



# Methamphetamines and Serious Injection Related Infections: Epidemiology and Outcomes of Alabama's Drug Crisis

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## Introduction

- Substance use in people who inject drugs (PWID) is often associated with severe injection related infections (SIRI) that can lead to prolonged hospitalizations.<sup>1</sup> Due to extended stays, many PWID express feeling “stuck” in the hospital, often leading to patient-directed discharge (PDD) prior to treatment completion.<sup>2</sup> PWID are at heightened risk of PDD, which leads to higher rates of readmission and mortality post discharge.<sup>3</sup> This indicates a critical need for improvements in quality and safety of care for PWID.<sup>4,5</sup>
- Linkage to medications for opioid use disorder (MOUD) in the hospital setting has been shown to reduce readmissions and death, emphasizing its importance during hospitalization.<sup>5,6</sup> However, no such pharmacotherapy is approved for treating methamphetamine use disorder. Methamphetamine use in conjunction with opioids complicates addiction treatment,<sup>7-9</sup> and thus likely increases the complexity of care for patients with SIRI. Yet, there is a dearth of research on hospital outcomes of methamphetamine use in the context of the contemporary drug crisis.
- The objective of this study is to explore outcomes and post-discharge trends for a cohort of hospitalized PWID with opioids and methamphetamine use. We hypothesize the sociodemographic and clinical outcomes of PWID differ based on their underlying substance use. We also anticipate the OUD continuum, including linkage and retention in treatment, will vary for those with OUD relative to those with polysubstance use, elucidating opportunities for targeted interventions along the care continuum.

## Methods

- Retrospective data was queried for patients admitted to the University of Alabama at Birmingham (UAB) main hospital or UAB Highlands satellite hospital with SIRI between 1/11/2016 and 4/24/2021. SIRI were defined as skin/soft tissue infections, blood stream infections, bone/joint infections, endocarditis, or brain abscesses.
- Demographics included: age, race, type of insurance, and location of residence. Residence was categorized using the US Department of Agriculture 2010 Rural-Urban Area (RUCA) Codes.<sup>10</sup> Data on viral infections (HIV and/or Hep C infection) and on hospital resource utilization such as consult services were also collected
- Patients were categorized into one of three groups: OUD use only, OUD plus methamphetamine use (OUD+), or no OUD with IVDU of a non-opioid drug (i.e., stimulants).
- MOUD use was defined as a receipt of methadone, buprenorphine, or extended-release naltrexone during admission and/or at discharge for OUD and not pain control only.
- We determined OUD outcomes across the care continuum based on work by Williams et al.<sup>11</sup> with the first stage as receiving a MOUD during hospitalization, second stage as having a prescription for MOUD at the time of discharge, and final stage as having a recorded outpatient ID or Addiction Medicine visit within the UAB health system within 12-months after discharge for SIRI. Care continuum outcomes are sequential, meaning patients either advance to the next stage or drop off the continuum.

