

# UCLA

## UCLA Previously Published Works

### Title

An evaluation of the association between specific post-overdose care services in emergency departments and subsequent treatment engagement

### Permalink

<https://escholarship.org/uc/item/6mv9x3dm>

### Journal

Journal of the American College of Emergency Physicians Open, 4(1)

### ISSN

2688-1152

### Authors

Chambers, Laura C  
Hallowell, Benjamin D  
Samuels, Elizabeth A  
[et al.](#)

### Publication Date

2023-02-01

### DOI

10.1002/emp2.12877

Peer reviewed

## ORIGINAL RESEARCH

## Evidence-Based Emergency Medicine

# An evaluation of the association between specific post-overdose care services in emergency departments and subsequent treatment engagement

Laura C. Chambers PhD, MPH<sup>1,2,3</sup> | Benjamin D. Hallowell PhD, MPH<sup>1</sup> |  
 Elizabeth A. Samuels MD, MPH<sup>3,4,5</sup> | Mackenzie Daly MPA<sup>6</sup> | Janette Baird PhD<sup>4</sup> |  
 Francesca L. Beaudoin MD, PhD<sup>3,4</sup>

<sup>1</sup>Substance Use Epidemiology Program, Rhode Island Department of Health, Providence, Rhode Island, USA

<sup>2</sup>Division of Infectious Diseases, The Miriam Hospital, Providence, Rhode Island, USA

<sup>3</sup>Department of Epidemiology, Brown University, Providence, Rhode Island, USA

<sup>4</sup>Department of Emergency Medicine, Brown University, Providence, Rhode Island, USA

<sup>5</sup>Drug Overdose Prevention Program, Rhode Island Department of Health, Providence, Rhode Island, USA

<sup>6</sup>Research, Data Evaluation, and Compliance Unit, Rhode Island Department of Behavioral Healthcare, Developmental Disabilities, and Hospitals, Providence, Rhode Island, USA

## Correspondence

Francesca L. Beaudoin, Brown University Department of Epidemiology, Box G-S121-2, 121 South Main Street, Providence, RI 02912, USA.

Email: francesca\_beaudoin@brown.edu

**Funding and support:** This work was supported by the Centers for Disease Control and Prevention (Grant R01CE19001 to F.L.B. and J.B.). L.C.C. was supported by the National Institutes of Health (Grants T32DA013911 and R25MH083620).

## Abstract

**Objective:** The objective of this study was to estimate the association between receipt of specific post-overdose care services in the emergency department (ED) and subsequent engagement in treatment for opioid use disorder (OUD) after discharge.

**Methods:** This was a retrospective cohort study of Rhode Island residents treated at 1 of 4 EDs for opioid overdose who were not engaged in OUD treatment and were discharged home (May 2016–April 2021). Electronic health record data were used to identify ED services received, and state administrative data were used to define subsequent engagement in OUD treatment within 30 days. Multivariable conditional logistic regression was used to estimate the association between ED services received and subsequent treatment engagement.

**Results:** Overall, 1008 people not engaged in OUD treatment were treated at study EDs for opioid overdose and discharged home, of whom 146 (14%) subsequently engaged in OUD treatment within 30 days. Most patients were aged 25 to 44 years (59%) and non-Hispanic White (69%). Receipt of behavioral counseling in the ED (adjusted odds ratio [aOR] = 1.79, 95% confidence interval [CI] = 1.18–2.71) and initiation of buprenorphine treatment in/from the ED (aOR = 5.86, 95% CI = 2.70–12.71) were associated with treatment engagement. Receipt of a take-home naloxone kit or naloxone prescription and referral to treatment at discharge were not associated with treatment engagement. Overall, 49% of patients received behavioral counseling in the ED, and 3% initiated buprenorphine in/from the ED.

**Conclusion:** Strategies for increasing provision of behavioral counseling and initiation of buprenorphine in the ED may be useful for improving subsequent engagement in OUD treatment after discharge.

## KEYWORDS

emergency medicine, medications for opioid use disorder, opioid use disorder, overdose, behavioral counseling

Laura C. Chambers and Benjamin D. Hallowell contributed equally to this article.

Supervising Editors: Brittany Punches, PhD, RN; Henry Wang, MD, MS.

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2023 The Authors. *JACEP Open* published by Wiley Periodicals LLC on behalf of American College of Emergency Physicians.

## 1 | INTRODUCTION

### 1.1 | Background

In the United States, the rate of opioid overdose has increased to crisis levels.<sup>1</sup> Improving access to treatment for opioid use disorder (OUD) is a national priority to reduce morbidity and mortality and other societal costs associated with opioid use. Standard of care for patients with OUD includes consideration of opioid withdrawal management (ie, detoxification); medications for OUD, which are highly effective for reducing morbidity and mortality<sup>2-7</sup>; and psychosocial treatment tailored to the patient's needs.<sup>8</sup> Treatment may occur in varied clinical settings (eg, outpatient, intensive outpatient, residential, inpatient). However, although there are effective treatments for OUD, engagement in treatment remains relatively low. For example, only 11% of people with OUD received a medication for OUD in the past year.<sup>9</sup> Barriers to engagement in treatment for OUD include patient, provider, and structural factors, such as stigma and misconceptions about addiction, a limited number of providers who can prescribe medications for OUD, transportation- and health insurance-related barriers to accessing healthcare, racism, poverty, and fear of arrest.<sup>10-15</sup>

### 1.2 | Importance

Emergency department (ED) visits for opioid overdose are an important opportunity to connect people with OUD to treatment. ED initiatives to provide patients treated after opioid overdose with behavioral counseling, take-home naloxone, and linkage to treatment have expanded during the past decade<sup>16-25</sup>; however, it is unknown which post-overdose care services are most beneficial for improving subsequent engagement in OUD treatment.

