Using Mixed Methods to Adapt and Evaluate the Implementation of a Multicomponent Tobacco-Free Workplace Program within Behavioral Health Centers

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Abstract

Background: Behavioral health treatment centers (BHTCs) rarely implement existing evidence-based practices for treating tobacco dependence, despite high rates of tobacco use among their clients. *Taking Texas Tobacco Free* (TTTF) has successfully targeted this disparity by delivering an evidence-based, multilevel, tobacco-free workplace program providing policy implementation and enforcement, education, provider training in tobacco screenings and treatments, and nicotine replacement therapies (NRT) to BHTCs across Texas. We describe a mixed methods design used to conduct a formative evaluation process to adapt implementation strategies to local contexts, evaluate program outcomes and characterize processes influencing program implementation in two BHTCs serving 17 clinics.

Methods: Varied data collection included pre and post-implementation leader, provider, and staff surveys; and pre, mid, and post-implementation provider, staff and consumer focus groups. During implementation, data were collected via various logs (tobacco screenings, NRT delivery) to monitor program content delivery. The RE-AIM (**R**each, **E**ffectiveness, **A**doption, **I**mplementation, **M**aintenance) framework guided translation of behavioral interventions into sustainable practice.

Results: While program implementation varied between each BHTC, all clinics adopted a 100% tobacco-free workplace policy, integrated tobacco screenings into routine practice, delivered evidence-based interventions, dispensed NRT to consumers and staff, and increased provider knowledge on how to address tobacco dependence. Pre, mid, and post-implementation qualitative findings served to: 1) develop program strategies and materials adapted to local contexts and populations and address barriers; 2) adjust delivery systems of key components to enhance implementation; 3) understand reasons for success or failure to implement specific practices; and 4) reveal program integration into clinic culture, enhancing sustainability.

Conclusions: Implementation of TTTF at both BHTCs increased organizational capacity in the provision of evidence-based practices to treat tobacco dependence through successfully meeting most of our RE-AIM targets. Mixing methods involved program adopters and recipients as collaborators directly shaping core interventions to their individual context and needs, thus increasing program fit, ownership, adoption and sustainability; closing the gap between research and practice. These findings contribute to the development of flexible strategies and interventions capable of addressing variable implementation contexts and barriers, thus enhancing the effectiveness and sustainability of a tobacco-free workplace program.

Contributions To The Literature:

- This is the first study using mixed methods to *adapt* and *evaluate* the implementation of a comprehensive tobacco-free workplace program within behavioral health settings.
- We illustrate full application of the RE-AIM framework using mixed methods, yielding an understanding of contextual and multilevel (organizational, community, provider) factors influencing implementation, and explain results on each dimension.
- Study findings present an effective model in building capacity for integrating evidence-based practices for treating tobacco dependence via a formative evaluation process that facilitated program uptake by

developing flexible, tailored and sustainable strategies responsive to the real-world conditions of diverse settings.

Background

Behavioral health clients (BHCs) (those with mental and substance use disorders) represent only 21% of the population, yet consume about half of the cigarettes sold in the United States [1] with smoking prevalence rates nearly five times that of the general population [2-7]. Consequently, these individuals account for 50% of annual smoking-related deaths [8]. From 2005-2016, smoking rates among the general population have declined steadily from 20.9% to 15.5% [9]. However, smoking rates for BHCs remain relatively static, and significantly higher, at 35.8% [9]. Practice guidelines [2, 10, 11] recommend that smokers with and without behavioral challenges receive the same evidence-based-practices (EBPs) [12] proven effective in helping individuals in both groups to successfully quit smoking [13, 14] at the same rates [15, 16]. Nonetheless, BHCs are less likely to quit smoking compared to those in the general population [1, 3] despite research showing equally high motivation to quit among both groups [17-19].

While many factors influence the persistently high smoking rates among BHCs, a significant contributor is the hesitancy of psychiatrists and behavioral health clinicians to offer specialized care for quitting [20, 21]. In 2016, only 48.9% of mental health facilities screened patients for tobacco use, only 37.6% of programs provided tobacco cessation counseling, and only 26.2% offered nicotine replacement therapy (NRT) [22]. The main barriers to implementing tobacco cessation services within behavioral health treatment centers (BHTCs) include several clinician-level factors such as lack of effective training on treating tobacco dependence [23, 24]; undervaluing of tobacco addiction as a problem [25]; lack of, or failure to, enforce tobacco-free workplace (TFW) policies [2]; and misconceptions regarding motivation for, and the behavioral effects of, quitting smoking for BHCs [12]. Clinicians also widely believe quitting smoking will jeopardize substance recovery efforts and trigger depression, aggressive behavior, suicide attempts or self-harming behaviors [20]. Although evidence indicates these clinician beliefs are myths [20], they persist and have the strongest negative impact [26, 27], along with organizational barriers [28], on successful implementation of tobacco cessation interventions. Given the systemic nature of these barriers, organizational change is recommended [29, 30].

Taking Texas Tobacco Free (TTTF) is a multicomponent TFW program assisting Local Mental Health Authorities (LMHAs) throughout Texas to implement comprehensive and sustainable tobacco cessation [31], designed to target known implementation barriers across diverse levels of influence – organizational, community, clinician, and client. LMHAs are state agencies that administer and provide behavioral health services across Texas according to geographic region through non-profit community mental health centers [32]. As a comprehensive TFW program, TTTF includes a TFW policy, clinician training in evidence-based treatments, integration of tobacco use assessments (TUAs) into routine practice, staff education on hazards of tobacco use, community outreach, and assistance with NRT provision [2]. TTTF was effective in building capacity for the integration of EBPs in assessing and treating tobacco dependence and helping clients and employees within 18 LMHAs successfully quit smoking [33].

To facilitate understanding and overcoming of barriers, implementation researchers are increasingly adopting mixed methods designs [34]. Combining qualitative and quantitative approaches provides a more comprehensive understanding of implementation issues and greater knowledge yield than either method alone [35].

Although widely recommended in implementation research [34, 36-39], few studies have applied mixed methods in evaluating smoking cessation interventions. Interventional studies have focused on evaluating the use of mono, rather than multicomponent smoking cessation interventions, such as the effectiveness of tailored smoking cessation training for the elderly [40] and for youth [41], and of financial incentives on quitting [42]. One exception is a mixed methods evaluation of policy implementation of a national public health guideline for smoking cessation in the UK, focused on pre- and post-implementation changes. [43]

This study adopts a three-phase mixed methods design to examine the adaptation, dissemination and implementation of TTTF within two LMHAs overseeing 17 community clinics. The current study addresses limitations of prior research in implementation through using mixed methods to both adapt interventions and evaluate the processes and outcomes of implementing a comprehensive TFW program within BHTCs.