## Results

Figure 1. OUD Care Continuum

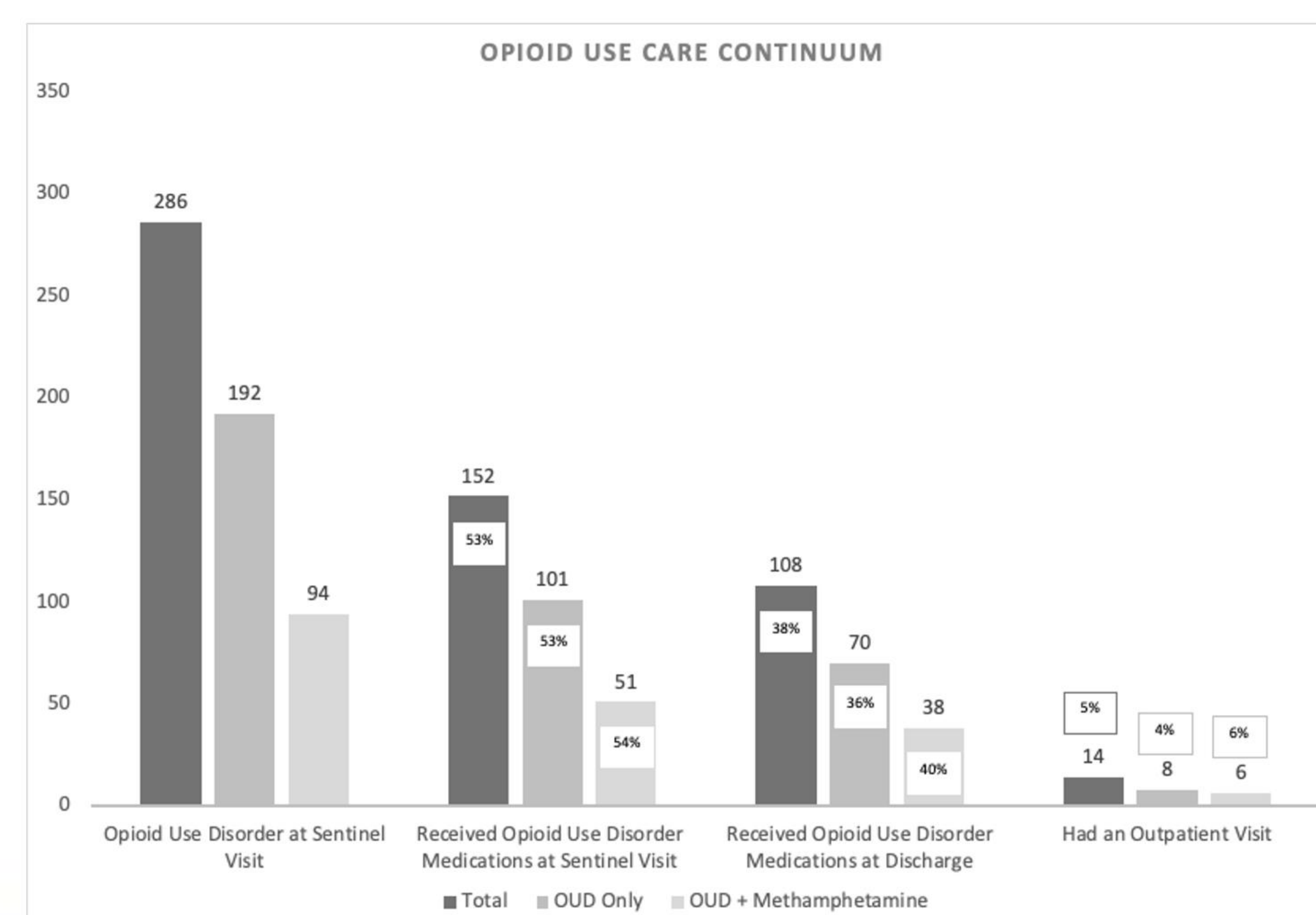


Table 1: Demographics by OUD Status, Sentinel Admission

	Presentation at Sentinel Visit			Overall	OUD Only vs. OUD & Meth Use †
	OUD Only (N = 192)	OUD+ (N = 94)	Other (N = 84)		
Age (Years)	38.0 (31.0, 46.0)	36.0 (29.0, 41.0)	41.0 (33.0, 51.0)	<b>0.0024</b> †	<b>0.0473</b> †
Gender, Male	102 (53.1%)	55 (58.5%)	60 (71.4%)	<b>0.0177</b> †	0.3899 †
Race				<b>&lt;0.0001</b> †	<b>0.0371</b> †
White	175 (91.1%)	93 (98.9%)	58 (69.0%)		
Black or African American	12 (6.3%)	1 (1.1%)	23 (27.4%)		
Other	5 (2.6%)	0 (0.0%)	3 (3.6%)		
Insurance Plan Type				<b>0.0029</b> †	<b>0.0129</b> †
Uninsured	79 (41.1%)	56 (59.6%)	25 (30.5%)		
Public	72 (37.5%)	23 (24.5%)	36 (43.9%)		
Private	41 (21.4%)	15 (16.0%)	21 (25.6%)		
Missing	0	2	2		
Length of Stay (days)	15.5 (7.0, 33.5)	16.5 (7.0, 33.0)	10.5 (6.5, 20.5)	0.1397 †	-
Rural-Urban Continuum Category				0.1195 †	-
Metropolitan	148 (77.5%)	70 (74.5%)	60 (72.3%)		
Micro-metropolitan	16 (8.4%)	11 (11.7%)	14 (16.9%)		
Small town	7 (3.7%)	2 (2.1%)	5 (6.0%)		
Rural	20 (10.5%)	11 (11.7%)	4 (4.8%)		
Missing	1	0	1		
Hepatitis C Test Result				0.0631 †	-
Positive	60 (65.9%)	27 (58.7%)	11 (40.7%)		
Negative	31 (34.1%)	19 (41.3%)	16 (59.3%)		
Not Tested or NA Result	91	46	27		
Meth Use Indicated, Yes	0 (0.0%)	94 (100.0%)	46 (54.8%)	-	-
Addiction Medicine Consultation, Yes	185 (96.4%)	92 (97.9%)	80 (95.2%)	0.6286 †	-
Time to Addiction Medicine Consultation	3.0 (1.0, 5.0)	2.0 (1.0, 5.0)	4.0 (2.5, 6.0)	<b>0.0003</b> †	0.4633 †
Missing	7	2	4		

