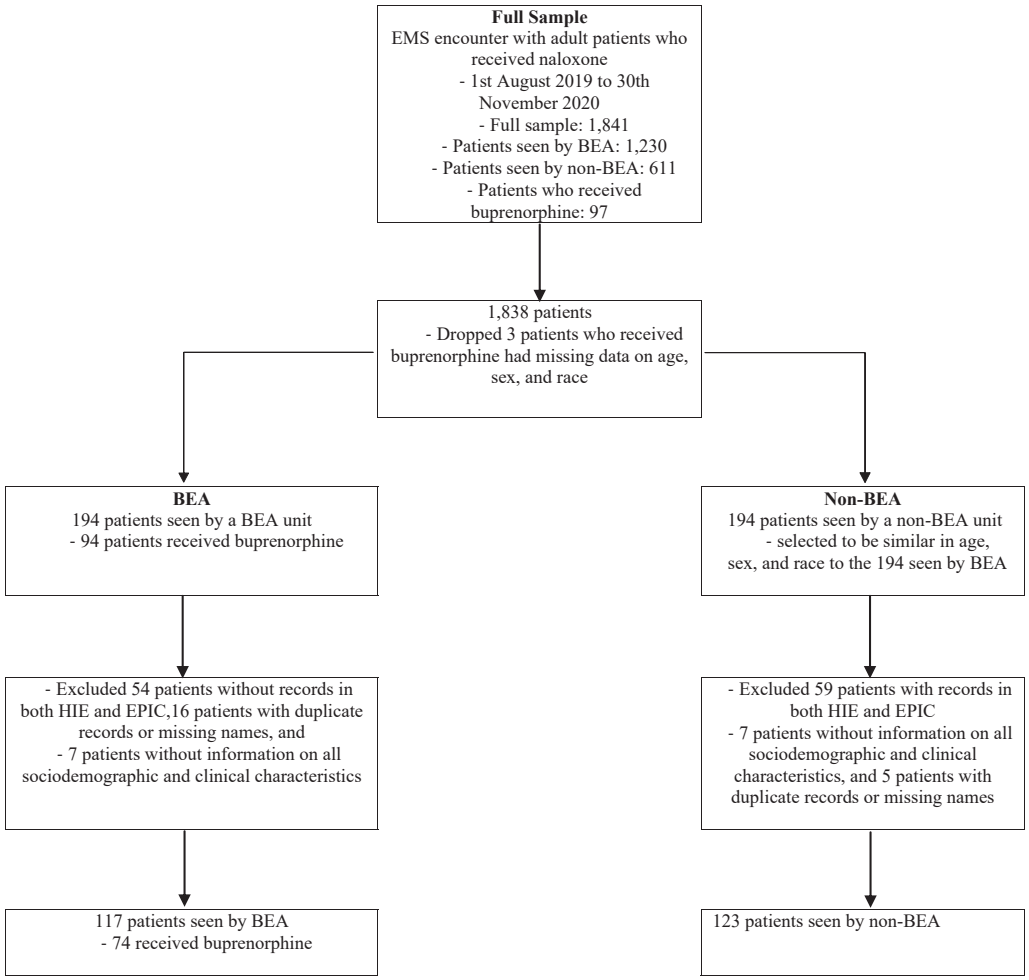


Figure 1. Patients who were visited by a Cooper University Health Care advanced life support EMS team for an opioid overdose requiring naloxone administration during the study period and patients in the analysis. *BEA,* buprenorphine-equipped ambulance; *HIE,* health information exchange. Notes: BEA denotes a buprenorphine-equipped advanced life support ambulance. HIE denotes the Camden Coalition Health Information Exchange database, and EPIC denotes the Cooper University Health Care electronic health records. We used a matching process to select 194 patients seen by a BEA unit and 194 seen by a non-BEA unit.

examined transport to the ED, time EMS spent on the scene, and naloxone doses administered.

Included sociodemographic and clinical characteristics were sex (male and female), age, race/ethnicity (non-Hispanic White, non-Hispanic African American, and other races), and insurance status (Medicaid, Medicare, uninsured, and other insurance coverage). In addition, clinical characteristics included mental illness, comorbid substance use, and key medical comorbidities, such as hypertension, diabetes, and obesity.

Primary Data Analysis

To examine the association between exposure to the buprenorphine-equipped ambulance intervention and opioid-related outcomes, we analyzed the sample of individuals who were seen by a buprenorphine-equipped ambulance unit (N=117) and those seen by a nonbuprenorphine-equipped ambulance unit (N=123). To examine characteristics between individuals who were seen by a buprenorphine-equipped ambulance unit and those seen by a nonbuprenorphine-equipped ambulance unit, we calculated the standardized mean difference. We then estimated unadjusted and adjusted regression models predicting each outcome to assess the association between exposure to a buprenorphine-equipped ambulance and opioid-related outcomes. The key predictor of interest was an indicator for being treated by a buprenorphine-equipped ambulance versus a nonbuprenorphine-equipped ambulance; covariates include demographic and clinical characteristics. Finally, we estimated logistic regressions to model binary outcomes and least squares regressions to model continuous outcomes (time on scene and naloxone). These estimations are analogous to an "as assigned" (intent to treat) analysis.