### 1.3 | Goals of this investigation

The objective of this study was to estimate the association between receipt of specific post-overdose care services provided in the ED and subsequent engagement in treatment for OUD after discharge.

## 2 | METHODS

### 2.1 | Study design, sample, and data sources

This was a retrospective cohort study of Rhode Island residents who were treated at 1 of 4 EDs for an opioid overdose within the state's largest medical system between May 1, 2016, and April 30, 2021; were not in treatment for OUD at the time of overdose; and were discharged home from the ED. Rhode Island has 1 of the highest per capita rates of overdose deaths in the United States, with 38 deaths per 100,000 residents in 2020.<sup>26</sup> The study EDs comprise more than half of all ED visits for opioid overdose in Rhode Island.<sup>27</sup> ED visits for opioid overdose were identified using electronic health record (EHR) data through

#### The Bottom Line

This study aimed to identify emergency department services for patients who experience an opioid overdose that may improve subsequent engagement in treatment. Among 1008 emergency department patients who experienced an opioid overdose and were not actively engaged in treatment, 14% subsequently engaged in treatment in the community within 30 days. Patients who received behavioral counseling and/or started medications for opioid use disorder in/from the emergency department were more likely to engage in treatment in the community.

structured query language from an Epic Data Warehouse using the case definition for opioid overdose from the US Centers for Disease Control and Prevention.<sup>28</sup> For people with multiple ED visits for opioid overdose meeting the inclusion criteria during the study period, 1 visit was randomly selected for inclusion in this study. Rhode Island residents were identified based on their address of residence in the EHR; undomiciled patients typically have their state of residence included in the EHR.

ED visits for opioid overdose were linked deterministically to state administrative data on treatment for OUD, including Prescription Drug Monitoring Program (PDMP) data from the Rhode Island Department of Health (RIDOH) and data from the Rhode Island Department of Behavioral Healthcare, Developmental Disabilities, and Hospitals (BHDDH). To link to the PDMP data, we created a unique identifier using the first 5 letters of an individual's last name, the first 3 letters of their first name, and their date of birth. PDMP data were used to identify prescriptions for buprenorphine products approved by the US Food and Drug Administration for the treatment of OUD. To link to the BHDDH data, we matched patients first using social security number (about 98% of matches) and second using the unique identifier previously described, as full name and date of birth were not collected systematically until 2018. BHDDH data include all behavioral health services licensed by the state of Rhode Island and were used to identify engagement in other treatments for OUD, including methadone, outpatient, intensive outpatient, residential detoxification, and residential treatment. OUD treatment services were identified based on a primary diagnosis of substance use disorder and substance type of opioids. People in active treatment for OUD at the time of overdose were excluded from all analyses. Active treatment for OUD at the time of overdose was defined as meeting either of the following criteria on the date of the ED visit: (1) buprenorphine medication on hand based on prescription fill dates and days' supply per the PDMP and/or (2) an ongoing treatment episode for OUD per BHDDH data.

This study was approved by the clinical sites' and RIDOH Institutional Review Boards. The Strengthening the Reporting of Observational Studies in Epidemiology guidelines were followed in the preparation of this report.

## 2.2 | Key measures

### 2.2.1 | Outcome

The study outcome was a subsequent engagement in any OUD treatment within 30 days of the ED visit for opioid overdose, defined as at least 1 buprenorphine prescription filled per the PDMP or any OUD treatment received per BHDDH.

### 2.2.2 | Exposures

The study exposures of interest were 4 types of post-overdose care services received in the ED, which were the focus of Rhode Island's statewide post-overdose and OUD treatment standards based on scientific evidence and expert consensus.<sup>29</sup> These 4 types of services were (1) receipt of behavioral counseling in the ED, including psychiatry, social work, and/or peer support consultations; (2) initiation of buprenorphine treatment in or from the ED (ie, administered in the ED or prescription received at discharge); (3) receipt of a take-home naloxone kit or naloxone prescription at discharge; and (4) referral to substance use treatment received at discharge. Services received in the ED were defined based on orders placed in the EHR.

### 2.2.3 | Covariates

We also considered other measures that may confound the association between receipt of specific post-overdose care services in the ED and subsequent engagement in treatment for OUD (ie, may be associated with both receipts of specific services and subsequent treatment engagement). These potential confounders were defined based on the EHR data and included patient age group (<18, 18–24, 25–34, 35–44, 45–54, 55–64, or ≥65 years), race/ethnicity (Hispanic [any race] or non-Hispanic White, Black, or “other” race), sex (female or male), insurance type (private, Medicaid, Medicare, other, or none), year of ED visit (2016, 2017, 2018, 2019, 2020, or 2021), and history of previous ED visit for opioid overdose in the medical system in the prior 365 days (yes or no). Age groups were created to allow for a flexible association between age and subsequent treatment engagement in our statistical analysis.

