

Multi-site intervention to improve emergency department care for patients who live with opioid use disorder: A quantitative evaluation

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Clinician's Capsule

What is known about the topic?

The emergency department is a key contact and intervention site for persons at risk of opioid death.

What did this study ask?

This quality improvement study evaluated the impacts of a multi-site program to initiate opioid use disorder treatment in emergency departments.

What did this study find?

Forty-seven discharged patients were given buprenorphine/naloxone and 35 continued to fill prescriptions for opioid agonist treatment 30 and 60 days after.

Why does this study matter to clinicians?

A multi-site approach to opioid use disorder in emergency departments can be effective and support standardized evidence-based care across sites.

clinics worked together to trial the intervention. We used administrative data to track the number of ED visits where patients were given buprenorphine/naloxone. Monthly ED prescribing rates before and after the intervention were considered and compared with eight nonintervention sites. We considered whether patients continued to fill opioid agonist treatment prescriptions at 30, 60, and 90 days after their index ED visit to measure continuity in treatment.

Results: The intervention sites increased their prescribing of buprenorphine/naloxone during the intervention period and prescribed more buprenorphine/naloxone than the controls. Thirty-five of 47 patients (74.4%) discharged from the ED with buprenorphine/naloxone continued to fill opioid agonist treatment prescriptions 30 days and 60 days after their index ED visit. Thirty-four patients (72.3%) filled prescriptions at 90 days.

Conclusions: Emergency clinicians can effectively initiate patients on buprenorphine/naloxone when supports for this standardized evidence-based care are in place within their practice setting and timely follow-up in community is available.

ABSTRACT

Background: Opioid use disorder is a major public health crisis, and evidence suggests ways of better serving patients who live with opioid use disorder in the emergency department (ED). A multi-disciplinary team developed a quality improvement project to implement this evidence.

Methods: The intervention was developed by an expert working group consisting of specialists and stakeholders. The group set goals of increasing prescribing of buprenorphine/naloxone and providing next day walk-in referrals to opioid use disorder treatment clinics. From May to September 2018, three Alberta ED sites and three opioid use disorder treatment

RÉSUMÉ

Contexte: Les troubles de l'usage des opioïdes représentent un sérieux problème de santé publique et, d'après des données probantes, il existerait de meilleurs moyens de traiter les personnes ayant des troubles de l'usage des opioïdes au service des urgences (SU). Une équipe pluridisciplinaire a donc élaboré un projet d'amélioration de la qualité des soins, fondé sur ces données afin de les mettre en application.

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Méthode: Le projet a été élaboré par un groupe de travail composé de spécialistes et d'intervenants. L'intervention avait pour buts d'augmenter le nombre d'ordonnances de buprénorphine et de naloxone et de diriger, dès le lendemain, les patients ayant des troubles de l'usage des opioïdes vers des centres de traitement sans rendez-vous. Ainsi, 3 SU et 3 centres de traitement des troubles de l'usage des opioïdes situés en Alberta ont joint leurs efforts, de mai à septembre 2018, pour expérimenter le projet. Des données administratives ont été utilisées afin de suivre le nombre de patients ayant reçu de la buprénorphine et de la naloxone au SU. L'équipe a aussi recueilli des données sur les taux mensuels de prescription du traitement au SU, avant et après l'intervention, puis comparé les résultats avec ceux de 8 centres de traitement non participants. A également été examiné le renouvellement des ordonnances du traitement par agonistes opioïdes, au bout de 30, 60 et 90 jours après la consultation de référence au SU, pour mesurer la poursuite du traitement.

Résultats: Une augmentation du nombre d'ordonnances de buprénorphine et de naloxone a été observée dans les centres de traitement participants, durant la période d'intervention, ainsi que par rapport aux centres témoins. Sur 47 patients qui ont quitté le SU avec une ordonnance de buprénorphine et de naloxone en main, 35 (74,4%) ont continué à renouveler leur traitement par agonistes opioïdes, 30 jours et 60 jours après la visite initiale au SU; il en a été de même pour 34 patients (72,3%) au bout de 90 jours.

Conclusion: Il est possible d'amorcer efficacement le traitement par la buprénorphine et la naloxone au SU lorsque le milieu de pratique offre ce genre de soins uniformes, fondés sur des données probantes, et qu'un service communautaire de traitement est en mesure d'assurer un suivi rapide.