In a secondary analysis, to further assess the buprenorphine-equipped ambulance intervention, we restricted our sample to individuals who were seen by a buprenorphine-equipped ambulance unit. First, we compared the characteristics of those who received buprenorphine from a buprenorphine-equipped ambulance (N=74) to those who did not receive buprenorphine from a buprenorphine-equipped ambulance (N=43). Second, to further understand the EMS encounter for patients who received buprenorphine, we examined the unadjusted prevalence of outcomes only measurable among those who received buprenorphine from a buprenorphine-equipped ambulance such as side effects from buprenorphine and initial and repeated COWS. Lastly, to assess the association between receiving buprenorphine in the field and the opioid use disorder-related outcomes among patients seen by a buprenorphine-equipped ambulance unit, we estimated unadjusted and adjusted regressions using an indicator for medication receipt as the exposure variable.

RESULTS

Exposure to a Buprenorphine-Equipped Ambulance

Table 1 presents summary statistics of individuals seen by a buprenorphine-equipped ambulance and a nonbuprenorphine-equipped ambulance. Individuals treated by buprenorphine-equipped ambulance and nonbuprenorphine-equipped ambulance were not significantly different in sex, age, race/ethnicity, medical comorbidities, or insurance coverage.

Table 2 reports the unadjusted means/proportions of study outcomes for individuals seen by a buprenorphine-equipped ambulance and individuals seen by a nonbuprenorphine-equipped ambulance and the regression estimates of the association between exposure to a buprenorphine-equipped ambulance and outcomes. In unadjusted regression analyses, we found that assessment and treatment by a buprenorphine-equipped ambulance were associated with greater odds of engaging in opioid use disorder treatment within 30 days of an EMS encounter. This was compared to similar individuals evaluated by a nonbuprenorphine-equipped ambulance (unadjusted odds ratio [OR]: 5.62, 95% confidence interval [CI]: 2.36 to 13.39), and this association increased slightly when adjusting for sociodemographic and clinical characteristics (adjusted odds ratio [aOR]: 7.24, 95% CI: 2.85 to 18.40). In addition, individuals evaluated by a buprenorphine-equipped ambulance and individuals not evaluated by a buprenorphine-equipped ambulance had similar subsequent 24-hour and 7-day overdose rates (aOR: 1.65, 95% CI: 0.22 to 12.69, aOR: 0.71, 95% CI: 0.31, 1.60, respectively).

Buprenorphine-equipped ambulance exposure was associated with changes in other processes of care outcomes, such as reduced odds of transport (aOR: 0.53, 95% CI: 0.31 to 0.90), increased total dose of naloxone of 0.41 mg (95% CI: 0.09 to 0.72), and an average scene time increase of 6.12 minutes (95% CI: 3.82 to 8.42). In addition, the buprenorphine-equipped ambulance intervention was associated with an increase in the average scene EMS time. The increase in time was greater for individuals who refused transport compared to those transported by EMS (4.84 minutes [95% CI: 1.42 to 8.25] and 8.55 minutes [95% CI: 5.25 to 11.85], respectively).

Receipt of Buprenorphine from a Buprenorphine-Equipped Ambulance

Table 3 details buprenorphine-equipped ambulance encounters. Individuals who received buprenorphine

Table 1. Characteristics of the study sample of patients seen by buprenorphine-equipped ALS units, buprenorphine-equipped ambulance, and ALS units that were unequipped to administer buprenorphine (nonbuprenorphine-equipped ambulance).

Type of Unit	Buprenorphine-Equipped Ambulance	Nonbuprenorphine-Equipped Ambulance	
Observations (N)	**117**	**123**	**240**
	Proportion/Mean (SD)	**Proportion/Mean Mean (SD)**	**Standardized Mean Difference**
Variables			
Sex			
Male	0.77 (0.42)	0.70 (0.46)	0.16
Female	0.22 (0.42)	0.30 (0.46)	0.18
Age			
(Range 18-81)	44.56 (12.07)	44.03 (11.80)	-0.04
Race/ethnicity			
Non-Hispanic White	0.38 (0.49)	0.35 (0.48)	0.07
Non-Hispanic African American	0.46 (0.50)	0.44 (0.50)	0.05
Other races	0.15 (0.36)	0.21 (0.41)	0.15
Comorbidities			
Key medical	0.58 (0.50)	0.55 (0.50)	0.06
Mental illness	0.52 (0.50)	0.48 (0.50)	0.08
Substance use disorder	0.79 (0.41)	0.66 (0.48)	0.29
Insurance coverage			
Medicaid	0.84 (0.37)	0.80 (0.40)	0.09
Medicare	0.07 (0.25)	0.09 (0.29)	0.08
Other insurance	0.03 (0.16)	0.06 (0.23)	0.16
No insurance	0.07 (0.25)	0.05 (0.22)	0.08

SD, standard deviation.

Notes: Group means are reported for the continuous variables. Group proportions are reported for the binary variables. Key medical comorbidities are HIV, AIDS, hepatitis A hepatitis B, hepatitis B, hepatitis C, endocarditis, chronic pulmonary disease, obesity, hypothyroidism, diabetes, and other conditions (traumatic brain injury, seizures, cancer, coronary artery disease, stroke, hypertension, asthma, gastroesophageal reflux disease, anemia, hyperlipidemia, Grave disease, fibromyalgia, chronic kidney disease, or atrial fibrillation).

(N=74) were generally similar to those who did not receive it (N=43) in terms of sex, age, race/ethnicity, medical comorbidities, and insurance coverage. However, for EMS encounters where a patient received buprenorphine from a buprenorphine-equipped ambulance, the initial COWS score was threefold higher than the repeated COWS score: 9.27 initial and 3.16 at follow-up. Most individuals (79%) received 16 mg of buprenorphine, while 21% received 24 mg.

