Increasing Capacity for Treatment of Opioid Use Disorder in Rural Primary Care Practices

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ABSTRACT

PURPOSE Evidence supports treatment for opioid use disorder (OUD) with buprenorphine in primary care practices (PCPs). Barriers that slow implementation of this treatment include inadequately trained staff. This study aimed to increase the number of rural PCPs providing OUD treatment with buprenorphine. This evaluation describes the impact of a practice team training on the implementation and delivery of OUD treatment with buprenorphine in PCPs of rural Colorado.

METHODS Implementing Technology and Medication Assisted Treatment Team Training in Rural Colorado (IT MATTTRs) was a multilevel implementation study that included a practice-focused intervention to improve awareness, adoption, and use of buprenorphine treatment for OUD. Participating PCP teams received the IT MATTTRs Practice Team Training and support. Practices' implementation of treatment components was assessed before and after training. Practice-reported and population-level data from the Prescription Drug Monitoring Program were obtained to describe changes in delivery of treatment after training.

RESULTS Forty-two practices received team training. Practices reported an average of 4.7 treatment-related components in place at baseline compared with 13.0 at 12-month follow-up ($F[2,56] = 31.17$, $P < .001$). The proportion of participating practices providing or referring patients for treatment increased from 18.8% to 74.4%. The increase in number of people with a prescription for buprenorphine was significantly greater in the study region over a 4-year period compared with the rest of the state (Wald $\chi^2 = 15.73$, $P < .001$).

CONCLUSIONS The IT MATTTRs training for PCP teams in OUD treatment with buprenorphine addressed elements beyond clinician waiver training to make implementation feasible and effectively increased implementation and delivery of this treatment in rural Colorado.

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INTRODUCTION

The United States has an epidemic of opioid use disorder (OUD). Over 4 million Americans report using prescription pain medicine for nonmedical reasons.[1] First-time heroin users increased from 90,000 in 2006 to 170,000 in 2016.[2] The use of illicit fentanyl analogs accounted for 12 times more overdose deaths in 2019 than in 2013.[3] More Americans die each year from drug overdoses than from motor vehicle accidents.[4] Beyond mortality, opioid dependence and OUD affects the quality of life of the people with the condition and their families and communities.[5] Evidence-based guidelines support use of the buprenorphine (a partial opioid antagonist) to treat opioid dependence and OUD in primary care settings.[6] Putting the guidelines into practice has been slowed by complex definitions, misconceptions about the patients that need treatment, and inadequately trained staff.[7,8] These factors contribute to a serious treatment gap for OUD; it is estimated that only 20% of youth and adults with OUD receive treatment.[9] Many reported barriers to treatment are magnified in rural communities and primary care.[10,11]

Clinicians, practices, and community members affiliated with the High Plains Research Network (HPRN) and the Colorado Research Network (CaReNet) identified opioid dependence as a primary concern in their communities. As the research team visited practices, clinicians and practice staff described their concerns about over-prescribing, drug diversion, potential for addiction, and the severe lack of local treatment. Colorado data supported these concerns, as 7 counties in the HPRN and southern CaReNet regions had drug overdose rates greater than 20 per 100,000; some of the highest rates in the nation.[4]

To help change the trajectory of this epidemic in rural Colorado, the HPRN and CaReNet developed and implemented a multilevel program called Implementing Technology and Medication Assisted Treatment Team Training in Rural Colorado (IT MATTTRs) for medical treatment of OUD with buprenorphine. Efforts to increase treatment for opioid dependence and OUD with buprenorphine included support for clinicians to obtain the Drug Enforcement Agency (DEA) waiver required to prescribe buprenorphine. Studies suggest that simply having a waivered prescriber, however, may be insufficient for delivery of treatment.[12] A frequently reported barrier is an unprepared practice and staff. To address this barrier, primary care implementation models aim to engage the practice team, particularly at practices with a waivered clinician or one actively seeking the waiver.[13,14] Programs using tele-education models with interactive sessions, access to a expert clinician who prescribes buprenorphine for OUD, and case-based learning, are challenged by inconsistent or low attendance.[15,16]

