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## Barriers to Initiate Buprenorphine and Methadone for Opioid Use Disorder Treatment with Post Discharge Treatment Linkage

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### Abstract

**Background:** Hospitals are an essential site of care for people with opioid use disorder (OUD). Buprenorphine and methadone are underutilized in the hospital.

**Objective:** Characterize barriers to in-hospital buprenorphine or methadone initiation to inform implementation strategies to increase OUD treatment provision.

**Design, Participants, and Setting:** Survey of hospital-based clinicians' perceptions of OUD treatment from 12 hospitals conducted between June 2022 to August 2022.

**Measures:** Survey questions were grouped into 6 domains: (1) evidence to treat OUD, (2) hospital processes to treat OUD, (3) buprenorphine or methadone initiation, (4) clinical practices to treat OUD, (5) leadership prioritization of OUD treatment, and (6) job satisfaction. Likert responses were dichotomized and associations between "readiness" to initiate buprenorphine or methadone and each domain were assessed.

**Key Results:** Of 160 respondents (60% response rate), 72 (45%) reported higher readiness to initiate buprenorphine compared to methadone, 55 (34%). Respondents with higher readiness to initiate medications for OUD were more likely to perceive that evidence supports the use of buprenorphine and methadone to treat OUD ( $p < .001$ ), to perceive fewer barriers to treat OUD ( $p < .001$ ), to incorporate OUD treatment into their clinical practice ( $p < .001$ ), to perceive leadership support for OUD treatment ( $p < .007$ ), and had greater job satisfaction ( $p < 0.04$ ). Clinicians reported that OUD treatment protocols with treatment linkage, increased education, and addiction specialist support would facilitate OUD treatment provision.

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**Conclusion:** Interventions which incorporate protocols to initiate medications for OUD, include addiction specialist support and education, and ensure post discharge OUD treatment linkage could facilitate hospital-based OUD treatment provision.

## Keywords

Substance use disorder; Medication treatment for opioid use disorder; Implementation science

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## Introduction

Hospitals are an essential site of care for people with opioid use disorder (OUD) and hospitalization is a critical time to engage adults in OUD treatment.<sup>1,2</sup> From 2000 to 2016 in the U.S., hospitalizations related to OUD increased 219%, a 3-fold increase.<sup>3</sup> Despite an increase in hospitalizations related to OUD, most hospitalized patients do not receive standard of care treatment for OUD, including buprenorphine or methadone<sup>4,5</sup> which contributes to rehospitalizations and death.<sup>6-9</sup>

In the U.S., 50,000 hospitalists provide care to hospitalized patients and most hospitalists report they regularly care for patients with OUD.<sup>10,11</sup> Hospital-based guidelines recommend the use of buprenorphine or methadone to manage opioid withdrawal in the hospital.<sup>12,13</sup> Adequately managed opioid withdrawal reduces patient-directed discharges,<sup>14-16</sup> improves patient and clinician satisfaction,<sup>13,17</sup> reduces rehospitalization,<sup>18</sup> and increases OUD treatment linkage.<sup>6,19,20</sup> Hospitalists are uniquely positioned to fill an OUD treatment gap. Identifying hospitalist-reported barriers to providing OUD treatment is necessary to develop targeted implementation strategies to eliminate these barriers.

Increasingly, emergency departments (ED) are filling an OUD treatment gap by initiating buprenorphine and facilitating OUD treatment linkage.<sup>2,21</sup> Successful implementation of ED-based buprenorphine has, in part, been due to the rigorous use of targeted implementation strategies to improve ED clinician uptake.<sup>22,23</sup> Similar strategies borrowed from the ED setting could be used to close an OUD treatment gap in the hospital. Therefore, we conducted a multisite survey across a large, statewide healthcare system to characterize contextual barriers and facilitators to the provision of OUD treatment from the perspective of hospitalists. Study findings will inform the development of a healthcare systemwide intervention to expand hospital-based OUD treatment coupled with targeted implementation strategies to address clinician-reported barriers.<sup>24</sup>

## Methods

### Overview

This study identified contextual barriers to hospital-based OUD treatment provision from the perspective of hospital-based clinicians.

The study approach was informed by the Consolidated Framework for Implementation Research (CFIR) which is a framework used to assess context, i.e., circumstances or site-specific factors that surround an implementation effort,<sup>25</sup> that may affect successful

implementation of an evidence-based intervention, i.e., initiation of medications for OUD.<sup>26,27</sup> This study was approved by the Colorado Multiple Institutional Review Board.

### Setting and Participants

The healthcare system includes 12 hospitals located in urban, suburban, and rural communities in northern, central, and southern Colorado. The largest hospital, a university-affiliated, Level 1 Trauma Center with over 700 beds, is the only hospital in the healthcare system with an addiction consultation service. The remaining hospitals range in size from 34 beds to 413 beds and they employ hospitalists working in privately-owned group practices or large healthcare medical groups. In 2021, there were >141,000 hospitalizations across these hospitals. We invited hospitalists, including physicians, physician assistants, and nurse practitioners to participate via an online survey (n=267).

