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Bridging Gaps in Opioid Use Disorder Treatment: Prehospital and Emergency Department Interventions

Quin W. Buob
Rowan University

Zachary J. Noll
Rowan University

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Quin Buob OMS-II, Zachary Noll OMS-II
Rowan-Virtua School of Osteopathic Medicine

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Background

- **Since 2011, drug overdose has been the leading cause of accidental death in the United States**
  - Two thirds of these deaths are related to opioid drugs [11]
  - The CDC reported that in 2020 overdose related deaths have increased by over 91,000 [10]
  - Non-fatal overdose discharge have a 5.5% 1-year mortality with 22.3% dying within the first 48 hours [10]
- **Access to Buprenorphine/MAT**
  - MAT has been shown to reduce opiate related mortality by over two thirds, but treatment induction remains to be extremely low[10]
  - Access to these resources are extremely limited due to the socioeconomic status, and access to substance use treatment
- **Emergency Department Buprenorphine**
  - Many Emergency departments have begun to use buprenorphine for treating opiate use disorder in the acute settings[16]
  - These initiatives have had variable success based on the robustness of the post-ED resources available to the patients[16]
- **Prehospital Buprenorphine**
  - In 2019, the New Jersey Department of health began to allow paramedics to administer buprenorphine prehospitally in attempts to bridge the gap that exists between the prehospital environment and conventional substance abuse treatment[4]

Significance

- **Frontline of Opioid Epidemic**
  - Both EMS and EDs has had increased encounters with those who suffer from opiate use with the rise in the opioid crisis nationwide
  - EMS and EDs act as the entrance to the healthcare system, and can influence the course that patients progresses through
- **Landmark Study: D'Onofrio, G, et. al 2015**
  - The first randomized control trial that established there is a significant increase in retention to long term treatment for those who received buprenorphine and a referral as opposed to just a referral (the standard of care at the time) [8]
- **Prehospital Use**
  - There has been very little research conducted looking at the effectiveness of prehospital use of buprenorphine
  - The few studies that have been conducted are small non-randomized pilot studies with small sample sized which are not generalizable [4,10,11]
  - Understanding the role that EMS can play as extension of the healthcare system rather than purely an entry way to it.
- **Refusal of Transport**
  - The often-forgotten aspect of the prehospital environment because a significant portion of post-overdose patients' never make it to the hospital [10]
  - The Covid-19 Pandemic has only exasperated this statistic increasing refusal of transport from 15% to 36% [4]
  - Utilizing this resource, and extending EMS beyond purely acute prehospital care is a necessity in order to effectively combat public health crisis[11]

Methodology

Database	Date Searched	Key Word String	Number of Results
Pubmed	11/15/2023	"Prehospital" "Buprenorphine"	11
Pubmed	11/15/2023	"Emergency Department" "Buprenorphine"	633
Pubmed	11/15/2023	"Emergency Medical Services" "Buprenorphine"	322
Pubmed	12/26/2023	"Paramedic" "Buprenorphine"	8
Google Scholar	12/26/2023	"EMS" "Buprenorphine"	16
Pubmed	12/27/2023	"Community Paramedic" "Buprenorphine"	5
Pubmed	12/27/2023	"Emergency Department" "MAT" "Buprenorphine	36
Google Scholar	12/27/2023	"Emergency Department" "Buprenorphine"	126

- **Exclusion Criteria**
  - Published within the last 8 years
  - In the United States
  - Sample demographic >18-year-old
- **Inclusion Criteria**
  - Randomized Control Trial, Retrospective Cohort Study, Observational Study, Retrospective Analysis, Pilot Cohort

Results

- **Prehospital**
  - Overdoses encountered by paramedic equipped to treat substance abuse were 5.62 times more likely to be engaged in addiction treatment within 30 days of encounter [4]
  - Patients who received buprenorphine, from a buprenorphine equipped ambulance, for withdrawal symptoms were 12.83 times more likely to engage in treatment [4]
  - Patients who refused transport to the hospital, but were educated on substance abuse resources by EMS were enrolled in a medication assisted treatment at 30 days [12,11]
- **Emergency Department**
  - About 73% of the patients who were induced with buprenorphine in the emergency department followed up with there initial medication assisted treatment[3, 5, 6, 8, 9,12,13,14]
  - At 30 days, only about 50% of those induced in the ED were retained in treatment, a deviation from the 78% retention established in D'Onofrio[8]
  - There has been a 4x increase in the number of buprenorphine prescription written in the ED, leading to an increase in physicians obtaining the Buprenorphine DEA Waiver [12,14,16]
- **Clinical Opiate Withdrawal Scale (COWS)**
  - One study showed that there was a reduction in COWS score in 96.67% of pt induced with buprenorphine prehospitally. [11]
  - ED induction also showed consistent reduction in COWS score when induced with buprenorphine prior to discharge[3,12]