## 2.3 | Statistical methods

Data management and analyses were completed in SAS version 9.4 (Cary, NC), using 2-sided tests and significance-level  $\alpha = 0.05$ . Sociodemographic information in the EHR was complete, and data on services provided and treatment engagement were assumed to be completed based on orders placed in the EHR and statewide treatment data, respectively. Characteristics of and ED services received by patients who did versus did not subsequently engage in treatment for OUD were compared using  $\chi^2$  tests. The collinearity of each set of measures

(exposures and covariates) was assessed using the Pearson correlation coefficient, and a correlation with an absolute value of >0.7 was considered problematic.

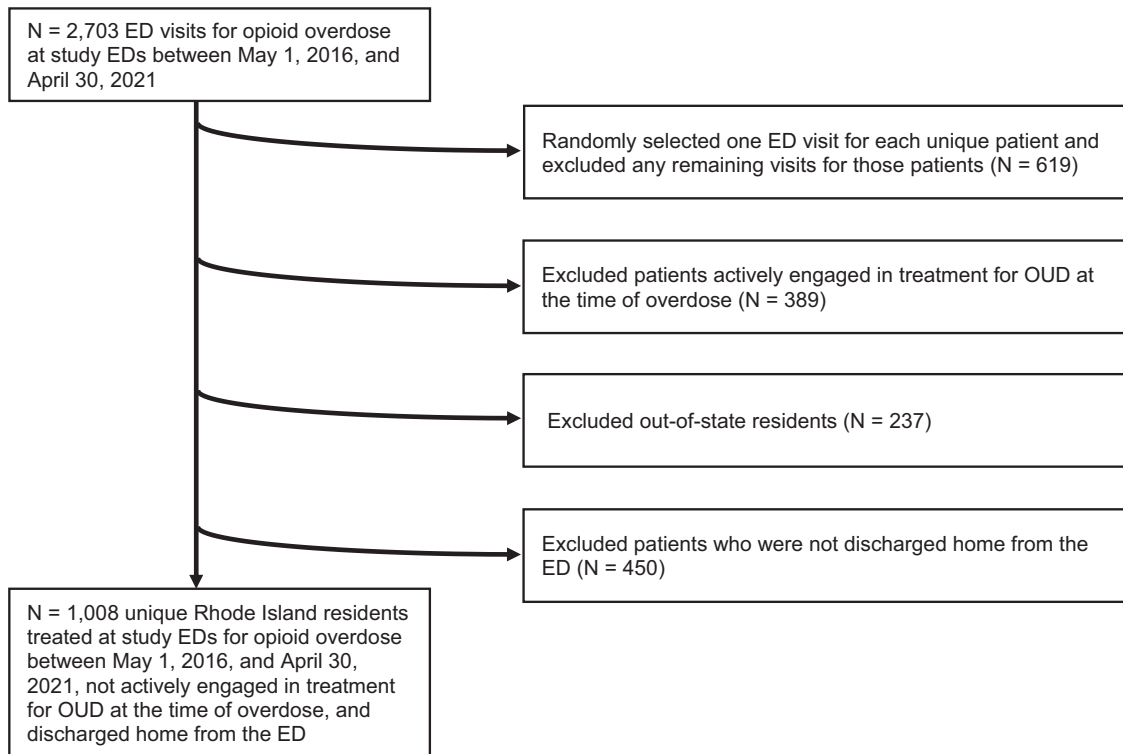
Multivariable conditional logistic regression was used to estimate the association between specific types of post-overdose care services received in the ED and subsequent treatment engagement, adjusting for confounders and stratifying by study ED. Select sociodemographic characteristics (age group, race/ethnicity, sex, and insurance type) were selected a priori for inclusion in the model as confounders based on their hypothesized association with both ED services received and subsequent treatment engagement. There was less clarity regarding whether year of ED visit and history of previous ED visit for opioid overdose would be associated with subsequent treatment engagement. Thus, their association with treatment engagement was evaluated in bivariate analyses, and they were included in the multivariable model if associated. Models were stratified by study ED to account for any correlation of measurements at each hospital. Finally, a sensitivity analysis was conducted including patients with other modes of discharge (eg, inpatient admission, left against medical advice, left without being seen, transferred facilities) to understand the impact of this inclusion criterion on our findings.

## 3 | RESULTS

Between May 1, 2016, and April 30, 2021, there were 2703 ED visits for opioid overdose at study EDs among 2084 unique patients (Figure 1). After randomly selecting 1 visit for each patient, of the remaining 2084 ED visits, 1695 (81%) were among patients not actively engaged in treatment for OUD at the time of overdose. After excluding 237 out-of-state residents (14%) and 450 patients who were not discharged home (27%), the remaining 1008 unique Rhode Island residents who were treated at study EDs for opioid overdose, not actively engaged in treatment for OUD at the time of overdose, and discharged home from the ED were included in this analysis.