### Survey Development

We created a 37-item web-based, anonymous survey informed by practice recommendations for hospital-based OUD treatment.<sup>12</sup> We grouped survey questions into six domains guided by CFIR: Domain 1: validity and quality of the evidence supporting OUD treatment (5 questions); Domain 2: satisfaction with current hospital process for OUD screening, treatment initiation, and treatment linkage (2 questions); Domain 3: barriers to buprenorphine (7 questions) and methadone initiation (7 questions) Domain 4: clinical practice for OUD management (8 questions); Domain 5: leadership priorities to provide OUD treatment (3 questions); and Domain 6: leadership support and job satisfaction (3 questions) (Appendix 1). We iteratively refined the survey content following feedback from addiction physicians and clinician researchers with expertise in substance use and hospital medicine.

### Data Collection

We collected responses on a 5-point Likert scale for agreement, readiness, or satisfaction (1 = strongly disagree/not ready/highly unsatisfied; 2 = disagree/slightly ready/somewhat unsatisfied; 3 = neither agree nor disagree/somewhat ready/neutral; 4 = agree/fairly ready/somewhat satisfied; 5 = strongly agree/completely ready/very satisfied). Two survey questions included prepopulated responses to known barriers to prescribe buprenorphine or methadone with a section for open-ended responses.<sup>28-30</sup> One survey question solicited open-ended feedback on ideas for improving OUD treatment and linkage.

The survey was managed using the secure web-based software platform REDCap electronic data capture tools.<sup>31,32</sup> Eligible participants received three email reminders and all participants provided informed consent prior to taking the survey. Participants received a \$20 gift card after survey completion. Data collection occurred from June 2022 to August 2022.

### Data Analysis

We generated descriptive statistics to characterize participants' characteristics. We calculated the mean summary scores for all domains and evaluated their distributions for approximate normality. For Domains 1, 2, 4, 5, and 6, the summary score ranged from 1 to 5, where

higher scores were indicative of greater agreement and higher satisfaction. Lower summary scores highlighted areas where targeted implementation strategies might be most impactful to increase intervention uptake. For Domain 3, the scores ranged from 0 to 1 and a higher mean score was indicative of greater perceived barriers to buprenorphine and methadone initiation. To assess for associations between “readiness” to initiate buprenorphine or methadone and each of the six domains, we dichotomized responses into “lower readiness” (not or slightly ready) versus “higher readiness” (somewhat, fairly, completely ready). Participant characteristics and domain summary scores were compared by the dichotomized readiness status using independent-tests, and chi square tests. We did not formulate *a priori* hypotheses. We conducted analysis between October 2023 to December 2022 using SPSS statistical software version v26.0 (IBM Corporation, Armonk, NY). A significance level of  $\alpha=0.05$  two-tailed was specified for all tests.

We analyzed three open-ended questions using a content analysis approach. This involves the use of a team-based coding scheme to analyze open-ended survey questions by identifying and quantifying key concepts to understand a situation or phenomenon.<sup>33,34</sup> *A priori* codes for the initial codebook were based on prior research and CFIR domains. Two study team members trained in qualitative research methods (SL and SLC) read and re-read the responses to identify emerging key concepts. The coding team independently applied the deductive codes to the open-ended responses. SLC and SL reviewed the application and conception of codes line-by-line and discussed any discrepancies until consensus was reached. The final reconciled codes were grouped into categories and quantified to determine the number of responses per category. Participant responses were not exclusive to one category and oftentimes crossed multiple categories. ATLAS.ti software (v9) was used for data management.

## Results

### Clinician Characteristics

Of the 160 survey participants (60% response rate), the mean age was 38.8 years old (Standard Deviation [SD] 7.7 years), 65 (40.6%) were women, 111 (69.4%) were physicians, and the mean time in clinical practice was 8.4 years (SD 6.9 years). Most participants 117 (73.1%) worked in one of three hospitals located in metropolitan Denver. At the time of survey distribution, a DEA X-waiver was required by law and 48 (30%) reported having an X-DEA waiver (Table 1).

### Readiness to Initiate and Titrate Buprenorphine or Methadone

Seventy-two participants reported “higher readiness” to initiate buprenorphine and 55 participants (34%) reported “higher readiness” to initiate methadone. Most participant characteristics did not differ statistically between readiness groups with the exception that participants who reported “higher readiness” to initiate buprenorphine were more likely to have an X-DEA waiver ( $p < .001$ ) than those who reported “lower readiness” to initiate buprenorphine (Table 1).

## Barriers Related to Buprenorphine and Methadone Initiation

Frequently reported barriers for initiating buprenorphine or methadone in the hospital were a lack of knowledge or comfort to initiate buprenorphine, 87 (54.4%) or methadone, 96 (60%), no clear discharge plan for buprenorphine, 84 (52.5%) or methadone, 89 (55.6%), no clear pathway or protocol to initiate buprenorphine, 72 (45%) or methadone, 85 (53.1%), and confusion about the legality of prescribing buprenorphine, 58 (36.3%) or methadone, 53 (33.1%) (Table 2).

