Using a Learning Collaborative Model to Disseminate Cognitive Processing Therapy to Community-Based Agencies

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Although effective treatments for posttraumatic stress disorder exist, their use in community settings is disappointingly low. Training alone does not necessarily lead to adoption. To address this problem, we trained community clinicians in cognitive processing therapy, an evidence-based treatment for posttraumatic stress disorder, using a Learning Collaborative, an intensive training methodology focused on both clinical training and developing sustainability. Sixty clinicians within 18 agencies began the year-long, team-based Learning Collaborative. Clinicians attended three in-person Learning Sessions, received weekly consultation, and submitted audio-recorded sessions to be rated for fidelity. Clinicians were rostered as approved treatment providers if they completed all training requirements. Additionally, we engaged leadership from each agency to build a sustainable practice. Clinicians trained through the Learning Collaborative demonstrated a high degree of fidelity to the treatment (average competence ratings "satisfactory" to "good"), and most (68%) were rostered as approved treatment providers. Patients treated by clinician trainees exhibited significant symptom reductions ($d = 1.68$ and 1.28 for posttraumatic stress and depression symptoms, respectively, among treatment completers). At a 6-month follow-up, 95% of rostered clinicians and 100% of agencies with rostered clinicians were still providing the treatment. These results suggest that the Learning Collaborative model is a promising approach for the dissemination and implementation of evidence-based treatments for adult posttraumatic stress disorder.

EFFECTIVE TREATMENTS FOR POSTTRAUMATIC STRESS DISORDER (PTSD) exist, but their use in community settings is disappointingly low (Becker, Zayfert, & Anderson, 2004; Foa, Gillihan, & Bryant, 2013; Jameson, Chambless, & Blank, 2009). Even when clinicians receive training in evidence-based treatments (EBTs), it does not necessarily lead to adoption. Training, even accompanied by consultation, is insufficient to change clinical practices (Nadeem, Olin, Hill, Hoagwood, & Horwitz, 2013); changing a clinician's routine is unlikely without assistance translating the new treatment into practice (Bauer, Damschroder, Hagedorn, Smith, & Kilbourne, 2015). Barriers to successful implementation may occur at any number of levels, including at the policy, system/organization, clinician, or patient level. For example, at the clinician level, implementation may be limited due to lack of knowledge or skill in an EBT or negative attitudes towards an EBT (Karlin & Cross, 2014). At the system level, insufficient resources/staffing or an organizational culture that is inconsistent with the EBT can limit implementation (Karlin & Cross, 2014), whereas organizational support (e.g., time and resource allocation) can be a strong predictor of EBT use (Rosen et al., 2016). Training at the clinician level without support of the local system may be insufficient for implementation or sustained fidelity (Karlin & Cross, 2014).

One highly effective EBT for PTSD that many providers have been trained in is cognitive processing therapy (CPT; Resick, Monson, & Chard, 2017). Traditionally, training in CPT has been provided using a *workshop only* model or a *workshop plus consultation* model, both of which primarily target clinician knowledge and competency in the treatment. The *workshop only* model involves a one-time training workshop spanning 2 to 3 days. Subsequently, some clinicians participate in clinical consultation (i.e., weekly calls for about 6 months with a CPT expert to receive guidance in delivery of the therapy; *workshop plus consultation* model). Consultation is required for "rostering" as an approved Provider, which means that a clinician has completed competency-based training including completion of training cases. Rostering in CPT is offered in the community and in the Department of Veterans Affairs (VA), and those who meet requirements are listed on an internal (VA) or public (community) roster. The *workshop plus consultation* model provides a high level of training, focusing on clinician mastery by offering close support on

training cases. However, even the *workshop plus consultation* model has led to suboptimal adherence and sustainability outcomes including reductions in use of the treatment and drift from the protocol over time (e.g., Finley et al., 2015; Rosen et al., 2017).

The VA has prioritized training in EBTs for PTSD and used the *workshop plus consultation* model to provide system-wide training in CPT as well as another EBT for PTSD, prolonged exposure (PE; Foa, Hembree, & Rothbaum, 2007; Karlin et al., 2010). In a recent study on the sustainability of PE among VA providers trained with the *workshop plus consultation* model, 77% of clinicians were still using PE at 6 months, and 70% were using PE 18 months posttraining (Rosen et al., 2017). While still promising, these data indicate that use declines over time, even for those who achieve mastery in the treatment. More troubling, many providers who report using EBTs are delivering treatment with poor fidelity, resulting in a diluted version of the therapy that may not be as effective. In one study of VA providers, only 52% of clinicians reported adhering to the CPT protocol "very often" (Finley et al., 2015). Thus, even providers who report using EBTs may not be delivering them as trained. Taken together, these results indicate that even when the *workshop plus consultation* model is used, there are reductions over time in the consistent use of treatment. Thus, a more intensive training approach focusing on clinician mastery plus implementation may be needed to enhance training outcomes.

