



## ORIGINAL ARTICLE

# Does a Rural Community-Based Intervention Improve Knowledge and Attitudes of Opioid Use Disorder and Medication-Assisted Treatment? A Report From the IT MATTTRs Study

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## Abstract

**Purpose:** Understanding knowledge of and attitudes toward medication-assisted treatment (MAT) for opioid use disorder (OUD) is important to changing the conversation about this devastating public health problem. While several studies report clinician knowledge and attitudes and training, less is known about community member perspectives. As part of the Implementing Technology and Medication Assisted Treatment Team Training in Rural Colorado study (IT MATTTRs), this study describes the implementation of community-based interventions developed by rural community members and researchers to increase awareness and promote positive attitudes toward MAT for OUD and explores changes in community members' OUD and MAT knowledge and beliefs.

**Methods:** Using the Boot Camp Translation process, the High Plains Research Network and Colorado Research Network MAT Advisory Councils developed multicomponent interventions on MAT for OUD. Baseline and postintervention surveys were administered using venue-based sampling of community members in rural communities.

**Findings:** Surveys were completed by 789 community members at baseline and 798 at postintervention. Nearly half (49%) reported exposure to at least 1 intervention product. Greater exposure to intervention materials was associated with beliefs that using opioids to get high in rural communities is a problem ( $P < .0001$ ), that opioid addiction is a chronic disease ( $P = .0032$ ), and that OUD can be treated locally ( $P = .0003$ ).

**Conclusions:** Partnering with local community members resulted in the successful development and implementation of community-based interventions, exposure to which was associated with OUD knowledge and beliefs. Locally created interventions should be included in comprehensive approaches to stem the OUD epidemic.

**Key words** Boot Camp Translation, knowledge, medication-assisted treatment, opioid use disorder, rural community health.

## Purpose

Opioid misuse has reached epidemic proportions, and in 2017, Health and Human Services (HHS) declared the opioid epidemic as a public health emergency in the United States. In 2016, 42,249 people died from opioid overdoses, and 11.5 million people misused prescription pain medications.<sup>1</sup> That same year, Colorado saw 504 fatal overdoses due to opioids.<sup>2</sup>

Treatment options are available to alleviate opioid dependence and misuse. Medication-assisted treatment (MAT) options include methadone from a certified clinic. However, proximity and transportation to these clinics, which are often located in urban areas, limit access in rural communities. In contrast, MAT with buprenorphine is a viable option in rural communities and can be delivered by primary care practices. MAT with buprenorphine has not been a widely available resource,<sup>3</sup> particularly in rural communities. For example, in 2016, there were only 3 providers actively prescribing buprenorphine for opioid use disorder (OUD) in a rural 24-county region in Colorado.<sup>4</sup> Additionally, the stigma associated with opioid addiction and a general lack of knowledge of treatment options creates a major barrier in seeking treatment for opioid dependence and OUD in rural communities.<sup>5</sup>

In changing attitudes, knowledge, and culture around addiction and treatment, a community may foster a network of support for individuals struggling with addiction and be well-equipped to direct community members to the resources they need.<sup>6</sup> Current literature on community-level knowledge of OUD and MAT and community efforts to address stigma is limited. Previous studies often focus on clinician perspectives and experiences with opioid prescribing and MAT.<sup>7–10</sup> Data that do exist about community knowledge, attitudes, and beliefs have come from nationwide public surveys and do not specifically evaluate the knowledge and perceptions of individuals from rural communities.<sup>5,11</sup>

Implementing Technology and Medication Assisted Treatment Team Training in Rural Colorado (IT MATTTRs Colorado) is a randomized, pragmatic trial designed to increase access to MAT for people living in rural communities. The study used a multilevel approach that included training for primary care practice teams to build capacity to provide MAT for OUD and support for clinicians to become waived to prescribe buprenorphine for OUD. The results of those study activities will be reported elsewhere.<sup>12</sup> Another component of IT MATTTRs was the development of 2 community interventions to change the local conversation about OUD and MAT. This manuscript describes the development and implementation of the community-based interventions created by rural community members and researchers and explores change in

knowledge, attitudes, and beliefs related to OUD and MAT in community members living in a rural and frontier agricultural region.