Keywords: Addiction, opioid agonist treatment, quality improvement

INTRODUCTION

In 2018, when our intervention began, 746 Albertans died from an apparent accidental opioid overdose.¹ The rate of emergency department (ED) visits related to opioid use and substance misuse increased by 65% from January 1, 2015 to September 30, 2018.¹ Nine percent of individuals who died from an apparent accidental opioid poisoning in Alberta had a substance use-related ED visit in the 30 days before death.¹

In the summer of 2017, leaders within Alberta began working with clinician experts on how best to serve ED patients who live with opioid use disorder. Project coordinators established an expert working group, including administrators, pharmacists, addiction medicine specialists, and emergency medicine physicians. Based on a rapid review of research evidence, the group set goals of increasing prescription of buprenorphine/naloxone (sublingual) in ED sites and establishing rapid referral of opioid use disorder patients to continuing treatment.

The Canadian Research Initiative in Substance Misuse strongly recommends initiating opioid agonist treatment with buprenorphine/naloxone "whenever feasible" as the preferred first-line treatment for opioid use disorder.^{2,3} Opioid agonist treatment "is significantly more effective than nonpharmacological treatments in retaining individuals in treatment and suppressing illicit opioid use".³ Opioid agonist treatment is also effective in

reducing morbidity and mortality,³ and can be initiated in the ED.⁴⁻⁶ A randomized control trial conducted in the United States showed that individuals who are initiated on buprenorphine/naloxone in the ED and referred to treatment had better outcomes than those who receive brief intervention and referral or facilitated referral.^{4,5} Specifically, patients who initiated buprenorphine/naloxone in the ED had increased engagement in addiction recovery programs and reduced self-reported illicit opioid use at 30 days since ED initiation.⁴ A Canadian observational study published after our project began shows 88% of eligible patients were prepared to start buprenorphine/naloxone treatment in the ED, and 54% attended clinic treatment.⁶

This article reports initial results of a multi-site effort to improve buprenorphine/naloxone initiation rates and develop processes for referring patients to community care.

METHODS

The project is quality improvement and formal exemption from ethics review was received from the University of Alberta Health Research Ethics Board. The project team worked with the Alberta Health Services Privacy Office to protect patient and clinician privacy from risks arising from data collection. Administrative data were used for measurement, as these data are available across sites in the province.

The program theory⁷ informing our intervention was that ED sites would benefit from common processes and tools that could be implemented locally, and that patients must be referred to and attend follow-up care in order for ED intervention to make a difference over time for patients. Our evaluation objectives were consequently to determine uptake of the initiation and referral pathway at the site level and to examine process, outcome, and balancing measures related to buprenorphine/naloxone initiation at ED visit and patient levels. Our initial evaluation, as reported here, was intended to establish whether the program could be spread to ED sites across the province.

Study design and time period

Evaluation used retrospective observational methods during May to September 2018.

Study setting

Our province has a single health authority with regional geographic subdivisions for operational decision making. Some electronic health records are captured within a provincial information system. ED sites rely on a variety of record keeping systems. Independent community addiction clinics and health authority operated clinics serve patients who live with opioid use disorder. The Emergency Strategic Clinical NetworkTM brings together stakeholders across the province to create and promote standardized best practices in emergency care.⁸

The intervention was developed with and piloted in three urban ED sites in the province. Each ED referred patients to a single opioid use disorder treatment clinic. Clinic and ED selection was based on including both health authority and independent sites, availability of local clinicians who would work on and advocate for the intervention (expert working group members), and on reports of prior referrals from selected ED sites to paired clinics.

Each paired set (ED and clinic) started the intervention at a different time. The North East Community Health Centre began the program on May 15, 2018, the Grey Nuns Community Hospital began on June 11, 2018, and the Rockyview General Hospital began on July 5, 2018. The sites are located in different cities with distinct clinical and operational emergency medicine leadership teams, and have unique staff mixes, medical record systems, and pharmacy systems. Rockyview

General Hospital had the third highest number of opioid visits within the province from January 1, 2015, to September 30, 2018; Grey Nuns Community Hospital had the ninth highest; and North East Community Health Centre was not among the top ten sites for opioid-related ED visits provincially.¹

Population

Patient eligibility criteria were developed by the expert working group. To be eligible, patients had to meet the following three criteria: “Age 18 years old and older, Suspicion of opioid use disorder,” and “Patient willing to engage in buprenorphine/naloxone.” Exclusion criteria were any of: “Allergy to buprenorphine or naloxone, Being admitted for medical/psychiatric concern, Severe liver dysfunction, Currently prescribed or using methadone or buprenorphine/naloxone,” or “Clinical signs of sedative/depressant impairment or intoxication.” Pregnant patients were included, and consultation with an addiction medicine specialist was recommended.⁹ Patients not prescribed buprenorphine/naloxone could still be referred to addiction clinics.