Grounded in participatory research, IT MATTTRs builds on these approaches to improve awareness and use of buprenorphine for treatment of OUD. Community-focused interventions were developed and implemented to create conversations about OUD while increasing knowledge of OUD, treatment with buprenorphine, and treatment-seeking behaviors.[17] Clinicians were offered the required DEA waiver training at no cost. The program also delivered a training for practice teams about OUD treatment with buprenorphine to increase patients ability to receive treatment locally. The training was based on advanced primary care and patient-centered medical home literature that promotes a team approach to patient care. The training was delivered to practices with and without a waivered clinician and to practices interested in providing treatment. This manuscript describes the impact of the IT MATTTRs intervention on the implementation and delivery of treatment of OUD with buprenorphine in rural primary care practices.

METHODS

This study was conducted in the HPRN and CaReNet practice-based research networks. The High Plains Research Network consists of 53 primary care practices and communities in the 16 counties of eastern Colorado. The Colorado Research Network consists of 45 practices, most of which care for underserved patients at federally qualified health centers or other practices serving patients with fewer resources. Both networks are housed in the University of Colorado Department of Family Medicine and are members of the State Network of Colorado Ambulatory Practices and Partners.

The IT MATTTRs Practice Team Training was developed by the research team, local medication-assisted treatment experts, community members, and professional practice facilitators.[18] Based on the American Society of Addiction Medicine and Center for Disease Control and Prevention guidelines, the training covered the epidemiology of OUD, pharmacology of buprenorphine, neurobiology of addiction, and detailed treatment steps. The training included facilitated discussion among office staff, nurses, medical assistants, clinicians, and billing and coding staff to encourage the identification of existing resources on which to build and guide implementation. Practices received training via the Shared Onsight Knowledge Dissemination Team Training model, typically delivered in 4 sessions during the lunch hour at the practice, or an Extension for Community Health Outcomes model.

The study aimed to recruit 40 practices based on power calculations to detect pre-post changes. Seventy-nine primary care practices (all HPRN practices and the rural CaReNet practices) in a 24-county region were identified from network rosters and were invited to participate. Enrollment closed when the recruitment goal was reached. Training was delivered over a 20-month period beginning in September 2017. Study protocols were approved by the Colorado Multiple Institutional Review Board.

Outcomes

IT MATTTRs used components of the Reach Effectiveness Adoption Implementation Maintenance (RE-AIM) planning and evaluation framework.[19] This is a well-established model that allows for examination of outcomes at patient, practice, and community levels. This report describes 3 primary outcomes, including (1) characteristics of participating practices (adoption [A]), (2) practice implementation (I) of treatment components, and (3) practice- and population-based reporting of administration of medication-assisted treatment (reach [R]).

Data Collection

Implementation of the components needed to provide treatment with buprenorphine was assessed using the IT MATTTRs implementation checklist. Because no formal tool existed, we created a checklist of 23 items that support treatment with buprenorphine in primary care practices based on American Society of Addiction Medicine guidelines and expert primary care physician recomendations.[4] One team member familiar with the OUD treatment activity completed the checklist before and 6 and 12 months after training.

Delivery of treatment with buprenorphine was assessed using an 8-item practice report that included data on patients prescribed buprenorphine, new inductions, and patients receiving treatment with buprenorphine for greater than 6 months. (Induction is the first stage of treatment during which patients go through withdrawal and receive their first 1-3 doses of medication.) Monthly data were collected for the 3 months before and 12 months following the training start date.