Overall, 595 patients (59%) were aged 25 to 44 years, 682 (69%) were non-Hispanic White, and 690 (68%) were men (Table 1). Most patients had either private insurance ( $n = 394$ , 39%) or Medicaid insurance ( $n = 357$ , 35%); 145 (14%) did not have health insurance. Overall, 74 (7%) had a history of previous ED visits for opioid overdose at a study ED in the prior 365 days.

Overall, 146 patients (14%) subsequently engaged in treatment for OUD within 30 days of the ED visit. Of those 146 patients, 81 (55%) engaged in buprenorphine, 44 (30%) in methadone, 10 (7%) in outpatient, 10 (7%) in intensive outpatient, 29 (20%) in residential detoxification, and 26 (18%) in residential treatment; 40 (27%) engaged in >1 treatment type. In bivariate analyses, insurance type ( $P < 0.01$ ) and race/ethnicity ( $P = 0.04$ ) were associated with subsequent engagement in treatment within 30 days. Compared with patients who did not subsequently engage in treatment, those who did were more likely to have Medicaid insurance (47% vs 33%) and be non-Hispanic White (77% vs 66%) and were less likely to be uninsured (5% vs 16%).



**FIGURE 1** Flowchart of study inclusion and exclusion criteria. ED, emergency department; OUD, opioid use disorder.

Overall, 491 patients (49%) received behavioral counseling in the ED, 31 (3%) initiated buprenorphine treatment in or from the ED, 657 (65%) received a take-home naloxone kit or naloxone prescription at discharge, and 320 (31%) were referred to substance use treatment at discharge. Of the 491 patients who received behavioral counseling in the ED, 69 (14%) had a psychiatry consultation, 241 (49%) had a social work consultation, and 369 (75%) had a consultation with a peer recovery support specialist. Of the 31 patients who initiated buprenorphine in or from the ED, 17 (55%) were administered buprenorphine in the ED, and 18 (58%) received a buprenorphine prescription at discharge. Of the 657 patients who received a take-home naloxone kit or naloxone prescription at discharge, 626 (95%) received a kit, and 75 (11%) received a prescription. In total, 266 patients (26%) did not receive any of these post-overdose ED services. In bivariate analyses, compared with those who did not receive the service, patients who received behavioral counseling in the ED (60% vs 47%;  $P < 0.01$ ) and initiated buprenorphine in or from the ED (10% vs 2%;  $P < 0.01$ ) more often subsequently engaged in treatment for OUD within 30 days of the ED visit. In contrast, receipt of a take-home naloxone kit or naloxone prescription ( $P = 0.36$ ) and referral to substance use treatment ( $P = 0.90$ ) at discharge were not associated with subsequent treatment engagement within 30 days.

No set of 2 measures met our criterion for problematic collinearity. In multivariable analyses, both receipt of behavioral counseling in the ED (adjusted odds ratio [aOR] = 1.79, 95% CI = 1.18–2.71) and initiation of buprenorphine in or from the ED (aOR = 5.86, 95% CI = 2.70–12.71) were associated with subsequent treatment engage-

ment within 30 days of the ED visit, stratifying by study ED and adjusting for other ED services received, age group, race/ethnicity, sex, and insurance type (Table 2). Receipt of a take-home naloxone kit or naloxone prescription at discharge and referral to substance use treatment at discharge were not associated with subsequent treatment engagement within 30 days, stratifying by study ED and adjusting for confounders. Of note, in the multivariable model, patients without health insurance had lower odds of treatment engagement compared with those with private insurance (aOR = 0.36, 95% CI = 0.17–0.79). The results were generally similar in sensitivity analyses that were not restricted to patients discharged home (Tables S1 and S2).

### 3.1 | Limitations

This study was strengthened by the use of EHR data from a large medical system, linked at the individual level to administrative treatment data from RIDOH and BHDDH. However, there were also limitations. Importantly, patients may have received other services in the ED that were not considered as a part of this bundle of post-overdose ED services. In addition, there may be unmeasured factors that influenced whether patients received a specific post-overdose service in the ED that are also independently associated with subsequent treatment engagement, leading to residual confounding. Unmet health-related social needs, for example, present key barriers to treatment engagement<sup>30</sup> and were not assessed systematically among patients in this study. We also were not able to evaluate whether providers offered

**TABLE 1** Baseline measures among Rhode Island residents treated at EDs for opioid overdose, not engaged in OUD treatment at the time of overdose, and discharged home from the ED, stratified by subsequent engagement in treatment for OUD in the community within 30 days of the ED visit