Methods

Study design

Following the successful implementation of TTTF within 18 LMHAs [31, 33], we were funded to enable its statewide dissemination through active and passive means and to implement a more cost-effective TTTF within additional LMHAs, this time using a mixed methods approach not included in the prior implementation. Researchers recommend the use of qualitative and mixed methods approaches to address the complexities involved in implementing interventions across diverse contexts [44] and for developing strategies that facilitate the implementation of EBPs [34, 36]. Mixed methods is particularly suited to evaluating complex interventions. The quantitative component assesses program impact, while the qualitative provides insight into contextual factors and change processes that are key to program adaptation and implementation [45, 46], facilitating effective integration of EBPs into local contexts. Our purpose in using a mixed methods design was for, *complementarity*, (i.e. using quantitative data to examine outcomes and qualitative to examine processes), and *expansion*, (i.e. qualitative data is used to explain results of quantitative analyses) [47].

We used a multistage evaluation mixed methods design [48], consisting of three phases, each with a different aim and a different core mixed methods design (see Figure 1). Specifically: Phase 1) formative evaluation or needs assessment (pre-implementation) – to identify site-specific contextual factors that might affect implementation of TTTF to tailor the program to fit local contexts; Phase 2) program implementation – to assess the delivery and uptake of TTTF components within LMHAs; and Phase 3) summative evaluation (post-implementation) – to evaluate program outcomes and characterize processes influencing program reach, effectiveness, adoption, implementation, and maintenance [49]. RE-AIM was selected as a guiding framework as it was developed to translate behavioral interventions into sustainable practice [49]. Full application of the model requires in-depth understanding of contextual and multilevel

factors influencing implementation, that use of both qualitative and quantitative methods provide, to understand and to explain reasons for outcomes on the RE-AIM dimensions [50]. Phases were interactive, with each phase building upon prior findings, and with iterative quantitative and qualitative data collection and analyses over the three phases [48]. The quantitative component had greater priority [48].

Participants and setting

This project has Institutional Review Board approval. Participation was open to any interested LMHAs in Texas who had not implemented the program previously. Our LMHA partner in the project, Integral Care, recruited centers through targeted mailings to ~20 LMHA chief executive officers (CEOs) assessing interest. Three LMHAs indicated interest, provided consent for participation, and enrolled: one withdrew mid-course due to competing organizational priorities. This paper focuses on the two remaining LMHAs. LMHA1 was in a large urban area and comprised two community BHTCs annually serving 10,247 unique clients (213,498 contacts). LMHA2 was in a mixed urban and rural area, spanning 25,000 square miles, managed 15 community BHTCs and annually served 6,538 unique clients (339,158 contacts).

Intervention: Taking Texas Tobacco Free

Previously described in detail [31, 33, 51, 52], TTTF is a multicomponent, comprehensive, and sustainable TFW program that is implemented through an academic-community partnership. TTTF entails adoption of various EBPs in tobacco cessation [2, 10], including: 1) policy implementation and enforcement; 2) integration of TUAs into routine practice; 3) provision of tobacco cessation services (e.g., behavioral counseling, NRT); 4) specialized provider training on treating tobacco dependence, i.e., Motivational Interviewing (MI); and 5) and community outreach (Figure 2). Program components target challenges and misperceptions regarding tobacco dependence among BHCs, encourage program buy-in and integration into local settings to reduce tobacco use and exposure to environmental tobacco smoke (ETS), and ultimately, prevent tobacco-related cancers and other diseases. TTTF was designed to increase organizational capacity for the provision of EBPs for tobacco use, because the delivery of such interventions has proven effective in increasing quit attempts and cessation among clients [10]. Therefore, TTTF's success is measured through RE-AIM targets as opposed to smoking cessation, reduced morbidity, etc. (cf. [53, 54]). We followed the Template for Intervention Description and Replication (TIDieR) Checklist [55] for describing interventions (Additional file 1).

Data collection

This study used a pre/post design with additional data collected during the active implementation phase to monitor program delivery and implementation. Data collection instruments used in this study are reported according to phase below, and described in Table 1.

Table 1: Aims, methods, data collection and analysis according to phase	
Phase/Design/Timing	Type and description of data collection and analysis
<p>Phase 1: Organizational Preparation/ Preimplementation</p> <p>Formative Evaluation</p> <p>-</p> <p><u>Aim:</u> to identify LMHA traits, readiness to implement change and site-specific contextual factors to guide program development</p> <p>-</p> <p>Timing: Baseline – months 1-6, pre-implementation</p>	<p>QUANTITATIVE Measures: descriptive analysis; All surveys are multiple choice</p> <p><u>Organizational Readiness to Implement Change (ORIC)^a</u> – Five subscales, formed from 24 items:</p> <ul style="list-style-type: none"> •change valence •efficacy toward change •change commitment •knowledge needed for change •resources <p><u>Demographics form:</u> • annual client contacts • unique clients annually • full-time employees</p> <p><u>Clinic leader survey:</u> 27 items •current quitting tobacco services •attitudes re: TFW programs •implementation challenges •tobacco prevalence among employees</p> <p><u>Clinician survey:</u> 27 items •knowledge and training on tobacco use •current practice of EBPs to treat tobacco use</p> <p><u>Employee survey</u> – 25 items (staff, providers, leaders): •personal tobacco history •quit attempts •tobacco training</p> <p><u>Knowledge test</u> – 10 items (identical, within session type (clinician vs. general), given directly pre & post receipt of tobacco education session): •tobacco dependence treatments (clinicians) •hazards of tobacco use (general)</p> <p>QUALITATIVE Approaches: Thematic & constant comparison analysis</p> <p><u>Participant observation</u> – (4) initial meetings and site visits; (6) Program champion consultations</p> <p><u>Staff focus groups</u> (2; N=23): •unique clinic traits •views re: TFW programs •implementation facilitators, barriers</p>
<p>Phase 2: Program Implementation:</p> <p>-</p> <p><u>Aim:</u> to monitor, adapt and implement TTTF into LMHAs</p> <p> </p> <p>*Timing: months 6-12, active implementation</p>	<p>QUANTITATIVE Measures: Descriptive analysis</p> <p><u>Monthly TUA, NRT and community outreach logs:</u> •TUAs conducted •NRT distributed •community events held</p> <p>QUALITATIVE Approaches: Thematic and constant comparison analysis</p> <p><u>Participant observation</u> – (4) periodic site visits, and (6) Program champion consultations</p> <p><u>Client focus groups</u> (1; N=5): •smoking history, current use •clinic quit services offered •cessation facilitators</p>

	Staff focus groups (2; N=20): •implementation challenges and facilitators •additional needs •program adaptations
Phase 3: Summative Evaluation: - <u>Aim:</u> evaluate program outcomes and explain processes influencing RE-AIM dimensions reach *Timing: 2-6 months post	QUANTITATIVE Measures: descriptive analysis <u>Repeat of: Clinic leader survey; clinician survey; and all employee survey.</u> QUALITATIVE Approaches: Thematic and constant comparison analysis <u>Participant observation</u> – (2) periodic site visits, and (4) program champion consultations <u>Staff focus groups (2; N=18):</u> •EBP integration effectiveness •implementation processes •improvements needed

*Phase 2 and 3 are not discrete, as program components began continued through summative evaluation.

