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## Population characteristics and follow-up rates of a novel emergency buprenorphine initiation and referral program

The Medication for Addiction Treatment and Electronic Referrals (MATTERS) network is a novel statewide referral network in New York that originated in late 2017 in Erie County, NY [1]. Erie County is a highly populated, racially and ethnically diverse county located in Western NY. MATTERS originated as a public health response to the opioid epidemic and operates through ED-initiated buprenorphine treatment to provide referrals to community-based care. As a part of this referral process, the MATTERS network gathers baseline demographics, medical history, and past substance use and treatment data from all patients at the time of referral. We sought to determine what, if any, factors were associated with patient attendance at their first outpatient clinic appointment after referral.

The creation of the MATTERS networks has been previously described [1]. The program facilitates urgent referrals from ED physicians, physician assistants, and nurse practitioners for follow-up appointments at participating Opiate Use Disorder (OUD) clinics. The referral process includes immediate confirmation of the date and location of the clinic appointment. Follow up appointments are typically scheduled within 72 hours. ED-initiated buprenorphine treatment is encouraged based on a standardized protocol followed by ED clinicians at the time of the referral. All referred patients provide limited demographic information and health history using a combination of fixed text fields and free response at the time of referral. Patients are asked for the reason for visit, history of treatment for opioid dependence, history of mental health issues, medical conditions, other substance use behavior, and insurance status. All patients are offered the same set of follow-up options regardless of their medical history, substance use history, or insurance status. We focused this retrospective data analysis on the characteristics of patients referred through the MATTERS network and examined whether these characteristics were associated with attendance at patients' first outpatient clinic appointment after referrals.

Responses were synthesized into standardized variables from a combination of fixed choice and free text responses to allow for analysis. Chi square tests were performed for all comparisons. A p-value of 0.05 was used as the threshold for statistical significance. Variables with a frequency of at least 3 patients are reported in Table 1.

From July 13, 2019 to December 7, 2020, 218 patients were referred through the MATTERS network. One hundred and eighteen patients (54%) were referred to one of three participating programs in our quality assurance feedback program. The average age of the patients referred through the network was 36.5 years. Of these 118 patients, 58 (49.2%) patients attended their first clinic appointment. All further analysis was conducted using data from the 118 patients who were referred to the three participating programs.

Most patients (78.0%) reported undergoing one or more treatments for opioid dependence in the past. Patients who had never been treated for opioid dependence were more likely to attend their first clinic visits compared with those who had been treated for opioid dependence in the past (69.2% vs. 43.5%,  $p = 0.02$ ).

Patients with pre-existing mental health issues (64.4%) attended their first outpatient clinic appointment at rates similar to those without pre-existing mental health issues (50.0% vs. 45.0%,  $p = 0.26$ ). Patients with pre-existing medical conditions (33.9%) attended their first outpatient clinic appointment at rates similar to those without medical comorbidities (42.5% vs. 51.3%,  $p = 0.37$ ). Uninsured or underinsured patients (74.6%) attended their first clinic appointment at rates similar to those who were underinsured (51.1% vs 43.3%,  $p = 0.46$ ).

The baseline characteristics of the patients referred through the MATTERS network align with previous literature around patients with OUD who present in the ED for opioid-related care. Approximately half of the New York MATTERS patient population (49.2%) attended their first clinic appointment. This finding is similar to Macmadu et al.'s findings that 58% of Medicaid patients in Rhode Island who had overdosed on opioids or were diagnosed with OUD did not enroll in opioid agonist therapy within 6 months [2]. The results are also similar to findings from Kaucher et al., who discovered that 30-day retention in care among patients who initiated buprenorphine in the ED was 49% [3]. However, this differs from D'Onofrio et al. who found that 78% of patients who received buprenorphine in the ED were still engaged in formal addiction treatment at 30-days [4]. Although our study found a rate of follow-up lower than that from D'Onofrio et al. [4], the use of the MATTERS program demonstrates a practical and scalable approach to referring patients to treatment centers.

Most patients referred through the network had a history of one or more mental health issues. This aligns with current literature showing untreated psychiatric comorbidities are risk factors for opioid misuse or addiction [5]. These results show that patients who had a history of mental health diagnoses and patients who were underinsured attended their first clinic appointment at similar rates to those who have no history of mental health issues and those who are insured. This may suggest that the MATTERS program successfully eliminates some barriers these patients face in obtaining linkage to care and to attending their first outpatient clinic visit.