THE LEARNING COLLABORATIVE MODEL: A NEW APPROACH TO TRAINING CPT

Various strategies have been developed to address implementation barriers at one or more levels (Tabak, Khoong, Chambers, & Brownson, 2012). One training methodology that addresses barriers at multiple levels (e.g., clinician level, organization level) is the Learning Collaborative (LC). The LC model was adapted from Quality Improvement Collaborative models used in medical settings (Nadeem, Olin, Hill, Hoagwood, & Horwitz, 2014; Schouten, Hulscher, van Everdingen, Huijsman, & Grol, 2008). The LC is an intensive approach that aims to disseminate best practices into diverse settings while fostering important implementation outcomes like sustainability (National Center for Child Traumatic Stress, 2007). Whereas traditional training models (i.e., *workshop only* or *workshop plus consultation*) focus on clinician-level training with little to no intervention at the organizational level, the LC model engages the organization (e.g., agency or clinic) in the change process and emphasizes building capacity for the intervention and

addressing implementation barriers (Nadeem et al., 2013).

Key differences between traditional training and the LC model include the following additions: (a) team-based training, led by a senior leader with administrative authority, (b) multiple, face-to-face Learning Sessions separated by supported action periods, (c) expert assistance building organizational capacity and implementing the treatment into a specific practice setting, and (d) an emphasis on fostering sustainability of the treatment (see Figure 1 for an overview of our LC). By building organizational capacity; creating an interorganizational network through which implementation sites can share experiences, challenges, and successes; and addressing organization- and clinician-level barriers to implementation, the LC aims to support implementation and foster sustainability of the intervention (Nadeem et al., 2013).

PRIOR USE OF THE LC MODEL

LCs have been used extensively in the medical field (Schouten et al., 2008), and, more recently, they have been used to disseminate behavioral health interventions. Two LCs have focused on trauma-focused cognitive behavioral therapy (TF-CBT; a trauma treatment for children and adolescents; Cohen, Mannarino, & Deblinger, 2016; Ebert, Amaya-Jackson, Markiewicz, Kisiel, & Fairbank, 2012; Lang, Franks, Epstein, Stover, & Oliver, 2015). In the first study (Ebert et al., 2012), TF-CBT use increased by two-thirds over the course of the LC, and 1 year later, all agencies were still providing TF-CBT. Most had increased their service capacity and continued to offer model-specific supervision and monitor treatment fidelity. In the second study (Lang et al., 2015), all agencies were successful in implementing TF-CBT with a high degree of fidelity during training and expressed confidence in continuing to do so. Furthermore, patients receiving TF-CBT experienced significant decreases in PTSD and depression symptoms with results comparable to those found in clinical trials.

In a randomized controlled trial (RCT), Brown et al. (2014) compared an LC to a less intensive implementation strategy to train providers in multidimensional treatment foster care (an intervention targeting child mental health, relationships, and child placement permanency; Chamberlain, 2003). The LC did not produce better implementation rates or more rapid uptake, but once initiated, those in the LC condition served more than twice as many patients.

To our knowledge, no LC has been completed to train community providers in CPT. Therefore, our goal was to describe and report the outcomes from a community-based CPT LC.

Material and Methods

PARTICIPANTS

Eighteen agencies/practices enrolled in the LC. Across agencies, a total of 60 clinicians began the LC. A senior leader led each team. Teams ranged in size from one to seven members; five providers participated as individuals and served in both senior leader and clinician roles. Of multi-person teams, the modal size was five members. Thirteen participants (including the five single participants) served dual roles as clinician and senior leader. The geographic setting of the agencies spanned 11 diverse counties and was 50% urban/metro, 28% rural, and 22% suburban. Agencies/practices ranged in size from 1 to 270 (Median = 12) staff members. Most agencies (72.2%) were not yet offering CPT, though most (94.4%) had experience with EBTs.

Clinician Trainees
Clinicians were mostly female (83.3%) and mostly master's-level educated (86.7%) as clinical social workers or professional counselors. Eight (13.3%) held doctoral degrees. Clinicians varied in experience with individual, adult treatment: 39.2% had 0–5 years, 35.3% had 6–10 years, and 25.5% had more than 10 years of experience.

