



Bridge clinic buprenorphine program decreases emergency department visits

Ross W. Sullivan^{a,*}, Laura M. Szczesniak^b, Susan M. Wojcik^a

^a Department of Emergency Medicine, Upstate Medical University, Syracuse, NY, USA

^b College of Medicine, Upstate Medical University, Syracuse, NY, USA

ARTICLE INFO

Keywords:

Buprenorphine
Bridge clinic
Opioid withdrawal
Opioid use disorder

ABSTRACT

Introduction: Opioid withdrawal due to opioid use disorder (OUD) is an increasing health emergency and complaint in emergency departments (EDs) across the United States. As a response to the increased need for OUD treatment, a low threshold buprenorphine program, or Bridge Clinic, was established within our hospital system. Patients are primarily connected to the Bridge Clinic through the ED, and are able to complete their consultation appointment reliably within 1–3 days of referral. This program also serves to connect patients to community resources for continued treatment of OUD.

Methods: A retrospective chart review was performed to identify ED-based referrals to the Bridge Clinic in the period from January 1, 2017 – December 31, 2018. Outcomes of interest included: (1) ED utilization in the six months before and after consultation at the Bridge Clinic and (2) adherence to buprenorphine therapy at 2-year follow-up.

Results: A total of 269 patients were included in the study, with 167 males (62%) and a mean age of 37.8 years. There were 654 total visits to the ED six months before referral to the Bridge Clinic and 381 visits in the six-month period after the initial appointment. There was a high adherence to buprenorphine treatment at 2 year follow up (56%).

Conclusions: These early results suggest that prompt referral to a buprenorphine treatment program significantly reduces ED utilization and connects patients to community resources for continued buprenorphine treatment for OUD.

1. Introduction

Opioid overdose deaths and opioid use disorder (OUD) in the United States (US) have dramatically increased over the past decade, with approximately 128 people dying every day from an overdose of prescription or illicit opioids (“Understanding the Epidemic”, 2021). With this epidemic, US Emergency Departments (EDs) have seen a 30% increase in opioid overdose-related visits (“Emergency Department Data”, 2018). Emergency physicians are increasingly called upon to provide care for opioid withdrawal and related issues. A recent systematic review concluded that buprenorphine is superior to clonidine in acute opioid withdrawal, with lower reported withdrawal scores and higher adherence to treatment (Love et al., 2018). In a landmark study, D’Onofrio et al. (2015) demonstrated that patients initiated on buprenorphine in the ED, in conjunction with a brief OUD-associated psychosocial intervention, were twice as likely to be engaged in formal OUD

treatment at 30 days compared to those who received a referral to treatment alone, or a brief psychosocial intervention without buprenorphine.

Despite evidence supporting the use of buprenorphine in the ED, a minority of ED visits for OUD-related issues ultimately result in the use of buprenorphine (Samuels et al., 2019). Providers may be reluctant to begin buprenorphine treatment due to misconceptions or stigmata associated with OUD, concerns about diversion of medications, and increased ED length of stay (D’Onofrio et al., 2018). In addition, there are also concerns about an influx of patients seeking care and an increase of ED visits once buprenorphine is initiated in the ED (D’Onofrio et al., 2018). Furthermore, it can be difficult to provide outpatient prescriptions for buprenorphine given X-waivers and the general lack of knowledge by ED physicians about outpatient OUD treatments.

In 2017 an ED protocol to address the need for OUD treatment in our community was initiated. This paper describes the steps taken to

* Corresponding author at: Department of Emergency Medicine, Upstate Medical University, 750 E Adams St, Syracuse, NY 13210, USA.

E-mail address: sullivar@upstate.edu (R.W. Sullivan).

<https://doi.org/10.1016/j.jسات.2021.108410>

Received 4 December 2020; Received in revised form 7 April 2021; Accepted 8 April 2021

Available online 17 April 2021

0740-5472/© 2021 The Authors.