Receiving buprenorphine was associated with greater odds of engaging in substance use disorder treatment within 30 days of an encounter than individuals who did not receive buprenorphine from the buprenorphine-equipped ambulance (Table 4, aOR: 12.83, 95% CI: 2.94 to 55.98). This resulted in 42% attending a clinic appointment. Individuals who received buprenorphine and individuals who did not receive buprenorphine had similar subsequent 7-day overdose and ED transport rates (aOR: 0.49, 95% CI: 0.14 to 1.75; aOR: 0.82, 95% CI: 0.36 to1.87, respectively). Among individuals seen by a buprenorphine-equipped ambulance, receiving buprenorphine was associated with an increased scene time mean of 9.82 minutes (95% CI: 6.63 to 13.01) and associated with an increased naloxone dose of 0.78 mg (95% CI: 0.16 to 1.40).

LIMITATIONS

Several limitations are worth considering. First, our setting may have several important features that affect its generalizability to other communities. Camden is disproportionately low-income and has experienced a major spike in fentanyl-involved overdoses.[21] Camden has benefited from a comprehensive hospital-based addiction medicine program, an ED providing buprenorphine since 2016, and a single EMS service integrated within the health system. Opiate overdoses are common across the city, but there is the possibility that geographic differences between ALS units' primary coverage areas could have influenced

Table 2. Association between being seen by buprenorphine-equipped advanced life support unit buprenorphine-equipped ambulance and changes in substance use disorder-related outcomes.

Type of Unit	Buprenorphine-Equipped Ambulance	Nonbuprenorphine-Equipped Ambulance			
Observations (N)	**117**	**123**	**240**	**240**	**240**
	Mean/Proportion (SD)	**Mean/ Proportion (SD)**	**Unadjusted Difference in Means [95% CI]**	**Unadjusted Odds Ratio**	**Adjusted Odds Ratio**
Primary Outcomes					
In treatment within 30 days	0.26 (0.44)	0.06 (0.23)	0.20 [0.11,0.29]	5.62 [2.36,13.39]	7.24 [2.85,18.40]
Overdosed in 24 hours	0.03 (0.16)	0.02 (0.13)	0.01 [-0.03,0.05]	1.58 [0.26,9.62]	1.65 [0.22,12.69]
Overdosed in 7 days	0.12 (0.33)	0.14 (0.35)	-0.02 [-0.11,0.07]	0.84 [0.39,1.79]	0.71 [0.31,1.60]
Secondary Outcomes					
Transport to ED	0.49 (0.50)	0.63 (0.49)	-0.14 [-0.26, -0.01]	0.63 [0.38,1.03]	0.53 [0.31,0.90]
	Mean/Proportion (SD)	**Mean/ Proportion (SD)**	**Unadjusted difference in means [95% CI]**	**Adjusted difference in means [95% CI]**	
Minutes on the scene	21.08 (9.04)	14.73 (8.24)	6.35 [4.15,8.54]	6.12 [3.82,8.42]	
Minutes on the scene if Transported to ED	21.79 (9.33)	16.60 (9.02)	5.19 [2.03,8.36]	4.84 [1.42,8.25]	
Minutes on the scene if Refused ED transport	20.40 (8.78)	11.33 (5.30)	9.07 [6.14,12.00]	8.55 [5.25,11.85]	
Total naloxone by any route (mg)	2.52 (1.55)	2.14 (0.70)	0.38 [0.08,0.69]	0.41 [0.09,0.72]	
Total naloxone by Intramuscular route	1.99 (0.27)	2.03 (0.47)	-0.03 [-0.14,0.07]	-0.03 [-0.14,0.09]	

ALS, advanced life support; *CI,* confidence interval; *ED,* emergency department; *SD,* standard deviation.

Notes: The unit of observation is a patient. Continuous outcomes were modeled using least squares, and binary outcomes were modeled using logistic regression. All regressions estimated the adjusted difference in means controlled for sex, age, race/ethnicity, medical comorbidities, and insurance coverage. Key medical comorbidities are HIV, AIDS, hepatitis A hepatitis B, hepatitis B, hepatitis C, endocarditis, chronic pulmonary disease, obesity, hypothyroidism, diabetes, and other conditions (traumatic brain injury, seizures, cancer, coronary artery disease, stroke, hypertension, asthma, gastroesophageal reflux disease, anemia, hyperlipidemia, Grave disease, fibromyalgia, chronic kidney disease, or atrial fibrillation).

the intervention. This was mitigated, in part, because of units swapping areas frequently. Also, the amount of naloxone administered may affect the level of responsiveness at lower doses or the level of withdrawal-induced at higher doses, affecting patients' ability or willingness to engage in the protocol. Locally, the predominant routes of naloxone administration were intramuscular for paramedics and intranasal for other responders, and the most common dose was 2 mg generating an average COWS score of 9, indicating moderate withdrawal.

Incomplete data for patients who refused transport to the hospital and difficulty tracking patients across electronic medical records may have introduced bias. That 37% of records could not be used after we selected the study sample indicates the limitations of using administrative data such as EMS records and the challenges in studying this population. The issues of incomplete data might have been mitigated by performing a pilot program with the data abstraction form.