Discussion

Prehospital

- **Treatment Retention**
  - When EMS is given the tools to assist in the long-term treatment, rather than solely acute settings, there is increase in not only retention to treatment but there is an increase in the number of patients who enter the into the healthcare system and an increase in the willingness to participate their treatment.[4, 10, 11]
- **Addressing the gaps**
  - The increase in the number of transport refusal are only increasing, leading to a larger population of patients who never actually make it to the hospital to receive care.[2, 4]
  - Due to the large number of transport refusals post naloxone reversal, there is a significant population that would not encounter treatment options in-hospital who would benefit from prehospital induction into long-term treatment. [2, 10]
- **Education**
  - These studies also present as a proof-of-concept that prehospital ALS providers (Paramedics, AEMTs, etc.) can be trained and under supervision of a physician can successfully link those suffering from substance to outpatient treatment without the need to first transport patients to the hospital. [4,11]

Emergency Department

- **Buprenorphine Induction**
  - Since the landmark study in 2015, emergency department have consistently shown that they can successfully initiate medication assisted treatment for opioid use disorder and can link it to long term treatment
  - They have also shown multiple ways of carrying out this induction:
    - Providing MAT prescription to subdue withdrawal symptoms until the referral appointment, establishing long term care within a few days of discharge [6, 7, 8]
    - Utilizing the ED Clinical Decision Unit, and utilizing the same providers to initiate treatment and maintain long term MAT management [5, 15]
    - Having the ED directly link the patient to substance use care with a next day referral to treatment center [3, 9, 12, 13, 14]
  - All these methods have worked out with varying success, and remain consistent amongst all methods (Figure 1)

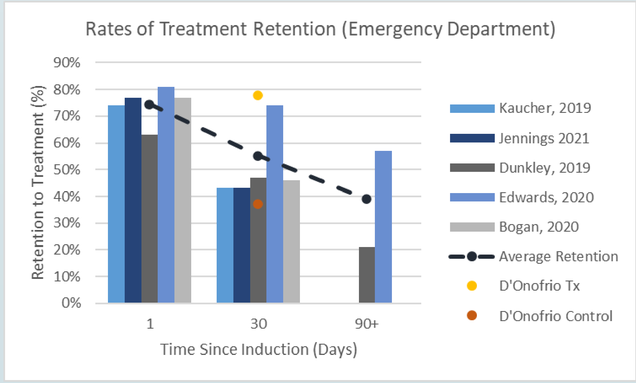

Figure 1. Retention rate to substance abuse treatment at 30 days *, Edwards, 2020 and Dunkley, 2019 checked retention at 90 days and 6 months respectively. Yellow- D'Onofrio treatment group retention (78%), Orange- D'Onofrio control group retention (37%), Black- Average retention to treatment across all studies.

- **Retention Rates**
  - Amongst all studies there were similar retention rates both at the initial follow up visit as well as the at 30 days and beyond, with just above 50% retention on average across all studies.[3, 5, 6, 8, 9,12,13,14]
  - The rates of retention were lower than the initial D'Onofrio study, which could be due to small sample sizes or lack of randomization within the studies (Figure 1).
  - There was also a linear decline retention of patients to treatment over time, which should be explored to ascertain the reasons for this occurrence (Figure 1).
- **Unexpected Outcomes**
  - The implementation of these program in both small and academic emergency rooms has led to an increase in the number of physicians who applied for Buprenorphine DEA Waiver [1, 12, 16]
    - Due to the exposure and extra training, they received by being involved with these institutions [1,12]
    - Increase in the number substance use disorder being seen in the emergency department requiring buprenorphine over the years [16]
  - The highest rates of these physicians were residents within emergency department, with attending physicians remaining hesitant to prescribe out-of-hospital buprenorphine

Future Direction

- **Addressing Limitations**
  - Many of these studies had significant limitation due to small sample sizes and many being retrospective analysis, and lacking randomized control trials
  - Though this protocol has been well studies within emergency departments, buprenorphine is a relatively new addition to the prehospital setting and is not widely researched or understood
  - Protocol Standardization: Each hospital/EMS agency has implemented their own protocols, though they all share similarities, there is no standardization on inclusion criteria for patient, or with how to carry out the treatment
- **Merging the two systems**
  - Both ED and EMS use of buprenorphine have independently shown to be successful in advancing the treatment opioid use disorder, but within the past several years the line between the ED and Prehospital environment have begun to blur, and this can be capitalized with a robust community paramedic programs
  - This is an opportunity for EMS to create a bridge to the hospital in similar ways to how it has been done with traumas and strokes, and instead of working as two separate entities, act as one collaborative system of providers. [11]
- **Social Support**
  - Substance abuse and its subsequent treatment is still often stigmatized within the community, in order to advance and effectively treat substance use disorder

References