Population-based delivery and receipt of treatment with buprenorphine was assessed using data from the Colorado Prescription Drug Monitoring Program (PDMP). The PDMP houses data on prescriptions for Schedule II to V medications, which are uploaded by pharmacies every

regular business day. County-level data on patients receiving partial opioid agonist prescriptions (eg, buprenorphine) were obtained to identify trends in prescribing. PDMP data for the state were obtained for 2015 through 2019. The IT MATTTRs program was geared to increase both locally available buprenorphine and people seeking treatment with buprenorphine within or outside the study region. Therefore, PDMP data included prescriptions based on patient, prescribing practitioner, and dispensing pharmacy locations.

Statistical Analysis

Descriptive statistics were computed for baseline practice characteristics. Simple group differences or pre-post differences were assessed using *t*-tests (paired, if appropriate) and χ^2 tests.

Implementation checklist data from baseline and 6- and 12-months follow-up (repeated measures) were analyzed using general linear mixed models with a practice random effect to examine the overall change. Initially, we examined patterns of missingness (missing completely at random, missing at random, missing not at random [non-ignorable]) and concluded there was no evidence of non-ignorable missingness.[20] To avoid biased estimates, we used maximum likelihood-based analytic approaches and included all reported data to analyze practice-reported measures, adjusting for covariates associated with missingness or outcomes, regardless of whether practices had missing data at some time points.[21-23] Presence or absence of individual components over time was analyzed using mixed effects logistic regression models (GLIMMIX Procedure [SAS Institute Inc]).

Practice-reported data on the delivery of treatment were analyzed using mixed effects Poisson regression models (GLIMMIX Procedure) to determine overall change. Data on the delivery and receipt of treatment with buprenorphine from the PDMP were analyzed using mixed effects Poisson regression models (GLIMMIX Procedure), with year and month as fixed categorical variables and a random effect for county, to detect any change in prescribing. Population-based counts of patients with a buprenorphine prescription by study region vs the rest of the state were analyzed using generalized estimating equation Poisson regression models (GENMOD Procedure [SAS Institute Inc]).

For all analyses, hypothesis tests were 2-sided with a = 0.05 and *P* values reported. All statistical analyses were performed using SAS version 9.4.

RESULTS

Forty-two practices enrolled and completed the IT MATTTRs Practice Team Training. Table 1 describes the participating practices.

Participating practices significantly increased the treatment components implemented (Table 2). Practices reported an average 4.7 items in place at baseline compared with 13.0 at 12-month follow-up (F[2,56] = 31.17, P <.001). Practices that had a DEA-waivered buprenorphine prescriber at baseline or acquired one during the study reported a significantly greater increase in treatment components implemented than practices without a waivered prescriber (F[2,56] = 7.77, P = .001). However, the average number of items still increased significantly in practices without a waivered prescriber (baseline 4.1 items; follow-up 8.4 items, P <.001) compared with practices having a waivered prescriber (baseline 4.9 item; follow-up 16 items, P <.001). Items that changed significantly from baseline to follow-up included having a prescriber with waiver to prescribe buprenorphine (16% vs 56%, P = .001), screening (44% vs 82%, P <.01), and having a patient treatment agreement (16% vs 51%, P <.01). At final follow-up, 74% of participating practices reported either providing treatment with buprenorphine or referring their patients for treatment compared with 19% at baseline.

As reported by practices, the overall number of patients prescribed buprenorphine increased significantly (F[1,403] df = 6.80, P = .01). New OUD treatment inductions did not increase significantly (P = .20), however, patients in treatment for greater than 6 months did (F[1,403] df = 30.56, P <.001) (Figure 1).