Patients
Patients were recruited by clinician trainees at their practice sites. Clinicians were required to complete CPT with two patients to be rostered as approved CPT Providers; however, clinicians were encouraged to enroll more patients to account for potential dropout. Clinicians were taught to screen for CPT-

| Planning & Project Launch:
 ▪ Stakeholder meeting
 ▪ Recruitment of teams
 ▪ Project launch call | Learning Session 1 | 4 months *Action Period* | Learning Session 2 | 4 months *Action Period* | Learning Session 3 | *Action Period* | Rostering & Project Close |

Action Periods:
▪ Weekly consultation calls
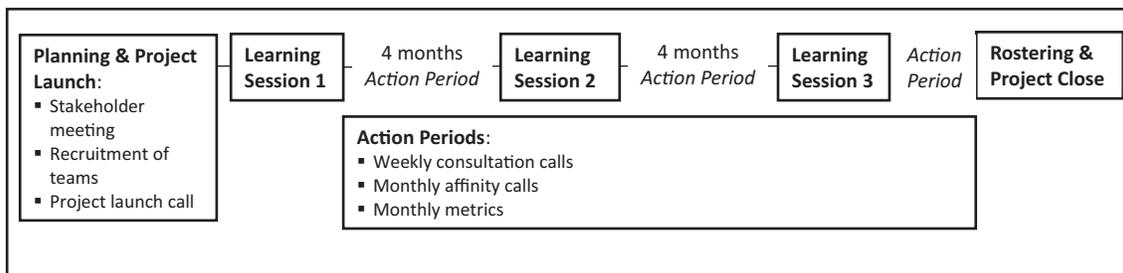▪ Monthly affinity calls
▪ Monthly metrics

FIGURE 1   Overview of the Learning Collaborative

appropriate patients, including identifying traumatic events meeting criteria according to the *Diagnostic and Statistical Manual of Mental Disorders— Fifth Edition* (DSM-5; American Psychiatric Association, 2013); administering a PTSD symptom assessment (PTSD Checklist for DSM-5 [PCL-5]; see "Measures"); and verifying patient willingness to engage in weekly treatment and complete between-session practice. For enrollment in CPT, patients needed to have significant PTSD symptoms as evidenced by a score of 33 or above on the PCL-5, although exceptions were sometimes made for subthreshold cases who were otherwise deemed a good fit for CPT after discussion with the clinical consultant. The few exclusions to patient enrollment were based on the state of the evidence for PTSD treatment: Patients could be neither actively suicidal or homicidal, nor currently experiencing a manic or psychotic episode. Substance use, suicidal ideation, and personality disorders were not exclusionary because these comorbid conditions are common and not contraindicated for treatment. Use of psychotropic medications was also not exclusionary. Most commonly, clinicians enrolled CPT patients as new cases were assessed as part of clinic intake procedures, but they could also enroll patients who were already on their caseloads and appropriate for CPT as described above. All cases were screened and enrolled by the clinician with the approval of their clinical consultant.

A total of 242 patients were enrolled in and completed at least one session of CPT. Patients were mostly female (72.8%), with a mean age of 36.0 years (SD = 12.9). Patients were mostly married (44.5%) or single (36.1%); 11.0% were divorced, 6.8% were separated, and 1.6% were widowed. Most were high school graduates (33.9%) or completed some college (32.3%); 18.5% did not complete high school, 11.6% were college graduates, and 3.7% completed at least some graduate school. Racial makeup was 63.4% White, 28.3% Black or African American, 7.9% "other" race, 2.1% American Indian or Alaskan Native, and 0.5% Asian (clinicians reported all that applied so total may exceed 100); 11.6% of patients were Hispanic. Clinicians provided information on patients' comorbid conditions including presence or absence of any type of "depression," "anxiety disorder," "substance use disorder," or "other" mental health condition. These comorbidities were based on clinician diagnosis or clinician review of patient chart. Ninety-seven percent of patients had at least one comorbidity; 31% had two, and 6% had three or more. The most commonly reported comorbid condition was depression (80.2%), followed by anxiety disorder (32.6%), substance use disorder (13.4%), and "other" condition (14.4%; e.g., borderline personality disorder,

bipolar disorder, psychotic spectrum disorder). Regarding types of trauma that were identified as the primary index trauma for treatment, 33% of patients were victims of violence/abuse, 30% experienced nonmilitary sexual trauma, 13% experienced combat trauma, 4% experienced a nonvehicular accident, 4% were in a car accident, 4% experienced military sexual trauma, 1% experienced another military trauma, 1% experienced a natural disaster, and 11% experienced another type of trauma (typically witnessing or learning about a family member's experience of one of the above-mentioned events).