## Domain Mean Summary Scores

Generally, participants “agreed” that treating OUD with buprenorphine or methadone improves health outcomes for people with OUD (mean = 4.19 [SD 0.75]) (Domain 1). Participants were generally “neutral” regarding their satisfaction with current hospital processes for OUD screening, treatment initiation, and linkage (mean = 3.03 [SD 0.96]) (Domain 2). Participants reported fewer barriers to the use of buprenorphine compared to methadone (mean for buprenorphine = 0.32 [SD 0.22]; mean for methadone = 0.34 [SD 0.23]) (Domain 3). On average, respondents “rarely” or “every once in a while” used the Clinical Opiate Withdrawal Scale (COWS) to assess withdrawal severity,<sup>35</sup> used the Diagnostic Statistical Manual, 5<sup>th</sup> Edition (DSM-5) to diagnose OUD,<sup>36</sup> initiated buprenorphine or methadone, or referred patients to OUD treatment after discharge (mean = 2.73 [SD 0.97]) (Domain 4). On average, respondents “disagreed” that hospital leadership prioritized OUD treatment with education, and training provided to clinicians (mean = 2.77 [SD 0.96]) (Domain 5). On average, participants “neither agreed nor disagreed” that they felt supported by hospital leadership to treat OUD, found their work to be rewarding, or were committed to their hospital leadership (mean = 3.67 [SD 0.75]) (Domain 6) (Table 3).

## Readiness to Treat OUD and Validity and Quality of the Evidence to Treat OUD

Validity and quality questions assessed participants’ perceptions that the use of buprenorphine, methadone, and naloxone improves health outcomes among people with OUD, and that hospitalists should provide this care (Domain 1). Participants with “higher readiness” to initiate buprenorphine “strongly agreed” in the evidence supporting OUD treatment (mean = 4.42 [SD 0.61]) compared to participants with “lower readiness” to initiate buprenorphine (mean = 4.0 [SD 0.8],  $p < .001$ ). Similarly, participants with “higher readiness” to initiate methadone more “strongly agreed” in the evidence supporting OUD treatment (mean = 4.56 [SD 0.52]) compared to participants with “lower readiness” to initiate methadone (mean = 4.0 [SD 0.78],  $p < .001$ ).

## Readiness to Treat OUD and Satisfaction with Hospital Processes

Satisfaction with hospital processes included standardized OUD screening, treatment initiation, and OUD treatment linkage (Domain 2). Participants reporting “higher readiness” or “lower readiness” to initiate buprenorphine or methadone did not differ in their satisfaction with hospital processes to treat OUD (Table 3).

### Readiness to Treat OUD and Barriers to Treat OUD

Barriers to treat OUD (Domain 3) included legal concerns with the use of buprenorphine or methadone, time constraints or discomfort initiating buprenorphine or methadone, lack of perceived patient interest in OUD treatment, lack of availability of pathways or protocols to initiate buprenorphine or methadone, and lack of OUD treatment referral pathways after discharge. “Higher readiness” respondents reported fewer barriers to initiate buprenorphine (mean = 0.24 [SD 0.24]) compared to “lower readiness” respondents (mean = 0.39 [SD 0.22],  $p < .001$ ). “Higher readiness” respondents also reported fewer barriers to initiate methadone (mean = 0.21 [SD 0.18]) compared to “lower readiness” respondents (mean = 0.41 [SD 0.23],  $p < .001$ ) (Table 3).

### Readiness to Treat OUD and Current OUD Treatment Practice

Current OUD treatment practices (Domain 4) included the use of the COWS score to assess opioid withdrawal severity,<sup>35</sup> use of the DSM-5 to diagnose OUD,<sup>36</sup> in-hospital buprenorphine or methadone initiation, and referral to OUD treatment after hospital discharge. Participants with “higher readiness” (mean = 3.07 [SD 0.97]) to initiate buprenorphine were more likely to provide this care compared to respondents with “lower readiness” (mean = 2.45 [SD 0.88],  $p < .001$ ). We noted similar findings for participants with “higher readiness” to initiate methadone (mean = 3.35 [SD 0.96]) compared to those with “lower readiness” to initiate methadone (mean=2.40, [SD 0.81],  $p < .001$ ).

### Readiness to Treat OUD and Leadership Prioritization for In-Hospital OUD Treatment

Hospital leadership prioritization for OUD treatment included providing necessary education and training to support hospitalist prescribing of buprenorphine and methadone for OUD (Domain 5). Participants with “higher readiness” to initiate buprenorphine reported greater support from leadership (mean= 2.99 [SD 0.92]) compared to participants with “lower readiness” (mean = 2.58 [0.96],  $p = .006$ ). Participants with “higher readiness” to initiate methadone reported greater support from leadership (mean = 3.07 [SD 0.90]) compared to participants with “lower readiness” (mean = 2.61 [SD 0.96],  $p = .003$ ).

### Readiness to Treat OUD and Hospital Leadership Support to Treat OUD and Job Satisfaction

Hospital leadership support and job satisfaction included the perception that leadership supported initiation of OUD treatment, that clinicians viewed their work as rewarding, and they felt committed to hospital leadership (Domain 6). Participants reporting “higher readiness” or “lower readiness” to initiate buprenorphine or methadone did not differ in their perception of leadership support or job satisfaction (Table 3).