Data collection limitations included less complete health records for patients who refused hospital transport and difficulty tracking some patients across multiple databases owing to a lack of unique identifiers. Furthermore, the health information exchange only includes health care entities in Camden, not entities in its surrounding

Table 3. Characteristics of individuals who did and did not receive buprenorphine, among those exposed to a buprenorphine-equipped ambulance unit.

Type of Unit	Received Buprenorphine Mean/Proportion (SD)	Did Not Receive Buprenorphine Mean/Proportion (SD)	Standardized Mean Difference
Observations	74	43	117
Sex			
Male	0.78 (0.41)	0.74 (0.44)	0.09
Female	0.22 (0.41)	0.23 (0.43)	0.04
Age			
(Range 18-81)	44.34 (10.72)	44.95 (14.23)	0.05
Race/ethnicity			
Non-Hispanic White	0.41 (0.49)	0.35 (0.48)	0.11
Non-Hispanic African American	0.47 (0.50)	0.44 (0.50)	0.06
Other races	0.12 (0.33)	0.21 (0.41)	0.24
Comorbidities			
Key medical	0.54 (0.50)	0.65 (0.48)	0.23
Mental illness	0.51 (0.50)	0.53 (0.50)	0.04
Substance use disorder	0.78 (0.41)	0.79 (0.41)	0.02
Insurance coverage			
Medicaid	0.82 (0.38)	0.86 (0.35)	0.10
Medicare	0.04 (0.20)	0.12 (0.32)	0.28
Other insurance	0.04 (0.20)	0.00 (0.00)	0.29
No insurance	0.09 (0.29)	0.02 (0.15)	0.31
Experience during EMS encounter			
No buprenorphine side effects	0.96 (0.20)		
16 mg of buprenorphine	0.79 (0.41)		
24 mg of buprenorphine	0.21 (0.41)		
Reported Initial COWS score	9.27 (4.64)		
Reported Repeat COWS score	3.16 (2.55)		
Attended scheduled appointment	0.42 (0.50)		

COWS, clinical opiate withdrawal scale; *EMS,* Emergency Medical services.

Notes: Group means are reported for the continuous variables. Group proportions are reported for the binary variables. The study sample includes individuals who did and did not receive buprenorphine among those exposed to a buprenorphine-equipped ambulance unit. First, we included all 94 individuals in our time period seen by a buprenorphine-equipped ambulance who received buprenorphine. Second, for record abstraction purposes, we randomly selected 100 patients who were seen by a buprenorphine-equipped ambulance unit but did not receive buprenorphine. Finally, after the initial selection of controls, an additional round of sample exclusions was performed to remove cases with incomplete records in the electronic health record or health information exchange that would prevent complete follow-up. Key medical comorbidities are HIV, AIDS, hepatitis A hepatitis B, hepatitis B, hepatitis C, endocarditis, chronic pulmonary disease, obesity, hypothyroidism, diabetes, and other conditions (traumatic brain injury, seizures, cancer, coronary artery disease, stroke, hypertension, asthma, gastroesophageal reflux disease, anemia, hyperlipidemia, Grave disease, fibromyalgia, chronic kidney disease, or atrial fibrillation).

communities. In addition, data abstractors were not blinded to the purpose of the study; but all coding decisions were reviewed by members of the study team. Finally, while the program implementation provides a plausible natural experiment, the intervention was not experimentally controlled. It is possible that effectiveness was driven by factors other than the provision of buprenorphine, such as greater commitment to supporting overdose patients among ambulances implementing the protocol.

DISCUSSION

This study evaluated a novel protocol that authorized EMS personnel to administer buprenorphine to opioid overdose patients in the field and provide a next-day substance use disorder clinic appointment. The intervention was associated with a nearly 6-fold increase in the odds of engagement with treatment within 30 days. While buprenorphine has proven efficacy in outpatient treatment and increasing ED data demonstrating similar positive outcomes, it was

Table 4. Association between receiving buprenorphine from a buprenorphine-equipped advanced life support unit buprenorphine-equipped ambulance and changes in opioid use disorder-related outcomes.

Medication Receipt	Received Buprenorphine	Did Not Receive Buprenorphine			
Observations	**74**	**43**	**117**	**117**	**117**
	Mean (SD)	**Mean (SD)**	**Unadjusted Difference In Means [95% CI]**	**Unadjusted Odds Ratio**	**Adjusted Odds Ratio**
Variable					
Primary Outcomes					
In Treatment within 30 days	0.35 (0.48)	0.09 (0.29)	0.26 [0.10,0.42]	5.28 [1.70,16.42]	12.83 [2.94,55.98]
Overdosed in 24 hours	0.01 (0.12)	0.05 (0.21)	-0.03 [-0.09,0.03]	0.28 [0.02,3.19]	- -
Overdosed in 7 days	0.09 (0.29)	0.16 (0.37)	-0.07 [-0.19,0.06]	0.54 [0.17,1.65]	0.49 [0.14,1.75]
Secondary Outcomes					
Transport to ED	0.46 (0.50)	0.53 (0.50)	-0.08 [-0.27,0.12]	0.74 [0.35,1.57]	0.82 [0.36,1.87]
			Unadjusted Difference In Means [95% CI]	**Adjusted Difference In Means [95% CI]**	
Minutes on the scene	24.61 (8.46)	15.00 (6.44)	9.61 [6.65,12.57]	9.82 [6.63,13.01]	
Minutes on the scene if Transported to ED	25.68 (9.23)	16.04 (6.00)	9.63 [5.25,14.01]	10.93 [5.76,16.10]	
Minutes on the scene if Refused ED transport	23.70 (7.75)	13.80 (6.88)	9.90 [5.80,14.00]	10.09 [5.57,14.62]	
Total naloxone by any route (milligram)	2.78 (1.87)	2.07 (0.47)	0.72 [0.14,1.29]	0.78 [0.16,1.40]	
Total naloxone by Intramuscular route	2.02 (0.31)	1.96 (0.18)	0.06 [-0.05,0.17]	0.01 [-0.09,0.11]	

CI, confidence interval; *ED,* emergency department; *SD,* standard deviation.