MEASURES
Monthly Metrics
Senior leaders completed online surveys reporting on past-month implementation efforts at their site, specifically: "In the last month, how many clients in your agency have been… Diagnosed with PTSD? Informed of CPT treatment? Enrolled in CPT?"

Clinician Fidelity
Consultants rated clinicians' fidelity based on review of audio-recorded sessions using the CPT Therapist Adherence and Competence Protocol Individual Version—Revised (Macdonald, Wiltsey-Stirman, Wachen, & Resick, unpublished). A previous study found support for the measure's interrater reliability, internal reliability, and content validity (Dittmann et al., 2017). Based on the recommendation of the CPT treatment developer, three specific sessions (Sessions 1, 4, and 12/final) were selected for review to provide a thorough representation of clinicians' skills. In Session 1, clinicians demonstrated their ability to provide psychoeducation and present the treatment rationale. In Session 4, clinicians demonstrated their ability to use Socratic questioning to challenge maladaptive beliefs. In the final treatment session, they demonstrated their ability to review patient progress and conclude therapy. Ratings were completed for adherence (i.e., whether essential session elements were present or absent) and competence (i.e., the clinician's skill in delivering the essential elements; rated 0 to 5). A session was considered to "pass" fidelity if the average competence rating across essential session elements was 3 or higher, corresponding to "satisfactory" or better delivery.

Patient Measures
Clinicians were trained to administer measures to assess patient appropriateness for CPT and monitor treatment progress.

Life Events Checklist for DSM-5 (LEC-5). The LEC-5 (Weathers et al., 2013a) assessed patients' exposure to 16 potentially traumatic events. The

event identified as most bothersome became the focus of treatment. This measure was administered once prior to initiating CPT.

PTSD Checklist for DSM-5 (PCL-5). The PCL-5 (Weathers et al., 2013b) is a 20-item, self-report measure that assesses the degree to which the patient has been bothered by DSM-5 PTSD symptoms on a scale from 0 (*not at all*) to 4 (*extremely*). The PCL-5 has demonstrated good internal consistency, test-retest reliability, and convergent and discriminant validity (Bovin et al., 2016). The past-month version was used to determine whether patients met diagnostic criteria for PTSD, and the past-week version was used during treatment to assess progress.

Patient Health Questionnaire-9. The PHQ-9 (Kroencke, Spitzer, & Williams, 2001) is a 9-item, self-report measure that was administered weekly to assess how often patients were bothered by depressive symptoms on a scale from 0 (*not at all*) to 3 (*nearly every day*). The PHQ-9 has demonstrated good internal and test-retest reliability (Kroencke et al., 2001).

Six-Month Clinician Follow-Up Survey
Six months after the completion of the LC, all clinicians were recontacted and asked to complete a brief survey regarding their ongoing use of CPT. Clinicians responded to questions about ongoing use (yes/no) of CPT, the PCL-5, and CPT supervision ("Since you ended CPT consultation, have you continued to use CPT?" "If you have continued to use CPT, do you continue to have your patients complete the PCL-5?" "Do you continue to have any regular supervision or peer consultation specifically focused on CPT?"). Clinicians were asked about the frequency of use of the PCL-5 (e.g., *screening/diagnosis only*; *pre-, mid-, and post-treatment*; *weekly*; etc.). Clinicians were also asked "Since ending treatment, how many clients have you… Diagnosed with clinically significant PTSD symptoms? Offered CPT to? Completed at least one session of CPT with?" Finally, clinicians were asked, "Since ending CPT consultation, how many clients… Have you completed a course of CPT with? Have dropped out of CPT treatment with you? Are currently in CPT treatment with you?"

PROCEDURE
Planning and Project Launch
This project was reviewed by the Duke University Health System Institutional Review Board and determined to be exempt from further oversight. The project began with an expert panel meeting

with community stakeholders to assess demand for community-based training in CPT, identify existing capacity to deliver treatment, foster support from likely referral channels, and identify targets for improvement. We then invited community providers to apply to participate in the LC, advertising through the expert panel, professional associations, managed care organizations, community agencies, and clinical training programs. We encouraged agencies to develop small teams to apply; however, we also accepted individual providers. A "launch call" was conducted to welcome and introduce the LC participants to one another and to provide information about the training methodology and next steps before the first in-person training. See Figure 1 and Table 1 for more information on the training program.