### Content Analysis of Open-Ended Responses

Participants highlighted additional considerations to improve hospital-based OUD treatment. Four major categories emerged with illustrative quotes: (Category 1): A desire for improved OUD education and training for clinicians (52 responses). One respondent wrote, “(We need an) education series on prescribing Suboxone and methadone in the hospital on yearly basis, specifically discussing initiation doses, COWS scale. This should be offered to providers,

nurses, and social workers.” (Category 2): Improved transitions and access to OUD care post discharge (47 responses). One respondent wrote, “I think our system is poor at transitioning care to the outpatient realm for addiction disorders.” (Category 3): Improved access to addiction specialists (35 responses). One respondent wrote, “We need a dedicated team of addiction providers to consult on our patients.” (Category 4): Improved pathways and protocols (31 responses). One respondent wrote, “We need a streamlined process/pathway built off of evidence-based practices and includes a discharge component to link patients to outpatient clinics/providers.” (Table 4). Open-ended responses regarding additional barriers to initiate buprenorphine or methadone did not reveal new categories and were encompassed in the recommendations to improve hospital-based OUD care.

## Discussion

Hospitalization is a critical time to initiate medications for OUD with treatment linkage for out-of-treatment adults with OUD. We identified hospitalist-reported barriers to providing OUD treatment with the intent to preemptively design targeted strategies to address these barriers during the multisite, hospital-based OUD intervention implementation.

Most participants agreed that the use of buprenorphine or methadone with OUD treatment referral was evidence-based and improved patient outcomes. Future implementation strategies to expand hospital-based OUD treatment will focus less on educating clinicians on the evidence to support OUD treatment and will focus more on addressing the respondent-reported contextual barriers to providing OUD treatment in the hospital. This includes a step-by-step approach to initiate medications for OUD, education for OUD treatment initiation, access to addiction specialists for challenging cases, and standardized processes to link patients to post discharge OUD treatment. Future implementation strategies will address each of the four emergent categories encompassing hospitalist-reported facilitators for OUD treatment provision.

Participants reported that processes to screen for, and to diagnose OUD, to initiate medications for OUD, and to ensure OUD treatment linkage following hospital discharge could be improved with protocols or pathways. Thus, we will develop an electronic health record (EHR)-based pathway that incorporates nursing prompts to complete screening questions for unhealthy substance use at hospital admission, an embedded COWS<sup>35</sup> scoring tool for nurse-driven opioid withdrawal assessments, an embedded link to the DSM-5 diagnostic criteria for OUD,<sup>36</sup> standardized orders for buprenorphine and methadone, and embedded links with resources for local buprenorphine prescribers and opioid treatment programs to facilitate scheduling of follow-up appointments. EHR-integrated protocols are routinely used to incorporate and facilitate evidence-based practice change among clinicians.<sup>37</sup>

Next, participants reported they infrequently initiate buprenorphine or methadone for patients with OUD, in part, due to a lack of comfort or knowledge to initiate this treatment. They reported that greater access to education or training would close this knowledge gap. Similar findings were noted among hospital-based clinicians working in academically-affiliated hospitals serving a large number of patients with OUD.<sup>38</sup> To address this barrier,

we will offer quarterly in-person or video conferencing seminars with educational content including how to initiate medications for OUD, for example traditional versus low dose buprenorphine initiation, the legality around the use of medications for OUD in the hospital and outpatient setting, and clear goals and expectations for nurses, clinicians, and social workers to incorporate these OUD treatment pathways into their hospital workflow. We will provide positive feedback to clinicians with updates on success stories of patients who remain engaged in treatment following in-hospital OUD treatment initiation to motivate and enhance practice change.<sup>22</sup>

Participants identified that access to addiction specialists would increase their comfort to provide OUD treatment. Our university hospital has an addiction consultation service and can offer telephone support to hospitalists working in the other 11 hospitals across our healthcare system. Information outlining how to access the addiction specialist will be included in the protocols or pathways and discussed during clinician education.

Lastly, obtaining healthcare system leadership commitment to support the OUD intervention and associated implementation activities is needed for initial and sustained success. With hospital leadership support at each of the hospitals, we will identify site-specific clinical and content champions to lead the hospital-based OUD treatment intervention at each hospital. We will conduct quarterly meetings with site leaders to identify areas that need additional support or could benefit from modifications to improve clinician uptake.

Following the hospital-based OUD intervention's implementation, our team will resurvey clinicians to assess the impact of the intervention on clinician behaviors, including readiness to initiate buprenorphine or methadone and associated processes to facilitate clinical practice change. Successful outcomes will include a shift in reported readiness to change for OUD care provision and higher mean scores.

## Limitations

Our survey study was cross-sectional and used a single data collection period. It is possible that hospitalists who did not respond to the survey are significantly different from survey responders, introducing a response bias. However, our response rate was 60% suggesting that the sample is reflective of the larger clinician pool. Similarly, perspectives from the participants that did not respond to the open-ended questions were not captured and may differ from the responders. This study relies on self-perceived readiness which may not reflect clinician's true skills or quality of care provided. We conducted this survey prior to the X-waiver elimination, which may impact clinical practices and perceptions of providing OUD care. Lastly, the results may not be generalizable to other U.S. regions.

## Conclusion

These findings suggest that hospitalists support OUD treatment, but many do not initiate it. Interventions which incorporate pathways or protocols to initiate medications for OUD, include addiction specialist support and education, and link patients to OUD treatment could facilitate hospital-based OUD treatment provision.