Table statistics reported as Median (IQR) for continuous factors, and Frequency (Column Percentage %) for categorical factors. Missing data is reported and not included in summary statistics. **BOLD** p-value indicates significance at the 0.05 level. † Kruskal-Wallis p-value; † Pearson Chi-Square p-value; † Mantel-Haenszel Row Mean Score p-value. † Stated statistical tests are unadjusted, and compare only those who have indicated OUD at sentinel hospital visit.

Table 2. Patient Outcomes by OUD Status, Sentinel Admission

	Presentation at Sentinel Visit			Overall	OUD Only vs. OUD & Meth Use
	OUD Only (N = 192)	OUD+ (N = 94)	No OUD (N = 84)		
Patient-Directed Discharge, Yes	35 (18.2%)	22 (23.4%)	6 (7.2%)	<b>0.0141</b> †	0.3034 †
Missing	0	0	1		
ED Visit 12 Months After Sentinel Admission, Yes	65 (33.9%)	33 (35.1%)	30 (35.7%)	0.9494 †	-
Readmission 12 Months After Sentinel Admission, Yes	186 (96.9%)	91 (96.8%)	83 (98.8%)	6.221 †	-
Outpatient Visit 12 Months After Sentinel Admission, Yes	83 (43.2%)	36 (38.3%)	41 (48.8%)	0.3684 †	-
Death occurs within 12 months of Sentinel Admission, Yes	21 (10.9%)	2 (2.1%)	6 (7.1%)	<b>0.0325</b> †	<b>0.0101</b> †

Table statistics reported as Frequency (Column Percentage %) for categorical factors. Missing data is reported and not included in summary statistics. **BOLD** p-value indicates significance at the 0.05 level. † Pearson Chi-Square p-value. † Stated statistical tests are unadjusted, and compare only those who have indicated OUD at sentinel hospital visit.

## Discussion

- PWID in the OUD+ group were younger, more likely to be uninsured, and received a more rapid Addiction Medicine consult. However, this did not translate to higher rates of MOUD use. This group was also more likely to leave PDD, a metric associated with poor outcomes.<sup>6</sup> The prevalence of methamphetamine use (38% overall) in this population is concerning, as it has been associated with infectious disease risk, morbidity, and mortality.<sup>8,12</sup> And yet, there are no FDA-approved pharmacotherapies for this substance use disorder.
- 25% of PWID resided outside of a metropolitan area, which has significant implications for healthcare access. Rural counties have fewer resources such as ID and/or addiction providers, robust emergency medical services, or harm-reduction services, hindering linkage to care after hospitalization.<sup>13</sup> Because there is less support for persons with drug use and limited public health infrastructure, the communities where PWID reside may contribute to significant barriers to care.
- There were no significant differences in the OUD care continuum for PWID with OUD, regardless of methamphetamine use. Just over half with OUD received MOUD during admission and fewer received MOUD on discharge. Only 5% received evidence-based OUD care across the continuum that included attending an outpatient ID or addiction clinic visit. This demonstrates that although these groups did not significantly differ, outcomes are poor regardless of type of substance use.
- Opportunities exist for improvements in providing treatment and continued linkage to care amongst the PWID population. In order to improve health for PWID, there is a need for communities to develop low barrier interventions to facilitate the transitions from hospitals back to community settings.
- Increasingly there are studies exploring ways to optimize addiction care outcomes, such as implementing an interprofessional Addiction Consult Service (ACS) to assist with substance use assessments and linkage to care<sup>5,14</sup> and telehealth as a modality to expand addiction services via remote administration of consultations.<sup>15</sup> However, this study highlights that much remains to be done in improving care for PWID and those struggling with substance use disorders.

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