For evaluation purposes, discharged visits where patients received buprenorphine/naloxone are compared with visits for opioid-related reasons where patients did not receive buprenorphine/naloxone. See online Appendix 1 for diagnosis codes counted as opioid related. Only discharged patients are included because the ED referral protocol is directed toward these patients. Patients with other dispositions, such as admissions, transfers, and left without treatment, are excluded because there is no development of an outpatient follow-up plan for them within the ED. See online Appendix 2 for disposition codes counted as discharged and admitted.

Intervention

We considered the Consolidated Framework for Implementation Research as a conceptual model for change in developing our intervention.¹⁰ This model considers a range of factors that impact the success of an intervention, including the credibility of its origin, evidence for the intervention, perceived need for change, relative advantage of the intervention over alternatives, perceived difficulty for practitioners, and individuals’ capacity and willingness to take up the intervention. To address these and other aspects of the model, local implementation teams were formed in each ED site. These teams

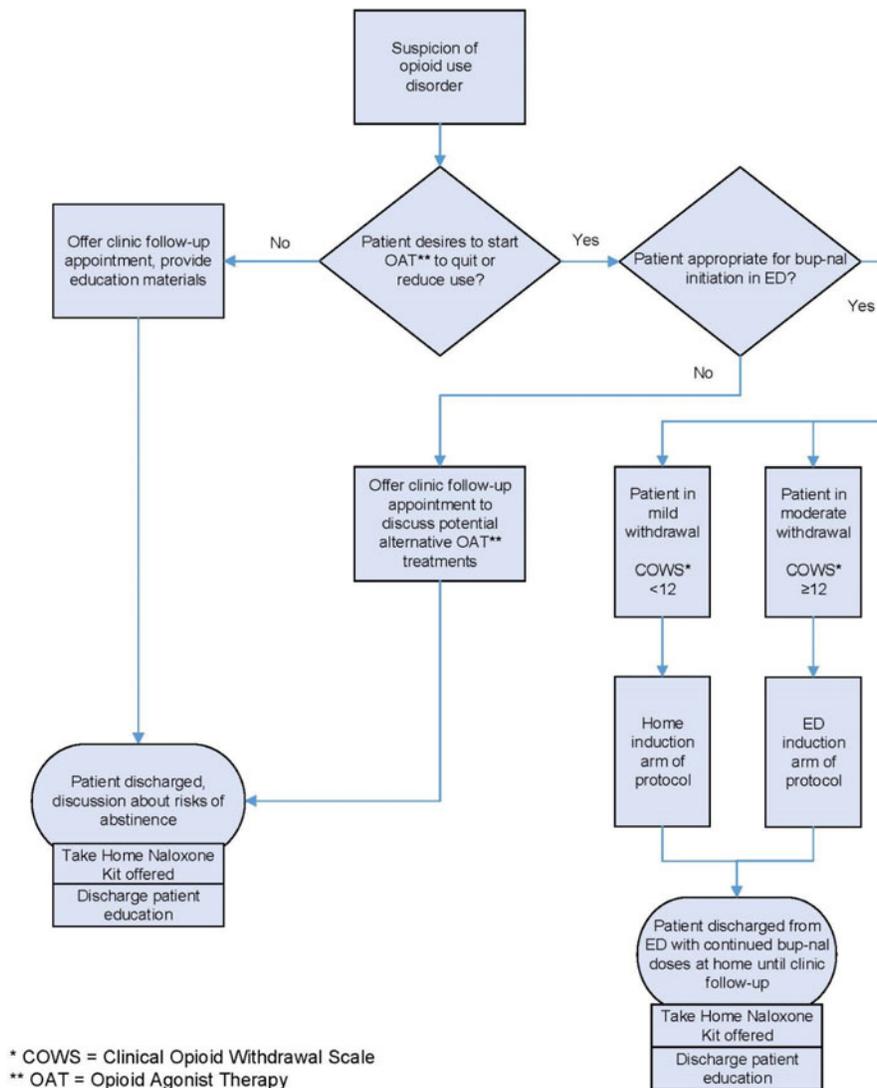


Figure 1. High level overview of protocol.

