

ORIGINAL RESEARCH

Health Policy

Feasibility and outcomes from an integrated bridge treatment program for opioid use disorder

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Abstract

Objective: With a significant proportion of individuals with opioid use disorder not currently receiving treatment, it is critical to find novel ways to engage and retain patients in treatment. Our objective is to describe the feasibility and preliminary outcomes of a program that used emergency physicians to initiate a bridge treatment, followed by peer support services, behavioral counseling, and ongoing treatment and follow-up.

Methods: We developed a program called the Houston Emergency Opioid Engagement System (HEROES) that provides rapid access to board-certified emergency physicians for initiation of buprenorphine, plus at least 1 behavioral counseling session and 4 weekly peer support sessions over the course of 30 days. Follow-ups were conducted by phone and in person to obtain patient-reported outcomes. Primary outcomes included percentage of patients who completed the 30-day program and the percentage for successful linkage to more permanent ongoing treatment after the initial program.

Results: There were 324 participants who initiated treatment on buprenorphine from April 2018 to July 2019, with an average age of 36 (± 9.6 years) and 52% of participants were males. At 30 days, 293/324 (90.43%) completed the program, and 203 of these (63%) were successfully connected to a subsequent community addiction medicine physician. There was a significant improvement (36%) in health-related quality of life.

Conclusion: Lack of insurance is a predictor for treatment failure. Implementation of a multipronged treatment program is feasible and was associated with positive

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patient-reported outcomes. This approach holds promise as a strategy for engaging and retaining patients in treatment.

KEYWORDS

addiction treatment, bridge treatment, buprenorphine, emergency department, opioid use disorder, prehospital emergency care, substance use disorder

1 | INTRODUCTION

1.1 | Background

Deaths from opioid-related overdoses across the United States have reached epidemic proportions, claiming >46,000 lives in 2017.^{1,2} Yet, many people who need treatment are not currently receiving it.³ Opioid-related visits to hospital emergency departments continue to increase, and an estimated 2 million individuals across the United States have opioid use disorder (OUD).⁴ Over 1.23% of all visits to US EDs in 2017 were opioid related, resulting in a total economic burden of \$5 billion to the ED alone.⁵ Timely access to medication for opioid use disorder (MOUD) reduces mortality; however, many communities experience a severe shortage of treatment capacity and access to MOUD.^{6,7} Excessive waitlists for treatment, especially among individuals without health insurance, are barriers to treatment initiation.^{8,9} In the Houston area, patients without insurance typically experience 6–12 week wait times before treatment initiation; moreover, some research suggests >50% of patients will never achieve admission because of excessive wait times.¹⁰ This may represent a substantial portion of the >80% of individuals with OUD who are currently not in treatment.⁴ Lack of treatment could result in increased opioid-related mortality.¹¹

1.2 | Importance

Hospital EDs and prehospital emergency care are often a first point of contact for patients and represent an opportunity to initiate treatment for an individual with OUD.¹² Results from a randomized clinical trial showed buprenorphine initiated for OUD in the ED was associated with longer treatment retention relative to control groups.^{13,14} Furthermore, several studies conducted in large urban EDs found between 40% and 60% of patients who initiated treatment in the ED remained active during the first 30 days of treatment.^{15,16} These results illuminate the need for rapid and accessible OUD treatment including MOUD and other interventions to promote treatment success and retention.

1.3 | Goals of this investigation

This study evaluates a comprehensive bridge program for persons with OUD in Houston, Texas, providing rapid access to buprenorphine with

adjuvant behavioral and peer support services. In this study, we report feasibility and initial outcomes so that others may learn from our study design and implementation.

2 | METHODS

2.1 | Design and setting

We developed a single-arm study based at the University of Texas Health Science Center at Houston (UTHealth). The 9-county Houston metropolitan statistical area is home to over 7.6 million people, one of the nation's largest. Texas reported a 34% increase in population-adjusted opioid-related death rates during the last 5 years and has the lowest number of treatment physicians per capita, about 1.42 providers per 100,000 people.⁷ The city of Houston represents roughly one fifth of total deaths across the state.¹⁷ Such limited treatment capacity necessitated feasibility testing for a new program to help initiate and bridge treatment to avoid excessive wait times for treatment initiation. Collaborators for this program include emergency physicians, multiple public safety agencies (emergency medical services [EMS] and police), social services organizations (recovery centers, public health departments), and a network of independent community addiction medicine physicians. Funding for the program was provided by the Texas Health and Human Services Commission.