Published by Elsevier Inc.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

develop a low threshold buprenorphine program, otherwise known as a Bridge Clinic, and how the clinic helped connect patients with OUD to long-term outpatient care. We hypothesized that patients who completed a consultation appointment in the Bridge Clinic would utilize the ED less after being connected to long-term support outside of the ED.

2. Methods

Upstate Medical University Hospital established a buprenorphine Bridge Clinic in 2017 to address the growing number of patients in OUD presenting to the ED. The goal of the Bridge Clinic is to connect patients quickly to care and is meant to be a short-term program for patients that helps treat OUD while connecting patients to community resources that also provide buprenorphine.

2.1. Setting and context

This Bridge Clinic is located within Upstate Medical University Hospital, an urban tertiary care public hospital that serves a relatively large geographic area within New York State, with a regionalized trauma system spanning 14 counties and roughly 1.7 million people. The hospital ED is part of a Level 1 system and has 2 EDs over two campuses. The main campus ED treats approximately 75,000 patients per year while the smaller community campus ED treats approximately 25,000 patients, and both hospitals serve an ethnically, racially, and geographically diverse population.

2.2. Bridge clinic program and referral process

The Bridge Clinic is operated by a double-boarded EM/Toxicology physician and is within walking distance of the main hospital, within the hospital network. For most patients presenting to the Bridge Clinic, referrals are provided from the hospital's ED, where all emergency medicine attending physicians, residents, and advanced practitioners receive education on opioid withdrawal and buprenorphine use, and utilize an algorithm to recommend dosing with buprenorphine for varying degrees of opioid withdrawal ("Buprenorphine Treatment Algorithm"). While in the ED, patients receive an initial dose of buprenorphine as part of the ED management of their withdrawal and obtain a referral to the Bridge Clinic.

In general, patients complete an initial consultation appointment at the Bridge Clinic 1–3 days after referral. X-waivered medical providers are present for every visit, where patient evaluation occurs. Both the medical provider and a New York State certified Peer advocate, or a community member with lived experience of OUD that can motivate, guide, and support persons in recovery from a mental health diagnosis, provide a simultaneous evaluation of the patient. The county provides Peer involvement without charge to the hospital or patient. Patients in withdrawal or in need of buprenorphine maintenance receive prescriptions for buprenorphine. Appointments also include a discussion about treatment goals and connections to community programs.

Patients typically complete an appointment every 1–2 weeks and are permitted to remain in the clinic for up to 8–12 weeks, although special circumstances, such as transportation issues, lack of geographic community resources, child care issues, among others, may occur that allow for more prolonged engagement. Importantly, patients can receive outpatient OUD care and buprenorphine prescriptions at the Bridge Clinic rather than in the ED.

2.3. Bridge clinic referral and ED usage in bridge clinic patients

A query of the electronic medical record (EMR, Epic™) to identify all ED-based referrals to the Bridge Clinic between January 1, 2017 – December 31, 2018 was conducted. Any opioid addiction-related diagnosis in the ED was included in the query followed by chart review to determine if the patient received a referral to the Bridge Clinic.

A chart review of all Bridge Clinic patients identified ED visits in the six months before and following the initial Bridge Clinic consultation appointment. Bridge Clinic patients were excluded from further analysis if they had no ED visits in the six months before the consultation appointment or had deceased within six months following initial consultation. The remaining patients were grouped into 1 or multiple (2 or more) ED visits in the six months before consultation and compared the number of visits before Bridge Clinic consultation to the six months after consultation for each group. Demographic data collected included age, type of insurance (public, private, or uninsured) and patients' homeless status. Homelessness was defined as no permanent address on file or if the address on file belonged to a shelter or other temporary housing. A query of patient prescription history at two-year follow-up using the New York State Internet System for Tracking Over-Prescribing (I-STOP) identified patients still connected to OUD treatment.