## Methods

### Design and Setting

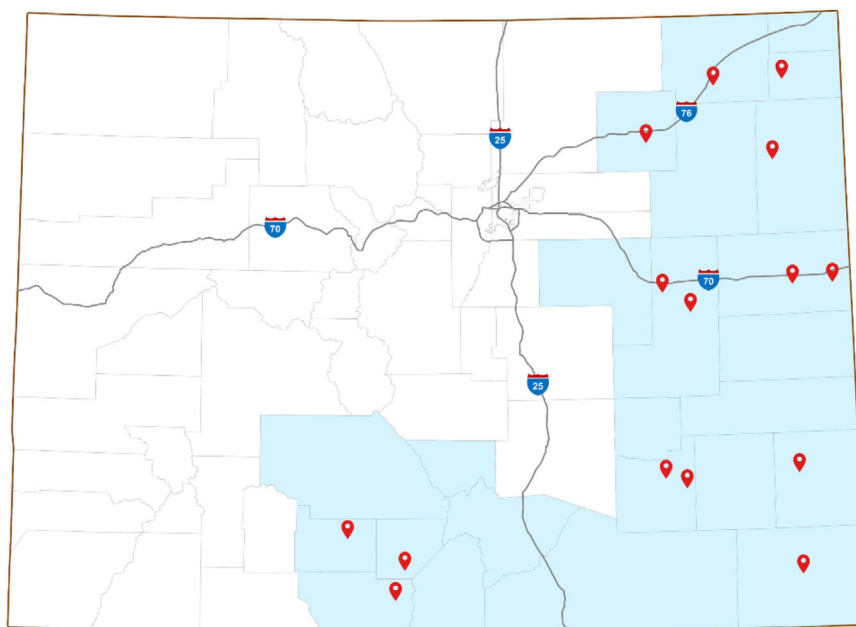
The IT MATTTRs study region includes 24 rural counties in eastern Colorado and the San Luis Valley (SLV), with a total population of just over 207,000 residents. This study region geographically covers 37% of the state of Colorado and is designated as rural by the Office of Management and Budget and the US Department of Agriculture (see Figure 1).<sup>13,14</sup>

The High Plains Research Network (HPRN) and the Colorado Research Network (CaReNet) are practice-based research networks that cover the counties of eastern Colorado and the SLV, respectively, and are networks within the State Networks of Colorado Ambulatory Practices & Partners (SNOCAP) housed within the University of Colorado Department of Family Medicine. Practices and community members in the SNOCAP region identified opioid dependence and OUD and limited access to diagnostic and treatment services for OUD as major concerns during site visits from SNOCAP researchers and at the Annual SNOCAP Convocation. Colorado data support these local concerns as 7 of the counties in the project region had drug overdose rates greater than 20 per 100,000, placing them among the highest rates in the nation.<sup>15</sup>

### Community Interventions

The HPRN Community Advisory Council (CAC) was concerned that training clinicians and practices in MAT may not be sufficient to improve access due to the lack of community knowledge and awareness of OUD and MAT. As a result, 2 community groups were formed (eastern Colorado [HPRN] and the SLV [CaReNet]) in an effort to change the conversation in the community around OUD and increase awareness of MAT. The groups used an evidence-based engagement process called Boot Camp Translation (BCT) to translate the complex language and concepts of OUD and MAT into locally relevant, actionable messages for rural communities.<sup>16,17</sup>

The BCT process occurred over an 11-month period. The community partners involved in the BCT process came from diverse ethnic, age, and occupational backgrounds, including educators, health care providers, pharmacists, social services employees, high school and college students, local business managers, law enforcement officials, teachers, concerned parents and grandparents, pastors, patient advisors, and a mental health substance

**Figure 1** IT MATTRs Study Region and Community Survey Distribution Town Locations.

abuse professional. The groups included individuals that had a firsthand understanding of this complex issue and other concerned community members.