Notes: The unit of observation is a patient. Continuous outcomes were modeled using least squares, and binary outcomes were modeled using logistic regression. All regressions estimated the adjusted difference in means controlled for sex, age, race/ethnicity, medical comorbidities, and insurance coverage. Key medical comorbidities are HIV, AIDS, hepatitis A hepatitis B, hepatitis B, hepatitis C, endocarditis, chronic pulmonary disease, obesity, hypothyroidism, diabetes, and other conditions (traumatic brain injury, seizures, cancer, coronary artery disease, stroke, hypertension, asthma, gastroesophageal reflux disease, anemia, hyperlipidemia, Grave disease, fibromyalgia, chronic kidney disease, or atrial fibrillation).

untested in the out-of-hospital setting immediately after overdose.

Patients who received buprenorphine accepted ED transport less often than other overdose patients. While the reasons for this increased refusal rate are unclear, the out-of-hospital protocol was created to mirror or exceed ED options whenever possible. Key differences were the different levels of health care providers versus immediate withdrawal treatment and quicker follow-up appointments in the out-of-hospital setting. Locally, reduced ED transport may have limited physician engagement and access to recovery coaches. However, this is difficult to determine because of the significant delay for physician assessment in a busy inner-city ED while the patient is experiencing and potentially unable to cope with withdrawal symptoms. In addition, engagement and addiction services are variable at different EDs and often inconsistently available at different times of the day. Compared to the reality of many US EDs, the ability to access immediate withdrawal treatment and the full gamut of addiction services on the same day or next-day substance use disorder clinic appointments may achieve better outcomes than ED care.

The protocol was not associated with a significant decrease in repeat overdose in either the immediate 24 hours or 7 days compared to the comparison group. Since buprenorphine is a partial agonist with strong receptor affinity and a long half-life, we expected it to have protective effects against repeat overdose. This lack of protection is surprising and requires further study to assess the benefit and ensure, however unlikely, that overdose rates are not higher after buprenorphine administration.

The most direct association with out-of-hospital buprenorphine was the two-thirds reduction in naloxone-induced withdrawal symptoms. Buprenorphine administered immediately after an overdose could theoretically cause additional iatrogenic withdrawal because of buprenorphine displacing the lingering effects of full opioid agonists on mu-opioid receptors. To minimize the risk of buprenorphine inducing further withdrawal, the protocol required patients to exhibit signs of withdrawal indicated by a COWS score >5 to receive buprenorphine. Patients were reassessed for ongoing withdrawal with initial and subsequent COWS scoring, allowing for rapid up-dosing of buprenorphine over a 5 to 15-minute period, ultimately providing 16 to 24 mg. This high dosing strategy is described in the literature, regularly used in hospital settings, and was associated with safety and effectiveness in this study.[22] There was no evidence of buprenorphine precipitated withdrawal.

EMS system dynamics are critical, and any new program must not negatively affect daily operations. The intervention increased scene time by 9.82 minutes, and the buprenorphine-equipped ambulance averaged 6.12 minutes longer scene time across all overdoses when compared to nonbuprenorphine-equipped ambulance units. This was not disruptive to the capacity of the EMS system to answer requests for service and meet response time goals. The initial training for the program was done with a combination of grants and continues as part of orientation or on-shift training to control costs. Currently, the only direct cost, outside of training, is the buprenorphine strips.

The above associations with out-of-hospital buprenorphine and substance use disorder clinic referral suggest that it may offer an effective, safe, and patient-centered way to promote rapid access to treatment and manage withdrawal symptoms for overdose survivors. The protocol builds on and extends low-threshold buprenorphine initiation programs.[23] This approach offers an alternative to gradual dosing protocols often used in office-based settings where patients often suffer opioid withdrawal prior to reaching a maintenance dose and where lack of adherence and attrition from care can be high. Out-of-hospital buprenorphine has the additional benefit of reaching patients who decline transport to the hospital and who may never otherwise interact with the health care system. Opioid use disorder patients post overdose represent a high-risk population who are less likely to engage in treatment and more likely to return to using illicit opioids following precipitated withdrawal after naloxone resuscitation. Notably, the patients receiving out-of-hospital buprenorphine in this study, like all the patients in the study, were predominantly publicly insured, non-White, and had a high burden of mental and physical comorbidities. The program's viability depends on investment in the EMS workforce and linkages to physicians with expertise in EMS and addiction medicine. Investments from payors (eg, Medicaid) and clinical systems can boost the reach and sustainability of this model.

In conclusion, patients who encountered paramedics trained to administer buprenorphine and able to arrange prompt substance use disorder treatment after an acute opioid overdose demonstrated a decrease in opioid withdrawal symptoms, an increase in outpatient addiction follow-up care, and showed no difference in repeat overdose. In addition, patients receiving buprenorphine in the out-of-hospital setting did not experience precipitated withdrawal. Like the ED medication for opioid use disorder programs that inspired it, EMS buprenorphine may be a promising new link to long-term recovery.