Data were analyzed using GraphPad Prism, and statistical analysis was performed using a Wilcoxon matched-pairs signed-rank test; *p*-values of <0.05 were considered statistically significant. This study was reviewed and granted exemption status by an Institutional Review Board.

3. Results

A total of 415 patients completed a consultation appointment in the Bridge Clinic during the study period. A review of the ED EMR identified 379 patients with opioid addiction-related diagnoses that received an ED referral to the Bridge Clinic. Therefore, there were 145 patients Bridge Clinic patients who received referrals from providers outside of the hospital system and had no ED visits in the six months before the consultation appointment; these patients were excluded from the analysis. One other patient had expired during the six months following Bridge Clinic consultation and was also excluded from the analysis. The final sample size was 269 patients with a 71% ED referral success rate for patients completing a consultation visit at the Bridge Clinic.

Patient demographics are summarized in Table 1. Of the 269, 167 were male (62%). The mean age was 37.8 (SD = 10.6). Males tended to be younger, with most between 18 and 34 years, while most females were between 35 and 50 years. Most patients (94%) had a form of public insurance, and 11% of patients were homeless.

The 269 patients seen in the Bridge Clinic for first-time consultation appointments accounted for a total of 654 ED visits six months before Bridge Clinic consultation and 381 visits in the six months following the first Bridge Clinic visit (Fig. 1A), which represents a 42% reduction in total visits for all patients. For the entire patient population, the number of visits per patient before consultation (median = 2; IQR = 1–3) decreased significantly in the six-month period after consultation (median = 0; IQR = 0–2; *p* < 0.001).

Table 1

Characteristics of patients included in this study that were first referred to the Bridge Clinic from January 1, 2017 to December 31, 2018.

Characteristic	Percentage (n)
Total No. of patients	269
1 ED visit in 6-month period prior to consultation	46% (124)
2+ ED visits in the 6-month period prior to consultation	54% (145)
Age group, y	
18–34	43% (116)
35–50	41% (111)
51–65	15% (41)
>65	<1% (1)
Patient address type on file	
Permanent/private address	89% (239)
Homeless or shelter	11% (30)
Insurance type	
Public	94% (253)
Private	5% (13)
Uninsured	1% (2)