^aShea CM, Jacobs SR, Esserman DA, Bruce K, Weiner BJ. Organizational readiness for implementing change: a psychometric assessment of a new measure. Implementation Science. 2014;9(1):7. LMHA = local mental health authority; TFW=tobacco-free workplace; TUA=tobacco use assessment; NRT=nicotine replacement therapy; EBP=evidence-based practice.

PHASE 1: Formative evaluation

The initial step in adopting TTTF was preparing for program implementation through developing each LMHAs' 100% TFW policy that included electronic nicotine delivery systems (ENDS), training clinicians, and champions, in treating tobacco dependence, educating staff about tobacco hazards, and integrating EBPs in tobacco cessation into clinical practice [2, 10], and tailoring materials to centers' needs. While TTTF team members consulted with LMHA leadership on policy drafting, we encouraged centers to confer with their members and community in developing their own TFW policy. Each LMHA designated one program champion to oversee program implementation and maintenance according to a recommended timeline [33], and facilitate and steward successful organizational change [56, 57]. TTTF team members provided guidance and practical advice throughout program implementation.

Quantitative data included pre-implementation clinic leader, clinician and employee surveys, LMHA demographics, pre- and post-knowledge tests, and the Organizational Readiness to Implement Change (ORIC) [58] survey that assessed organizational characteristics and needs regarding knowledge, skills, practice, and readiness to implement change [scale of 1 (*agree*) – 5 (*disagree*), higher scores indicate greater commitment to change], (Table 1 describes instruments). Qualitative data included pre-implementation staff focus groups, field visits and champion consultations. Analysis of quantitative data informed sample selection for the pre-implementation focus groups. We purposively selected a

heterogeneous sample for the focus groups, selecting participants who had expressed apprehension of TTTF to hear and address their concerns.

PHASE 2: Program implementation

The active implementation phase entailed adoption of various EBPs in tobacco cessation [2, 10] as described in Figure 2. TUAs are an empirically based method to increase quit attempts [2], which in this program consisted of documenting current, and history of, tobacco use; prior quit attempts and methods used; NRT use; and clients' readiness to quit. Counselors facilitated smoking cessation groups using a validated and effective smoking curriculum, developed specifically for BHCs [59, 60]. TTTF staff delivered an 8-hour training in MI to participating LMHAs, as guidelines indicate the most successful evidence-based interventions combine the delivery of behavioral and pharmacological support [10, 61]. In accordance with best practices, this combined therapy approach attends to clients' needs whether they are ready for smoking cessation treatments or motivational treatments to quit in the future [10, 25]. Community outreach focused on expanding and sustaining community TFW programs to address high tobacco use rates among this population.

Quantitative data included LMHA quarterly reports submitted by champions, documenting TUAs administered and quantities and types of NRT distributed to staff and clients, and descriptions of monthly community outreach events. Various qualitative methods – mid-implementation staff, and separately, client, focus groups; site visits; and champion consultations – were used to engage program partners collaboratively, examine and understand implementation processes and challenges in greater depth, and make program adjustments as needed.

To facilitate documentation of client tobacco use, centers were asked to integrate TUAs into the electronic health record. Establishing use of these audit and monitoring methods are recognized as enhancing program success and sustainability [16]. Quarterly reports served two functions: (1) provided ongoing monitoring of program component delivery, allowing team members to intervene and suggest potential adjustments to these processes; and (2) provided data for summative evaluation.

PHASE 3: Summative evaluation

The summative evaluation phase consisted of LMHAs' ongoing implementation of evidence-based program components. Post-implementation, with the exception of the ORIC, we administered all surveys (center leader, clinician, and employee), continued monitoring implementation through quarterly TUA and NRT logs, and conducted staff focus groups, site visits and champion consultations. All qualitative methods focused on examining and understanding how and why results were obtained for program outcomes.

Data Analysis

Quantitative

Quantitative data were analyzed using SAS 9.4 [62] (Table 1). Descriptive statistics, including mean and standard deviation (SD) and percent, were provided for continuous and categorical variables of interest,

respectively. The distribution of variables between pre- and post-implementation were examined using chi-square tests, as pre- and post- data were unmatched at the participant level. Alpha was set at 0.05.

Qualitative

Focus groups and interviews were conducted using interview guides (available upon request from corresponding author), transcribed verbatim and uploaded to Atlas.ti8 (v8.4) along with all other qualitative data to facilitate data management. Qualitative data were coded inductively from themes drawn from the data as well as deductively, according to the RE-AIM dimensions. Three team members trained in qualitative research independently coded initial transcripts to develop a coding frame. Coding discrepancies were discussed and reconciled until agreement was reached, refining codes until a final coding frame was agreed upon and reapplied to all transcripts [63]. Coding and analysis proceeded iteratively across each stage of data collection. Constant comparison of data – a continuous process of comparing emerging data within and across previously coded transcripts – was used to refine themes, avoid redundancy, ensure fittingness of themes, and check accurate accounting of the data set [64]. Analyst triangulation, where two or more analysts independently code the same data and compare findings, was used to ensure congruency and credibility of findings [65].

Mixed methods integration

Quantitative and qualitative data were analyzed separately, and merged at the end of each phase. Qualitative analysts remained blinded to quantitative results during qualitative data analysis, until data merging. Various types of integration were used to mix the quantitative and qualitative data, aligned with the different core mixed methods designs and aims of each study phase. In phase 1 (formative evaluation), the qualitative data was used to *build* and *adapt* intervention features to the local context. In phase 2 (program implementation and monitoring) qualitative and quantitative data were *compared* and *connected* to make ongoing program adjustments that facilitated successful implementation. In phase 3 (program evaluation) qualitative and quantitative data from phases 1 – 3 were *connected*; that is, qualitative data on the implementation processes was used to *explain* the quantitative outcomes [66].

Results

Phase 1

Scores on the ORIC subscales for both LMHAs were as follows: commitment = 4.0 (SD = .78); valence = 4.6 (SD = .53); efficacy = 4.0 (SD = .86); knowledge = 3.5 (SD = 1.16); resources = 3.7 (SD = 0.94); and total = 4.0 (SD = .73), showing a high degree of readiness to implement change. Regarding existing TFW policy, center leaders reported: 1 clinic (4.35%) had a TFW policy that included e-cigarettes; 4 (17.39%) regularly conducted TUAs and noted them within clinical records; 1 (4.35%) routinely provided tobacco cessation services for clients wanting to quit; and 14 (61%) had no existing TFW policy and did not provide assessments or any cessation services. However, regarding commitment to the TFW policy implementation at baseline, according to center leader surveys, 90% of employees (40% agree, 50% somewhat agree) were

committed to implementing this policy change. Clinician survey results indicate only 25% of clinicians were providing TUAs pre-implementation.