2.2 | Selection of participants

Inclusion criteria included patients ≥ 18 years of age who met the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* criteria for OUD. We included individuals with polysubstance use if they met the diagnostic criteria for OUD. Postpartum women were included, but pregnant women were excluded. Patients were screened and enrolled between April 2018 and July 2019. Patients were referred to the program from a variety of sources, including 2 hospital EDs, local recovery centers, sobering centers, drug courts, EMS, and local law enforcement agencies. All patients were screened for eligibility. We excluded children and patients in need of advanced inpatient care, such as medically supervised detoxification.

The study was approved by the Committee for the Protection of Human Subjects at UTHealth. Written informed consent was obtained for all patients in the study.

2.3 | Intervention

After identification, screening, and informed consent, patients provided baseline demographic, family, medical, and social history. A self-reported drug use questionnaire was also collected. Participants saw an advanced nurse practitioner with doctoral training in family and addiction medicine (DNP) who performed a comprehensive physical examination, obtained a 16-panel urine drug test, and recorded the level of withdrawal symptoms present through the Clinical Opioid Withdrawal Scale (COWS).¹⁸ An emergency physician affiliated with the study assessed patients through an ambulatory office setting, both in-person and via telemedicine, to confirm OUD diagnosis. Through secure video conferencing, the study staff used telemedicine in combination with an advanced practice nurse sitting in 1 clinic, consulting with a physician in another clinic in the same academic health center.¹⁹ Five physicians from the department of emergency medicine at our study site, and the nurse practitioners, obtained a Drug Enforcement Agency waiver through the Drug Addiction Treatment Act of 2000 (DATA 2000) and Comprehensive Addiction and Recovery Act (CARA) to prescribe buprenorphine for the treatment of OUD. With few exceptions, study physicians provided buprenorphine prescriptions within 24 hours of enrollment to support rapid access to MOUD.

In some cases, patients were unable to receive their prescription. Lack of insurance and geographic access were a result of several factors, including missed physician appointments or lack of transportation. Although the program covered all medical and behavioral services, prescriptions were not included, and occasionally the patients experienced financial barriers paying for their initial prescription. Although financial assistance was not advertised during recruitment because of limited funds, it was made available to certain patients with no other means so they could continue in the program.

The study most frequently prescribed buprenorphine with naloxone at 8 mg/2 mg dosage. Individuals with a history of higher daily use necessitated a 12 mg/3 mg or higher dosage. Physicians prescribed MOUD during the interim bridge period, which varied for each individual because of waitlists for successful placement at an outpatient community clinic. Prescriptions were administered through an affiliated retail pharmacy. In nearly all cases, patients were instructed on home induction of buprenorphine as soon as possible.

This study used 12 independent (non-affiliated) outpatient treatment physicians across the community after the interim bridge period. Referrals were based on the patient's health insurance plan (if any), clinic availability, and geographic location. The majority of patients in this program did not have any type of health insurance, and we referred them to clinics that accepted the state's special funding for outpatient-based opioid treatment physicians. Although treatment was initiated on buprenorphine, most clinics offered all 3 approved MOUD treatments, including methadone, buprenorphine, or naltrexone.

After initiation, patients were instructed to schedule their first behavioral counseling session with a licensed chemical dependency counselor (LCDC) during the first week in the program. LCDCs worked

The Bottom Line

Engaging and retaining patients with opioid use disorder is challenging. By initiating buprenorphine in the emergency department followed by a session of behavioral counseling and weekly peer support, 90% (293/324) of subjects completed the program with an additional 63% (203/324) subsequently connected with ongoing addiction treatments.

with participants using behavioral strategies to achieve long-term sobriety. Counselors also used a comprehensive biopsychosocial form to guide sessions, and this form also served as a valuable data collection instrument. The study required that patients meet with a counselor during the first 2 weeks.

We also used peer recovery support specialists (or peer "coaches"). These individuals worked with patients on a daily basis to enhance motivation and engagement.²⁰ Peer coaches are individuals with lived experience with substance use disorder who have at least 2 years of sobriety and have achieved statewide certification to provide support services.²¹ The peer coaches associated with this study had experience with OUD and polysubstance use. Peer coaches for this study were provided by the Houston Recovery Center (HRC) in collaboration with UTHealth. In this program, peer coaches helped participants discuss strategies for emotional, housing, financial, and personal needs and provided daily contact to encourage participants to remain in recovery. Peer coaches checked in with all patients daily, either through an in-person recovery group or through one-on-one sessions by phone, in person, or through videoconference. Research assistants performed follow-up assessments to obtain patient-reported outcomes, and helped navigate participants into ongoing MOUD treatment.