Supervising editor: Lewis S. Nelson, MD. Specific detailed information about possible conflict of interest for individual editors is available at https://www.annemergmed.com/editors.

Author affiliations: From the Department of Emergency Medicine (Carroll, Salzman, Murphy, Haroz), and Division of Addiction (Heil, Baston), Cooper University Health Care, Camden, NJ; Johns Hopkins Bloomberg School of Public Health, Baltimore, MD (Solomon, Saloner, Stuart, Patel); Harvard University Institute for Quantitative Social Science, Cambridge, MA (Greifer).

Authorship: All authors attest to meeting the four ICMJE.org authorship criteria:(1) Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND (2) Drafting the work or revising it critically for important intellectual content; AND (3) Final approval of the version to be published; AND (4) Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Author contributions: RH, GC, BS, EAS, and KS conceived the concept and design of the study. BS and EAS obtained research funding. BS, GC, EAS, and KS supervised the data collection. GC, BS, EAS, KS, NG, JH, and EM undertook data acquisition, analysis, or interpretation of data. KS and NG provided statistical advice on study design and analyzed the data. RH, GC, BS, JH, KS, and EAS

drafted the manuscript, and all authors contributed substantially to its revision. GC and KS take responsibility for the paper as a whole.

Funding and support: By *Annals* policy, all authors are required to disclose any and all commercial, financial, and other relationships in any way related to the subject of this article as per ICMJE conflict of interest guidelines (see www.icmje.org). This study was supported by the Bloomberg Overdose Initiative.

Publication dates: Received for publication March 16, 2022. Revisions received May 23, 2022, and June 28, 2022. Accepted for publication July 7, 2022.

Drs. Carroll and Solomon are cofirst authors.

REFERENCES

1. Zozula A, Neth MR, Hogan AN, et al. Non-transport after prehospital naloxone administration is associated with higher risk of subsequent non-fatal overdose. *Prehosp Emerg Care*. 2022;26(2):272-279.
2. Leshner AI, Dzau VJ. Medication-based treatment to address opioid use disorder. *JAMA*. 2019;321(21):2071-2072.
3. Sordo L, Barrio G, Bravo MJ, et al. Mortality risk during and after opioid substitution treatment: systematic review and meta-analysis of cohort studies. *BMJ*. 2017;357:j1550-j1551.
4. Kilaru AS, Xiong A, Lowenstein M, et al. Incidence of treatment for opioid use disorder following nonfatal overdose in commercially insured patients. *JAMA Netw Open*. 2020;3(5):e205852-e205853.
5. Frazier W, Cochran G, Lo-Ciganic WH, et al. Medication-assisted treatment and opioid use before and after overdose in Pennsylvania Medicaid. *JAMA*. 2017;318(8):750-752.
6. Koyawala N, Landis R, Barry CL, et al. Changes in outpatient services and medication use following a non-fatal opioid overdose in the West Virginia Medicaid program. *J Gen Intern Med*. 2019;34(6):789-791.
7. Larochelle MR, Bernson D, Land T, et al. Medication for opioid use disorder after nonfatal opioid overdose and association with mortality: a cohort study. *Ann Intern Med*. 2018;169(3):137-145.
8. D'Onofrio G, O'Connor PG, Pantalon MV, et al. Emergency department–initiated buprenorphine/naloxone treatment for opioid dependence: a randomized clinical trial. *JAMA*. 2015;313(16):1636-1644.
9. D'Onofrio G, Edelman EJ, Hawk KF, et al. Implementation facilitation to promote emergency department-initiated buprenorphine for opioid use disorder: protocol for a hybrid type III effectiveness-implementation study (Project ED HEALTH). *Implement Sci*. 2019;14(1):48-49.
10. Rhee TG, D'Onofrio G, Fiellin DA. Trends in the use of buprenorphine in US emergency departments, 2002-2017. *JAMA Netw Open*. 2020;3(10):e2021209-e2021210.
11. Champagne-Langabeer T, Bakos-Block C, Yatsco A, et al. Emergency medical services targeting opioid user disorder: an exploration of current out-of-hospital post-overdose interventions. *J Am Coll Emerg Physicians Open*. 2020;1(6):1230-1239.
12. Wakeman SE, Larochelle MR, Ameli O, et al. Comparative effectiveness of different treatment pathways for opioid use disorder. *JAMA Netw Open*. 2020;3(2):e1920622-e1920623.
13. Levine M, Sanko S, Eckstein M. Assessing the risk of prehospital administration of naloxone with subsequent refusal of care. *Prehosp Emerg Care*. 2016;20(5):566-569.
14. Simon R, Snow R, Wakeman S. Understanding why patients with substance use disorders leave the hospital against medical advice: a qualitative study. *Subst Abus*. 2020;41(4):519-525.
15. Bergstein RS, King K, Melendez-Torres GJ, et al. Refusal to accept emergency medical transport following opioid overdose, and conditions that may promote connections to care. *Int J Drug Policy*. 2021;97:103296-103297.
16. Glenn MJ, Rice AD, Primeau K, et al. Refusals after prehospital administration of naloxone during the COVID-19 pandemic. *Prehosp Emerg Care*. 2021;25(1):46-54.
17. Rock P, Singleton M. EMS heroin overdoses with refusal to transport and impacts on ED overdose surveillance. Online J Public Health Inform. 2019;11.
18. Naloxone (Narcan) incidents. In: New Jersey Department of Health. Patient Disposition; 2019:2021. Accessed August 25, 2022. https://www.state.nj.us/health/populationhealth/opioid/
19. Carroll GG, Wasserman DD, Shah AA, et al. Buprenorphine field initiation of ReScue treatment by emergency medical services (Bupe first EMS): a case series. *Prehosp Emerg Care*. 2021;25(2):289-293.
20. Wesson DR, Ling W. The Clinical Opiate Withdrawal Scale (COWS). *J Psychoact Drugs*. 2003;35(2):253-259.
21. NJCARES Dashboard of Opioid-Related Data and Information; vol 2021. NJ: Office of the Attorney General. Accessed August 25, 2022. https://www.njoag.gov/programs/nj-cares/
22. Herring AA, Schultz CW, Yang E, et al. Rapid induction onto sublingual buprenorphine after opioid overdose and successful linkage to treatment for opioid use disorder. *Am J Emerg Med*. 2019;37(12):2259-2262.
23. Jakubowski A, Fox A. Defining low-threshold buprenorphine treatment. *J Addict Med*. 2020;14(2):95-98.