Learning Sessions
Participants attended three in-person Learning Sessions that occurred at approximately 4-month intervals. Pre-work was assigned prior to the first Learning Session to prepare teams with a common knowledge base. Clinicians completed an online CPT training (the Medical University of South Carolina's CPT web course; www.cpt.musc.edu/). Clinicians also completed an online military culture training to meet the needs of military-affiliated patients. Each senior leader was responsible for completing an organizational readiness assessment developed by the expert panel and outlining the success criteria for implementing CPT (e.g., outreach to enroll PTSD patients, standardized measures to assess PTSD, procedures to promote sustained use of CPT). The readiness assessment was revisited at Learning Session 1 and 2 and used as formative evaluation for teams to identify areas where they had successfully taken steps to implement CPT versus areas where they needed to increase their efforts.

Action Periods
Each Learning Session was followed by an action period during which teams worked to implement CPT with the support of the training team (see Table 2 for more details on project roles). Clinicians assessed, enrolled, and treated patients with PTSD while receiving weekly clinical consultation. In addition, monthly affinity calls were held (separate calls for clinicians and senior leaders). Monthly metrics were collected from each team and summarized by the training staff to use as part of formative evaluation to provide feedback and identify areas for improvement (e.g., low transfer from offering treatment to enrollment might lead to discussion on engagement strategies). Teams and training staff communicated regularly through

Table 1
Learning Collaborative Activities

Learning Sessions	
Learning Session 1 (2-day, in-person training)	▪ CPT training workshop for clinicians and senior leaders ▪ Teams created "elevator speeches" to use to communicate within and outside their agencies about their new treatment service

Learning Session 2
  (1-day, in-person training)
	▪ Focused on development of advanced CPT skills for clinicians
	  ○ Group-based practice of Socratic Questioning
	  ○ Option to learn group-administered CPT to increase services or participate in break-out sessions on other advanced topics
	▪ Sharing of implementation challenges and successes

Learning Session 3 (1-day, in-person training)	▪ Focused on developing long-term CPT sustainability, including reviewing essential treatment ingredients and acceptable modifications for ongoing practice ▪ Clinicians and senior leaders conducted "mini-sessions" to teach-back products and processes that facilitated implementation of CPT in their agencies ▪ Community partners attended as part of a "community connections" activity to foster state and local partnerships and increase CPT referral channels ▪ Clinicians and senior leaders participated in focus groups to provide feedback on the training process
Action Periods	
Cross-Site Monthly Clinical **Affinity Calls**	▪ Facilitated by the lead consultants and attended by all clinicians ▪ Designed to enhance CPT knowledge and facilitate discussion on challenges and successes in delivering CPT
Cross-Site Monthly Senior **Leader Calls**	▪ Facilitated by the improvement advisor and attended by all senior leaders ▪ Focused on each agency's implementation efforts (e.g., reviewing metrics related to patient screening, referral, and enrollment), improvement experiences (e.g., expanding the CPT referral base), and strategies to build organizational capacity (e.g., making changes within the agency to accommodate the new practice)
Monthly Metrics	▪ Senior leaders provided reports on their agency's rates of screening for CPT-appropriate cases, offering CPT to patients, and enrolling patients in CPT, as well as implementation challenges and successes, which were then discussed on affinity calls
Weekly Clinical **Consultation Calls**	▪ Consultation groups consisted of one CPT consultant and five clinicians from two or more agencies ▪ During calls, consultants collected data from clinicians about their progress using the CPT protocol and session-by session patient symptom scores ▪ Early consultation included didactics and responding to clinician questions about CPT; as consultation progressed, clinicians became more active in discussing case conceptualizations and therapeutic approaches ▪ Consultants helped clinicians problem-solve organizational barriers to CPT delivery

a shared online workspace (Sakai) that included discussion boards and shared resources.

Fidelity Review
During action periods, clinicians submitted audio recordings to be rated for fidelity. All clinicians were asked to submit recordings to obtain a higher level of rostering (Quality-Rated Provider status), but recordings were not required for basic CPT Provider status. Clinicians chose which audio to submit (sessions across different patients were acceptable). Immediately following rating of an audio recording, clinicians received detailed feedback from their consultant on strengths and weaknesses of their session, including elements necessary for fidelity that were not completed satisfactorily. If a clinician did not pass fidelity, he or she could submit another recording for that session from another patient.

