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Enhancing Use of Medications for Opioid Use Disorder Through External Coaching

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Abstract

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The Network for the Improvement of Addiction Treatment (NIATx) organizational change model was developed by the Center for Health Enhancement System Studies (CHESS) at the University of Wisconsin–Madison. Dr. Molfenter is a faculty member at CHESS. He is also affiliated with the NIATx Foundation, the organization responsible for making the model available to the public. The other authors report no financial relationships with commercial interests.

Objective: This randomized controlled trial tested whether external coaching influences addiction treatment providers' utilization of medications to treat opioid use disorder (MOUDs).

Methods: This study recruited 75 unique clinical sites in Florida, Ohio, and Wisconsin, including 61 sites in specialty treatment agencies and 14 behavioral health sites within health systems. The trial used external coaching to increase use of MOUDs in the context of a learning collaborative and compared it with no coaching and no learning collaborative (control condition). Outcome measures of MOUD capacity and utilization were monthly tabulations of licensed buprenorphine slots (i.e., the number of patients who could be treated based on the buprenorphine waiver limits of the site's providers), buprenorphine use, and injectable naltrexone administration.

Results: The coaching and control arms showed no significant difference at baseline. Although buprenorphine slots increased in both arms during the 30-month trial, growth increased twice as fast at the coaching sites, compared with the control sites (average monthly rate of 6.1% vs. 3.0%, respectively, $p<0.001$). Buprenorphine use showed a similar pattern; the monthly growth rate in the coaching arm was more than twice the rate in the control arm (5.3% vs. 2.4%, $p<0.001$). Coaching did not have an impact on injectable naltrexone, which grew less than 1% in both arms over the trial period.

Conclusions: External coaching can increase organizational capacity for and growth of buprenorphine use. Future research should explore the dimensions of coaching practice, dose, and delivery modality to better understand and enhance the coaching function.

A strategy promoted by the Centers for Disease Control and Prevention (1), the World Health Organization (2), the Substance Abuse and Mental Health Services Administration (3), and the National Institutes of Health (4) to reduce opioid-related overdoses and deaths is the broad use of three Food and Drug Administration–approved medications to treat opioid use disorder (MOUDs): buprenorphine, methadone, and naltrexone. Despite significant policy mandates at the federal, state, county, and city levels for the use of pharmacotherapy to treat opioid use disorders, significant gaps in the utilization of MOUDs persist (5, 6). Of the approximately 2.1–2.4 million individuals with opioid use disorders in the United States, only about 20% receive any treatment (7). Of those who enter treatment, only about one-third receive MOUDs, and their retention in care for more than 6 months is 30%–50% (8).

Addressing the persistent implementation gap is hampered by an interrelated mix of funding policy, workforce acceptance, and workflow issues that influence MOUD capacity and ongoing use (9, 10). Funding support is a necessary but not sufficient condition for MOUD use (11). Once a consistent funding source is secured, workforce acceptance can influence MOUD use rates. Resistance to MOUDs by prescribers, counselors, and support staff can limit MOUD uptake (12, 13). Moreover, agreeing to provide an MOUD does not guarantee the prescriber's continued use of the medication (14). MOUD workflow issues can affect a prescriber's enthusiasm to prescribe an MOUD (15, 16). Resistance can grow when extra tasks are encountered in carrying out buprenorphine diversion prevention and administering long-acting naltrexone by injection. In sum, a diverse set of determinants influence MOUD capacity and use (17).

To address these multifaceted barriers, we designed an implementation strategy for MOUDs that consisted of external coaching through scheduled events with organizational representatives in a learning collaborative model. External organizational coaching emerged in non–health care settings to improve goal attainment (18, 19) and recently has shown promise in health care settings (20–23). Coaching has been used in psychiatric practice to implement psychotherapies (24), improve outreach to individuals with serious mental illness (25), and enhance mental health–primary care integration (26).

This trial tested whether external organizational coaching could influence the implementation and scaling up of an evidence-based practice that had both clinical dimensions related to individual clinician treatment practices and organizational dimensions related to prescribers on staff, workflows to administer the pharmacotherapy, and MOUD billing mechanisms. This article reports the impact of coaching, compared with a control condition of no coaching and no learning collaborative, on buprenorphine treatment capacity, buprenorphine use, and injectable naltrexone use over a 30-month period.