2.4 | Outcomes

This program had 2 primary dependent variables: treatment adherence during the initial 30-day period and successful linkage rate to ongoing care. We defined treatment adherence as the number of patients who completed the intervention successfully divided by the total number enrolled. Completion was determined based on patients who received the initial buprenorphine induction, maintained ongoing medications for 30 days, received at least 1 behavioral counseling session, and met with peer coaches once weekly for 4 weeks. We defined successful linkage as the number of enrolled patients who initiated MOUD treatment after the initial 30-day program with a community physician, divided by total patients enrolled. Secondary outcomes were rates of reuse and relapse. We chose 30 days as our end point as this study was designed to bridge OUD treatment to permanent ongoing care. To assess quality of life, we used the five-dimension European quality of life (EQ-5D QOL) visual analog scale, which is well represented

in research worldwide.²² This scale represents a number between 0 and 100, where the best imaginable health state is marked 100 and the worst state is marked 0. Additional variables captured included the source of enrollment (home outreach, community referral, or hospital ED) and baseline and demographic information.

2.5 | Database management

Study data were collected and managed using Research Electronic Data Capture (REDCap) electronic data capture tools hosted at UTHealth. REDCap is a secure, web-based software platform designed to support data capture for research studies and has been used in thousands of academic studies.²³

2.6 | Analysis

We reported descriptive statistics of the demographic and clinical characteristics of the participants. QOL differences before versus 30 days after enrollment were assessed with independent *t* tests. The size of effect for the QOL differences was estimated by using Cohen's *D*. A probability value < 0.05 (2-tailed) was considered statistically significant for all tests. All analyses were performed using Stata IC 15 (Stata-Corp LLC, College Station, TX, USA).

3 | RESULTS

3.1 | Characteristics of study subjects

During the study period, we enrolled and inducted 324 patients (on average, *N* = 15–25 per month) into MOUD treatment. Approximately 6% of patients presented after an overdose. The majority of those enrolled were in their mid-30s, male, Caucasian, and were largely identified through community referrals. Of the total, 165 patients reported using heroin (50.9%), 113 patients reported taking prescription opioids (34.9%), and 46 patients reported use of both substances. This was a largely vulnerable population, with only 110 (33.9%) reporting stable housing and 224 (75.3%) having no health insurance. Table 1 summarizes the baseline characteristics.

3.2 | Main results

We found 293 (90.4%) adhered to the treatment program at the 30-day end point after initial buprenorphine induction. Of these, we successfully linked 203 (62.6%) to their first MOUD appointment with a community physician, which generally took between 2 and 5 weeks after enrollment depending on each clinic's waitlist. QOL scores between buprenorphine induction and 30 days after induction improved from 55.66 (SD = 24.52) to 75.79 (SD = 21.94), a 20.13-point (36%) relative

TABLE 1 Baseline demographic characteristics of enrolled patients

Characteristic	N (%)
Total	324 (100)
Age, y, mean (SD)	36.10 (9.61)
Gender	
Female	154 (47.53)
Male	169 (52.16)
Transgender	1 (0.31)
Race	
Caucasian	247 (76.23)
African American	52 (16.05)
Asian	10 (3.09)
Other/unknown	15 (4.63)
Ethnicity	
Hispanic/Latino	75 (23.15)
Non-Hispanic/Latino	231 (71.29)
Unknown	18 (5.56)
Marital status	
Not married	271 (83.64)
Married	41 (12.65)
Not reported	12 (3.71)
Veteran status	
Veteran	17 (5.25)
Non-veteran	307 (94.75)
Health insurance	
Yes	80 (24.69)
None	244 (75.31)
Housing status	
Stable (own or rent)	110 (33.95)
Temporary or unstable	134 (41.36)
Homeless	42 (12.96)
Unknown/unreported	38 (11.73)
Primary type of opioid drug used	
Heroin/Fentanyl	165 (50.93)
Prescription opioids	113 (34.88)
Both, prescription and illicit	46 (14.19)
Primary source of referral	
Hospital/emergency department	28 (8.6)
First responders	33 (10.2)
Community	263 (81.2)

improvement ($t = 6.625$, $P < 0.0001$). The size of effect observed was 0.84 (95% CI, 0.56–1.11).

A total of 31 patients did not complete the program (294 of 324). In total, 26 (8.0%) patients had a lapse event during the study period,

TABLE 2 Program outcomes

	N (%)
Total number enrolled	324 (100)
Treatment program adherence at 30 days	293 (90.43)
Treatment linkage, to community medication for opioid use disorder	
Successful	203 (62.65)
No	121 (37.35)
Quality of life improvement	20.13 (36.46)
Patient-reported lapses during 30 days	
None	298 (91.97)
1 or more	26 (8.03)
Mortality	0 (0.0)

with 14 discontinuing the program. A total of 12 patients resumed medications and subsequently met the criteria for treatment adherence. Those who did not complete the program were lost to follow-up. Table 2 summarizes the primary and secondary outcomes of the study.