	Overall, N = 1008	Subsequent engagement in treatment for OUD within 30 days of the ED visit		
		Yes, n = 146	No, n = 862	P value
<b>Sociodemographics</b>				
<b>Age group, years</b>				
<18	4 (0)	0 (0)	4 (1)	0.25
18–24	139 (14)	17 (12)	122 (14)	
25–34	356 (35)	64 (44)	292 (34)	
35–44	239 (24)	35 (24)	204 (24)	
45–54	153 (15)	15 (10)	138 (16)	
55–64	81 (8)	11 (8)	70 (8)	
≥65	36 (4)	4 (3)	32 (4)	
<b>Race and ethnicity</b>				
Non-Hispanic White	682 (69)	112 (77)	570 (66)	<b>0.04</b>
Hispanic	184 (18)	23 (16)	161 (19)	
Non-Hispanic Black	111 (11)	10 (7)	101 (12)	
Non-Hispanic other race	31 (3)	1 (1)	30 (3)	
<b>Sex</b>				
Male	690 (68)	99 (68)	591 (69)	0.86
Female	318 (32)	47 (32)	271 (31)	
<b>Insurance type</b>				
Private	394 (39)	58 (40)	336 (39)	<b>&lt;0.01</b>
Medicaid	357 (35)	69 (47)	288 (33)	
Medicare	91 (9)	9 (6)	82 (10)	
Other	21 (2)	2 (1)	19 (2)	
None	145 (14)	8 (5)	137 (16)	
<b>Visit year</b>				
2016	163 (16)	21 (14)	142 (16)	0.96
2017	195 (19)	30 (21)	165 (19)	
2018	181 (18)	28 (19)	153 (18)	
2019	209 (21)	32 (22)	177 (21)	
2020	189 (19)	25 (17)	164 (19)	
2021	71 (7)	10 (7)	61 (7)	
<b>ED visit for opioid overdose in prior 365 days</b>				
No	934 (93)	132 (90)	802 (93)	0.26
Yes	74 (7)	14 (10)	60 (7)	
<b>ED services received</b>				
<b>Received behavioral counseling in ED</b>				
No	57 (51)	58 (40)	459 (53)	<b>&lt;0.01</b>
Yes	491 (49)	88 (60)	403 (47)	
<b>Initiated buprenorphine in or from ED</b>				
No	977 (97)	131 (90)	846 (98)	<b>&lt;0.01</b>
Yes	31 (3)	15 (10)	16 (2)	

(Continues)

**TABLE 1** (Continued)

	Overall, N = 1008	Subsequent engagement in treatment for OUD within 30 days of the ED visit		
		Yes, n = 146	No, n = 862	P value
Received take-home naloxone kit or prescription at discharge				
No	351 (35)	46 (32)	305 (35)	0.36
Yes	657 (65)	100 (68)	557 (65)	
Referred to substance use treatment at discharge				
No	688 (68)	99 (68)	589 (68)	0.90
Yes	320 (31)	47 (32)	273 (32)	

Data are provided as n (%).

Abbreviations: ED, emergency department; OUD, opioid use disorder.

Bold indicates statistical significance ( $P < 0.05$ ).

the services (only whether patients received them) or the potential correlation within providers. Importantly, 30-day treatment engagement may have been impacted by interventions that occurred after the ED visit and were not influenced by their ED care. In addition, this analysis considered 4 main types of post-overdose ED services, and the association with subsequent treatment engagement may vary for the more granular services within each type. Similarly, the analysis considered the association between post-overdose ED services and any subsequent OUD treatment engagement; future work to understand the association between ED services and specific types of treatment would be useful. Moreover, our analysis was limited to patients treated at the EDs for opioid overdose, so our findings may not be generalizable to patients with OUD who are treated at EDs for other reasons (eg, opioid withdrawal). Finally, despite routine quality improvement activities, administrative data on OUD treatment are imperfect. Some patients may be misclassified as not having engaged in OUD treatment, which we would expect to attenuate the associations of interest.

## 4 | DISCUSSION

In this retrospective cohort study of Rhode Island residents treated at EDs for an opioid overdose and who were not actively engaged in treatment for OUD, 14% subsequently engaged in treatment for OUD within 30 days, which is generally consistent with prior studies.<sup>31</sup> Receipt of behavioral counseling in the ED and initiation of buprenorphine in or from the ED were each independently associated with higher odds of subsequent treatment engagement within 30 days, adjusting for sociodemographic confounders and other ED services received. In contrast, receipt of a take-home naloxone kit or naloxone prescription and referral to substance use treatment at discharge were not associated with higher odds of subsequent treatment engagement. Finally, being uninsured was independently associated with lower odds of subsequently engaging in treatment within 30 days compared with having private insurance.

This real-world study of patients treated at EDs for opioid overdose suggests that initiation of buprenorphine in the ED or provision

of a buprenorphine prescription at discharge is associated with subsequent engagement in OUD treatment within 30 days. This finding is consistent with a prior randomized controlled trial of ED patients with OUD (of whom about 9% were being treated for overdose), which found that patients who initiated buprenorphine in the ED (along with a brief psychosocial intervention and linkage to the hospital's primary care center) were more likely to engage in addiction treatment after 30 days<sup>32</sup> and 2 months<sup>33</sup> than patients who received only a referral to addiction treatment or a referral along with a brief psychosocial intervention. Given that only 3% of patients in the present study initiated buprenorphine in or from the ED, there is an important opportunity to improve patient care through the expansion of buprenorphine provision in the ED. Importantly, for most of the study period, Rhode Island had statewide treatment standards for post-overdose and OUD care in EDs and hospitals in place,<sup>29</sup> which included initiation of buprenorphine in the ED for eligible patients. Additional supports for ED providers and patients are needed to improve the use of this important service, including those that target stigma, misconceptions about addiction and medications for OUD, how to provide buprenorphine in the ED, financial barriers, and concerns about ED capacity to take on this type of care in the context of other demands.<sup>12</sup>