In the HPRN region of eastern Colorado, the “Have You Met MAT?” community intervention included informing local residents that opioids are a major problem and introduced terminology associated with OUD. The HPRN CAC chose to use common language before introducing formal or clinical terms. For example, messages first used “addiction” then “use disorder,” and “pain medications” then “opioids.” The community group also wanted to prompt people to think about their own prescription opioid behavior and to know that, from a neurobiological perspective, opioid use has a profound cellular impact in the brain, and opioid misuse is often about avoiding withdrawal rather than about getting high. Educating the community about MAT with buprenorphine as a potentially locally available, effective outpatient treatment was important. The resulting main messages from the BCT process were: (1) Deaths from opioid drug overdose increased 300% in eastern Colorado. (2) How long have you been taking your pain medication (Percocet, OxyContin, Hydrocodone)? (3) When addicted, people take opioid pain medicines or heroin just to feel normal, not to get high. (4) Get your life back—with local outpatient care. And (5) Talk to your doctor about medication-assisted treatment. The group chose the tagline “Have You Met MAT?” as a way to introduce MAT to their communities.

In the SLV, the “MAT for OUD in the SLV” campaign included the message that OUD can happen to anyone

in the community, that persons suffering from OUD are not alone, that help is locally available in the primary care office, and that they should “talk to a health care provider.” The main messages the group aimed to disseminate throughout the community were simple, clear, and engaging: “There’s always hope, there’s always help. You can do something!” “Everyone deserves access to care,” and “It’s real, it’s me, it can be treated.” During the BCT, 1 group member poignantly stated, “There are no longer ‘those people’ in our community. ‘Those people’ are us! We are all connected to a story of OUD.” Appendix A offers descriptions, distribution efforts, and images of the materials developed.

### Intervention Evaluation

The IT MATTRs Community Knowledge Survey was distributed before and after the implementation of the community-based interventions to detect change in knowledge, attitudes, and beliefs around OUD and MAT.

### Survey Development

The Community Knowledge Survey was created through the collaborative work of the IT MATTRs academic researchers, MAT experts, local practice facilitators, and community members, and includes questions that were derived and adapted from existing guidelines and data collection tools.<sup>2,18–20</sup> The survey includes a mix of questions

related to knowledge (eg, opioid addiction is a chronic disease, and heroin and prescription opioids target the same area of the brain), attitudes (eg, likelihood that the respondent would talk to child, friends, family members, or customers about opioid abuse), beliefs (eg, seriousness of opioid and heroin use in your community), and awareness of treatment for OUD. The survey asked respondents about the types of messages and materials respondents had seen or read about OUD and MAT. To assess exposure to the community interventions, the post survey included questions about seeing the study-specific materials. Finally, demographic data were collected, including age, gender, race, education, and profession.

### Data Collection

Venue-based sampling was used to target leaders in a community and the community members with whom they interact. Venue-based sampling is an effective method to capture information from target populations, while identifying specific days, times, and locations that would be an ideal opportunity to reach the intended sample.<sup>21</sup>

We identified 11 “venue” categories to reach community members who might interact with clients or customers in a manner that could be conducive to conversations about OUD and MAT or are individuals in a position to influence or determine local rules, ordinances, programs, and policies. The venue categories included school boards, faith leaders (pastors, ministers, staff), law enforcement (city and county), service providers (hair dressers, nail technicians, tattoo artists), school teachers, bars and coffee shops, city council and chamber of commerce, county commissioners, hospital boards, community college faculty, and social services (case workers and directors). A 12th category for “community members” included individuals who were present at the venue at the time of survey distribution but were not necessarily the target population (ie, individuals who were attending board meetings or patrons at businesses).