4 | LIMITATIONS

Our findings should be interpreted in light of the limitations of the descriptive study design. Because this is not a randomized controlled trial, we are not suggesting causality. The lack of study comparison groups limits the findings. Our future research plan is to conduct a similar study designed with randomization and control groups to evaluate effect differences. Additionally, our primary focus was on the short-term results after the initial consultation and enrollment. Future studies will report on longer term outcomes of this cohort.

5 | DISCUSSION

In this study of socioeconomically vulnerable patients, we found a program that initiates treatment and provides behavioral counseling and peer support services was feasible and allowed for high linkage rates to more permanent care. These outcomes are important as addiction medicine waitlists can significantly deter patient engagement and retention. These challenges are exacerbated in states where there is a low density of practitioners, such as in Texas, where patients with greater needs may experience more challenges.²⁴

We can contrast these findings with those of other research. Naeger and colleagues found that of all adult, privately insured patients between 2010 and 2014, only 17% of those treated during an inpatient admission received continuing care after discharge.²⁵ This is especially significant given the high relapse rates with this condition. One study estimates that 59% of patients will experience a relapse within 1 week after inpatient treatment for OUD.²⁶ In a large randomized clinical trial, Nunes and colleagues estimated the

relapse rates to be around 63% for short-term inpatient stays based on treatment as usual.²⁷ Another found that just over 60% of heroin users reused heroin after initial detoxification within 30 days whereas Trowbridge and colleagues found that only 39% of patients who initiated buprenorphine were still active in treatment at 30 days.^{28,29} In addition, multiple studies have concluded that the risk of overdose deaths is significantly less for patients in treatment than those who are not in treatment.^{30,31}

Our results are especially noteworthy given this context. More than half of the participants were considered high risk in our sample because of prior use of heroin or synthetic drugs or because of their socioeconomic status. A lack of financial resources creates a barrier to outpatient services and is an obstacle to remaining in costly MOUD treatment. The time to follow-up is longer for the vulnerable who cannot afford more expensive, self-financed programs. Our intervention successfully engaged and retained 90% in a 30-day program involving MOUD, peer support, and behavioral counseling; linked 63% of patients to ongoing treatment enrollment through a community physician; and improved overall QOL by 36% (from 56 to 76, on a scale of 1–100). Our engagement strategy, which used supportive behavioral and peer support services, could partially explain our findings and higher retention rates.

There are opportunities to improve on this model. There were 121 patients (37%) who simply chose not to continue MOUD treatment after the interim period. A small minority discontinued because of reuse, as mentioned earlier, but many were simply lost to follow-up. We attempted to reach many of those through follow-up surveys, yet this vulnerable population included many without phone or email contacts. Of those we reached, barriers including financial, transportation, and access to care were more likely to have prevented successful linkage. For example, patients without health insurance were instructed during the interim period to work on necessary identification and registration for the county health insurance. Many people did not follow through and were not able to be placed into care. Also, our interim program provided free coverage of most behavioral, medical, and peer-based care as well as transportation vouchers during the program. Once patients were outside the research program, transportation and costs became more challenging. Future programs should improve the transition into community care to mitigate these barriers.

Our results demonstrate that a more comprehensive program combining rapid access to buprenorphine with behavioral and emotional support is feasible, especially in the presence of long wait times. In Houston, we observed an average wait time of \approx 1 month to achieve linkage to MOUD treatment. Regional variations in capacity, and lower prescribing levels for those who are waived, could be one of many structural factors affecting opioid-related mortality.¹¹ Whereas some communities particularly in the northeast portion of the United States report average wait time for first appointment of <1 week, many other regions including Houston have significantly longer wait lists, making interim bridge programs more necessary.⁶ In our study linkage to ongoing care despite long clinic wait times was associated with significant improvements in QOL. This model

holds promise as one strategy to support treatment adherence and engagement.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to report.

AUTHOR CONTRIBUTIONS

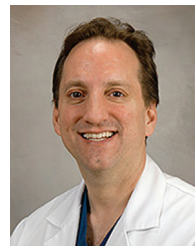
Study concept and design: JRL, TCL, KAC. Acquisition of the data: JRL, TCL, AY, MMO. Analysis and interpretation of the data: MCT, JRL, AY, MMO. Drafting of the manuscript: JRL, TCL, KAC. Critical revision of the manuscript for important intellectual content: KAC, AS, SP, SL, BJB, GK, TF, HW. Statistical expertise: MCT. Acquisition of funding: JRL.

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