COUNTY OF SAN LUIS OBISPO HEALTH AGENCY
PUBLIC HEALTH DEPARTMENT
Nicholas Drews *Health Agency Director*
Penny Borenstein, MD, MPH *Health Officer/Public Health Director*

MEETING DATE	May 15th, 2025
STAFF CONTACT	Eric Boyd
SUBJECT	Prehospital Determination of Death/Do Not Resuscitate (DNR)/End of Life Care Policy #125 Revision
SUMMARY	The Policy #125 (last rev. 4/15/2017) revisions were deemed necessary to address issues related to the interpretation of current obvious death criteria. Proposed changes are intended to clarify procedures on how death is determined in the field, not overhaul current practices: - Rigor removed from obvious death criteria and must be confirmed present in jaw and one or more joints - "Pulseless and apneic" replaced by "signs of life" and introduced a table detailing assessment procedures. Upon review, other revisions are suggested to improve overall policy structure, reduce redundant information, and add clarity where needed: - Moved all procedures from Policy section and added a general policy statement. - Operative DNRs are listed as policy rather than definitions - Added General Guidelines to Procedures - Added language related to pre-term or spontaneous abortion non-viability criteria - Modified MCI procedure language to better distinguish how determination of death differs from non-MCI responses.
REVIEWED BY	Dr. William Mulkerin, SLOEMSA Staff, Operations, Clinical Adivsory
RECOMMENDED ACTION(S)	Review changes, recommend for adoption by EMCC
ATTACHMENT(S)	Draft Policy of : Prehospital Determination of Death/Do Not Resuscitate (DNR)/End of Life Care Policy #125 Revision

POLICY #125: PREHOSPITAL DETERMINATION OF DEATH / DO NOT RESUSCITATE (DNR) / END OF LIFE CARE

I. PURPOSE

A. To establish criteria for the determination of death and/or the termination of resuscitative measures and outline the procedure to be followed by EMS personnel in the County of San Luis Obispo (SLO).

II. DEFINITIONS

- Resuscitation: medical interventions whose purpose is to restore cardiac or respiratory activity at the scene of an emergency, which includes chest compressions (CPR), assisted ventilation (breathing), endotracheal intubation, defibrillation, and cardiotonic drugs (heart stimulating drugs).
  - Such measures do **not** affect the provision of life sustaining measures of artificial nutrition or hydration or the provisions of other emergency medical care, including treatment for pain, difficulty breathing, major bleeding, or other medical conditions.

III. POLICY

A. EMS Personnel may withhold or terminate resuscitation, determine that a patient is dead, and leave the body in custody of medical or law enforcement personnel, according to the procedures outlined in this policy.

B. The following Do Not Resuscitate (DNR) orders are considered operative to withhold resuscitative measures from patients in accordance with their wishes and the procedures outlined in this policy:

1. California Durable Power of Attorney for Health Care (DPAHC): As defined in California Civil Code, Sections 2410-2444 and a health care agent designated therein is present, and that agent requests that resuscitation not be done.
2. Physician Order for Life-Sustaining Treatment (POLST) – Section A “Do not attempt resuscitation/DNR (Allow Natural Death)”
3. A fully executed Natural Death Act Declaration.
4. DNR Medallion: A metal or permanently imprinted insignia, worn by a patient, that has been manufactured and distributed by an organization approved by the California State Emergency Medical Services Authority. The insignia must be imprinted with the words “Do Not Resuscitate, EMS,” “Do Not Resuscitate, or “POLST”.
5. A written document in the patient’s permanent medical record for patients who are in a licensed health care facility, or who are being transferred between licensed health care facilities containing the statement “Do Not Resuscitate”, “No Code”, or “No CPR” **has been read and reviewed** on scene by EMS personnel,

and whose authenticity has been verbally documented by a witness from the health care facility.

C. Nothing in this policy will prevent peace officers from acting within the scope and course of their official duties and pronouncing death as permitted by the policies of their agencies.