Receipt of behavioral counseling in the ED was also associated with subsequent engagement in OUD treatment within 30 days. Behavioral counseling may include consultation with a psychiatrist, social worker, or peer recovery support specialist and is a critical component of treatment for OUD. Counseling may include motivational interviewing and cognitive behavioral therapy techniques, in addition to treatment referral, which can support patients in identifying their readiness, ability, and willingness to engage in treatment and examining their patterns of thinking and coping strategies.<sup>10</sup> Although almost half of patients received behavioral counseling in this study, there remains an opportunity to increase the provision of this service. Prior work has demonstrated that non-Hispanic Black patients are less likely than non-Hispanic White patients to receive behavioral counseling in the ED after an opioid overdose,<sup>34</sup> which may exacerbate racial/ethnic disparities in treatment engagement. One strategy to increase uptake of counseling is to have dedicated OUD and substance use



**TABLE 2** Multivariable model of the association between baseline measures and subsequent engagement in treatment for OUD within 30 days of the ED visit, stratified by study ED, among patients discharged home from the ED

	Adjusted OR (95% CI)
<b>Sociodemographics</b>	
<b>Age group (years)</b>	
<18	1.05 (0.001, undefined)
18–24	Reference
25–34	1.57 (0.86, 2.88)
35–44	1.28 (0.67, 2.47)
45–54	0.81 (0.38, 1.73)
55–64	1.23 (0.52, 2.90)
≥65	–
<b>Race and ethnicity</b>	
Non-Hispanic White	Reference
Hispanic	0.67 (0.40, 1.12)
Non-Hispanic Black	0.54 (0.27, 1.09)
Non-Hispanic other race	0.14 (0.02, 1.08)
<b>Sex</b>	
Male	Reference
Female	0.93 (0.63, 1.38)
<b>Insurance type</b>	
Private	Reference
Medicaid	1.47 (0.98, 2.21)
Medicare	0.75 (0.33, 1.69)
Other	0.65 (0.14, 2.97)
None	<b>0.36 (0.17, 0.79)</b>
<b>ED services received</b>	
<b>Received behavioral counseling in ED</b>	
No	Reference
Yes	<b>1.79 (1.18, 2.71)</b>
<b>Initiated buprenorphine in or from ED</b>	
No	Reference
Yes	<b>5.86 (2.70, 12.71)</b>
<b>Received take-home naloxone kit or prescription at discharge</b>	
No	Reference
Yes	1.00 (0.63, 1.59)
<b>Referred to substance use treatment at discharge</b>	
No	Reference
Yes	0.80 (0.51, 1.24)

Abbreviations: CI, confidence interval; ED, emergency department; OR, odds ratio; OUD, opioid use disorder.

Bold indicates statistical significance ( $P < 0.05$ ).

disorder counseling services embedded in EDs, which would not require clinician-initiated consultation.

Receipt of a take-home naloxone kit or naloxone prescription and referral to substance use treatment at discharge were not associated with higher odds of subsequent treatment engagement within 30 days. It is not surprising that the provision of take-home naloxone was not associated with treatment engagement, as that is not the intended goal of this service. Rather, the goal is for the patient and their social network to have naloxone on hand for rapid response to a potential future overdose. In addition, the lack of an association between referral to substance use treatment and subsequent treatment engagement within 30 days is consistent with prior evidence that the majority of ED patients with OUD who are provided a referral, with or without facilitation, do not engage in addiction treatment within 30 days.<sup>32</sup>

Our finding that being uninsured was independently associated with lower odds of subsequent treatment engagement within 30 days is consistent with prior work.<sup>35</sup> Although not significant in multivariable analyses, people of color were less likely to engage in OUD treatment, which is generally consistent with prior studies that have identified racial/ethnic disparities in OUD treatment initiation and retention,<sup>11,35–41</sup> including after opioid overdose.<sup>31</sup> It is also noteworthy that a higher percentage of patients with Medicaid insurance subsequently engaged in treatment within 30 days, although this finding was not significant in multivariable analyses. Prior studies of treatment engagement for people with Medicaid insurance have had mixed results.<sup>35,42</sup> In Rhode Island, Medicaid may have a highly accessible network of OUD treatment providers, including through community health centers. Taken together, these findings highlight the importance of minimizing social and structural barriers to OUD treatment, such as stigma, racism, poverty, access to healthcare, and fear of arrest.<sup>13–15,43</sup>

Of note, during the study period, the overall number of ED visits for opioid overdose was relatively stable in Rhode Island.<sup>44</sup> However, the number of people engaged in treatment for OUD increased during this period.<sup>45</sup> There were also important changes in emergency medicine practices during this period, including the implementation of statewide treatment standards for post-overdose and OUD care in EDs and hospitals in Rhode Island in March 2017.<sup>29</sup> Overall provision of the post-overdose ED services of interest increased before the start of our study period. After policy implementation, visits more often included initiation of buprenorphine in or from the ED, provision of a take-home naloxone kit or prescription, and referral to treatment, but provision of behavioral counseling in the ED and 30-day engagement in treatment remained similar (F.L. Beaudoin and J. Baird, unpublished data, 2021).