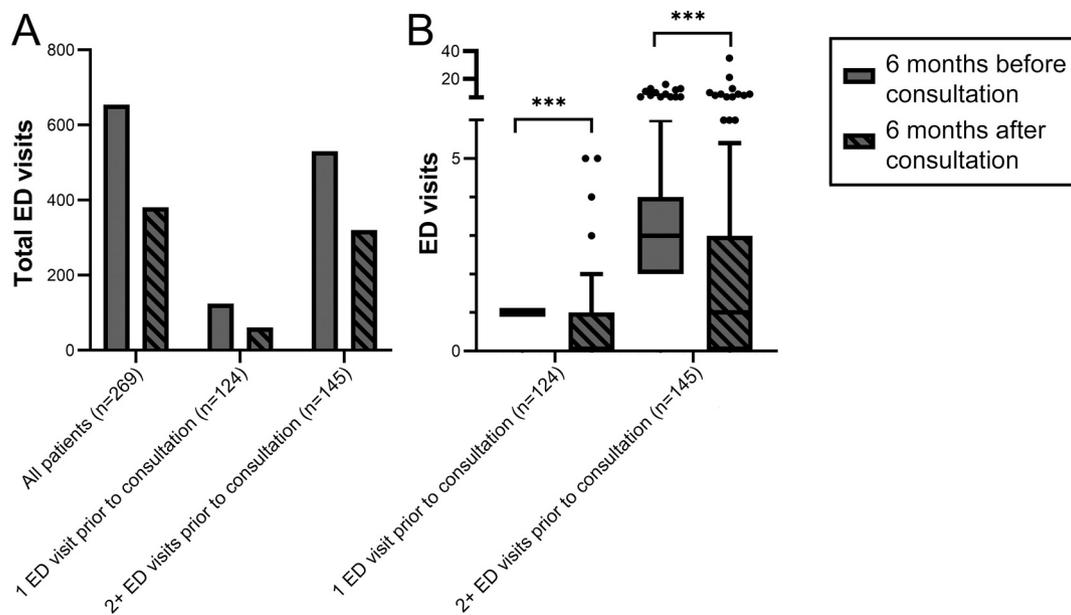


Fig. 1. ED utilization in Bridge Clinic patients. A, Total ED usage and B, ED visits per patient before and after completion of a consultation appointment in the Bridge Clinic; $p < 0.001$ is denoted by (***). Patient visits above the 90th percentile are plotted as individual data points.

A total of 124 patients presented once to the ED in the six months before consultation at the Bridge Clinic. After consultation, these same patients accounted for 61 visits in the six months (Fig. 1A), or a 51% reduction in visits for this group. The number of visits per patient before consultation decreased significantly in the six months after consultation (Fig. 1B, median = 0; IQR = 0–1; $p < 0.001$); 85 patients (69%) had no visits during this period, 26 patients (21%) had a single visit, and 13 patients (10%) had two or more ED visits.

The remaining 145 patients presented to the ED for multiple visits in the six months preceding consultation ranged from 2 to 16 visits and accounted for 530 total visits. This same group of patients accounted for 320 visits in the six months following Bridge Clinic consultation (Fig. 1A), or a 40% reduction in visits. The number of visits per patient before consultation (Fig. 1B, median = 3; IQR = 2–4) decreased significantly in the six months after consultation (median = 1; IQR = 0–3; $p < 0.001$); 55 patients (38%) had no visits during this period, 32 patients (22%) had a single visit, and 58 patients (40%) had two or more ED visits. There were eight patients with ED visits totaling more than two standard deviations above the median number of visits for this group, which were considered outliers. These patients accounted for 92 and 86 visits before and after Bridge Clinic consultation, respectively. Closer analysis of this group revealed that three out of eight patients accounted for 80% of the visits in the post-consultation period, and the rest of the outliers showed a significant decrease in visits. Bridge Clinic records indicated that the three patients who did not show a reduction in ED visits were all homeless and had other active psychiatric diagnoses in addition to OUD.

A majority of patients (92%) attended three or more Bridge Clinic appointments, thus allowing for adequate time to connect to community care outside of the clinic. Furthermore, a query of the New York State I-STOP, which allows for monitoring of prescriptions for controlled substances, found that 178 patients (66%) were receiving controlled medications, such as medical tetrahydrocannabinol, in a 2-year follow-up check; furthermore, a majority of these patients were still taking buprenorphine (151 patients, 56%).

4. Discussion

Emergency Departments are on the front lines of the current opioid epidemic. Not all ED visits by patients with OUD are life-threatening

situations, however. This paper provides a general overview of an ED-affiliated low-threshold buprenorphine clinic, or Bridge Clinic, which aims to smooth the transition of OUD treatment from the ED to the clinic while providing patients with the care and follow-up necessary for a vulnerable population. Although there is evidence that OUD patients on buprenorphine utilize the ED less than patients off buprenorphine (Schwarz et al., 2012), and a recent study found that buprenorphine programs decrease the length of stay in the ED (Kaucher et al., 2020), there is still little evidence regarding overall ED utilization within a department that initiates buprenorphine. At the time of this study, X-wavier training requirements were a significant barrier to providing ED patients with buprenorphine prescriptions. Given that the population of patients seen in the Bridge Clinic is relatively young and with public insurance plans (Table 1), it is imperative that these patients are connected with proper care to ensure positive long-term outcomes.