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## Appendix

### Appendix

Appendix 1. Survey Questions Within Each Domain and Counts (%) for Categorical Variables

DOMAIN 1		
D1_Q1	In-hospital BUPRENORPHINE or METHADONE initiation with referral to addiction treatment improves health outcomes for people with opioid use disorder.	
	<i>Strongly Disagree</i>	1 (0.6)
	<i>Disagree</i>	3 (1.9)
	<i>Neither Agree nor Disagree</i>	14 (8.8)
	<i>Agree</i>	53 (33.3)
	<i>Strongly Agree</i>	88 (55.3)
D1_Q2	Respected clinical experts in my institution feel that in-hospital BUPRENORPHINE or METHADONE initiation with referral to addiction treatment improves health outcomes for people with opioid use disorder.	
	<i>Strongly Disagree</i>	3 (1.9)
	<i>Disagree</i>	4 (2.5)
	<i>Neither Agree nor Disagree</i>	24 (15.1)
	<i>Agree</i>	46 (28.9)
	<i>Strongly Agree</i>	82 (51.6)
D1_Q3	Data from randomized controlled trials or other scientific evidence supports that in-hospital BUPRENORPHINE or METHADONE initiation with referral to addiction treatment improves health outcomes for people with opioid use disorder.	
	<i>Strongly Disagree</i>	1 (0.6)
	<i>Disagree</i>	1 (0.6)
	<i>Neither Agree nor Disagree</i>	24 (15.2)
	<i>Agree</i>	65 (41.1)
	<i>Strongly Agree</i>	67 (42.4)
D1_Q4	We should initiate BUPRENORPHINE for opioid use disorder in the hospital as an evidence-based practice.	
	<i>Strongly Disagree</i>	2 (1.3)
	<i>Disagree</i>	6 (3.8)
	<i>Neither Agree nor Disagree</i>	23 (14.4)
	<i>Agree</i>	57 (35.6)
	<i>Strongly Agree</i>	72 (45.0)
D1_Q5	We should initiate METHADONE for opioid use disorder in the hospital as an evidence-based practice.	
	<i>Strongly Disagree</i>	5 (3.2)
	<i>Disagree</i>	13 (8.2)
	<i>Neither Agree nor Disagree</i>	31 (19.6)

DOMAIN 1		
	<i>Agree</i>	60 (38.0)
	<i>Strongly Agree</i>	49 (31.0)
D1_Q6	We should prescribe NALOXONE at discharge for patients with opioid use disorder as an evidence-based practice.	
	<i>Strongly Disagree</i>	2 (1.3)
	<i>Disagree</i>	1 (0.6)
	<i>Neither Agree nor Disagree</i>	4 (2.5)
	<i>Agree</i>	33 (20.8)
	<i>Strongly Agree</i>	119 (74.8)
DOMAIN 2		
D2_Q1	How satisfied are you with your hospital's SCREENING process to identify patients with opioid use disorder?	
	<i>Highly Unsatisfied</i>	6 (3.8)
	<i>Somewhat Unsatisfied</i>	42 (26.4)
	<i>Neutral</i>	63 (39.6)
	<i>Somewhat Satisfied</i>	39 (24.5)
	<i>Very Satisfied</i>	9 (5.7)
D2_Q2	How satisfied are you with your hospital's process to LINK patients to addiction treatment following discharge?	
	<i>Highly Unsatisfied</i>	22 (13.8)
	<i>Somewhat Unsatisfied</i>	35 (21.9)
	<i>Neutral</i>	43 (26.9)
	<i>Somewhat Satisfied</i>	37 (23.1)
	<i>Very Satisfied</i>	23 (14.4)
DOMAIN 3		
D3_Q1	What are your thoughts about initiating BUPRENORPHINE for opioid use disorder IN THE HOSPITAL? Select all that apply.	
	<i>a. I am unsure of the legality of prescribing BUPRENORPHINE without an X-waiver</i>	58 (36.3)
	<i>b. I don't have time in my day to initiate BUPRENORPHINE</i>	32 (20.0)
	<i>c. I don't know how to initiate BUPRENORPHINE</i>	87 (54.4)
	<i>d. I don't feel like our patients are interested in BUPRENORPHINE</i>	10 (6.3)
	<i>e. I don't feel like our patients will be able to successfully maintain sobriety</i>	18 (11.3)
	<i>f. We don't have a clear pathway or workflows to initiate BUPRENORPHINE in our hospital</i>	72 (45.0)
	<i>g. We don't have a clear plan to link patients to a BUPRENORPHINE prescriber after discharge (i.e., treatment linkage)</i>	84 (52.5)
	<i>h. Other (write in section)</i>	12 (7.5)
	<i>i. None of the above are concerns</i>	22 (13.8)
D3_Q2	What are your thoughts about initiating METHADONE for opioid use disorder IN THE HOSPITAL? Select all that apply.	

