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## Voting with Their Feet: Social Factors Linked with Treatment for Opioid Use Disorder using Same-Day Buprenorphine Delivered in California Hospitals

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### Abstract

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Contributors: MK had full access to the data in the study and takes responsibility for the integrity and accuracy of the findings presented. MK contributed to study design, analysis plan, interpretation, writing, and editing of the report, and was responsible for data analysis. DG contributed to study design, analysis plan, interpretation, writing, and editing of the report. EA contributed to interpretation, writing, and editing of the report. AA contributed to the interpretation, writing, and editing of the report. MM contributed to interpretation and editing of the report. HS contributed to interpretation and editing of the report. AS contributed to interpretation and editing of the report. AM contributed to interpretation and editing of the report. SS contributed to study design, analysis plan, interpretation, writing, and editing of the report. AH contributed to study design, analysis plan, interpretation, writing, and editing of the report.

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All authors have approved the final article. MK had full access to the data in the study and takes responsibility for the integrity and accuracy of the findings presented. MK contributed to study design, analysis plan, interpretation, writing, and editing of the report, and was responsible for data analysis. DG contributed to study design, analysis plan, interpretation, writing, and editing of the report. EA contributed to interpretation, writing, and editing of the report. AA contributed to the interpretation, writing, and editing of the report. MM contributed to interpretation and editing of the report. HS contributed to interpretation and editing of the report. AS contributed to interpretation and editing of the report. AM contributed to interpretation and editing of the report. SS contributed to study design, analysis plan, interpretation, writing, and editing of the report. AH contributed to study design, analysis plan, interpretation, writing, and editing of the report.

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#### Conflict of Interest

The authors have no conflicts of interest to declare.

**Background:** Medication for opioid use disorder (MOUD) using buprenorphine in primary or specialty care settings is accessed primarily by persons with private health insurance, stable housing, and no polysubstance use. This paper applies Social Cognitive Theory to frame links between social factors and treatment outcomes among patients with social and economic disadvantages who are seeking MOUD at California Bridge Program (CA Bridge) hospitals.

**Methods.**—Electronic medical records for patients identified with OUD between January-April, 2020 receiving care at CA Bridge hospitals defined outcomes: hospital-administered buprenorphine; provision of buprenorphine prescription at discharge. Multi-level models assessed whether social factors—housing status, insurance type, and methamphetamine use—predicted outcomes while accounting for group-level effects of treating hospital and controlling for age, race/ethnicity, and gender.

**Results:** 15 CA Bridge hospitals yielded 845 patient records. Most patients received hospital-administered buprenorphine (58%) and/or a buprenorphine prescription (55%); 27% received neither treatment. Patients with unstable housing had greater odds of hospital-administered buprenorphine compared to patients with stable housing. Patients with Medicaid had greater odds of receiving a buprenorphine prescription compared to patients with other insurance. Methamphetamine use was not associated with outcomes.

**Conclusions:** Patients with OUD are successful in accessing same-day MOUD in CA Bridge hospital settings over a significant period. Importantly, access to MOUD in these settings was facilitated for patients traditionally not treated using buprenorphine, i.e., those with housing instability, Medicaid insurance, and co-methamphetamine use. Findings suggest barriers to MOUD for patients with social and economic disadvantages can be lowered by changing treatment delivery.

## Keywords

Emergency services; opiate substitution treatment; buprenorphine-administration and dosage; opioid-related disorders

## 1. INTRODUCTION

The Western United States (US) has experienced a dramatic rise in opioid overdose deaths as fentanyl consumption becomes more common in the opioid-using population (Shover et al., 2020). Much of the opioid-associated mortality is likely preventable by engagement in medication treatment for opioid use disorder (MOUD) (Sordo et al., 2017). Yet, of those who are engaged in treatment, less than 40% are prescribed MOUD (Williams et al., 2019; Wu et al., 2016). Of great concern is the alarmingly high mortality risk in the very populations least likely to have buprenorphine access— those with public insurance, unstable housing, and reported co-use of other substances such as methamphetamine (Baggett et al., 2015). Without engagement of the most high-risk, marginalized groups with OUD, it is unlikely that US expansion in buprenorphine access will achieve equitable reductions in overdose mortality and injection-related risk behaviors observed elsewhere (Carter et al., 2019; Williams et al., 2019).