Qualitative findings were used to adapt the program to individual centers through development of: 1) program materials, i.e., posters representing center clients regarding age, ethnicity and language; and 2) additional resources tailored to the needs of special populations, including pregnant women, women with infants and young children. Materials included educational brochures providing guidance and specific recommendations on EBPs for treating tobacco dependence within these specialized subpopulations. These intervention adaptations enhanced the delivery, reach, and implementation of TTTF.

Qualitative analysis showed that while the majority of LMHA staff were onboard with becoming tobacco-free, some, particularly smokers, were apprehensive regarding program implementation. In fact, many felt that staff apprehension was primary and greater than that of clients:

I anticipate a struggle with staff here who may be struggling with the new policy and then conveying that to consumers. 'You can do this [stop smoking] when I'm not sure I can do this'...I think the staff is going to be harder...I think our clients will follow what our staff does, for the most part, if we set a good example.
(Program director, smoker, LMHA2)

Other concerns and apprehensions regarding program implementation included perceived violation of staff and clients' rights to smoke, and staff's expectations that client resistance would manifest as violent behavior, as well as attrition, due to becoming tobacco-free: "Our staff's concern would be behaviors from our consumers that we're going to try to prevent smoking. They're going to act out and then they're going to hurt us." (Nursing director, LMHA1). However, generally, staff expressed confidence that once implementation had started, staff and clients would accept the program: "They'll bicker about it first, but then everyone'll get on board." (Counselor, LMHA2)

Phase 2

TUA and NRT quarterly logs indicated implementation of each of these program initiatives. Both LMHAs were dispensing NRT to clients at about the same rates, ~ 4 boxes of patches monthly. Employees at LMHA2 used 2 packages of gum and 1 box of patches quarterly, while no employees at LMHA1 requested NRT. LMHA2 monthly logs show a slight decline in TUAs conducted during implementation (September: 812; October: 585; November: 483); however, LMHA1 saw an almost 26.42% decline (September: 1200; October: 1690; November: 883) in TUAs conducted following the initial months of implementation. Qualitative findings explained this decline by revealing that prescribers from LMHA1 were conducting TUAs and were protesting that time constraints kept them from completing these assessments. At LMHA2, TUAs were conducted by clinicians and did not decrease considerably over time. Thus, triangulation of quantitative and qualitative methods [65] explained how this program delivery decision at LMHA1 hindered implementation of TUAs. "The prescribers do them [TUAs]...the issue we've had is doctors not having the time of really being able to go over them in depth." (Counselor, LMHA1). Once LMHA1 shifted the administering of TUAs to clinicians, numbers increased (December: 1446; January: 1764; February: 1615).

Additionally, qualitative data revealed limitations to program delivery and implementation by LMHA. At LMHA1, clients and clinicians reported a need to tailor educational materials, which TTTF staff complied with, to fit clients’ advanced readiness to change, and challenges of not offering after-hours smoking cessation groups. Implementation at LMHA2 was hindered initially by not including employees in NRT distribution along with clients, which was soon corrected. Furthermore, LMHA2 did not offer any smoking cessation groups. Results from the qualitative and quantitative data collection during implementation were connected to build and adjust program strategies and materials, address implementation challenges and understand processes to further enhance program implementation and sustainability.

Phase 3

Detailed results evaluating program implementation according to how each RE-AIM dimension was measured within this study, along with qualitative and mixed methods findings on each dimension, is included in Table 2. Analysis of qualitative data produced five themes guided by the RE-AIM framework: factors related to Reach, Effectiveness, Adoption, Implementation and Maintenance. (Table 3 provides quotes supporting each theme.)

Table 2. Quantitative, Qualitative and Mixed Methods Results on RE-AIM Dimensions

RE-AIM dimension	Quantitative Results	Qualitative Findings	Connecting Qualitative and Quantitative Findings
<p>Reach- measured via increases over baseline in:</p> <p>1) percentage of clinicians trained in tobacco interventions;</p> <p>2) percentage of employees trained in basic tobacco education;</p> <p>3) number of community education and outreach events conducted and people reached</p>	<p>Significant increases over baseline:</p> <p>1) clinicians: 7%-77% to 22%-84%; all p<.001 on: assessing client tobacco use, pharmacotherapy use, the effects of nicotine on psychiatric meds., use of counseling and behavioral therapies to treat tobacco use, hazards of smoking on BHCs;</p> <p>2) employees: 34.6% to 88.2%; p<.001;</p> <p>3) 85754 people reached via community outreach-health fairs, social media and website through May 2018</p>	<p>Theme: Factors related to Reach – Categories:</p> <p>1) Clinician and staff views on tobacco training</p> <p>2) Community attitudes towards TFW programs</p>	<p>Qualitative findings support quantitative results:</p> <p>1) Illustrating how clinicians and staff valued the tobacco training as essential to implementing change</p> <p>2) Indicating acceptability of TFW within the greater community</p>
<p>Effectiveness- assessed via:</p> <p>1) establishment of enforced and comprehensive TFW policies in all LMHAs;</p> <p>2) increases in the self-reported acceptability of TFW programs;</p> <p>3) significant decreases over baseline in the proportion of LMHA employees using tobacco</p>	<p>Significant changes over baseline:</p> <p>1) Both LMHAs successfully established a 100% TFW policy; pre-implementation only 4.17% of clinic leaders reported LMHA enforced a TFW policy providing quitting tobacco services to clients;</p> <p>2) No significant changes in TFW program acceptability were seen pre/post, as employee motivation (80%), determination (85.71%), and confidence in ability to sustain a TFW (95.24%) were high pre-implementation;</p> <p>3) No significant decreases (9.82% à 10.19%) in number of employee smokers. However, average total quit attempts doubled, 4.89 to 10.42 post-implementation</p>	<p>Theme: Factors related to Effectiveness– Categories:</p> <p>1) Questioning or supporting myths about TFW policy</p> <p>2) Staff attitudes on TFW programs</p> <p>3) Employee experiences of quitting smoking</p>	<p>Qualitative findings from each LMHA differed compared to quantitative:</p> <p>1) LMHA2 enforced policy consistently, no employee or client policy violations reported; LMHA1 reported policy was inconsistently enforced due to fear of provoking client violence;</p> <p>2) LMHA2 overcame TFW program misconceptions, LMHA1 did not;</p> <p>3) LMHA2 reported one employee reported quitting, and two reducing smoking due to TFW</p>
<p>Adoption- assessed via</p>	<p>Significant increases post-implementation over baseline:</p>	<p>Theme: Factors related to</p>	<p>Qualitative findings were applied to</p>