Rostering
Clinicians who completed all training requirements were eligible to be listed as approved CPT Providers on the CPT Provider Roster (www.cptforptsd.com/cpt-provider-roster/). Two levels of rostering were offered, each requiring fidelity to the model. The traditional Provider level could be achieved if a

clinician completed two training cases (discussed on consultation calls and approved by their consultant as being delivered with fidelity to the model) and attended at least 75% of weekly consultation calls for at least 6 months. Quality-Rated Provider status could be achieved if clinicians completed all the requirements for Provider status and passed fidelity on audio recordings of Sessions 1, 4, and 12/final. Following the first Learning Session, clinicians had up to 9 months to complete training requirements.

Six-Month Follow-Up
Six months after the conclusion of the LC, we recontacted each clinician via e-mail requesting that they complete a brief, de-identified survey about their ongoing use of CPT, the PCL-5, and peer consultation/supervision related to CPT. Up to three follow-up e-mail requests were sent to those who had not completed the survey.

STATISTICAL ANALYSES
Descriptive statistics were used to evaluate training completion rates, rostering outcomes, treatment fidelity, number of patients seen, and usage of CPT

Table 2
Project Staff, Stakeholder, and Trainee Roles

Role	Primary Responsibilities	Role in Supporting Implementation and Sustainability
Project Staff	***CPT Developer and Trainer***: Provided CPT training at Learning Session 1, developed training materials for clinical affinity calls and Learning Sessions 2 and 3.	
	Lead Clinical Consultants: Two consultants provided weekly clinical consultation, assessed treatment fidelity, developed training materials for clinical affinity calls and Learning Sessions 2 and 3, and managed rostering.	Consultation calls included discussion of organizational barriers (e.g., educating peers on CPT, incorporating assessment of treatment progress into practice). As necessary, the consultants made site visits or had individual calls with providers to overcome obstacles to implementation.
	Adjunct Clinical Consultants: Three consultants provided additional clinical consultation and assessed fidelity.	
	Implementation Advisor: Worked with senior leaders at Learning Sessions and on affinity calls to build a CPT referral base, create outreach materials, establish community partnerships, problem-solve barriers to implementation, and review implementation metrics.	The implementation advisor was the key staff member responsible for supporting implementation and sustainability. This individual worked with each team to build capacity, address barriers, and develop strategies to foster sustainability.
Stakeholders	Prior to project launch, a day-long expert panel meeting of ~50 stakeholders was convened to assess demand for training in CPT, identify existing capacity to deliver treatment, and foster support from likely referral channels. Stakeholders represented state and local government; veteran service organizations; and mental health professionals from university, VA, and community settings.	Stakeholders provided referrals and educated their colleagues on the new service available within the local participating agencies. They also identified targets for improvement and developed the organizational readiness assessment.
Senior Leaders	Each team was led by a senior leader who had administrative authority within the agency to make relevant changes. Their role was to build organizational capacity and ensure that clinicians had the necessary resources to implement the treatment (e.g., dedicated training time, a CPT caseload).	Senior leaders were instrumental in supporting the practice within the agency including making structural changes as needed (e.g., altering intake processes, educating staff, ensuring availability of resources).
Clinicians	One to five clinicians participated from each agency to receive training and consultation in CPT.	Clinicians incorporated the treatment into practice and worked with their consultant and senior leader to address barriers.

at the 6-month follow-up. Rates of informing of/offering and enrolling patients in CPT were obtained at the agency level during training and at the clinician level at the 6-month follow-up. Penetration rates were calculated by dividing the number patients informed of/offered CPT by the number of patients diagnosed with PTSD (inform rate/offer rate) and the number of patients enrolled in CPT by the number of patients diagnosed with PTSD (enroll rate). To evaluate whether there were changes in penetration rates during training, we used Hierarchical Linear Modeling (HLM; Raudenbush & Bryk, 2002), which employs maximum likelihood estimation. HLM is accommodating of missing data and useful for analyzing data with a nested structure. We also used HLM to examine symptom change for patients nested within therapists nested within agencies.

Results

TRAINING OUTCOMES

Penetration Rates During Training

To examine the amount of variability between agencies in penetration rates, a 2-level unconditional model was specified with penetration rate (Level 1)

nested within agency (Level 2). First, inform rate was selected as the Level 1 outcome with no predictors added to the model. Results indicated that between-agency differences contributed a significant proportion of variability (intraclass correlation [ICC] = .6772; variance component = 0.02, $p < .001$) with additional variability within-agencies (ICC = .3228; variance component = 0.01). When enroll rate was set as the outcome, between-agency differences again contributed a significant proportion of variability (ICC = .2998; variance component = 0.04, $p = .005$), though most variability was within-agency (ICC = .7002; variance component = 0.09).