METHODS

Study Design

The reported data were gathered in a cluster-randomized controlled trial comparing the ability of two implementation strategies, external coaching in the context of a learning collaborative versus no coaching or learning collaborative, to increase MOUD capacity and use. Recruitment began in 2016 by surveying all publicly funded organizations licensed to provide addiction treatment services that had at least 100 admissions per year (for any level of care) in the targeted states. Study participants in this convenience sample were 36 organizations with 75 unique clinical sites in Florida, Ohio, and Wisconsin interested in increasing utilization of buprenorphine and injectable naltrexone. The clinical sites were the unit of analysis, with the number of sites ranging from one to six sites per organization. The sites included 61 from community-based specialty treatment organizations and 14 from behavioral health units located within health systems. This study was reviewed and approved by the University of Wisconsin Institutional Review Board.

Randomization

Block randomization occurred within each state on the basis of opioid use disorder admissions and previous history providing buprenorphine or injectable naltrexone. The breakdown of sites by the coaching implementation strategy versus control arm by state was as follows: Florida, coaching strategy, N=19; control, N=10; Ohio, N=13, N=10; and Wisconsin, N=13, N=10.

Power Calculation

Based on our previous projects with similar participants, with at least 30 sites in each condition with an average of 150 buprenorphine slots (i.e., the number of patients who could be treated based on the buprenorphine waiver limits of the site’s providers) in each organization (27), the study was designed to achieve a power of 0.93 (d=0.30) or higher (d>0.30), with a type I error rate of 0.05 (9). In total, 45 sites were placed in the coaching

arm and 30 in the control arm (a CONSORT diagram is included in the online supplement to this article). The imbalance occurred because of the need to cluster sites from large health systems to avoid contamination effects and the desire to include as many sites as possible in the coaching arm.

Time Line

The 24-month study period began in April 2017 and was followed by a 6-month data collection period (months 25–30; referred to below as the maintenance period) to test the sustainability of the coach's impact on the primary outcomes of capacity, via slots, and buprenorphine and injectable naltrexone use. The 30-month trial was completed in October 2019.

Control Condition

The control sites were provided attention control measures of a monthly newsletter that provided tips on MOUD practice improvement as well as monthly announcements of MOUD implementation tips and practices on a study-specific website that included the MOUD practice improvement tools and techniques used by the study's coaches.

External Coaching Condition

The coaching implementation strategy was provided in the context of a learning collaborative. Learning collaborative components were three state-specific (Florida, Ohio, and Wisconsin) 1-day in-person training and coaching events held at the beginning, middle, and end of the 2-year study period and monthly state-specific group coaching sessions (N=21) held during the months in which the learning sessions were not occurring. Coaching was defined as providing expertise in MOUD implementation and systems change through the Network for the Improvement of Addiction Treatment (NIATx) change model, structured technical assistance, and ongoing mentoring to help sites adopt, implement, and increase the use of MOUDs (23, 28). The NIATx change model relies on setting an aim for improvement, using data to assess movement toward that aim, and use of plan-do-study-act (PDSA) rapid cycles or pilot tests to test changes intended to move in the direction of achieving the aim (29). Coaches received a 1-day training on the study protocol, applying the NIATx change model, and the roles of executive sponsors, change teams, change team leaders, and physician champions to promote MOUD expansion.

The coach assigned to each state interacted with the sites in that state during the in-person learning collaborative meetings that included training on prescribing practices for buprenorphine and injectable naltrexone, methods for assessing the need for MOUDs, use of internal and community outreach to build support, how to deliver these medications to the patient, medication adherence strategies, and use of the NIATx organizational change model to implement practices to expand MOUD use. During the 60-minute monthly group coaching check-in sessions (N=21 over the 24 months), coaches worked with sites on setting up the project infrastructure to improve MOUD services by addressing project roles, setting implementation objectives, and developing a data collection and evaluation strategy. On these calls, coaches also discussed inner and outer context barriers and methods to increase funding, build workforce capacity, reduce stigma, and improve workflow related to

MOUD services. The coaching conversations included monthly MOUD performance data for buprenorphine slot expansion, PDSA cycles' progress, and discussions about increasing the number of patients receiving buprenorphine or injectable naltrexone.