In conclusion, among Rhode Islanders treated at EDs for opioid overdose who were not actively engaged in OUD treatment, receipt of behavioral counseling in the ED and initiation of buprenorphine in or from the ED were each independently associated with subsequent treatment engagement within 30 days, whereas receipt of a take-home naloxone kit or naloxone prescription and referral to substance use treatment at discharge were not associated with subsequent treatment engagement. Strategies for increasing initiation of buprenorphine and provision of behavioral counseling in the ED may



be useful for improving subsequent engagement in OUD treatment. Additional research is needed to identify patients who may benefit most from initiation of buprenorphine in the ED. Policies and programs that reduce social and structural barriers to OUD treatment are also essential.

## AUTHOR CONTRIBUTIONS

Janette Baird and Francesca L. Beaudoin contributed to the study concept and design. Benjamin D. Hallowell contributed to the data analysis. Laura C. Chambers, Benjamin D. Hallowell, Elizabeth A. Samuels, Mackenzie Daly, Janette Baird, and Francesca L. Beaudoin contributed to the interpretation of the results and critically revised the article. Laura C. Chambers drafted the manuscript.

## CONFLICT OF INTEREST

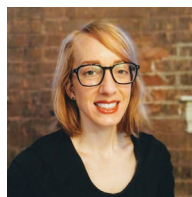
The authors declare no conflict of interest.

## REFERENCES

- Hedegaard H, Miniño AM, Warner M. Drug overdose deaths in the United States, 1999–2019. *NCHS Data Brief*. 2020(394):1-8.
- 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.
- 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.
- 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.
- Clark RE, Baxter JD, Aweh G, O'Connell E, Fisher WH, Barton BA. Risk factors for relapse and higher costs among medicaid members with opioid dependence or abuse: opioid agonists, comorbidities, and treatment history. *J Subst Abuse Treat*. 2015;57:75-80.
- Hser YI, Evans E, Huang D, et al. Long-term outcomes after fentanyl to buprenorphine/naloxone versus methadone in a multi-site trial. *Addiction*. 2016;111(4):695-705.
- Weiss RD, Potter JS, Griffin ML, et al. Long-term outcomes from the national drug abuse treatment clinical trials network prescription opioid addiction treatment study. *Drug Alcohol Depend*. 2015;150:112-119.
- The ASAM National Practice Guideline for the treatment of opioid use disorder: 2020 focused update. *J Addict Med* 2020; 14(2S Suppl 1):1-91.
- US Substance Abuse and Mental Health Services Administration. 2020 National Survey on Drug Use and Health: Detailed Tables, Table 5.42B. Accessed August 3, 2022. Available at: <https://www.samhsa.gov/data/report/2020-nsduh-detailed-tables>
- Mumba MN, Findlay LJ, Snow DE. Treatment options for opioid use disorders: a review of the relevant literature. *J Addict Nurs*. 2018;29(3):221-225.
- Wu LT, Zhu H, Swartz MS. Treatment utilization among persons with opioid use disorder in the United States. *Drug Alcohol Depend*. 2016;169:117-127.
- D'Onofrio G, McCormack RP, Hawk K. Emergency departments - A 24/7/365 option for combating the opioid crisis. *N Engl J Med*. 2018;379(26):2487-2490.
- Goedel WC, Shapiro A, Cerdá M, Tsai JW, Hadland SE, Marshall BDL. Association of racial/ethnic segregation with treatment capacity for opioid use disorder in counties in the United States. *JAMA Netw Open*. 2020;3(4):e203711.
- Gary FA. Stigma: barrier to mental health care among ethnic minorities. *Issues Ment Health Nurs*. 2005;26(10):979-999.
- Saloner B, Le Cook B. Blacks and Hispanics are less likely than Whites to complete addiction treatment, largely due to socioeconomic factors. *Health Aff*. 2013;32(1):135-145.
- American College of Emergency Physicians. E-QUAL Network Opioid Initiative. Accessed: August 3, 2022. Available at: <https://www.acep.org/administration/quality/equal/emergency-quality-network-e-qual/e-qual-opioid-initiative/>
- Colorado Chapter of the American College of Emergency Physicians. *Opioid Prescribing and Treatment Guidelines: Confronting the Opioid Epidemic in Colorado's Emergency Departments*. 2017.
- Snyder H, Kalmin MM, Moulin A, et al. 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.
- Kilaru AS, Perrone J, Kelley D, et al. Participation in a hospital incentive program for follow-up treatment for opioid use disorder. *JAMA Netw Open*. 2020;3(1):e1918511.
- The Network for Public Health Law. Harm Reduction And Overdose Prevention 50-State Survey: SUD-Related Emergency Department Mandates. 2021.
- Department Baltimore City Health, Levels of Care for Baltimore City Hospitals Responding to the Opioid Epidemic: Guide for Hospitals. 2018.
- New York City Department of Health and Mental Hygiene. Guidance for the Care of Patients Presenting to New York City Emergency Departments Following a Non-Fatal Opioid Overdose. 2019.
- State of Rhode Island. Rhode Island General Laws 23-17.26-3 - Comprehensive Discharge Planning. 2016.
- Massachusetts Health and Hospital Association. Guidelines for Medication for Addiction Treatment for Opioid Use Disorder within the Emergency Department. 2019.
- California State Legislature. *Health and Safety Code Section 11757: AB-389 Substance Use Disorder Treatment - Peer Navigators*. 2019.
- US Centers for Disease Control and Prevention. Drug Overdose Mortality by State. Accessed: August 3, 2022. Available at: [https://www.cdc.gov/nchs/pressroom/sosmap/drug\\_poisoning\\_mortality/drug\\_poisoning.htm](https://www.cdc.gov/nchs/pressroom/sosmap/drug_poisoning_mortality/drug_poisoning.htm)
- Rhode Island Department of Health. Opioid Overdose Reporting System (48-Hour Reporting System), unpublished data. 2021.
- US Centers for Disease Control and Prevention. CDC's Drug Overdose Surveillance and Epidemiology (DOSE) System. Accessed: August 3, 2022. Available at: <https://www.cdc.gov/drugoverdose/nonfatal/case.html>
- Rhode Island Department of Health and Department of Behavioral Healthcare, Developmental Disabilities, and Hospitals. *Levels of Care for Rhode Island Emergency Department and Hospitals for Treating Overdose and Opioid Use Disorder*. 2017.
- Samuels EA, Doran KM. Moving upstream: a social emergency medicine approach to opioid use disorder. *Ann Emerg Med*. 2022;79(2):168-171.
- 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.
- D'Onofrio G, O'Connor PG, Pantaloni MV, et al. Emergency department-initiated buprenorphine/naloxone treatment for opioid dependence: a randomized clinical trial. *JAMA*. 2015;313(16):1636-1644.
- D'Onofrio G, Chawarski MC, O'Connor PG, et al. Emergency department-initiated buprenorphine for opioid dependence with continuation in primary care: outcomes during and after intervention. *J Gen Intern Med*. 2017;32(6):660-666.