Prescription Drug Monitoring Program data show significant increases in patients per year with a prescription for buprenorphine with a zip code in the 24-county study region (time: overall F[4,1401] df = 209.71, P <.001) and with a prescription for buprenorphine from a local prescriber in the study region (time: overall F[4,1423] df = 652.97, P

Table 1. Characteristics of Participating Primary Care Practices (N = 42)

Characteristic	No. (%)
Practice staff	
1-5	22 (52.4)
6-10	13 (30.9)
≥11	7 (16.7)
Licensed clinicians (MD/DO, NP, PA)	
≤5 clinicians	30 (71.4)
Type of practice	
Hospital-based clinic	19 (45.2)
Federally qualified health center	18 (43.0)
Private	4 (9.5)
Integrated community mental health center	1 (2.3)
Waivered prescriber[a]	
At baseline (n = 32)	5 (15.6)
At follow-up (n = 39)	22 (56.4)
Miles from urban community	
≤90	14 (33)
91-120	8 (19)
121-190	20 (48)

DEA = Drug Enforcement Agency; DO = doctor of osteopathic medicine; MD = doctor of medicine; NP = nurse practitioner; PA = physician assistant.

[a] DEA-waivered prescriber status not available for all clinics.

<.001) (Figure 2). Additionally, patients who obtained their medication from a pharmacy in the study region increased significantly (time: overall F[4,1401] df = 655.84, P <.001). The percent increase in patients with a buprenorphine prescription for the study region was 87% compared with 65% in the rest of the state. Poisson regression indicated that the increase in number of patients with a buprenorphine prescription was significantly greater in the study region from 2015 through 2019 compared with the rest of the state (year x region coef [SE]: 0.0545 [0.0137], Wald χ^2 = 15.73, P <.001).

Practices reported significant increases in patients receiving medication after the intervention and receiving treatment with buprenorphine for at least 6 months. An important message and discussion topic in the team training is that treatment with buprenorphine for OUD requires more than a few months. These results suggest the positive impact of the team training on practices' expectations and, consequently, patients' continued treatment engagement. Analysis of practice data did not show a significant increase in new medication-assisted treatment inductions. One explanation could be early pent-up demand in small communities leveling off or decreasing as eligible and interested patients receive care.

DISCUSSION

The IT MATTTRs program was associated with an increase of opioid dependence and OUD treatment with buprenorphine in rural Colorado primary care practices. Several factors may have contributed to this increase. First, the IT MATTTRs community-level interventions were associated with community members' awareness of treatment for OUD in primary care.[17] Second, the IT MATTTRs Practice Team Training reached 441 team members. Across roles, participants reported high levels of satisfaction and significantly higher self-rated ability to deliver treatment components after the training.[18] Third, practices implemented many of the processes and components necessary for delivering treatment.

Across participating practices, treatment components implemented significantly increased. While increases were greater in practices with a waivered clinician, changes were still significant in those without. Practices with protocols to screen, protocols to refer patients to a buprenorphine prescriber, and at least 1 patient referred to a prescriber increased significantly. For some practices, engaging in OUD treatment may begin in partnership with another practice or behavioral health center with a waivered prescriber. While the team training encourages progression toward providing the full spectrum of care, including induction, the fostering of partnerships with this type of intervention may serve as a strategy to increase access to treatment in rural communities.

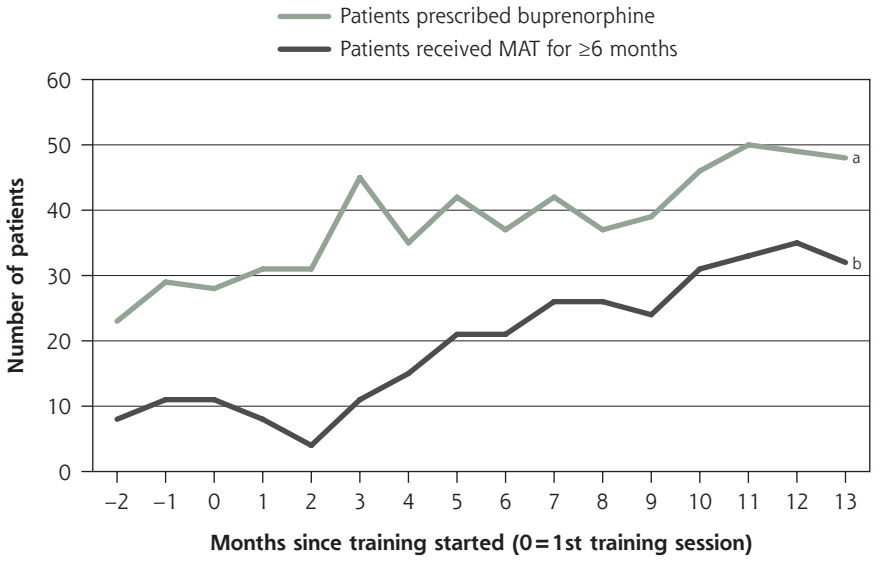
Table 2. IT MATTTRs Implementation Checklist Components