DOMAIN 1		
	<i>a. I am unsure of the legality of prescribing METHADONE for opioid use disorder</i>	53 (33.1)
	<i>b. I don't have time in my day to initiate METHADONE</i>	27 (16.9)
	<i>c. I don't know how to initiate METHADONE</i>	96 (60.0)
	<i>d. I don't feel like our patients are interested in METHADONE</i>	12 (7.5)
	<i>e. I don't feel like our patients will be able to successfully maintain sobriety</i>	18 (11.3)
	<i>f. We don't have a clear pathway or workflows to initiate METHADONE in our hospital</i>	85 (53.1)
	<i>g. We don't have a clear plan to link patients to a METHADONE clinic after discharge (i.e., treatment linkage)</i>	89 (55.6)
	<i>h. Other (write in section)</i>	10 (6.3)
	<i>i. None of the above are concerns</i>	22 (13.8)
DOMAIN 4		
D4_Q1	Overall, how ready are you to initiate and titrate BUPRENORPHINE for opioid use disorder?	
	<i>Not Ready</i>	64 (40.0)
	<i>Slightly Ready</i>	24 (15.0)
	<i>Somewhat Ready</i>	32 (20.0)
	<i>Fairly Ready</i>	32 (20.0)
	<i>Completely Ready</i>	8 (5.0)
D4_Q2	Overall, how ready are you to initiate and titrate METHADONE for opioid use disorder?	
	<i>Not Ready</i>	84 (52.5)
	<i>Slightly Ready</i>	21 (13.1)
	<i>Somewhat Ready</i>	29 (18.1)
	<i>Fairly Ready</i>	20 (12.5)
	<i>Completely Ready</i>	6 (3.8)
D4_Q3	Use the Clinical Opioid Withdrawal Scale (COWS) to assess severity of opioid withdrawal	
	<i>Never</i>	15 (9.4)
	<i>Rarely</i>	19 (11.9)
	<i>Every Once In A While</i>	34 (21.4)
	<i>Sometimes</i>	53 (33.3)
	<i>Almost Always</i>	38 (23.9)
D4_Q4	Initiate BUPRENORPHINE guided by the COWS score	
	<i>Never</i>	54 (34.0)
	<i>Rarely</i>	44 (27.7)
	<i>Every Once In A While</i>	21 (13.2)
	<i>Sometimes</i>	27 (17.0)
	<i>Almost Always</i>	13 (8.2)
D4_Q5	Use the DSM-5 to diagnose opioid use disorder	
	<i>Never</i>	34 (21.3)
	<i>Rarely</i>	46 (28.8)

DOMAIN 1		
	<i>Every Once In A While</i>	23 (14.4)
	<i>Sometimes</i>	40 (25.0)
	<i>Almost Always</i>	17 (10.6)
D4_Q6	Initiate METHADONE	
	<i>Never</i>	81 (50.6)
	<i>Rarely</i>	28 (17.5)
	<i>Every Once In A While</i>	14 (8.8)
	<i>Sometimes</i>	29 (18.1)
	<i>Almost Always</i>	8 (5.0)
D4_Q7	Prescribe NALOXONE at discharge	
	<i>Never</i>	12 (7.5)
	<i>Rarely</i>	7 (4.4)
	<i>Every Once In A While</i>	14 (8.8)
	<i>Sometimes</i>	67 (41.9)
	<i>Almost Always</i>	60 (37.5)
D4_Q8	Prescribe BUPRENORPHINE using your X-DEA at discharge	
	<i>Never</i>	103 (64.8)
	<i>Rarely</i>	27 (17.0)
	<i>Every Once In A While</i>	7 (4.4)
	<i>Sometimes</i>	11 (6.9)
	<i>Almost Always</i>	11 (6.9)
D4_Q9	Refer patients to a BUPRENORPHINE prescriber after discharge	
	<i>Never</i>	43 (26.9)
	<i>Rarely</i>	36 (22.5)
	<i>Every Once In A While</i>	25 (15.6)
	<i>Sometimes</i>	36 (22.5)
	<i>Almost Always</i>	20 (12.5)
D4_Q10	Refer patients to an opioid treatment program for METHADONE after discharge	
	<i>Never</i>	46 (28.8)
	<i>Rarely</i>	34 (21.3)
	<i>Every Once In A While</i>	25 (15.6)
	<i>Sometimes</i>	38 (23.8)
	<i>Almost Always</i>	17 (10.6)
DOMAIN 5		
D5_Q1	Our hospital leadership has prioritized hospital-based opioid use disorder treatment.	
	<i>Strongly Disagree</i>	14 (8.8)
	<i>Disagree</i>	33 (20.6)
	<i>Neither Agree nor Disagree</i>	49 (30.6)
	<i>Agree</i>	50 (31.3)