There were several key limitations of this study. First, given the retrospective nature of this analysis, we were limited in our ability to gather more information that could provide further insight to the efficacy of the MATTERS program. Additionally, because of the small sample size, individual medical conditions and mental health issues were unable to be analyzed to understand differential effects of varying conditions on initial appointment attendance. Furthermore, since much of this data is submitted by the patients themselves, there is potential for social desirability bias in their responses.

MATTERS provides a novel framework to link patients with OUD to outpatient clinics. Patients referred through the MATTERS network who had received treatment for OUD in the past were less likely to follow up with their first clinic appointment compared to those who had never been treated for OUD in the past. Further data are needed to evaluate the long-term outcomes of patients referred through the MATTERS program.

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**Table 1**  
Baseline characteristics of patients referred through New York MATTERS network

	Total Patients Referred	Attended First Appointment	
All Patients	118 (100%)	58 (49.2%)	
<b>Reason for visit</b>			
Acute Withdrawal	50 (42.4%)	20	40.0%
Detox	16 13.6%	11	68.8%
Neither overdose nor acute withdrawal	11 9.3%	6	54.5%
Other	17 14.4%	9	52.9%
Overdose	12 10.2%	5	41.7%
Unknown	12 10.2%	7	58.3%
<b>Treatment for opioid dependence in past</b>			
One or more treatments	<b>92 78.0%</b>	<b>40</b>	<b>43.5%*</b>
None	<b>26 22.0%</b>	<b>18</b>	<b>69.2%*</b>
Outpatient Treatment	68 57.6%	29	42.6%
Inpatient Treatment	53 44.9%	21	39.6%
Buprenorphine (Suboxone)	67 56.8%	29	43.3%
Methadone	6 5.1%	1	16.7%
Naltrexone (Vivitrol)	3 2.5%	3	100.0%
<b>History of Mental Health Issues</b>			
One or more mental health issues	<b>76 64.4%</b>	<b>38</b>	<b>50.0%</b>
None	<b>40 33.9%</b>	<b>18</b>	<b>45.0%</b>
ADD/ADHD	6 5.1%	2	33.3%
Anxiety	61 51.7%	32	52.5%
Bipolar disorder	14 11.9%	8	57.1%
Depression	50 42.4%	26	52.0%
Prior Suicide Attempts	6 5.1%	1	16.7%
PTSD	8 6.8%	2	25.0%
<b>Comorbidities</b>			
One or more comorbidities	<b>40 33.9%</b>	<b>17</b>	<b>42.5%</b>
None	<b>76 64.4%</b>	<b>39</b>	<b>51.3%</b>
Asthma/COPD	15 12.7%	4	26.7%
Diabetes	5 4.2%	1	20.0%
Hepatitis	14 11.9%	5	35.7%
Hypertension	7 5.9%	7	100.0%
<b>Insurance</b>			
Under insured	<b>88 74.6%</b>	<b>45</b>	<b>51.1%</b>
Adequately Insured	<b>30 25.4%</b>	<b>13</b>	<b>43.3%</b>
Medicaid	74 63.0%	39	52.7%
Medicare	6 5.0%	3	50.0%
No insurance	11 9.0%	4	36.4%
Other insurance	3 3.0%	0	0.0%
Private Insurance	21 18.0%	10	47.6%
Unknown	3 3.0%	2	66.7%
<b>Patient/Family provided with naloxone</b>			
Yes	<b>18 15.3%</b>	<b>7</b>	<b>38.9%</b>
No	<b>51 43.2%</b>	<b>29</b>	<b>56.9%</b>
Unknown	49 41.5%	22	44.9%

\* p<0.05

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**Conflicts of interest**

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**CRedit authorship contribution statement**

**Joshua J. Lynch:** Writing – review & editing, Validation, Supervision, Project administration, Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Arianna A. Hughes:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation. **Susan J. Burnett:** Writing – review & editing. **Emily R. Payne:** Writing – original draft, Funding acquisition, Formal analysis, Data curation. **Brian M. Clemency:** Writing – review & editing, Validation, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

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