	Baseline (n = 32) No. (%)	Follow-Up (n = 39) No. (%)	*P* Value
Average no. MAT components in place	4.7	13	<.001
Individual MAT components			
Licensed clinician with buprenorphine waiver	5 (15.6)	22 (56.4)	.001
Patient consent form	5 (15.6)	13 (33.3)	.07
Patient treatment agreement	5 (15.6)	20 (51.3)	<.01
Diversion control plan developed and operational	1 (3.1)	16 (41.0)	.01
Urine drug testing protocol and system	6 (18.8)	29 (74.4)	.001
Designated MAT practice team	5 (15.6)	12 (30.8)	.13
MAT team meets regularly	2 (6.3)	11 (28.2)	.02
Emergency management protocol	1 (3.1)	11 (28.2)	.02
Referral protocol for behavioral health (list of providers with contact and appointment information)	19 (59.4)	26 (66.7)	.52
Behavioral health (integrated care model or in-house) or signed treatment/management agreements with at least 1 external behavioral health provider	13 (40.6)	34 (87.2)	<.01
Psychosocial support/connection referrals available (ie, 12-step, community organizations, faith community)	9 (28.1)	26 (66.7)	<.01
Payment schedule with diagnostic and billing codes	14 (43.8)	14 (35.9)	0.51
Screening process (and screening tool) for patients currently on opioids, new opioid prescriptions, identification of illicit use	14 (43.8)	32 (82.1)	<.01
Patient assessment checklist	9 (28.1)	13 (33.3)	.66
Opioid registry and tracking system	21 (65.6)	35 (89.7)	.02
Opioid overdose prevention kit	2 (6.3)	29 (74.4)	<.001
Side effect management protocol	1 (3.1)	13 (33.3)	.01
Referral protocol to practices with buprenorphine prescriber	1 (3.1)	21 (53.8)	<.01
Signed treatment/management agreement with a practice having a buprenorphine prescriber	0 (0.0)	6 (15.4)	<.01
Have done MAT inductions for OUD patients	ND	10 (25.6)	ND
Enrolled 1 patient in MAT	3 (9.4)	9 (23.1)	.10
Enrolled 10 or more patients in MAT (subset of row above)	2 (6.3)	7 (17.9)	.12
Referred 1 or more patient for MAT at another facility	3 (9.4)	26 (66.7)	<.001

IT MATTTRs = Implementing Technology and Medication Assisted Treatment Team Training in Rural Colorado; MAT = medication-assisted treatment; ND = no data; OUD = opioid use disorder.

Prescription Drug Monitoring Program data indicated a significant increase in people with a prescription for buprenorphine in the study region. People living in rural communities may access medical care outside their local region.[24] Since training the practice teams took longer than the community-focused interventions, some patients may have accessed care outside the 24-county study region. Our results also show a significant increase in patients who received their buprenorphine prescriptions locally, based on prescriber location. This outcome suggests that IT MATTTRs, with activated community members and practice teams, was associated with both an overall and a local increase in treatment of OUD with buprenorphine.