Access to buprenorphine is not equal across all people seeking MOUD. Patients treated with buprenorphine are unlikely to be Black, have public insurance, live in low-income zip codes, or have co-occurring use disorders (Duncan et al., 2015; Hansen et al., 2016; Hatcher et al., 2018; Lagisetty et al., 2019). For people with OUD who share one or more of these social and economic factors who seek buprenorphine, decisions to prioritize pressing survival needs, such as shelter, personal safety, or the use of stimulants to stay awake when sleeping unsheltered, may be perceived by clinicians/providers as lack of motivation for treatment – or even a plan to sell buprenorphine (Langendam et al., 2001). Clinicians use this type of justification for barring access to buprenorphine for individuals with disparate social and economic factors, perpetuating continued opioid use and opioid-related mortality risks (Krausz and Jang, 2018; Netherland and Hansen, 2016).

Approaches that integrate social determinants of health into treatment for patients with OUD are needed to equitably stem the rising mortality of the opioid epidemic. An emergency medicine and hospitalist approach to buprenorphine treatment that is trauma-informed and emphasizes low-threshold engagement with patients who have significant social and economic barriers provides an alternative delivery setting. (D’Onofrio et al., 2018; Herring et al., 2019; Laroche et al., 2018).

This paper frames the question of whether individuals with economic and social disparities would find hospital-delivered same-day treatment with buprenorphine as MOUD to be acceptable using a model of Social Cognitive Theory (Bandura, 1977). From this perspective, persons living with these disparities who find requirements and barriers to buprenorphine as MOUD intolerable or otherwise unacceptable will “vote with their feet,” and decide not to engage the treatment. Data to support this conception include those showing racial/ethnic and socio-economic disparities are associated with poor access to buprenorphine in traditional outpatient settings (Lagisetty et al., 2019) (Candon et al., 2018). Patients who are homeless also perceive limited access to buprenorphine in traditional settings (Godersky et al., 2019). The impact of this study is its test of whether changing MOUD delivery corresponds with improvements in access for those traditionally barred from buprenorphine to surmount some of the traditional barriers that hardly-reached patient populations with OUD often face (Anderson et al., 2016; Fahimi and Goldfrank, 2019; Herring et al., 2019). It does this by assessing whether a novel statewide program of California hospitals that aims to reduce treatment barriers provides same-day buprenorphine treatment equally to patients independent of insurance type, housing status, and co-methamphetamine use.

## 2. MATERIAL AND METHODS

### 2.1 CA Bridge

Beginning in 2019, the California Bridge Program (CA Bridge) initiated a large-scale program of direct funding to hospitals that supported training and technical assistance in buprenorphine treatment throughout EDs and other hospital departments in order to engage vulnerable patient populations with OUD. Hospitals received training in harm reduction and cultural competency as essential components of high-quality care for OUD; a strategy that emphasizes engagement with patients who are homeless or unstably housed, have public

insurance, and report co-using stimulants. Participating hospitals were expected to dedicate additional staff, such as substance use navigators (SUNs), to provide motivational interviewing and promote linkage to outpatient treatment for all patients (Program, n.d.).

The CA Bridge model of care does not advocate for universal OUD screening of ED patients, but rather, emphasizes creating a welcoming environment for patients to disclose their OUD status. Public signage was placed in waiting and treatment areas advertising the availability of on-demand buprenorphine. Additionally, SUNs are trained to monitor the ED for patients with OUD and educate ED staff to build their referral pipeline. Likewise, there is not a universal protocol for referring patients to outpatient care post buprenorphine initiation, but instead SUNs tailor linkage options for each system and each patient through relationships formed with outpatient programs including federally qualified health centers, narcotic treatment programs, and specialty addiction treatment programs. SUNs work with patients to choose a treatment option, then follow them longitudinally (typically up to 30 days) after hospital discharge to assess engagement in care. After 18 months of direct grant support, technical assistance, and implementation facilitation with 52 hospitals across California, over 10,000 patients with OUD had been identified, and more than 8,000 received treatment with buprenorphine (Program, n.d.).