<p>significant increases over baseline in:</p> <ol style="list-style-type: none"> 1) the proportion of clinicians providing EBPs; 2) the number of TUAs conducted; 3) self-reported compliance with TFW policy consistent practices 	<ol style="list-style-type: none"> 1) Clinician provision of EBPs (chi square=14.70, df=1, p<.001); specifically, behavioral counseling (chi square= 6.69, df=1, p=.010); NRT (chi square=31.98, df=1, p<.001); but not for provision of non-nicotine medications (chi square=2.87, df=1, p=.090). 2) TUAs provided rose from 25% pre to 40% post (chi square=9.99, df=1, p<.005); 3) 92% of employees reported TFW policy compliance 	<p>Adoption–Categories:</p> <ol style="list-style-type: none"> 1) Contextual factors impacting program uptake: facilitators and barriers 2) Practices compliant with TFW policy; 3) Clinician views of tobacco cessation interventions 	<p>facilitate and adapt uptake of TTTF:</p> <ol style="list-style-type: none"> 1) Identified barriers and facilitators to program implementation; 2) Noted practicing of novel strategies to reduce client tobacco use; 3) Modified or adjusted delivery of program initiatives during active implementation phase
<p>Implementation-assessed via self-reported program fidelity in:</p> <ol style="list-style-type: none"> 1) number of passive dissemination materials distributed; 2) number of champion-initiated trainings; 3) self-reported consistency with step-by-step implementation guide components 	<p>Post-implementation, program fidelity regarding:</p> <ol style="list-style-type: none"> 1) passive dissemination materials 675 posters, 2650 rack cards; 2) LMHA2 CEO and champions from both LMHAs, presented their experiences on implementing TTTF at a national behavioral health conference with TTTF staff; 3) Each center successfully implemented the TFW program and all major program components 	<p>Theme: Factors related to Implementation–Categories:</p> <ol style="list-style-type: none"> 1) Tailoring dissemination and implementation materials/strategies 2) Champion initiative 3) Program implementation fidelity 	<p>Qualitative findings were applied to tailor TTTF to LMHA specifics and note areas needing improvement:</p> <ol style="list-style-type: none"> 1) Development of various site-specific program materials and strategies; 2) While champions effectively lead implementation efforts, neither initiated center trainings 3) Variations between LMHAs in policy enforcement
<p>Maintenance-establishment within LMHAs of systems to:</p> <ol style="list-style-type: none"> 1) monitor and document TUA provision; 2) obtain and distribute NRT to clients and staff; 3) incorporate tobacco education into 	<p>Systems established within LMHAs:</p> <ol style="list-style-type: none"> 1) To monitor and document TUAs, 13659 TUAs were delivered, 12377 unduplicated; 2) NRT distribution 89.5 boxes of patches, 10 boxes of gum, 41 boxes of lozenges to clients and employees; 3) 48% of clinic leaders reported implementing tobacco-free training into new employee orientation and 26% into annual training requirements 	<p>Theme: Factors related to Maintenance –Categories:</p> <ol style="list-style-type: none"> 1) Functional delivery systems 2) Attitudes about sustaining program initiatives 3) Integration into organizational culture 	<p>Qualitative findings were used to improve delivery and assess sustainability:</p> <ol style="list-style-type: none"> 1) Delivery of TUAs was modified in LMHA1; 2) Clinicians valued TUAs and NRT as effective quit tools; NRT delivery was extended to employees also at LMHA2

TFW = tobacco –free workplace; BHCs = behavioral health clients; LMHAs = local mental health authorities; EBP's = evidence-based practices; TTTF = Taking Texas Tobacco Free; TUAs = tobacco use assessments; NRT = nicotine replacement therapy; CEO = chief executive officer.

Reach

Reach focused on changes in clinician and staff training regarding tobacco, and community outreach. Significant outcomes were seen in clinician trainings in evidence-based tobacco cessation interventions and in educating staff on tobacco use hazards through cost-effective videoconference technology. Knowledge increase for clinicians pre- (N=286, Mean 4.60) and post-education (N=268, Mean 6.51) were significant ($p<.0001$), and for general staff, pre- (N=153, Mean 4.29), and post-education (N=108, Mean 6.69, $p<.0001$). Through outreach, we reached 973 professionals from participating LMHAs and various other community agencies via specialized clinical training and presentations on how to implement the TTTF program and become tobacco-free. Qualitatively, clinicians reported valuing the tobacco treatment training as vital to treating tobacco dependence and getting staff on board with program implementation. Likewise, general staff reported valuing the tobacco education training as helpful in understanding and assisting tobacco-dependent clients. Clinicians also related that attitudes in their greater communities were supportive of tobacco-free environments, which facilitated TFW program implementation at LMHAs.

Effectiveness

Effectiveness focused on the establishment, enforcement and acceptability of TFW policies, and decreases over baseline of numbers of LMHA employees using tobacco. Quantitative results indicated full implementation of TFW policies in both participating LMHAs, leading them to become 100% TFWs, protecting thousands of employees, clients and visitors from ETS. Although participating LMHAs established TFW policies, staff focus group participants reported variations in policy enforcement in the two LMHAs. The CEO of LMHA2 reported that in enforcing the TFW policy, they realized their initial fears regarding policy implementation were unfounded misconceptions, which she repeatedly stressed to staff as a strong supporter and implementation TFW program leader (Table 3). As a result, LMHA2 enforced the policy consistently with clients and reported no violations among employees. Whereas during focus groups, LMHA1 staff repeatedly supported the misconception that enforcing TFW policies would precipitate client acting-out, and reported not enforcing the policy among clients due to fear of provoking violent behavior. Neither LMHA reported increases in client violent behavior, post-implementation. It is notable that these qualitative findings conflict with post-implementation survey data indicating adoption and enforcement of 100% TFW policies in both LMHAs. Additionally, LMHA2 employees were on board with enforcing their TFW policy and program, and reported policy integration into their workplace culture. LMHA1 staff reported that

they should not be burdened with policy enforcement, signaling their reticence to accept and adopt the program fully. No employees reported quitting smoking at LMHA1; however, the percentage who smoked were few. At LMHA2, one employee reported quitting smoking because of TFW policy implementation during a focus group, and two others reported cutting down on smoking.