DOMAIN 1		
	<i>Strongly Agree</i>	14 (8.8)
D5_Q2	Our hospital leadership has provided education and training for in-hospital BUPPRENOPHINE initiation for opioid use disorder.	
	<i>Strongly Disagree</i>	22 (13.8)
	<i>Disagree</i>	46 (28.8)
	<i>Neither Agree nor Disagree</i>	51 (31.9)
	<i>Agree</i>	33 (20.6)
	<i>Strongly Agree</i>	8 (5.0)
D5_Q3	Our hospital leadership has provided education and training for in-hospital METHADONE initiation for opioid use disorder.	
	<i>Strongly Disagree</i>	30 (18.9)
	<i>Disagree</i>	58 (36.5)
	<i>Neither Agree nor Disagree</i>	46 (28.9)
	<i>Agree</i>	20 (12.6)
	<i>Strongly Agree</i>	5 (3.1)
DOMAIN 6		
D6_Q1	I feel supported by my hospital leadership to treat opioid use disorder.	
	<i>Strongly Disagree</i>	10 (6.3)
	<i>Disagree</i>	22 (13.8)
	<i>Neither Agree nor Disagree</i>	60 (37.7)
	<i>Agree</i>	48 (30.2)
	<i>Strongly Agree</i>	19 (11.9)
D6_Q2	I find my current work personally rewarding.	
	<i>Strongly Disagree</i>	2 (1.3)
	<i>Disagree</i>	8 (5.0)
	<i>Neither Agree nor Disagree</i>	20 (12.5)
	<i>Agree</i>	84 (52.5)
	<i>Strongly Agree</i>	46 (28.8)
D6_Q3	I am committed to my hospital leadership.	
	<i>Strongly Disagree</i>	5 (3.1)
	<i>Disagree</i>	7 (4.4)
	<i>Neither Agree nor Disagree</i>	48 (30.2)
	<i>Agree</i>	70 (44.0)
	<i>Strongly Agree</i>	29 (18.2)

Q: What do you think, if in place, would help improve opioid use disorder treatment and addiction treatment linkage in your hospital? Please describe. (write in section)

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**Table 1.**

Hospitalist Characteristics and Associations with Readiness Status for Initiating Buprenorphine and Methadone for OUD in the Hospital

Characteristics	All	Buprenorphine		P Value <sup>c</sup>	Methadone		P Value <sup>c</sup>
	N = 160	Higher Readiness <sup>a</sup> N=72	Lower Readiness <sup>b</sup> N=88		Higher Readiness <sup>a</sup> N=55	Lower Readiness <sup>b</sup> N=105	
Age years Mean (SD)	38.8 (7.7)	39.1 (7.7)	38.6 (7.8)	0.663	39.1 (8.2)	38.7 (7.5)	0.768
Gender N (%)							
Female	65 (41.1)	33 (45.8)	32 (37.2)	0.273 <sup>d</sup>	26 (47.3)	39 (37.9)	0.252 <sup>d</sup>
Male	93 (58.9)	39 (54.2)	54 (62.8)		29 (52.7)	64 (62.1)	
Role N (%)							
Physician	111 (69.4)	53 (73.6)	58 (65.9)	0.293 <sup>d</sup>	38 (69.1)	73 (69.5)	0.955 <sup>d</sup>
Advanced practice provider (NP, PA)	49 (30.6)	19 (26.4)	30 (34.1)		17 (30.9)	32 (30.5)	
Hospital region <sup>e</sup> N (%)							
North	21 (13.6)	10 (14.7)	11 (12.8)	0.821 <sup>d</sup>	6 (11.1)	15 (15.0)	0.240 <sup>d</sup>
Central	117 (76.0)	52 (76.5)	65 (75.6)		45 (83.3)	72 (72.0)	
South	16 (10.4)	6 (8.8)	10 (11.6)		3 (5.6)	13 (13.0)	
Training (SD), years	8.4 (6.9)	8.4 (6.9)	8.4 (7.0)	0.960	8.1 (7.3)	8.5 (6.8)	0.726
X-DEA License N (%)							
Yes	48 (30.0)	37 (51.4)	11 (12.5)	<0.001 <sup>d</sup>	NA	NA	NA
No/I don't know what an X-waiver is	112 (70.0)	35 (48.6)	77 (87.5)				

Abbreviations: SD, standard deviation.

<sup>a</sup>Higher readiness includes Likert responses “somewhat ready”, “fairly ready”, and “completely ready”

<sup>b</sup>Lower readiness includes Likert responses “not ready” and “slightly ready”

<sup>c</sup>All tests for continuous variables were independent t-tests unless superscripted with “d” in which case they were Chi-square tests

<sup>e</sup>Each hospital region in Colorado includes 4 hospitals for a total of 12 affiliated hospitals

**Table 2.**

Incidence of Perceived Barriers to Initiating Buprenorphine and Methadone for OUD in the Hospital

<b>Barrier<sup>a</sup></b>	<b>Buprenorphine (n, %)</b>	<b>Methadone (n, %)</b>
Unsure of the legality of prescribing this medication	58 (36.3)	53 (33.1)
Don't have time in my day to initiate this medication	32 (20.0)	27 (16.9)
Don't know how to initiate this medication	87 (54.4)	96 (60.0)
Don't feel like our patients are interested in this medication	10 (6.3)	12 (7.5)
Don't feel like our patients will be able to successfully maintain sobriety	18 (11.3)	18 (11.3)
No clear pathway or workflows to initiate this medication in our hospital	72 (45.0)	85 (53.1)
No clear plan for post discharge treatment linkage for this medication	84 (52.5)	89 (55.6)
Other (open-ended section)	12 (7.5)	10 (6.3)
None of the above are concerns	22 (13.8)	22 (13.8)

<sup>a</sup>Participants could choose multiple answers

**Table 3.**

Relationship between Domain Summary Scores and Readiness Status for Initiating Buprenorphine and Methadone for Hospitalized Patients with OUD