## 2.2 Study Sample and Measures

The study sample consists of adult patients (at least 18 years old) who were identified with OUD and offered CA Bridge services between January 1 and April 30, 2020 at 15 of the 52 Bridge hospitals. Patients could be directly seeking treatment for OUD as initial treatment, treatment restart, or lapse prevention in the ED or identified with OUD by hospital staff while presenting for other conditions in the ED or other hospital units. Data were retrospectively abstracted from patients' electronic medical records by available hospital personnel. CA Bridge hospitals were not required to contribute patient-level data to the research database, and therefore, could opt-in based on staffing capacity. Of the 20 hospitals that agreed to participate in this study, hospitals needed to have at least 90% of their patients identified with OUD during the timeframe of interest entered into the research database by September 30, 2020 to be included in this analysis. Most patient encounters occurred within hospital EDs, but encounters could have also taken place within other hospital departments (e.g. inpatient units, labor and delivery, etc.). If patients had more than one encounter within the timeframe of interest, only data related to the first encounter was used for this analysis. To provide contextual information, we described contributing hospitals in terms of location and teaching status (defined by California's Office of Statewide Health Planning and Development), and self-reported buprenorphine provision prior to CA Bridge implementation.

Two binary outcomes were defined related to patients' willingness to engage the CA Bridge: (1) administration of at least one dose of buprenorphine within the hospital; and (2) receipt of a buprenorphine prescription at discharge. These outcomes were not mutually exclusive as some patients could both receive buprenorphine administration and a prescription. Predictor variables at the time of the encounter included insurance type (Medicaid vs. all other insurance types including self-pay), housing status (unstable housing - living on the

street, in a vehicle, shelter, halfway house, or short-term sobering center, vs stable/unknown housing), and current methamphetamine use (self-reported use vs non-use). Potential confounders included patient age at the day of the encounter, self-reported race/ethnicity, and gender. Reasons as to why buprenorphine was not administered or not prescribed at discharge were also assessed.

### 2.3 Statistical Analysis

The distribution of predictors and outcomes was analyzed by hospital to determine if any hospitals had any disproportionate patient populations. Because patients were inherently nested within hospitals at which they received treatment, a multi-level approach was used to incorporate the group-level effect of the treating hospital and properly account for the hierarchical (correlated) nesting of data (Heck and Thomas, 2009; Hox, 2003; Kozlowski and Klein, 2012). The intraclass correlation coefficient (ICC) was calculated to describe the proportion of variability in buprenorphine administration and buprenorphine prescription that is accounted for by the treating hospital.

Data were modeled using hierarchical generalized linear models (HGLMs) to assess whether patients who had Medicaid insurance, unstable housing, or reported co-methamphetamine use at the time of the encounter received hospital-administered buprenorphine and buprenorphine prescriptions at the same or greater frequency as those with other insurance types, stable/unknown housing, and no reported methamphetamine use, respectively. In total, six separate multivariable HGLMs were used to examine the independent association between each predictor and receipt of hospital-administered buprenorphine and buprenorphine prescription after controlling for age, race/ethnicity, and gender in concert with pre-specified directed acyclic graphs detailing causal relationships between predictors and outcomes of interest. All analyses were conducted using SAS Version 9.4. This study was approved by Institutional Review Boards at the Public Health Institute and California's Office of Statewide Health Planning and Development.

## 3. RESULTS

Participating CA Bridge hospitals provided complete data on a total of 845 patients who were identified with OUD from January to April of 2020. The median number of patients per hospital over the timeframe was 45 (interquartile range: 37–74). Of the 15 hospitals, four were in rural locales, four had teaching programs, and 13 reported available buprenorphine prior to CA Bridge implementation. Patient demographic and social characteristics are detailed in Table 1. Patients who left hospital without a dose of buprenorphine or a prescription were more likely to be over the age of 60, have insurance other than Medicaid, and be stably housed. Individual hospitals varied in regards to the percentage of patients identified with OUD who had Medicaid insurance (50% to 86%), unstable housing (0% to 45%), and reported methamphetamine use (13% to 68%).

Buprenorphine was administered to 58% of patients who were identified with OUD during the hospital encounter; buprenorphine prescriptions were provided to 55% of patients at discharge. In assessing the joint distribution of both outcomes, 39% of patients were administered buprenorphine and received a buprenorphine prescription at discharge, and

26% received neither hospital-administered buprenorphine nor a buprenorphine prescription. The most prevalent reason (34%) that buprenorphine was not administered at the hospital was because patients had recent use of opioids and were not yet in withdrawal at the time of the hospital encounter. The most prevalent reason (21%) that a patient was not provided with a buprenorphine prescription at discharge was that patients declined.