Data Collection and Measures

At baseline, a Web-based organizational survey collected organizational characteristics' data on location (metropolitan area versus nonmetropolitan area), site setting (substance use disorder treatment center or county, health system or federally qualified health center), treatment services (regular outpatient services, intensive outpatient services, or inpatient services), MOUD services (buprenorphine and injectable naltrexone), opioid use disorder admissions, and MOUD performance (buprenorphine slots, buprenorphine use, and injectable naltrexone administrations).

Recorded coaching calls were used to determine the dose of coaching calls for each site based on the percentage of attendance at scheduled coach events by at least one member of site staff, the number of participants in those events by site, and roles of those involved (e.g., change leader, executive sponsor, or physician).

The primary outcome variables were the monthly performance numbers of buprenorphine slots, buprenorphine use, and injectable naltrexone administrations. Monthly data were entered into a secure Web portal by each site's staff (a data collection form is included in the online supplement).

Data Analysis

Chi-square analysis, Mann-Whitney tests, and linear models were used to compare the differences in organizational characteristics between the coaching and control groups at baseline.

A comparison was made between states at baseline and at the maintenance period (i.e., months 25–30), to determine whether significant differences occurred with buprenorphine slots, buprenorphine use, and injectable naltrexone administrations by using an omnibus F test with Holm's correction used for multiple comparisons (30). The comparison between states was performed to account for the state-specific policies pertaining to use of federal funds related to the opioid emergency declaration as well as MOUD Medicaid policy. Coaching groups were segmented by state.

For the analysis of the three primary outcomes—the monthly number of buprenorphine slots, buprenorphine use, and injectable naltrexone use—mixed-effects models (random effects due to site and fixed effects due to study arm and time) were used in the form of latent growth models. Specifically, we examined mixed-effects models, using R software (31) for the longitudinal data, with the main effects of time (month) and study arm (with or without coaching) and the interaction effect between monthly growth and coaching. The modeling accounted for the nested structure of the repeated measures within sites, and each site was allowed to have a different intercept. Most but not all sites provided data on monthly buprenorphine and injectable naltrexone use over the 30-month study period. Specifically, about 5% of responses were missing from the 75 sites across 30 months

(114 missing responses out of 2,250 possible responses). Therefore, we implemented full-information maximum-likelihood estimation to account for those occasional missing responses.

RESULTS

No significant baseline differences between control and coaching groups for buprenorphine slots, monthly buprenorphine use, and monthly injectable naltrexone use were observed (Table 1).

The monthly averages of buprenorphine slots, buprenorphine use, and injectable naltrexone use across the sites at baseline and during the maintenance period (i.e., months 25–30) were summarized for the control and coaching arms and for the three states separately (Table 2). Buprenorphine use was greater than injectable naltrexone use for all three states. Monthly averages for buprenorphine slots and use in Ohio were higher than in Florida and Wisconsin. The utilization of buprenorphine slots increased from the baseline to the maintenance period for both the control and the coaching arms, and the improvement was greater for the coaching arm than for the control arm. Specifically, the percentage increase in the utilization of the registered slots was 37% for the coaching arm {[(51.7/152.2)−(21.9/88.2)]/(21.9/88.2) ×100} and 13% for the control arm {[(28.8/99.3)−(14.3/55.9)]/(14.3/55.9)×100} (Table 2).

Mixed-effects models were applied for the monthly buprenorphine slots, buprenorphine use, and injectable naltrexone use with arm (coaching=1, control=0), time (month–1, where month51, …, 30), and their interaction in the models as fixed effects and with random effects for the 75 sites. Considering the right-skewness of the distributions, log-transformed outcomes were used in the models, with a small constant (1) added before the transformation to account for zeroes.

The estimates of the model parameters are presented in Table 3. The mixed-effects model results can be interpreted as follows. The arm column shows the differences between the coaching and control arms at baseline (time=0). The nonsignificant estimates in this column indicate that the coaching and control arms were not significantly different at baseline, validating successful randomization before the intervention. The time column displays the significant monthly growth rate in buprenorphine slots and use in both the coaching and the control arms over time, and the values in the arm × time column indicate that buprenorphine slots and use increased at significantly greater rates in the coaching arm than in the control arm. Specifically, the results indicate that the number of buprenorphine slots increased on average 3.0% per month among the control sites (exp[0.030]=1.030, $p<0.001$) but that the intervention sites with coaching showed a growth rate two times higher—6.1% (exp[0.030+0.030]=1.061, $p<0.001$). The pattern of change was similar for buprenorphine use. Although buprenorphine use showed on average a 2.4% monthly increase among the control sites (exp[0.024]= 1.024, $p<0.001$), the growth rate was 5.3% (exp[0.024+0.028]=1.053, $p<0.001$) on average among the intervention sites, more than two times higher than among the control sites. In terms of injectable naltrexone use, the average monthly growth rate was positive but less than 1% (exp[0.008]=1.008, $p=0.003$) and was similar in the intervention and control groups (i.e., the interaction effect was not significant).