Next, inform rate was specified as the outcome, and assessment number (i.e., first assessment, second assessment, etc.) was added as a Level-1 predictor (transformed so the intercept reflects the first assessment) to examine changes in inform rate over the course of training. Both intercepts and slopes were allowed to randomly vary by agency. The average baseline inform rate was 0.93, indicating that, at the first assessment point, 93% of patients with PTSD were informed of CPT as a treatment option. There was no significant effect of time ($\beta_{10} =$

0.00, SE = 0.03, p = .90), indicating no change in inform rate over the course of training.

An analogous model was run for enroll rate, and the same pattern of results emerged. The average baseline enroll rate was 0.68, indicating that, at the first assessment 68% of patients with PTSD were enrolled in CPT. Again, there was no significant effect of time (β_{10} = -0.04, SE = 0.05, p = .43), indicating no change in enroll rate over the course of training.

Training Completion

Forty-four of the original 60 clinicians (73%) completed the LC. The other 16 clinicians dropped out or were removed. Two clinicians initially serving in dual roles of clinician and senior leader were unable to complete the clinical training component but continued in the senior leader role. Earlier in the LC, reasons for dropout were primarily competing obligations and insufficient time to devote to training. Later, clinicians dropped out or were removed by the training staff for attending an insufficient number of consultation calls or because they could not complete the two required training cases within the project timeframe.

Fidelity

Of the 60 clinicians who began the LC, 48 (80%) submitted recordings, with a mean of 3.1 recordings submitted per clinician. Results of the fidelity review indicated that clinicians were generally adherent to the protocol, passing fidelity in 78.2% of sessions. Necessary session elements were present 95% of the time. The mean competence rating was 3.3 on a 5-point scale, reflecting "satisfactory" to "good" skill in delivering session elements.

Rostering

Of the 44 clinicians who completed the LC, 41 met requirements for rostering (93% of LC completers; 68% of all LC initiators). Most of these (n = 30; 79%) met requirements at the higher, Quality-Rated Provider level (see Figure 2). Among clinicians who met rostering requirements, the mean percentage of consultation calls attended was 90.76% (SD = 7.52) and the mean number of calls attended was 21.32 (SD = 4.12), surpassing the requirement of at least 75% of calls for 6 months. Across all clinicians, the mean percentage of calls attended was 83.30% (SD = 19.95), with a mean total of 19.13 (SD = 6.96) calls.

PATIENT OUTCOMES

Patients Seen

Across all clinicians who began the LC, 242 patients initiated treatment (i.e., completed at least one CPT session). Ten of these remained in treatment at the end of the LC and are excluded from subsequent analyses. Of the other 232 patients, 109 (47%) completed treatment. For training purposes, treatment completion was defined as completing a planned final session at which the final CPT content was delivered (e.g., review final impact statement, discuss the course of treatment). The mean number of patients initiated by clinicians was 4 (SD = 3.0), and the mean number completed was 1.8 (SD = 1.4). Among the clinicians who met rostering requirements, the mean number of patients initiated was 5.1 (SD = 2.8), and the mean number completed was 2.5 (SD = 1.2), suggesting that to complete two training cases, clinicians needed to initiate about five cases to account for dropout in community mental health settings.
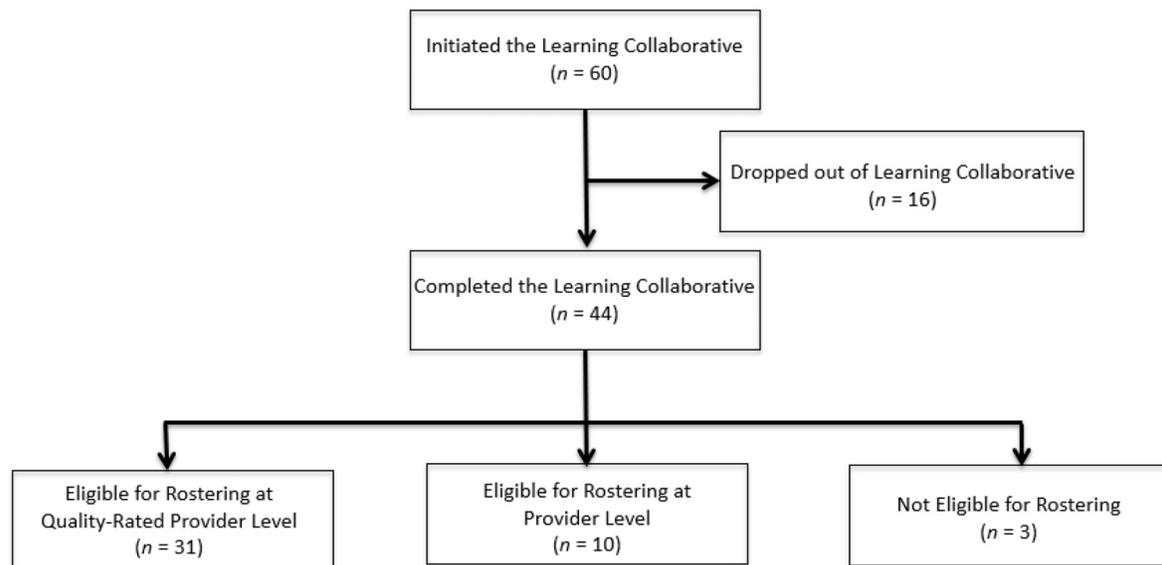