In assessing the group-level effect on patient outcomes, the treating hospital accounted for 33% of the variation observed in buprenorphine administration ( $ICC=0.329$ ) and in provision of buprenorphine prescriptions ( $ICC=0.334$ ). Patients with unstable housing had greater odds ( $aOR=1.78$ , 95% CI: 1.26–2.53) of receiving hospital-administered buprenorphine compared to patients with stable/unknown housing after controlling for patient age, race/ethnicity, gender, and accounting for hospital as a group-level indicator. Patients with Medicaid insurance had increased odds of receiving a buprenorphine prescription compared to patients with other insurance types after controlling for age, race/ethnicity, and gender, and accounting for hospital as a group-level indicator ( $aOR=1.55$ , 95% CI: 1.06–2.26). Reported co-methamphetamine use had non-statistically significant effects on the outcomes of interest.

#### 4. DISCUSSION

Our findings suggest patients with OUD who are low-income, unstably housed, and co-use methamphetamine demonstrate willingness and intent to initiate buprenorphine for treatment of OUD in the ED. These hospitals provided acceptable low-barrier treatment for patients with OUD that engaged those living with economic and social disparities. In contrast, patients who left the hospital with neither medication nor prescription were older, had insurance other than Medicaid, and had stable housing, suggesting that they had fewer socio-economic disadvantages, had other MOUD options outside of hospitals, or had ambivalence about initiating MOUD in the hospital setting.

Applying the social cognitive theory perspective, participants with characteristics that would otherwise bar them from MOUD decided to engage the care provided using the CA Bridge model – they voted with their feet. This finding represents a major advancement compared to MOUD delivered in traditional outpatient settings (Lagisetty et al., 2019) (Candon et al., 2018) where persons with economic and social disparities are unable to successfully access buprenorphine. Amidst rapidly rising opioid overdose rates in the Western US (Shover et al., 2020), our findings show the CA Bridge model represents one scalable strategy to reach individuals at highest risk who cannot access MOUD in traditional settings.

While the fixed costs of maintaining 24–7 ED services are high, the marginal costs of low acuity visits (as most OUD-related visits are) are low (Anderson et al., 2016; Lee et al., 2013; Morganti et al., 2013; Richardson and Hwang, 2001; Williams, 1996). No other setting is able to practically replicate the all-hours access and wrap-around services to address social determinants of health, acute psychiatric stabilization, and case management offered in addition to same-day buprenorphine treatment for OUD. This contrasts with primary care and specialty clinic settings that provide buprenorphine access only when financial barriers (insurance or cash payments), structural barriers (not open nights or

weekends), and contractual/reciprocity barriers (must be on time and presentable/appropriately dressed, and have “motivation” for treatment) are met (Lassiter, 2015; Netherland and Hansen, 2016). The evolution of emergency medicine has been uniquely adaptive and collaborative, rapidly adopting skills and competencies to care for the most vulnerable during times of emergency need.

Since its inception, emergency medicine has been shaped by a mandate to provide care to “anyone, anytime”, an ethos that is required to inclusively address disparities in access to MOUD for people using opioids (Anderson et al., 2016; Fahimi and Goldfrank, 2019; Rodriguez et al., 2009; Tang et al., 2010). Emergency clinicians have demonstrated a unique interest in rapidly adopting new skills (such as buprenorphine treatment of OUD) (Herring et al., 2019), and competencies from other specialties to improve care for vulnerable patients routinely served in most EDs (Fahimi and Goldfrank, 2019). This study provides evidence that social determinants among patients with OUD can be addressed to facilitate equal access to buprenorphine that is delivered respectfully, reliably, and without prejudice and discrimination. The search for ways to deliver this care and avoid structural stigma often encountered by patients with OUD seeking treatment in other settings is essential.

#### 4.1 Limitations

Data presented are not representative of all ED visits in California. Only 15 of the 52 hospitals were included, which may lead to selection bias and a lack of generalizability to broader populations of CA Bridge patients and people with OUD. Some hospitals had small numbers of patients included in the analysis, which could lead to insufficient power to detect differences by social factors of interest. Other more nuanced variables were unavailable, such as whether patients utilized services only in the ED, only in other hospital units (and the specific department and length of stay), or both the ED and other hospital units, may explain willingness to accept hospital-administered buprenorphine or a buprenorphine prescription and should be further explored. Not all patients had documentation of housing status in their medical record; unknown housing was combined with stable housing for simplification, which may have led to biases depending on the reasons for missing data. Lastly, patient-level data on long-term engagement in addiction treatment after buprenorphine initiation in the hospital were not available at the time of this analysis, but will be explored in future.