The analysis of coaching dose via percentage of coach event participation, the number of participants per coach event, and roles participating in coach events indicated no significant differences related to the effects of these variables on buprenorphine slots, buprenorphine use, or injectable naltrexone. Ninety-eight percent (N=44) of the coaching sites attended at least 25% of the potential 24 coach events, and 80% (N=36) attended at least 50% of the coach events.

DISCUSSION

This study found that an external coaching implementation strategy within the context of a learning collaborative fostered increases in organizational buprenorphine slots and buprenorphine use but not in injectable naltrexone use. Previous studies have shown that organizational coaching within a learning collaborative setting has improved number of admissions (23), wait times (23, 32), no-shows (33), and retention in substance use disorder treatment organizations (34). This study has expanded on that evidence by suggesting that external coaches can increase capacity and utilization of buprenorphine, a public health priority for combatting the opioid crisis. The coaching dose analysis for those receiving coaching found no direct relationship between coaching dose and the three main outcomes. However, at least 80% of participants received at least 50% of the coaching dose. These dose-to-outcome findings suggest the need for a prospectively designed trial to investigate whether there are minimal-dose coaching effects.

In the trial, coaches worked synergistically on several contextual elements to enhance buprenorphine capacity and use and scaling-up trajectory. For example, the urgency of the opioid epidemic prompted increased public funding in these three states. Coaches could urge treatment organization leadership to take advantage of this funding by offering new service models and promoting staff engagement in those models. Coaches also could encourage organizations to use community outreach to engage more prescribers and increase referrals. For internal capacity building, coaches encouraged inward-focused leadership to support the launching and nurturing of these capacity-building programs and to focus on building intraorganization enthusiasm and capacity for MOUD provision. Coaches also were able to encourage identification of a prescriber champion given the importance of this role, as noted in previous MOUD implementation projects (35). Finally, collecting and analyzing MOUD utilization data were key components of the coaching strategy. All participating organizations (in both coaching and control arms) were prompted to collect and report monthly on the number of treatment slots created and used. In the coaching condition, these data were used to spur discussion during coaching sessions and became a focus of cyclic quality improvement.

In this study, significant effects were limited to buprenorphine capacity and use. One reason that the coaching strategy may not have been significantly related to change in injectable naltrexone use was that study sites did not prioritize this treatment regimen, and fewer patients preferred it. This lower preference was exemplified by the low initial injectable naltrexone use (baseline monthly average per site of 5.3 for injectable naltrexone versus 19.0 for buprenorphine) and the limited growth between baseline and maintenance period in use at sites across study conditions (average growth per month of 1.7 for injectable

naltrexone vs. 23.9 for buprenorphine). In general, patients prefer medication formulations that can be self-administered in nonclinical settings, and they are less interested in injectable or implantable options (36, 37). Addiction treatment clinicians are not as apt to prescribe injectable naltrexone, because patients must experience a period of detoxification before administration (38, 39); in addition, many clinicians perceive that naltrexone is less effective than buprenorphine in reducing cravings and in preventing relapse (40). The preference for sublingual buprenorphine or buprenorphine-naloxone over injectable naltrexone is part of a greater trend in the addiction treatment field (41) and may have been a factor in this three-state trial.

The research described here was subject to several limitations. All participating treatment organizations were volunteers and thus may have differed in important and unknown ways from organizations that were not motivated to participate in a trial. For the trial, MOUD utilization data came from organizational databases and were not standardized across data sets, as would be the case with claims data. The imbalance in the number of sites in the coaching condition versus the control condition could be a limitation if not for the lack of baseline differences in site characteristics and the balance in variables used for blocking between study conditions. Last, the trial occurred under pre-COVID-19 conditions in which use of telehealth for provision of MOUDs was minimal. The post-COVID-19 pivot toward use of telehealth (42) may have changed some of the focus areas of coaching.