included a physician champion, a nursing lead, an administrative lead (e.g., ED manager), and representatives from pharmacy services and social work. Teams worked with experts to create the initial treatment protocol, order set, discharge instructions, education materials, fax referral forms and referral pathways based on available evidence. A full-time project manager and the interdisciplinary Emergency Strategic Clinical NetworkTM (ESCN) leadership team provided expertise and infrastructure to develop materials, processes, and operational relationships. All processes were intended to be evidence based, promote standard practices, maximize detection of patients with opioid use disorder,

minimize use of ED resources, and reduce barriers to clinic attendance for patients.

Local teams led education for physicians and nurses on the benefits of opioid use disorder treatment, buprenorphine/naloxone medication initiation, referral protocols, and supporting documents. As each site is different, local teams also worked to tailor the program to local resources (e.g., social work hours), and information systems, and to coordinate with local services outside the ED (e.g., accounting for clinic and pharmacy opening hours, and ensuring referral options or bridging practices during off hours). [Figure 1](#) shows a high-level overview of our intervention protocol.

Outcome measures

The monthly rate of buprenorphine/naloxone initiation per ED was assessed from January to April 2018 (baseline) and May to September 2018 (intervention period). Rates were compared with eight nonintervention sites in Calgary and Edmonton. Monthly initiation rate was our main outcome at the site level.

One process and two outcome measures were assessed at the patient level. The process measure was the number of referrals to community clinics from intervention ED sites. The outcome measures were attendance at first appointment at community clinic and continuity in care.

We used ED electronic medical records to track patients given buprenorphine/naloxone in the ED. Participating community clinics manually tracked the number of referrals received by means of fax from participating ED sites and the number of referred patients who attended their first follow-up appointment, as no existing data system captures such information across sites.

The Pharmaceutical Information Network¹¹ dataset was used to determine the number of patients filling any opioid agonist treatment prescription 30, 60, and 90 days after being discharged from ED. This dataset includes information on prescriptions filled at pharmacies in Alberta. Prescription filling was understood as a proxy measure for continuity in care. See online Appendix 3 for the medications and doses counted as opioid agonist treatment prescriptions.

Patient and emergency visit characteristics are also reported. Diagnosis, patient age, patient sex, Canadian Triage Acuity Score (CTAS),¹² disposition (e.g. admitted or discharged), and length of stay were extracted from the National Ambulatory Care Reporting System.¹³ Diagnoses were classified using International Classification of Disease-10 codes.¹⁴

Two balancing measures were developed to assess ED resource use and adverse patient events related to buprenorphine/naloxone. Patient length of stay was recorded as a proxy measure for ED resource use caused by buprenorphine/naloxone initiation in the ED. Numbers and descriptions of adverse events involving buprenorphine/naloxone were derived from the provincial Reporting and Learning System.¹⁵

Data analysis

Descriptive statistics are presented for all measures. A run chart, i.e., a line graph showing data over time, was used to

compare the number of ED visits where buprenorphine/naloxone was given in intervention sites before and after the intervention.¹⁶ Comparison to eight other sites was conducted to establish whether changes observed were due to the intervention or to wider system changes at a time when there is an increasing focus on opioids. One Edmonton hospital is excluded from the analysis as an outlier, as it has a very successful and high-profile pre-existing hospital-wide addiction medicine program.

When reporting prescription filling for patients who were given buprenorphine/naloxone in the ED, the first ED visit where buprenorphine/naloxone is given was used. For patient-level analysis of patients not given buprenorphine/naloxone in the ED, their first ED visit for an opioid-related reason was used. A non-parametric Wilcoxon rank sum test comparing means was used to compare lengths of stay for visits where patients are given buprenorphine/naloxone in the ED and not given buprenorphine/naloxone in the ED. Sample size for ED visits is 427.

RESULTS

Table 1 gives characteristics of facilities participating in the intervention. Figure 2 shows the number of buprenorphine/naloxone starts in intervention and control sites by month from January 2018 to September 2018.

Before the intervention, from January to April 2018, ED sites participating in the intervention gave buprenorphine/naloxone tablets during four unique ED visits (an average of 0.25 visits per month per site). From program launch dates until the end of September 2018, these sites gave buprenorphine/naloxone tablets during 66 visits (an average of 5.9 visits per month per site, after intervention launch dates). From May to September 2018, the eight other sites in Edmonton and Calgary gave buprenorphine/naloxone during 84 unique visits (an average of 2.1 visits per month per site).