#### 4.2 Conclusions

Our study found that a regionally diverse coalition of hospitals implemented a trauma-informed, low-threshold buprenorphine treatment program for patients with Medicaid, unstable housing, and co-methamphetamine use. Future clinical and policy initiatives should focus on ways to maximize the success of hospitals to engage patients from disenfranchised communities in OUD treatment while collaboratively developing alternate low-threshold access points to care.

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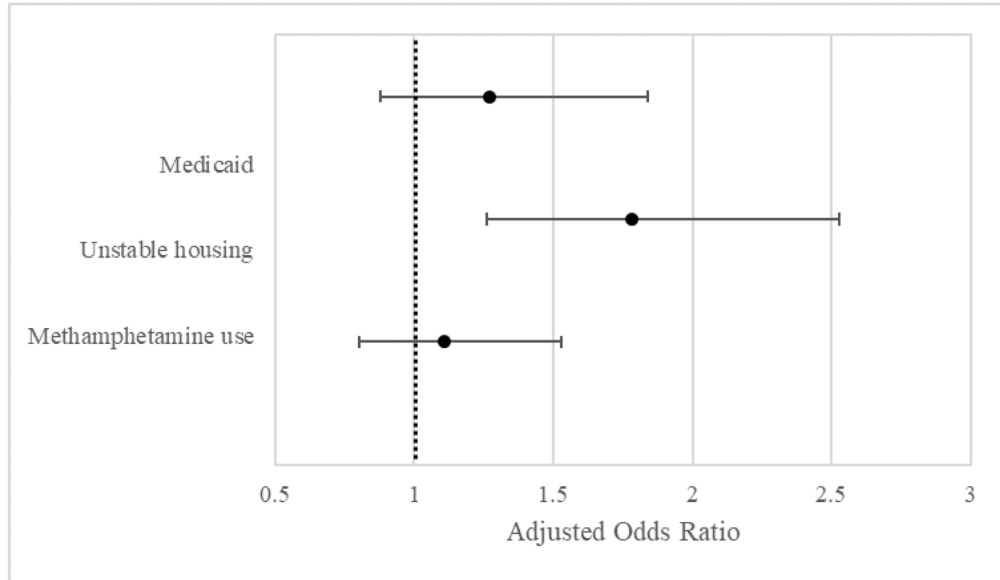
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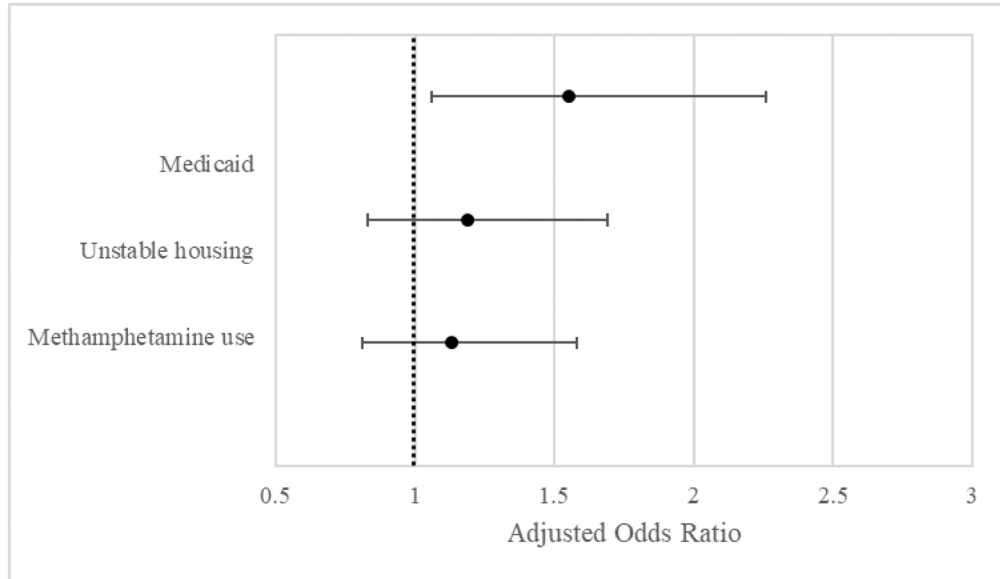
### Highlights