Table 3. Themes: factors related to the reach, effectiveness, adoption, implementation and maintenance of the TTTF program

Theme & Categories	Context	Participant Quotes
<p>Factors related to Reach:</p> <p><u>Categories:</u></p> <p>1) Clinician and staff views on training</p> <p>2) Community attitudes towards TFW programs</p>	<p>Clinicians' and staff's views on tobacco training, as well as community attitudes toward tobacco use were supportive of TTTF and positively impacted reach</p>	<p>1) The more education you guys provided us, the better. Like how it [nicotine] interacts with psychiatric medications...I had <i>NO</i> idea about that! I was really shocked at how much I didn't know! No one ever told us that! I was like, how could I <i>NOT</i> know this? So they're cutting their chances of getting into wellness with their mental health when they're smoking...it's all about education. (<i>CEO, LMHA2</i>)</p> <p>1) The training we received was fantastic, and getting it to staff prior to the implementation date, I think it really brings people on board. When you have your center saying 'We're behind you, we're going to help you, provide you with the tools you need to help you quit smoking...I think it really shows the staff as individuals that, 'Okay, these guys really, truly care for me as something other than a warm body working.' (<i>Program Director, LMHA2</i>)</p> <p>2) My experience of (city) is that it's a very health-conscious community...I think there's just a cultural shift here towards healthy living. A lot of people are into healthy eating, healthy living, so that makes it easier. (<i>Intervention Director, LMHA1</i>))</p>
<p>Factors related to Effectiveness</p> <p><u>Categories:</u></p> <p>1) Questioning or supporting myths/fears about TFW programs</p> <p>2) Staff attitudes towards TFW program</p> <p>3) Staff experiences of quitting</p>	<p>Attitudes towards Myths/Fears about TFW programs can aid or hinder program adoption</p> <p>Staff acceptance of TTTF facilitated program success</p> <p>TTTF helped employees to quit/manage tobacco</p>	<p>1) But there were a lot of things that people predicted would happen that didn't happen. You know, that people would be smoking at respite or in the group homes. Most of the fears that we feared, we had no reason to fear. I mean it went so well. (<i>CEO, LMHA2</i>)</p> <p>1) I'll be honest, I feel intimidated to go up to people to tell them to stop smoking, that's one of my fears of going up to someone who's already having a really bad day and then setting them off and having a crisis situation or an aggressive situation...I'm not going to risk myself to tell him to stop smoking, personally...I don't know anyone else who does. (<i>Counselor, LMHA1</i>)</p> <p>2) I can't see where there would be any barriers coming forward to sustain it [tobacco-free program]... because everybody has bought into it, because it <i>IS</i> policy. It's part of (LMHA2) now and I believe that everybody has accepted that...This is <i>our</i> environment for (LMHA2) now. (<i>Program Director, LMHA2</i>))</p> <p>3) Because we're going to a non-smoking campus I thought, well, I guess I got to quit smoking. Because, I mean, if I'm not going to smoke at work when I'm stressed out I might as well just quit. And it seemed like it just got too complicated. I've got to plan my smoke breaks off campus and go somewhere where I can smoke and that's just too complicated! I don't need to smoke that bad! (<i>Counselor, LMHA2</i>)</p>
<p>Factors related to Adoption:</p>	<p>Site-specific contextual factors can either hinder</p>	<p>1) The facilitator is going to be the staff and to a large degree the staff that smoke, and I know this is hard but... staff to client – 'I'm going through this too.' I don't smoke on the grounds either anymore. So the facilitator to the</p>

<p><u>Categories:</u></p> <p>1) Contextual factors affecting program uptake (facilitators and barriers)</p> <p>2) TFW compliance</p> <p>3) Clinician views of tobacco cessation interventions</p>	<p>or aid program uptake</p> <p>Clinicians reported using novel practices compliant with TFW policy</p> <p>Clinicians reported benefits of using tobacco cessation interventions</p>	<p>largest degree is the staff. (<i>Program Director, smoker, LMHA2</i>)</p> <p>1) The support staff aren't trained in mental health and so they really shouldn't be the ones who are telling them [not to smoke]...And so, they don't say something when they're out there [smoking] and we don't say something. And so, yeah, even though we want to be smoke free, I don't feel like it's being addressed or enforced. [Barrier] (<i>Counselor, LMHA1</i>)</p> <p>2) Introducing mindfulness and those relaxed breathing skills...they really appreciated that and it's something they can take with them, and delaying the first cigarette too. A client told me, 'If I can delay that first one, just for one hour I'm not going to smoke, and then at the end of that hour, OK, just for another hour, I'm not going to smoke, then I can get to lunch [smoke-free].' (<i>Counselor, LMHA1</i>)</p> <p>3) I think the best thing we've done so far is implementing the [tobacco] assessment...We're asking the question now. It's not just 'Are you smoking?' It's 'Do you want to quit?' We're also giving them the opportunity and providing that assistance to quit if they request it. (<i>Program Manager, LMHA2</i>)</p>
<p>Factors related to Implementation</p> <p><u>Categories:</u></p> <p>1) Tailoring material/strategies</p> <p>2) Champion-initiated trainings</p> <p>3) Program fidelity (consistent with Implementation Guide (IG); website)</p>	<p>Program materials/ strategies tailored to staff suggestions for their center</p> <p>Champion's work load, and confidence-level limited implementing TTTF</p> <p>Staff shared faithfully implementing main TTTF components and use of TTTF's IG and website</p>	<p>1) My consumers, I go to their homes because they are 0 through 3 [years old]. So, their families, some of them are smokers...if there is a pamphlet that we could give them the education about it [smoking] ...because the consumer is the baby who's in danger. So we need to offer assistance to the parents who are putting the baby in that environment. (<i>Early childhood intervention specialist, LMHA2</i>)</p> <p>1) They [consumers] were really interested in how addiction effects the brain...and doing more group activities because the activities in the book are more individualized...what was most impactful to them was connecting with each other, having the common ground of being able to support each other. (<i>Counselor, LMHA1</i>)</p> <p>2) I don't feel prepared to lead staff trainings...and don't really have the time to set them up and keep them going. (<i>Champion, LMHA2</i>)</p> <p>3) We found it [website] really helpful...a lot of our stuff is based on Betty Hardwick and Dallas Metro Care. We looked a lot and picked out the positive messaging, especially for our policy. (<i>CEO, LMHA2</i>)</p> <p>3) There was some withdrawal symptoms on the website that we printed out that were really useful to give them to take with them...there is a column for withdrawal symptoms and then another column for coping skills. And so, you're going to be angry, you're going to be depressed, and you might be irritable and here are some skills that you can use for those. <i>Counselor, LMHA1</i>)</p>
<p>Factors related to Maintenance</p>	<p>Enabling uptake via</p> <p>adjustments to key initiatives</p>	<p>1) The prescribers do them [TUAs]. Every time they [clients] see a prescriber, they do an assessment with them...the issue we've had is the doctors, and not having the time of really being able to go over it more in depth. (<i>Counselor, LMHA1</i>)</p>

<u>Categories:</u>	delivery	2) The only thing I can foresee from a management point is just as we continue to grow and change we're going to have to be mindful not to forget and let it [TTTF] drop. Like already [5 months after implementation] we're seeing this dwindling...So I think we'll have to be continuously proactive on how we're going to, as the fire dies, ignite it over and over again so that we keep this awareness fresh and keep these services available. (<i>Anonymous, LMHA1</i>)
1) Functional delivery systems		
2) Attitudes towards sustaining program initiatives	While aware of challenges of sustaining TFW program, staff valued the initiatives	2) When you're interacting with a patient, instead of just saying 'Do you smoke? Yes, no, how much?' You go on to say 'Do you want some assistance quitting?' And we weren't doing that. We were just 'Do you smoke?' Check, check...And so we never knew whether they wanted help to quit or not...You got to take it to the next step....that is <u>so</u> important. (<i>CEO, LMHA2</i>)
3) Integration into organizational culture	To varying degrees, changes were seen in organizational culture in participating LMHAs	3) It's a change in the culture and I think that's the whole point of the program is to change the culture and how we see things and what the new normal is. Smoking has been the normal and this process is changing all of that, it's just going to take us a few months to get there. (<i>Program Manager, LMHA2</i>)

TFW = tobacco – free workplace; TTTF = Taking Texas Tobacco Free; LMHAs = local mental health authorities; CEO = chief executive officer; TUAs = tobacco use assessments; IG = Implementation Guide.