Future research on coaching should delve deeper into the dimensions of coaching related to coaching processes, dose, coaching event participants, modality (e.g., in person, virtual, synchronous, and asynchronous) for delivering coaching, and coaching experience backgrounds to better understand and enhance the coaching function. In addition, the impact of internal coaching versus that of external coaching should be investigated.

CONCLUSIONS

This study conceptualized MOUD implementation and scale-up of an evidence-based practice as a process that an external coach can facilitate. This is an important finding as policy makers and providers attempt to overcome the underutilization of MOUDs to reduce opioid overdose incidence and deaths. Coaches support the confluence of internal and external factors, such as leadership, community outreach, and funding, and can inspire more informed and nuanced approaches to implementation endeavors. A more sophisticated understanding is needed of how the coaching function achieves these gains and how to scale up coaching as an implementation and improvement strategy.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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HIGHLIGHTS

- This randomized trial found that use of external coaches in specialty addiction treatment programs significantly increased buprenorphine capacity and use.
- Buprenorphine capacity (i.e., the number of patients who could be treated on the basis of providers' waiver limits) and use increased significantly from 2016 to 2019 in both control and coaching arms but significantly more at the sites that received coaching.
- Growth in injectable naltrexone use at all sites was less than 1%.
- Effective external coaching targeted leadership, community outreach, and funding.

TABLE 1.

Characteristics of participating addiction treatment sites, by group assignment

	Control (N=30)		Intervention (N=45)		
Characteristic	**N**	**%**	**N**	**%**	**p**
Site location					.339
Metropolitan	21	70	37	82	
Nonmetropolitan	9	30	8	18	
Site setting					.321
Substance use disorder specialty treatment center	26	87	35	78	
Health system or federally qualified health center	4	13	10	22	
Treatment services[a]					
Regular outpatient services	25	83	33	74	.341
Intensive outpatient services	11	37	25	56	.121
Inpatient services	1	3	5	11	.583
Provides medications for opioid use disorder[a]					
Buprenorphine	19	63	26	57	.662
Injectable naltrexone	25	83	29	64	.250
Admissions for opioid use disorder per site per year (M±SD)					
Florida	391.9±436.2		227.4±218.4		.432
Ohio	332.9±334.4		327.2±292.9		.970
Wisconsin	136.5±125.6		127.0±140.7		.460
Medications to treat opioid use disorder: performance (M±SD)					
Buprenorphine slots	55.9±151.2		88.2±137.3		.358
Buprenorphine administrations per month	14.3±33.2		21.9±48.3		.425
Injectable naltrexone injections per month	6.2±14.2		4.7±9.7		.618

[a]Sites could offer more than one service or medication, so percentages will not sum to 100%.

TABLE 2.

Use of medications to treat opioid use disorder at baseline and during the 6-month maintenance period, by group and study site[a]

	Control		Intervention		Florida		Ohio		Wisconsin	
Use	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
Buprenorphine slots										
Baseline	55.9	151.2	88.2	137.3	71.3	109.7	108.5	209.8	47.1	80.5
Maintenance period	99.3	191.8	152.2	159.5	89.9	107.5	231.5	245.3	88.1	113.0
Buprenorphine use										
Baseline	14.3	33.2	21.9	48.3	9.4	22.3	37.5	67.8	11.4	17.3
Maintenance period	28.8	48.5	51.7	67.3	34.4	51.2	72.2	84.7	25.6	33.3
Injectable naltrexone use										
Baseline	6.2	14.2	4.7	9.7	4.2	8.7	7.6	15.4	4.4	10.4
Maintenance period	7.9	13.7	6.5	11.4	6.0	11.3	8.1	13.6	7.2	12.5

[a]The active intervention occurred over 24 months and was followed by a 6-month maintenance period during which data on sustainability were collected. Values for each state are overall means (i.e., for both the control and coaching arms) during the 6-month maintenance period.

TABLE 3.

Mixed-effects models of predictors of use of medications to treat opioid use disorder at participating sites[a]

Use	Intercept	p	Study arm	p	Time	p	Study arm × time	p
Buprenorphine slots	1.858*	<.001	.811	.080	.030*	<.001	.030*	<.001
Buprenorphine use	1.246*	<.001	.295	.446	.024*	<.001	.028*	<.001
Injectable naltrexone use	.930*	<.001	.109	.660	.008	.003	−.001	.865

[a]Outcome variables were log-transformed.

*p<0.001.