These findings demonstrate that timely referral to an internal Bridge Clinic from the ED can significantly reduce ED visits by patients with OUD. ED utilization of 269 patients who completed an initial consult in the first 24 months of the Bridge Clinic program indicated a 42% reduction in ED visits after linkage to OUD treatment outside of the ED. Importantly, this reduction includes patients who visited either once or multiple times in the six months before consultation, helping conclude that Bridge Clinic referral helps a broad spectrum of OUD patients. The significant decrease most likely results from prompt referral and connection to addiction care and receiving buprenorphine for withdrawal symptoms.

There were eight outliers in the multiple ED visit patient group that accounted for a large portion of total ED visits both before and after Bridge Clinic consultation. These same patients had a very small reduction in ED visits in the six-months after consultation to the Bridge Clinic. Interestingly, homelessness played a significant role in whether visits were reduced in Bridge Clinic patients. After separating the homeless and non-homeless patients in this group, the homeless patients comprised most of the post-consultation visits for this small group, as these patients saw an increase in ED visits after completion of the Bridge Clinic consultation appointment. In the absence of stable living arrangements, homeless patients are likely to report to the ED for all medical needs apart from OUD, including psychiatric care, and solely addressing OUD in these patients is not sufficient to decrease their ED visits. The most valuable care for homeless populations may be to secure

them a stable place to live. Further research into this is warranted.

Overall, these results suggest that patients who received a referral to the Bridge Clinic and completed a first-time consult generally utilized the ED less, which helps to decongest the ED for more acute patient care. This study adds to recent literature supporting the implementation of Bridge Clinics to treat OUD (Bogan et al., 2020; Herring et al., 2019; Kawasaki et al., 2019). Even though the program is generally only 8–12 weeks duration, the purpose of the Bridge Clinic program is to connect patients to community care for OUD through the ED. Community care and long-term support for OUD are incredibly important for the treatment and management of OUD, so this clinic serves as the initial step for many patients that may not have connected to community care otherwise. Due to the nature of data acquisition, it is unclear whether buprenorphine administration specifically reduced ED visits in OUD patients, but further studies on Bridge Clinics and buprenorphine administration could evaluate patient outcomes for the entire Bridge Clinic population rather than just in first-time patients.

The follow-up results at the time of writing this manuscript are also encouraging. An overwhelming majority of patients who presented to the Bridge Clinic completed several appointments, and that more than half of the patients in the study were still prescribed buprenorphine two years after their initial consultation appointment. This indicates that the Bridge Clinic has been successful at its primary mission: connecting patients to long-term support for OUD.

4.1. Limitations

Limitations are noted. As a retrospective chart review, the study did not randomize ED utilization into groups with and without referral to the Bridge Clinic, and due to pre-post design, findings are subject to regression to the mean. Return visits only within the hospital system were queried, and it is possible that patients in this study were seen at other emergency departments in the area in the six months before or after their initial Bridge Clinic visit. There is no assessment of other potential care or treatment modalities outside of the Bridge Clinic and our ED. In addition, a selection bias exists because the study population only includes patients who completed an initial consultation to the Bridge Clinic, not all patients who received a referral. Referrals were only identified from the same hospital system, so the total number of Bridge Clinic referrals outside the hospital system cannot be calculated. It is unclear how these results may generalize to other cities with less long-term support for patients with OUD.

4.2. Conclusions

This retrospective chart review supports the notion that starting a referral program in the ED with high fidelity referral decreases ED visits. ED visits decreased by 42% in OUD patients who completed a consultation appointment in the Bridge Clinic. Additionally, 56% of patients have continued buprenorphine treatment at least two years following the initial Bridge Clinic appointment. As these results are preliminary, further study is warranted to determine the long-term outcomes of patients referred to our Bridge Clinic and if buprenorphine administration within the ED improves patient outcomes.

CRedit authorship contribution statement

Ross Sullivan: Conceptualization, methodology, validation, investigation, data curation, formal analysis, supervision, writing - original draft, writing - review & editing. **Laura Szczesniak:** validation, formal analysis, writing - review & editing. **Susan Wojcik:** Methodology, Validation, Data curation, writing - review & editing.