The demographics of patients receiving buprenorphine/naloxone in the ED and their prescription filling rates at 30, 60, and 90 days, are given in Table 2. Thirty-five (74.4%) patients discharged from the ED with buprenorphine/naloxone continued to fill opioid agonist treatment prescriptions 30 days and 60 days after their index ED visit. Thirty-four (72.3%) filled prescriptions at 90 days.

The participating ED sites referred 37 patients to the three participating clinics, and 16 of those individuals

	Start date for intervention	Facility type	Number of ED visits annually (calendar year 2018)	Number of opioid-related ED visits annually (calendar year 2018)
North East Community Health Centre (AHS - Edmonton)	May 15, 2018	Free Standing ED (no inpatient, admitted patients are transferred)	50,845	134
Grey Nuns Community Hospital (Covenant Health, Edmonton)	June 11, 2018	Community Hospital ED	75,270	303
Rockyview General Hospital (AHS, Calgary)	July 5, 2018	Community Hospital ED	79,551	887

(43%) attended their first community follow-up appointments.

Characteristics of ED visits during which buprenorphine/naloxone was given are presented in Table 3. Median length of stay for ED visits resulting in discharge with buprenorphine/naloxone was not significantly longer than for opioid-related visits where buprenorphine/naloxone was not given ($p = 0.35$).

One patient safety event involving buprenorphine/naloxone was reported, which was a dosing error with no apparent harm to the patient. This event occurred because clinicians provided a dose based on the naloxone component of buprenorphine/naloxone tablets. Working in the protocol was subsequently clarified, to specify that buprenorphine/naloxone is a combination drug and

quantity given should be based on the buprenorphine component.

DISCUSSION

Interpretation of findings

As the intervention site increased monthly buprenorphine/naloxone prescribing rates more than comparison sites, the increase in buprenorphine/naloxone dispensing at participating sites appears to be the result of the project. Nearly three-quarters of the patients started on the medication in the ED continued to fill prescriptions for opioid agonist treatment at 30, 60, and 90

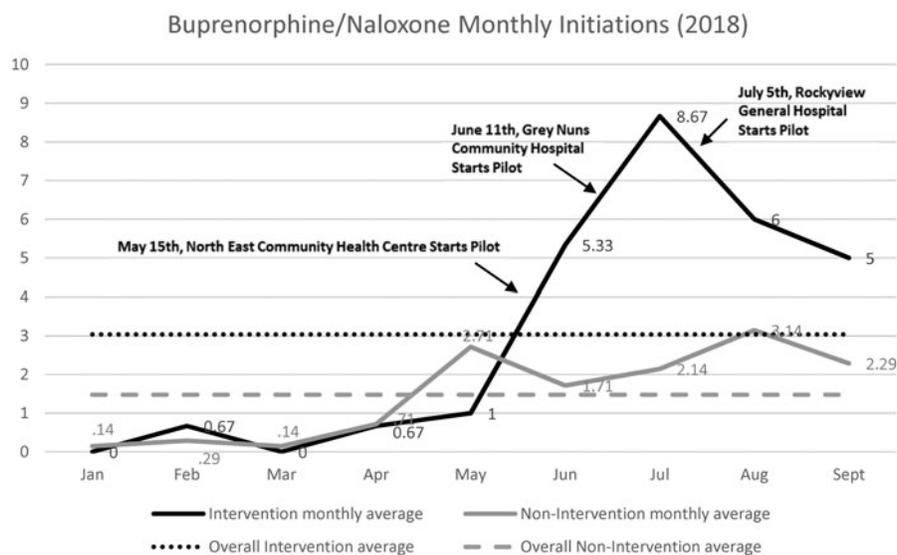


Figure 2. Buprenorphine/naloxone average monthly initiations (2018).

	Discharged patients receiving buprenorphine/naloxone	Discharged patients with opioid-related ED visits NOT receiving buprenorphine/naloxone
	n = 47	n = 335
Age (median (range))	34 (21–66)	33 (15–78)
Male (n (%))	23 (48.9%)	216 (64.4%)
Female (n (%))	24 (51.1%)	118 (35%)
Number filling opioid agonist treatment prescription at 30 days after their first ED visit	35 (74.4%)	112 (33.4%)
at 60 days	35 (74.4%)	110 (32.8%)
at 90 days	34 (72.3%)	109 (32.5%)

days. We regard the fact that 43% of referrals attended their first follow-up appointment as evidence of success of the referral pathway. Some patients who received the medication were not referred to participating clinics, and these patients may have preferred referral to primary care or another clinic.