Using a purposeful sampling frame, we identified specific geographical locations representing the diversity of the 24-county study region. We identified 7 larger towns (population >5,000) and coupled each of those with a smaller town (population <5,000) to give a broader representation of our target population. One large town was assigned 2 smaller corresponding towns due to the expansive region that area encompasses (see Figure 1). Baseline survey distribution took place July 2017 through October 2017; follow-up survey distribution occurred October 2018 through February 2019.

Paper surveys were distributed in person by members of the study team.

### Analysis

Descriptive statistics were generated for respondent characteristics and responses to questions about opioid use. Differences between pre- and postintervention characteristics and response frequencies were assessed using chi-square, Fisher’s exact tests, and t-tests. For further analyses, responses for Likert scale type questions were collapsed into 3 categories (Don’t know, not serious or slightly serious, somewhat or very serious, OR Don’t know, disagree or strongly disagree, agree or strongly agree). A generalized logit model for multinomial outcomes was used to determine whether there was a difference in pre- and postintervention responses.

For dichotomous outcomes, standard logistic regression models were used to assess differences between pre- and postsurvey responses. All models are adjusted for age, gender, education, Hispanic ethnicity, and location (San Luis Valley vs eastern Colorado). Unadjusted and adjusted *P* values report differences between pre- and posttime periods.

Associations between exposure to community intervention materials (0, 1, 2, and  $\geq 3$  items) and knowledge postintervention were assessed using chi-square tests, and *P* values are reported. No assumptions of linearity in exposure categories were made to allow us to explore the possibility that, beyond 1 item, there would be no additional benefit. All analyses were carried out using SAS version 9.4 (SAS Institute Inc., Cary, NC).

## Results

### Participants

The IT MATTTRs Community Knowledge Survey was completed by 789 participants at baseline (“pre”) and 798 participants at follow-up (“post”). Table 1 shows the survey respondents’ demographic characteristics. The majority of respondents were between the ages of 35 and 64 (pre = 67%, post = 60%) and White (pre = 87%, post = 81%). Nineteen percent at preintervention and 23% at postintervention were Hispanic or Latino. A greater proportion of respondents were from the SLV region at postintervention (41%) compared to preintervention (28%).

### Pre-Post Analysis of Knowledge, Attitudes, Beliefs, and Personal Experiences

Overall, there was considerable concern and knowledge about OUD reported at baseline. More than half of respondents at preintervention (59%) and postintervention (60%) reported knowing someone personally who

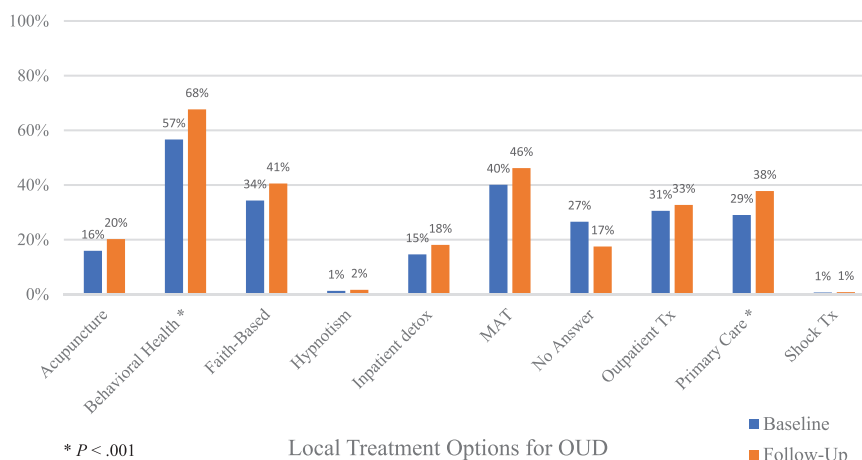
**Table 1** Community Knowledge Survey Respondent Characteristics