Declaration of competing interest

No conflicts of interest are reported by any of the authors listed on this manuscript.

Acknowledgments

We would like to thank Aaron Przybylski for help with data acquisition.

References

- Bogan, C., Jennings, L., Haynes, L., Barth, K., Moreland, A., Oros, M., Goldsby, S., Lane, S., Fucell, C., & Brady, K. (2020). Implementation of emergency department-initiated buprenorphine for opioid use disorder in a rural southern state. *Journal of Substance Abuse Treatment*, 112, 73–78. <https://doi.org/10.1016/j.jsat.2020.02.007>.
- Buprenorphine Treatment Algorithm. NIDA. <https://www.drugabuse.gov/nidamed-medical-health-professionals/discipline-specific-resources/initiating-buprenorphine-treatment-in-emergency-department/buprenorphine-treatment-algorithm>.
- D'Onofrio, G., McCormack, R. P., & Hawk, K. (2018). Emergency departments — A 24/7/365 option for combating the opioid crisis. *New England Journal of Medicine*, 379(26), 2487–2490. <https://doi.org/10.1056/nejmp1811988>.
- D'Onofrio, G., O'Connor, P. G., Pantalon, M. V., Chawarski, M. C., Busch, S. H., Owens, P. H., ... Fiellin, D. A. (2015). Emergency department-initiated buprenorphine/naloxone treatment for opioid dependence. *JAMA*, 313(16), 1636. <https://doi.org/10.1001/jama.2015.3474>.
- Emergency Department Data Show Rapid Increases in Opioid Overdoses. (2018). CDC online newsroom. <https://www.cdc.gov/media/releases/2018/p0306-vs-opioids-overdoses.html>.
- Herring, A. A., Perrone, J., & Nelson, L. S. (2019). Managing opioid withdrawal in the emergency department with buprenorphine. *Annals of Emergency Medicine*, 73(5), 481–487. <https://doi.org/10.1016/j.annemergmed.2018.11.032>.
- Kaucher, K. A., Caruso, E. H., Sungar, G., Gawenus, L., Hurlbut, K., Sanchez, D. C., & Broderick, K. (2020). Evaluation of an emergency department buprenorphine induction and medication-assisted treatment referral program. *The American Journal of Emergency Medicine*, 38(2), 300–304. <https://doi.org/10.1016/j.ajem.2019.158373>.
- Kawasaki, S., Francis, E., Mills, S., Buchberger, G., Hogentogler, R., & Kraschewski, J. (2019). Multi-model implementation of evidence-based care in the treatment of opioid use disorder in Pennsylvania. *Journal of Substance Abuse Treatment*, 106, 58–64. <https://doi.org/10.1016/j.jsat.2019.08.016>.
- Love, J. S., Perrone, J., & Nelson, L. S. (2018). Should buprenorphine be administered to patients with opioid withdrawal in the emergency department? *Annals of Emergency Medicine*, 72(1), 26–28. <https://doi.org/10.1016/j.annemergmed.2017.10.002>.
- Samuels, E. A., D'Onofrio, G., Huntley, K., Levin, S., Schuur, J. D., Bart, G., ... Venkatesh, A. K. (2019). A quality framework for emergency department treatment of opioid use disorder. *Annals of Emergency Medicine*, 73(3), 237–247. <https://doi.org/10.1016/j.annemergmed.2018.08.439>.
- Schwarz, R., Zelenev, A., Bruce, R. D., & Altice, F. L. (2012). Retention on buprenorphine treatment reduces emergency department utilization, but not hospitalization, among treatment-seeking patients with opioid dependence. *Journal of Substance Abuse Treatment*, 43(4), 451–457. <https://doi.org/10.1016/j.jsat.2012.03.008>.
- Understanding the Epidemic, Drug Overdose. (2021). CDC injury center. <https://www.cdc.gov/drugoverdose/epidemic/index.html>.