Domain with Prepopulate Response	Buprenorphine				Methadone			
	All Mean (SD)	Higher Readiness <i>N</i> = 72	Lower Readiness <i>N</i> = 88	<i>P</i> Value <sup>a</sup>	All Mean (SD)	Higher Readiness <i>N</i> = 55	Lower Readiness <i>N</i> = 105	<i>P</i> Value
Domain 1: Perceived validity of the evidence to treat OUD <sup>c</sup>	4.19 (0.75)	4.42 (0.61)	4.00 (0.80)	<0.001 <sup>b</sup>	4.19 (0.75)	4.56 (0.52)	4.00 (0.78)	<0.001 <sup>b</sup>
Domain 2: Satisfaction with hospital processes for OUD screening, treatment, and linkage <sup>c</sup>	3.03 (0.96)	3.12 (0.96)	2.94 (0.97)	0.236	3.03 (0.96)	3.17 (0.93)	2.95 (0.97)	0.161
Domain 3: Perceived barriers to use the medication <sup>d</sup>	0.32 (0.22)	0.24 (0.24)	0.39 (0.22)	<0.001	0.34 (0.23)	0.21 (0.18)	0.41 (0.23)	<0.001
Domain 4: Current clinical practices for OUD treatment <sup>c</sup>	2.73 (0.97)	3.07 (0.97)	2.45 (0.88)	<0.001	2.73 (0.97)	3.35 (0.96)	2.40 (0.81)	<0.001
Domain 5: Perceived hospital leadership support to treat OUD in the hospital <sup>c</sup>	2.77 (0.96)	2.99 (0.92)	2.58 (0.96)	0.006	2.77 (0.96)	3.07 (0.90)	2.61 (0.96)	0.003
Domain 6: Job satisfaction <sup>c</sup>	3.67 (0.75)	3.81 (0.73)	3.55 (0.75)	0.022 <sup>b</sup>	3.67 (0.75)	3.92 (0.64)	3.54 (0.77)	0.005 <sup>b</sup>

<sup>a</sup>All tests for continuous variables were independent t-tests unless superscripted with "b" in which case they were Chi-square tests

<sup>c</sup>Summary score range is 1 to 5

<sup>d</sup>Summary score range is 0 to 1

**Table 4.**

## Opportunities to Improve OUD Treatment and Linkage

Categories (response frequency) <sup>a</sup>	Illustrative example (106 respondents)
<b>Improved OUD education and training for clinicians and staff (52 responses)</b>	<ul style="list-style-type: none"> <li>• <i>"I think having trainings for hospitalist would be really helpful. The real reason I don't prescribe bup or methadone is because I don't know how and don't feel comfortable."</i></li> <li>• <i>"I think we would benefit from further provider/RN education and definitely a formal program upon discharge and possible even initiation here in the hospital"</i></li> <li>• <i>"Financially supported time for physicians and nurses already trained in addiction to provide mentoring and training/coaching to throughout the hospital to different floors and interested physicians"</i></li> <li>• <i>"Many providers have never been trained in OUD or the treatment of such. Asking seasoned providers to do something brand new is not an easy sell. Need to build a burning platform and utilize trusted colleagues who are already treating OUD. Can use these trusted colleagues to dispel rumors, sell why this is necessary,"</i></li> </ul>
<b>Improved transitions and access to OUD care post discharge (47 responses)</b>	<ul style="list-style-type: none"> <li>• <i>"Knowing they were going to have good follow-up. I prescribe VERY limited opiate course on discharge and would be okay with prescribing at least Suboxone if I thought patients were going to have good follow up and be able to continue getting it from outpatient providers, but that can be very difficult"</i></li> <li>• <i>"Ensuring there was a way for patients to actually have hospital follow up in a clinic. Lack of follow up is my biggest hesitation with in-hospital initiation"</i></li> <li>• <i>"Higher level of social work/case manager involvement and more community involvement and referral services"</i></li> <li>• <i>"A significant barrier seems to be a lack of outpatient resources"</i></li> </ul>
<b>Improved access to addiction specialists (35 responses)</b>	<ul style="list-style-type: none"> <li>• <i>"...our addiction medicine team has changed the care we provide for patients with OUD. Building this across the system would be imperative"</i></li> <li>• <i>"We need a dedicated Addiction Medicine provider, social worker, case manager, and out-patient referrals to provide this type of treatment"</i></li> <li>• <i>"More access to addiction medicine teams and/or ability for all frontline providers to prescribe Suboxone - even if we have waiver and have undergone training, unless you use it you actually don't feel very comfortable doing this"</i></li> <li>• <i>"Team specifically for this purpose that crosses inpatient and outpatient and arranges follow-up"</i></li> </ul>
<b>Improved pathways and protocols (31 responses)</b>	<ul style="list-style-type: none"> <li>• <i>"Education and clear pathways including clarification of medical legal implications"</i></li> <li>• <i>"An easy pathway I could refer to when initiating treatment/treatment linkage..."</i></li> <li>• <i>"Having a streamlined process/pathway that is built off of evidence-based practices that also includes a discharge component from the start to help link patients to outpatient clinics/providers"</i></li> </ul>

<sup>a</sup>Responses could have included multiple categories. The reported N reflects the associated responses by category.