Adoption

Increases in *adoption* measures (TUAs conducted, EBPs provided, TFW policy compliance), were significant, with clinicians trained and conducting 13,659 (12,377 unduplicated) TUAs during implementation. Diverse NRT products (140.5 boxes) were delivered and distributed to clients and employees, which indicates people were making quit attempts. Qualitatively, staff attitudes towards enforcing the TFW policy served as both an implementation barrier and a facilitator. In LMHA1, staff apprehensions served as a barrier to full program implementation while at LMHA2, staff program support facilitated becoming tobacco-free. Clinicians at both LMHAs were enthusiastic about providing novel EBPs for tobacco cessation to clients, such as delaying gratification and reported their effectiveness in helping clients manage smoking. Likewise, clients reported that the smoking cessation groups had helped them to quit smoking: “And I've got these mints [NRT] which, you know, they really, really work...But without the group support, I wouldn't have been able to do it.” (Sandy, Client, LMHA1) Within one smoking cessation group at LMHA1, 2 out of the 3 participants (66.66%) reported quitting smoking. Counselors of other groups reported that many clients had reduced their smoking significantly. Clinicians reported compliance with implementing practices consistent with upholding the TFW policy such as the TUAs, described as a vital step in helping clients in quitting smoking.

Implementation

Regarding *implementation*, quantitative assessment of program fidelity indicated each LMHA had successfully implemented all major TTTF components as intended. Qualitative implementation factors

focused on staff and clients' suggested alterations to increase program fit to their center, and implementation consistency with the *Implementation Guide* (IG). Employees' suggestions led to the creation of various dissemination materials targeting their clients, including posters in Vietnamese, of young people and teens, and smokeless tobacco users, and information cards addressing the harms of ETS, especially on young children, and the hazards of smoking while pregnant. Employees reported consulting the website (www.takingtexasobaccofree.org) and the step-by-step IG and their usefulness in steering implementation efforts. Clients suggested adjustments to the smoking group curriculum, to reflect individuals in the preparation or action stage of change [67], rather than pre-contemplation: "It's [curriculum] geared towards smokers who haven't made the decision to stop smoking...but we have already made the decision to quit and that's why we signed up for the group" (Rick, Client, LMHA1)." Clients also asked for more group, rather than individual, smoking cessation materials and requested information on the neurobiology of nicotine addiction. We added these resources to the project website to address requests and improve implementation.

Maintenance

Regarding program *maintenance*, systems for monitoring and documenting TUA provision and NRT distribution were established, and modified where needed, to operate efficiently within each LMHA, and some tobacco education for new employees had been incorporated into annual trainings. Qualitative data indicate employees' general attitudes towards ongoing program maintenance between the two LMHAs varied. At LMHA1, the tobacco-free program was seen as having been implemented and then forgotten about; a project requiring periodic reviving, rather than being integrated into center culture. At LMHA2, employees reported integration of the program and program maintenance into the center to become part of organizational culture. Both LMHAs valued NRT as essential to helping their clients manage or quit smoking.

Areas in which program implementation were weak included: 1) lack of significant decrease over baseline of the number of employees using tobacco, as the distribution of smokers did not change significantly from pre- to post-implementation ($\chi^2 = 6.79$, $df = 3$, $p = 0.079$; and 2) lack of sustainability initiatives, i.e. neither LMHA provided champion-initiated trainings, or continued smoking cessation groups. Challenges reported by champions to providing in-house trainings included competing organizational duties and lacking confidence to lead such trainings.

Discussion

Study findings demonstrate that while implementation of program components was differential within and between LMHAs, TTTF's implementation was largely successful. Both LMHAs integrated tobacco cessation interventions and TUAs into routine practice, delivered evidence-based tobacco cessation interventions, recorded significant increases in clinician knowledge on how to address tobacco dependence, and dispensed NRT to clients. Although both LMHAs reported adopting a 100% TFW policy, comparison of quantitative and qualitative data indicate inconsistent policy implementation and enforcement between the two agencies. While LMHA2 adopted and enforced a 100% TFW policy, qualitative findings from staff focus

groups indicated LMHA1 staff inconsistently enforced the policy out of fear of provoking violent behavior from clients. Policy adoption without policy enforcement is limited.

As researchers have noted, clinician misconceptions regarding treating tobacco dependence within BHTCs serve as the strongest organizational barrier to successful implementation of tobacco cessation programs [26-28]. In applying what they learned in the TTTF trainings on treating tobacco dependence among BHCs, LMHA2 staff overcame their initial misconceptions and fears regarding addressing smoking among their clients to faithfully integrate TTTF into their organization. The overcoming of this fundamental barrier served as a catalyst allowing LMHA2 staff and leadership to incorporate effective clinician training on EBP's to treat tobacco dependence, value tobacco addiction as a serious problem, and establish and enforce tobacco-free policies – thus addressing the most commonly cited implementation barriers to tobacco cessation programs within BHTCs [2, 12, 23-25, 32]. Whereas at LMHA1, staff attitudes and misapprehensions regarding smoking and their BHCs persisted without change, resulting in partial program adoption due to lack of policy enforcement. Although TTTF team members continually attempted to correct these misconceptions by providing research evidence and prior program experience to the contrary, these erroneous beliefs continued unabated among LMHA1 staff. Qualitative data indicate the difference between attitudes at each LMHA towards TFW policy enforcement was largely influenced by program support, or lack thereof, of center leaders. The CEO of LMHA2 actively championed and remained abreast of program implementation, while LMHA1 center leadership adopted a hands-off approach, delegating implementation exclusively to managerial staff. Our findings are consistent with various studies citing the critical importance of support and direction from organizational leaders to successful program implementation [68-70].

Qualitative data from clinicians and clients at LMHA1 indicate greater success in clients quitting smoking than at LMHA2. Differences in client quit rates at each LMHA may likely be attributed to the provision, or lack, of smoking cessation groups, which have proven effective in helping BHC's to quit as part of comprehensive tobacco-free programs [25, 59, 60]. Although LMHA1 only held one series of smoking cessation groups, clinicians and clients reported that in one group alone, two out of the three group members (66.66%) quit smoking with support from peers and NRT. LMHA2 did not provide any smoking cessation groups. At LMHA1, clinicians were enthusiastic, engaged and supportive in assisting clients in the smoking cessation groups, and clients attributed their success in quitting to the support they received from them. While staff at both LMHAs valued the provision of smoking cessation groups, their main obstacle was organizational, as neither operated in the evening or offered after-hours services, when clients were available for evening sessions.