- CA hospitals facilitated OUD treatment for those with socio-economic disadvantages
- Patients accepted low-threshold treatment for OUD via emergency departments
- Patients with OUD using methamphetamine able to equitably receive buprenorphine

**Panel A.**



**Panel B.**



**Figure 1. Odds Ratios of Hospital-Administered Buprenorphine (Panel A) and Odds Ratios of Receipt of Buprenorphine Prescription (Panel B) by Insurance Type, Housing Status, and Methamphetamine Use**

Note: Predictors were assessed in separate multivariable hierarchical generalized linear models; all ORs adjusted for age, gender, and race/ethnicity and accounted for hospital as a group-level indicator; reference categories for predictors of interest were as follows: Medicaid vs. all other insurance types, unstable housing vs. stable and unknown housing, methamphetamine use vs. no methamphetamine use.

**Table 1.**Demographic and Social Characteristics<sup>1</sup> of CA Bridge Patients (N=845)

	Administered Buprenorphine (N=492) <sup>2</sup>		Prescribed Buprenorphine (N=463) <sup>2</sup>		No Buprenorphine Administration or Prescription (N=222)		Total (N=845)	
	N	%	N	%	N	%	N	%
<b>Age<sup>3</sup></b>								
18–29	153	31.1%	145	31.3%	59	26.6%	253	29.9%
30–39	166	33.7%	173	37.4%	66	29.7%	286	33.8%
40–49	93	18.9%	78	16.9%	22	9.9%	131	15.5%
50–59	55	11.2%	47	10.2%	43	19.3%	111	13.1%
60+	21	4.3%	20	4.3%	32	14.4%	60	7.1%
Unknown	4	0.8%	0	0.0%	0	0.0%	4	0.5%
<b>Gender</b>								
Male	335	68.1%	327	70.6%	140	63.1%	569	67.3%
Female	156	31.7%	136	29.4%	82	36.9%	275	32.5%
Other	1	0.2%	0	0.0%	0	0.0%	1	0.1%
<b>Race/Ethnicity</b>								
White non-Hispanic	260	52.9%	237	51.2%	123	55.4%	436	51.6%
Black non-Hispanic	25	5.1%	20	4.3%	11	5.0%	45	5.3%
Hispanic or Latino	110	22.4%	105	22.7%	42	18.9%	182	21.5%
Other	10	2.0%	11	2.4%	2	0.9%	16	1.9%
Unknown	87	17.7%	90	19.4%	44	19.8%	166	19.6%
<b>Insurance<sup>3</sup></b>								
Medicaid	392	79.7%	379	81.9%	150	67.6%	649	76.8%
Private	28	5.7%	25	5.4%	21	9.5%	56	6.6%
Medicare	20	4.1%	22	4.8%	26	11.7%	54	6.4%
Military	1	0.2%	2	0.4%	0	0%	2	0.2%
No insurance	22	4.5%	17	3.7%	18	8.1%	45	5.3%
Other	18	3.7%	14	3.0%	7	3.2%	27	3.2%
Unknown	11	2.2%	4	0.9%	0	0.0%	12	1.4%
<b>Housing Status<sup>3</sup></b>								
Stable housing	242	49.2%	232	50.1%	137	61.7%	444	52.5%
Unstable housing <sup>4</sup>	173	35.2%	152	32.8%	43	19.4%	258	30.5%
Other	13	2.6%	5	1.1%	5	2.3%	18	2.1%
Unknown	64	13.0%	74	16.0%	37	16.7%	125	14.8%
<b>Methamphetamine use</b>	168	34.2%	161	34.8%	80	36.0%	293	34.7%

<sup>1</sup> All characteristics assessed at time of ED/hospital encounter<sup>2</sup> Groups are not mutually exclusive as patients could have received both hospital-administered buprenorphine and a buprenorphine prescription<sup>3</sup> Denotes statistically significant differences between groups with all p-values less than 0.003

<sup>4</sup>Unstable housing includes marginal housing, living in a shelter, car, on the street, at a sobering center or halfway house

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