Demographics <sup>a</sup>	Baseline N = 789 n (%)	Follow-Up N = 798 n (%)	P Value*
<b>Region</b>			
San Luis Valley	220 (27.9)	327 (41.0)	< .0001
Eastern Colorado	569 (72.1)	471 (59.0)	
<b>Venue affiliation</b>			
Community member	167 (21.2)	90 (11.3)	< .0001
Venue affiliated	622 (78.8)	704 (88.7)	
<b>Gender</b>			
Female	489 (63.0)	515 (67.9)	.05
Male	287 (37.0)	244 (32.2)	
<b>Age</b>			
18-34	164 (21.2)	232 (30.4)	< .001
35-64	520 (67.3)	458 (60.0)	
65 <sup>a</sup>	89 (11.5)	74 (10.0)	
<b>Education</b>			
HS/some college/NA	203 (26.5)	233 (30.5)	.01
Associates/bachelor	298 (38.9)	318 (41.6)	
Grad/professional	266 (34.7)	213 (27.9)	
<b>Race (check all that apply)</b>			
White	686 (87.0)	648 (81.2)	< .01
Black/African American	5 (0.6)	12 (1.5)	
Asian	4 (0.5)	9 (1.1)	.17
Native Hawaiian/other Pacific Islander	1 (0.1)	3 (0.4)	.62
American Indian/Alaska Native	13 (1.6)	17 (2.1)	.48
Other	50 (6.3)	56 (7.0)	.59
Prefer not to answer/missing	42 (5.3)	74 (9.3)	< .01
<b>Hispanic or Latino</b>			
Yes	146 (18.8)	180 (23.2)	< .01
No	593 (76.4)	537 (69.2)	
<b>Profession (check all apply)</b>			
Government	216 (27.4)	188 (23.6)	.08
Education	260 (33.0)	227 (28.5)	.05
Agriculture	21 (2.7)	19 (2.4)	.72
Military	6 (0.8)	4 (0.5)	.51
Business	90 (11.4)	110 (13.8)	.15
Faith/nonprofit	31 (3.9)	21 (2.6)	.15
Health/social	134 (17.0)	155 (19.4)	.21
Law	36 (4.6)	35 (4.4)	.86
Other	49 (6.2)	76 (9.5)	.01
Prefer not to answer	31 (3.9)	49 (6.1)	.04
<b>Venue affiliation</b>			
Social services	154 (19.5)	155 (19.5)	< .0001
Oversight (school boards, hospital boards)	28 (3.6)	36 (4.5)	
Faith leaders	49 (6.2)	32 (4.0)	
Law enforcement	76 (9.6)	81 (10.2)	
Business (bars and service providers)	46 (5.8)	91 (11.5)	
Education (school teachers, college/CC faculty)	218 (27.6)	251 (31.6)	
Government (city council, chamber, commissioners)	51 (6.5)	58 (7.3)	
Community members	167 (21.2)	90 (11.3)	

\*P values are for baseline to follow-up comparisons.

<sup>a</sup>Fewer than 5% of respondents had missing data.

**Figure 2** Respondent Beliefs Toward the Availability of Local Treatment for OUD at Baseline and Postintervention.



has struggled with prescription drug addiction, and nearly 40% reported they or someone they knew had taken opioid pain medication for something other than pain. The percentage of respondents who reported opioid abuse as somewhat or very serious was 67% at preintervention and 71% at postintervention (unadj  $P = .003$ , adj  $P = .66$ ). The percentage of respondents correctly reporting that heroin and prescription pain medications target the same area of the brain was 58% at baseline compared to 64% at postintervention (unadj  $P = .07$ , adj  $P = .70$ ). Prior to the intervention, 58% of respondents reported that people who become addicted to prescription pain medicine can transition to using heroin, compared to 63% at postintervention (unadj  $P = .07$ , adj  $P = .72$ ).