Clinical implications

Results suggest that a multi-site effort can initiate patients on opioid agonist treatment, and effectively connect patients to treatment. In this project, ED sites worked together while avoiding duplication of efforts, and patients received standardized care across sites.

The median difference in length of stay for visits leading to discharge with buprenorphine/naloxone and opioid-related visits leading to discharge without

buprenorphine/naloxone was not statistically significant. This suggests that dispensing buprenorphine/naloxone does not increase ED length of stay for discharged patients. The expert working group regarded the fact that only one minor patient safety event was reported positively.

Comparison to previous studies

We are not aware of other studies reporting buprenorphine/naloxone monthly prescribing rates at the ED level across sites. Our findings on continuity of care may be compared with findings reported by D'Onofrio et al. and Hu et al.^{5,6} D'Onofrio et al. report 74% of patients given buprenorphine/naloxone and referred to treatment were engaged in treatment 60 days after randomization.⁵ However, D'Onofrio et al. excluded

	Discharged visits receiving buprenorphine/naloxone	Discharged opioid-related visits NOT receiving buprenorphine/naloxone
	n = 51	n = 376
Length of stay (median (interquartile range))	5 hours 52 minutes (IQR: 4 hours 17 minutes)	5 hours 5 minutes (IQR: 6 hours 10 minutes)
CTAS 1 (n (%))	1 (1.9%)	20 (5.3%)
CTAS 2	14 (27.5%)	196 (52.1%)
CTAS 3	24 (47.1%)	109 (29.0%)
CTAS 4	11 (21.6%)	44 (11.7%)
CTAS 5	1 (1.9%)	5 (1.3%)
Unknown	0 (0%)	2 (0.5%)
First listed ICD-10 code (n(%))		
Poisoning by opioids	9 (17.6%)	231 (61.4%)
Mental and behavioral issues related to opioids (including withdrawal)	32 (62.7%)	102 (27.1%)
Other	10 (19.6%)	43 (11.4%)

patients with active psychiatric conditions. Hu et al. reports no such exclusion and found 35% of patients (15/43) initiated on buprenorphine/naloxone and referred to treatment were continuing on buprenorphine/naloxone 6 months later.⁶

Our 43% referral attendance rate was similar to the 54% rate reported by Hu et al.⁶ We believe reducing the time and effort required to make referrals through standardized fax referral forms encouraged uptake of the program in ED sites. We believe that next day walk-in options made transitions in care straightforward for patients.

Strengths and limitations

A particular strength of our work was that it examined a multi-site approach to initiating opioid use disorder treatment across ED sites. A limitation of our evaluation was an inability to determine the number of eligible patients who could have received buprenorphine/naloxone in the ED during our intervention period. A further limit of our analysis was that Reporting and Learning System use is voluntary. Therefore, some patient safety events may not have been captured in the data relied on.

Research implications

While this was a quality improvement project, results suggest a need for research to determine the numbers and characteristics of patients who would benefit from buprenorphine/naloxone and referral to opioid use disorder treatment in Alberta ED sites. Further quality improvement efforts could then focus on ensuring that these patients receive buprenorphine/naloxone.

CONCLUSION

Emergency clinicians can effectively initiate patients on buprenorphine/naloxone when supports for this standardized evidence-based care and pathways for follow-up in community are available.

Supplemental material: The supplemental material for this article can be found at <https://doi.org/10.1017/cem.2020.438>.

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Competing interests: Dr. Deol reports grant funding from AHS and Health Canada to provide treatment guidelines and education on opioid use disorder to emergency physicians, during the conduct of the study; he is part owner and part of the leadership team of Metro City Medical Clinic Calgary. Dr. Fanaeian reports grant funding from AHS and Health Canada to provide treatment guidelines and education on opioid use disorder to emergency physicians, during the conduct of the study; and clinical practice in treating patients with opioid use disorder. Dr. Ghosh reports he is currently an addiction physician at a publicly funded clinic supporting those with substance use disorders. Dr. Holroyd reports that he is the Senior Medical Director of the AHS Emergency Strategic Clinical Network.

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