IV. PROCEDURE

A. General Guidelines:

1. All patients require rapid and immediate medical evaluation.
2. The highest medical authority on scene shall determine death in the field.
    a. If BLS responders have any questions or uncertainty regarding determination of death, then BLS measures shall be instituted until arrival of ALS personnel.
    b. If ALS responders have questions or uncertainty regarding determination of death, ALS measures shall be instituted until base hospital contact is made and orders are received.
3. EMS Personnel who arrive on scene after the patient is determined to be dead shall not re-evaluate the patient.
4. The Coroner must be contacted when resuscitation has been withheld or terminated:
    a. Deceased patients should not be moved unless directed by the Coroner, to access other patients requiring medical care or assessment, for the safety of First Responders, or for other extraordinary circumstances.
    b. All IV lines, airways, etc., must be left in place whenever resuscitation is terminated in the field.
5. Pre-term deliveries or spontaneous abortions with a gestation ≤20 weeks without signs of life (pulseless, not breathing) are considered non-viable. A first responder may withhold resuscitation on scene.
    c. If uncertain as to gestational age begin resuscitation and establish base hospital contact.
    d. Initiation of resuscitation efforts may be also made based on provider judgement of scene itself.
6. References to “signs of life” in the following sections are based on results from assessment procedures described in Table 1.

Table 1. Assessment procedures for determining absence of signs of life.

CATEGORY	ASSESSMENT PROCEDURES	ABSENT SIGNS OF LIFE
Respiratory	Open the patient's airway. Auscultate lungs or feel for breaths while observing the chest for movement for a minimum of 30 seconds	No spontaneous breathing. No breath sounds on auscultation
Cardiac	Palpate the carotid artery (brachial for infant) for a minimum of 3020 seconds. Auscultate for heart sounds for minimum of 3020 seconds. OR ALS ONLY- Monitor the patient's cardiac rhythm for minimum of 1 minute. Obtain a 6-second strip to be retained with the EMS provider's documentation.	No Pulse No heart sounds. Asystole in 2 leads
Neurological	Check for pupil response to light. Check for response to painful stimuli.	No pupillary response No response to painful stimuli

B. Upon assessment, if the patient is found to be **obviously dead,** based on any of the following conditions, then no further assessment or treatment shall be started, and base hospital contact is not required:

- Decapitation
- Incineration
- Evisceration of heart or brain
- Decomposition

C. Upon assessment, resuscitation may be withheld without the need for base hospital contact if the patient is absent signs of life **AND** any of the following criteria are met:

1. Rigor mortis and/or dependent lividity is present:
    a. Rigor is determined to be present when found in the jaw **and** at one more joint(s).
    b. Dependent lividity is determined by checking dependent areas of the body for purplish-red discoloration.
2. Traumatic arrest and absent signs of life upon EMS arrival.
3. Reliable history of cardiac arrest with no CPR rendered for more than 20 minutes.
4. Severe or multiple injuries clearly incompatible with life.
5. EMS personnel are presented with an operative Do Not Resuscitate (DNR) order.

D. Consultation with Base Hospital is required prior for withholding or terminating resuscitation efforts under the following circumstances:

1. Consultation with the STEMI Base Hospital (French Hospital) physician or MICN:
    a. Termination of resuscitative measures for medical arrest of cardiac origin > 34 kg unresponsive to ALS procedures after 20 min of resuscitation (include a capnography reading if available).
    b. Mechanical ventricular device is present.
2. Consultation with the SLO Trauma Center (SVRMC) physician or MICN:
    a. Traumatic Arrest **with** signs of life upon EMS arrival, unresponsive to ALS procedures and more than 20 minutes estimated time for transport to Trauma Center or closest hospital (refer to protocol #661).
3. Consultation with the closest SLO base hospital physician or MICN:
    a. All other termination orders: e.g. medical arrest of pediatrics <34kg, atraumatic arrests due to non-cardiac origin (refer to protocol #641).

E. An operative **DNR is presented for patient with a pulse and or respiratory effort**:

1. Provide care and treatment within paramedic scope of practice, unless clearly excluded by the documents.
2. POLST - follow the directions noted in Section A - cardiopulmonary resuscitation (CPR) and Section B - medical intervention.
3. Other advanced directives - follow any supportive care and interventions as noted.
4. Consult the Base Hospital if situation or legitimacy of the DNR is unclear.

F. During a **Mass Casualty Incident (MCI)**, determination of death procedures are modified as follows:

1. Utilize START Adult Triage Algorithm and JumpSTART Pediatric Triage Algorithm for the assessment of patients.
2. Base contact is **NOT** necessary for withholding resuscitation efforts or determination of death during an MCI.
3. A triage tag denoting “black” with the time of the initial evaluation and findings must be applied to the patient.

V. DOCUMENTATION

A. The circumstances under which resuscitation was not initiated or was terminated, including results of physical exam, and/or any additional findings such as a lack of heart and lung sounds, fixed and dilated pupils, skin color, ECG tracing and capnography if available.

B. The resuscitation measures performed, if any, and the results thereof.

C. The name of the EMS personnel terminating resuscitative measures or the name of the Base Hospital physician who pronounced the patient.

D. The time of termination or non-initiation of resuscitation.

E. When DNR is present:

1. Name of physician on the DNR.
2. Date the DNR order was signed.
3. Type of DNR - attach copy when possible.
4. Name of the person that confirmed patient identity.
5. Name and certification # of the person and the agency name if determination or resuscitative measures were made by other than the transporting agency.

VI. AUTHORITY

- California Health and Safety Code, Division 2.5
- California Code of Regulations, Title 22, Division 9
- California Probate Code Sections 4780-4785.

VII. REFERENCES

- POLST California
- START Adult Triage Algorithm - CHEMM
- JumpSTART Pediatric Triage Algorithm - CHEMM