34. Reddy NG, Jacka B, Ziobrowski HN, et al. Ethnicity, and emergency department post-overdose care. *J Subst Abuse Treat*. 2021;131:108588.
35. Cantone RE, Garvey B, O'Neill A, et al. Predictors of medication-assisted treatment initiation for opioid use disorder in an interdisciplinary primary care model. *J Am Board Fam Med*. 2019;32(5):724-731.
36. Stahler GJ, Mennis J, Baron DA. Racial/ethnic disparities in the use of medications for opioid use disorder (MOUD) and their effects on residential drug treatment outcomes in the US. *Drug Alcohol Depend*. 2021;226:108849.
37. Schiff DM, Nielsen T, Hoepfner BB, et al. Assessment of racial and ethnic disparities in the use of medication to treat opioid use disorder among pregnant women in Massachusetts. *JAMA Netw Open*. 2020;3(5):e205734.
38. Nguyen T, Ziedan E, Simon K, et al. Racial and ethnic disparities in buprenorphine and extended-release naltrexone filled prescriptions during the COVID-19 pandemic. *JAMA Netw Open*. 2022;5(6):e2214765.
39. Mennis J, Stahler GJ. Racial and ethnic disparities in outpatient substance use disorder treatment episode completion for different substances. *J Subst Abuse Treat*. 2016;63:25-33.
40. Mennis J, Stahler GJ, El Magd SA, Baron DA. How Long does it take to complete outpatient substance use disorder treatment? Disparities among Blacks, Hispanics, and Whites in the US. *Addict Behav*. 2019;93:158-165.
41. Stahler GJ, Mennis J. Treatment outcome disparities for opioid users: are there racial and ethnic differences in treatment completion across large US metropolitan areas? *Drug Alcohol Depend*. 2018;190:170-178.
42. Jones CM, McCance-Katz EF. Co-occurring substance use and mental disorders among adults with opioid use disorder. *Drug Alcohol Depend*. 2019;197:78-82.
43. Alegria M, Carson NJ, Goncalves M, Keefe K. Disparities in treatment for substance use disorders and co-occurring disorders for ethnic/racial minority youth. *J Am Acad Child Adolesc Psychiatry*. 2011;50(1):22-31.
44. Prevent Overdose RI. Emergency Response Data. Accessed: August 3, 2022. Available at: <https://preventoverdoseri.org/ems-data/>
45. Prevent Overdose RI. Medication-Assisted Treatment Data. Accessed August 3, 2022. Available at: <https://preventoverdoseri.org/medication-assisted-therapy/>

## AUTHOR BIOGRAPHY



**Laura C. Chambers, PhD, MPH**, is an Assistant Professor and Lead Research Scientist at Brown University School of Public Health in Providence, Rhode Island.

## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

**How to cite this article:** Chambers LC, Hallowell BD, Samuels EA, Daly M, Baird J, Beaudoin FL. An evaluation of the association between specific post-overdose care services in emergency departments and subsequent treatment engagement. *JACEP Open*. 2023;4:e12877. <https://doi.org/10.1002/emp2.12877>