A significantly greater percentage of respondents reported behavioral health (pre = 55%, post = 67%, unadj  $P < .001$ , adj  $P < .001$ ) and primary care (pre = 28%, post = 36%, unadj  $P < .001$ , adj  $P < .001$ ) as options for sources of treatment available in their community (see Figure 2). Further, at follow-up, a significantly greater percentage of respondents who had been prescribed an opioid ( $n = 452$ ) reported that the prescriber discussed the risk of addiction (pre = 42%, post = 54%, unadj  $P = .01$ , adj  $P = .01$ ).

### Exposure to Boot Camp Translation Materials

Exposure to the community-based intervention materials created by the community was substantial. Nearly 50% of respondents reported exposure to at least 1 of the intervention-specific materials, 21% reported exposure to 2 or more, and 9% reported exposure to 3 or more community intervention products (Table 2). Respondents reported seeing a variety of the materials, including local

**Table 2** Dose Exposure to Intervention Materials (N = 798)

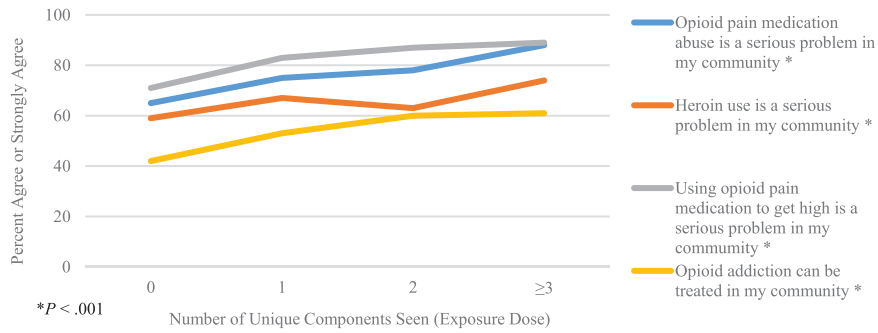
# Items Exposed to (Dose)	n (%)
0	406 (51)
1	213 (28)
2	99 (12)
3 or more items	80 (9)

newspaper articles (32%), posters (18%), program “inserts” (8%), drink coasters (6%), and movie ads (5%). During the study, the mean number of nonintervention materials (eg, TV, Internet, newspaper) respondents reported seeing remained steady (baseline mean items = 2.3 [SD 1.0], post = 1.9 [SD 2.9]).

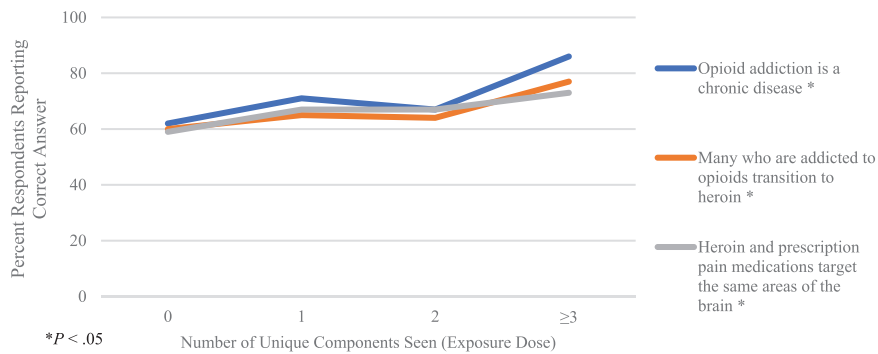
### Exposure Analysis

Greater exposure to the community intervention materials was significantly associated with beliefs that opioid pain medication abuse and heroin use are serious problems in these communities (opioid use: exposure to 0 items = 65% agreed or strongly agreed, 1 item = 75%, 2 items = 78%, and  $\geq 3$  items = 88%,  $P < .001$ ; heroin use: exposure to 0 items = 59% agreed or strongly agreed, 1 item = 67%, 2 items = 63%, and  $\geq 3$  items = 74%,  $P < .0011$ ), that there is a problem with individuals using opioid pain medications to get high in rural communities (exposure to 0 items = 71% agreed or strongly agreed, 1 item = 83%, 2 items = 87%, and  $\geq 3$  items = 89%,  $P < .0001$ ), and that opioid addiction can be treated in these communities (exposure to 0 items = 42% agreed or strongly agreed, 1 item = 53%, 2 items = 60%, and  $\geq 3$