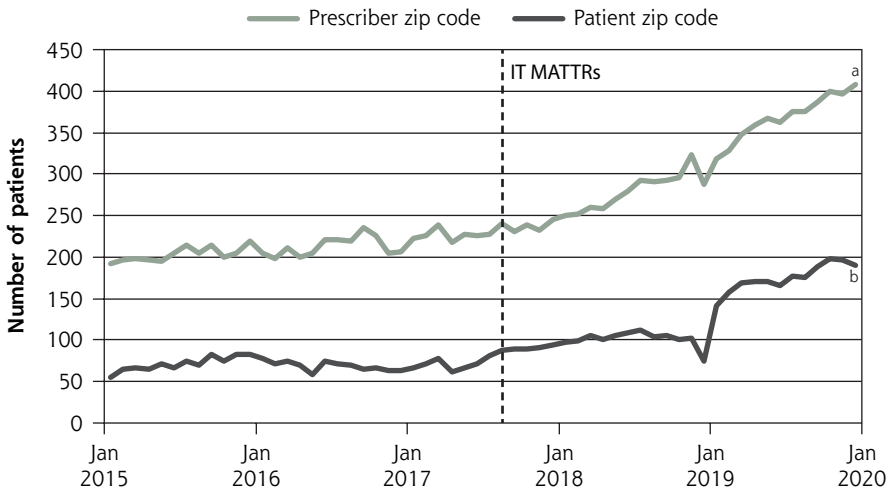
Figure 1. Patients prescribed buprenorphine and those in treatment with buprenorphine for 6 months or more reported by IT MATTTRs study practices.



IT MATTTRs = Implementing Technology and Medication Assisted Treatment Team Training in Rural Colorado; MAT = medication-assisted treatment;

[a] For trend over time: $P = .01$.
[b] For trend over time: $P = <.001$.

Figure 2. Patients prescribed buprenorphine by patient and provider location in the IT MATTTRs study region from 2015-2019.



IT MATTTRs = Implementing Technology and Medication Assisted Treatment Team Training in Rural Colorado.

Notes: The study region covered 24 counties. Data obtained from the Colorado Prescription Drug Monitoring Program. Vertical dashed line indicates inception of IT MATTTRs program.

[a] For trend over time: $P < .001$.
[b] For trend over time: $P < .001$.

Several other statewide and national programs and resources related to OUD prevention, treatment, and policy were ongoing during this study. The combined impact of these likely contributed to a substantial increase in the delivery of treatment in the state as a whole. Our results, however, show a greater increase in patients receiving treatment with buprenorphine in the study region compared with the rest of the state, suggesting an independent effect on improving access to buprenorphine treatment in primary care.

To further support efforts to increase access to treatment, the training is available to primary care practices, hospitals, health systems, and other disciplines and has been delivered to health professionals in Colorado, Montana, California, and North Carolina.

Limitations include missing practice-level data. In some cases, the requested baseline data was not received. When the practice's training start date could not be altered, we proceeded to avoid losing the practice entirely. However, results from sensitivity analyses with complete data only were similar, supporting the robustness of study findings. The association of individual implementation checklist components and treatment of OUD with buprenorphine is unknown, and analysis is beyond the scope of this paper. Also, approximately two-thirds of participating practices were able to provide data on treatment delivery. The results of this analysis, however, align with the change in the delivery and receipt of treatment demonstrated by PDMP data. This study was not designed to measure quality of care. Last, we were unable to

conduct exploratory analysis of patient-level outcomes data as planned to describe the impact of treatment on quality of life. These data were to be obtained from a web-based opioid and patient engagement and monitoring system offered for free to participating practices. Due to practices' very low uptake of this system, resulting data were too limited for analysis.

CONCLUSION

Improved identification and treatment of patients with OUD in rural primary care practices is critical and timely. A multilevel, community- and practice-focused intervention to implement medication-assisted treatment for OUD effectively increased delivery of treatment in rural Colorado. IT MATTTRs addresses elements beyond the clinician waiver training to make the implementation of treatment of OUD with buprenorphine in practice feasible.

Read or post commentaries in response to this article.

Key words: buprenorphine; education; opioid-related disorders; primary health care; rural health

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