Study findings on each of our individual program components is consistent with prior research supporting the effectiveness of TFW policies in reducing tobacco use [71, 72]; TUAs in increasing quit attempts [2]; EBPs in treating tobacco dependence [10, 73]; and increasing cessation services provided by training clinicians on treating tobacco dependence [24, 74]. Moreover, as a comprehensive organization-wide TFW program, TTTF's multicomponent model proved effective in addressing the many challenges influencing successful program implementation [25, 30] and affecting organizational change. Implementation scientists have stressed the importance of differentiating between core *intervention* components, and core

implementation components, i.e., the core implementation drivers required to implement intervention components, such as coaching or training [75].

Employing a mixed methods design allowed key program stakeholders to participate collaboratively via qualitative methods to shape core intervention components to their needs, and researchers to understand context-specific implementation facilitators, barriers and processes at individual LMHAs. Improving systems, organizational and community fit of intervention components enhanced core implementation components and addressed implementation challenges more effectively. Use of mixed methods also facilitated implementation by providing information on which intervention components were successfully adopted (or not), by whom, and why (or why not), expanding our understanding of what core implementation components need further development.

Identified areas of weakness in program implementation on the RE-AIM dimensions included: 1) absence of champion-initiated trainings (implementation); 2) inability to provide routine smoking cessation groups (adoption); and 3) continuing tobacco education – i.e., challenges integrating tobacco education into new employee orientation and training (maintenance). Although these components are on the clinician, systems, and organizational levels, the organization primarily determines them, as ultimately, they are due to prioritization of resources.

While champions' stewardship was vital in overseeing and organizing program implementation and maintenance efforts, neither took the next step to initiate any trainings in their LMHAs. Other studies support the importance of champions in leading successful implementation [76]. Champions reported competing duties and demands on their time and uncertainty in their ability to lead such trainings, as the main obstacles to providing in-house trainings. As both program champions reported similar challenges to providing and leading continuing tobacco education efforts, this indicates an area of needed improvement to the TTTF program, i.e., greater support and resources, such as train-the-trainer courses, to meet this implementation goal to ensure sustainability. Our future implementation programs will seek to address how to provide champions with the additional resources needed to transition from being managers to leaders of organizational change.

There are several limitations to this study. Some focus group participants may have had a stake in over-reporting program success. To diminish the potential for social desirability bias in the qualitative data, we intentionally included program sympathizers and detractors to get a more accurate picture of implementation, inquired about – and encouraged participants to share – negative and positive experiences, and used varied qualitative data collection methods, triangulating across data sources to ensure rigor [65, 77]. Given the central role of context to successful implementation and the attention placed on this factor within this study, study findings are not necessarily applicable to other settings and populations. Our aim however, was not generalizability of findings; rather on the contrary, we sought to demonstrate and describe how we identified and responded to the needs of individual clinics to enhance program fit and implementation. Limitations for quantitative data included that not all surveyed stakeholders participated in data collection, despite solicitation, and inability to match pre-and post-data at participant-level. Also, as

previously mentioned, client-level quantitative data on quit attempts among clients was not collected for comparison to qualitative reports.

Conclusions

Implementation of TTTF at both LMHAs increased organizational capacity in the provision of EBPs to treat tobacco use and dependence through successfully meeting the majority of our RE-AIM targets. Adopting a mixed methods approach enhanced TTTF program implementation, which allowed us to conduct a formative evaluation process to adapt implementation strategies to local contexts; evaluate program outcomes; and characterize processes influencing program implementation in two LMHAs (17 clinics). Mixing methods also involved program adopters and recipients as collaborators who directly influenced implementation by shaping core interventions to their individual context and needs, facilitating uptake. The collaboration of such key stakeholders was vital to enhancing program buy-in, adapting delivery systems, program content and materials, and ensuring maintenance; and alerted us to needed improvements in core implementation components. Study findings suggest that successful implementation of multilevel, evidence-based tobacco interventions requires an in-depth understanding of the implementation culture at the level of the clinician, client, organization, and community level, to better address barriers and support facilitators.

Study findings contribute to the development of flexible strategies and tailored interventions responsive to real-world conditions in diverse settings, which are better equipped to address implementation barriers. The need to address tobacco dependence among BHCs is imperative. This evaluation of the TTTF program presents a successful model for the implementation of an effective and sustainable evidence-based, TFW program in community organizations interested in becoming tobacco-free.

Declarations

Availability of data and materials

The datasets supporting the findings of this study are available, on reasonable request, from the corresponding author, Dr. Lorraine Reitzel at: Lrreitzel@uh.edu. Program materials are available online at our project website: www.takingtexastobaccofree.com.

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Author's Contributions

IML conceived of the study, collected, oversaw and contributed to qualitative data analysis, and wrote the manuscript. BK managed the project and collected quantitative data. TAC conducted quantitative data analysis, under the direction and assistance of DPO, and both edited the manuscript. KL assisted with quantitative data management. VCF edited and provided direction for writing up the manuscript, and along with BK, conducted staff and clinicians trainings. BK oversaw program implementation, and VCF and TW contributed to program implementation. LRR obtained funding to support this project, served as project director along with WTW, and lead the design and implementation of the program, and contributed to writing the manuscript. All authors read and approved the final manuscript.

Ethics Declarations

Ethics approval and consent to participate

This study was approved by the Institutional Review Board of the University of Houston (Study: 16541-EX (8506), approved, 07/13/2016; additional modifications approved 08/19/16). All participants provided oral or written consents.

Consent for publication

Not applicable.

Competing interests

The authors have no competing interests to declare.

Abbreviations

BHTCs: Behavioral health treatment centers

TTTF: Taking Texas Tobacco Free

NRT: Nicotine replacement therapy

RE-AIM: Reach, effectiveness, adoption, implementation, maintenance

BHCs: Behavioral health conditions

EBPs: Evidence-based practices

TFW: Tobacco-free workplace

LMHAs: Local mental health authorities

TUA: Tobacco-use assessments

CEOs: Chief executive officers

ETS: Environmental tobacco smoke

MI: Motivational interviewing

ORIC: Organizational Readiness to Implement Change

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Figures

Figure 1

Mixed Methods Program Development and Evaluation Design of Taking Texas Tobacco Free (TTTF)

1. Williams JM, Miskimen T, Minsky S, Cooperman NA, Miller M, Dooley Budsock P, et al. Increasing tobacco dependence treatment through continuing education training for behavioral health professionals. *Psychiatric Services*. 2014;66(1):21-6.

Figure 2

Major Components of Taking Texas Tobacco Free and barriers targeted at behavioral health centers