**Figure 3** Association Between Exposure to Intervention Materials and OUD and MAT Beliefs.



**Figure 4** Association Between Exposure to Intervention and OUD Knowledge.



items = 61%,  $P = .0003$ ). See Figure 3. Exposure to intervention materials was also significantly associated with greater knowledge that opioid addiction is a chronic disease (exposure to 0 items = 62% of respondents had correct response, 1 item = 71%, 2 items = 67%, and  $\geq 3$  items = 86%,  $P = .0032$ ), heroin and opioid pain medication target the same areas of the brain (exposure to 0 items = 59% of respondents had correct response, 1 item = 67%, 2 items = 67%, and  $\geq 3$  items = 73%,  $P = .0471$ ), and many individuals who become addicted to prescription pain medicine transition to using heroin (exposure to 0 items = 60% of respondents had correct response, 1 item = 65%, 2 items = 64%, and  $\geq 3$  items = 77%,  $P = .0194$ ). See Figure 4.

## Discussion

Our findings provide valuable information about the implementation of a community-based intervention designed to improve knowledge, attitudes, and beliefs of OUD and MAT in rural communities. In general, rural community members already reported high levels of knowledge and experience with opioid pain medications and OUD at baseline. However, awareness of locally avail-

able treatment from primary care, one of the main messages in the community interventions, significantly improved from pre- to postintervention.

Even with a limited dissemination budget, the “Have You Met MAT?” and “MAT for OUD in the SLV” materials reached a large number of community members. Exposure to intervention materials was significantly associated with knowledge about OUD and OUD beliefs. As exposure increased, community members were dramatically more likely to report that opioid pain medication abuse and heroin use are a problem in the community. Respondents exposed to the intervention were also more likely to know that OUD is a chronic disease, that heroin and prescription pain medications target the same areas of the brain, and that treatment for OUD could be available locally. We are unable to directly attribute changes in knowledge, attitudes, and beliefs to this intervention. However, the broad exposure, the levels of OUD and MAT knowledge and beliefs based on exposure to multiple products, and relatively constant exposure to nonintervention messages and materials supports a locally created, multicomponent approach to community-based interventions. We believe a larger dissemination budget could be expected to increase exposure even further and improve knowledge and attitudes.

While the literature and our study confirmed that there is stigma associated with OUD, we found through the Boot Camp Translation process, our dissemination efforts, and survey results that many individuals and community organizations are interested in and willing to talk about OUD.

### Limitations

Venue-based sampling offers the opportunity to target specific groups for surveys but does not guarantee exact duplication of venue or respondents over multiple surveys. For example, a school board that participated at baseline did not have a meeting during the postintervention data collection time frame and could not be reached. We adjusted for variation in respondent characteristics. Venue-based sampling is also not a random sample of the community and may not reflect the total community population. However, our goal was to obtain information from specific groups of people who were most likely to interact with a person in a way that could influence the person's knowledge and attitudes toward those suffering from OUD or have the capacity to improve local policy to support access to care for those suffering from OUD. Because there was not a validated community knowledge survey, we used an iterative process to create a survey based on questions from published studies and added a number of questions unique to our research question.

### Conclusion

Using a community-based participatory research approach, the IT MATTTRs community advisory councils successfully created community-based interventions with messages and materials about OUD and local treatment that reached a large number of community organizations and members. Beliefs about the availability of treatment from local primary care increased significantly. Further, exposure to intervention materials had significant association with OUD knowledge and beliefs and suggests the effectiveness of the interventions. Our findings support the use of locally derived messages and multicomponent dissemination efforts to create an important additive impact to efforts aiming to improve awareness of and promote treatment for OUD.

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## Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Supporting Information