FIGURE 2 Overview of Learning Collaborative enrollment and completion.

Patient Treatment Outcomes

Across treatment initiators (completed and noncompleted cases), the mean decrease in PTSD symptoms from pre- to posttreatment (or last value reported) was 21.53 points (SD = 22.61; range -31 to 72; pretreatment: M = 51.61, SD = 13.66; posttreatment: M = 30.09, SD = 22.35). Across completed cases, the mean decrease was 38.69 points (SD = 17.61; range -5 to 72; pretreatment: M = 52.44, SD = 13.24; posttreatment: M = 13.74, SD = 12.94). These pre- to posttreatment scores fell from above to below the PTSD cutoff of 33 (Bovin et al., 2016), indicating probable loss of diagnosis. For depression symptoms, across treatment initiators, the mean decrease from pre- to posttreatment (or last value reported) was 5.60 points (SD = 7.14; range -10 to 25; pretreatment: M = 15.64, SD = 6.07; posttreatment: M = 10.03, SD = 7.51). Across completed cases, the mean decrease was 9.82 points (SD = 6.77; range -4 to 25; pretreatment: M = 14.99, SD = 6.09; posttreatment: M = 5.17, SD = 4.97). These pre- to posttreatment scores fell from the "moderately severe" to "mild" range of symptoms.

HLM was used to model symptom change during treatment. First, to examine variability in scores attributable to agency- and therapist-level factors, a 4-level unconditional model was specified with symptom scores (Level 1) nested within patients (Level 2) nested within therapists (Level 3) nested within agencies (Level 4) across treatment initiators. First, PCL-5 score was set as the Level 1 outcome with no predictors added. Agency did not contribute significant variability (ICC = .0012; variance component = 0.49, p = .41). Between-therapist differences contributed a small proportion of variability (ICC = .0333; variance component = 13.60, p = .087). However, most variability was between- (ICC = .4354; variance component = 177.95, p < .001) and within- (ICC = .5301; variance component = 216.64) patients.

A similar pattern of results emerged for PHQ-9 scores. The unconditional model revealed that agency did not contribute significant variability (ICC = .0059; variance component = 0.28, p = .35). Between-therapist differences contributed a small proportion of variability (ICC = .0610; variance component = 2.96, p = .035). However, most variability in PHQ-9 scores was between- (ICC = .5055; variance component = 24.53, p < .001) and within- (ICC = .4276; variance component = 20.75) patients. Because agency did not contribute significant variance in either model, subsequent models included only therapist and patient as higher-order clusters.

Next, a 3-level HLM model was specified to examine symptom scores (Level 1) nested within patients (Level 2) nested within therapists (Level 3) across treatment initiators. First, PCL-5 was specified as the outcome variable. Session number (transformed so the intercept corresponds to Session 1) was added as a Level-1 predictor to examine changes in PTSD scores over the course of treatment. Both intercepts and slopes were allowed to vary randomly by patient and therapist. The average baseline PCL-5 score was 51.88. This model revealed a significant effect of time, such that PTSD scores decreased by an average of 3.39 points each session, β_{100} = -3.39, SE = 0.21, p < .001, approximate effect size of Cohen's d = 1.04. When re-run with completers only, a similar pattern was observed. The average baseline PCL-5 score was 51.47, and there was a significant effect of time, with PTSD scores decreasing by an average of 3.58 points each session, β_{100} = -3.58, SE = 0.20, p < .001, approximate Cohen's d = 1.68.

Analogous models were run for depression symptoms. The average baseline PHQ-9 score was 15.71. Again, there was a significant effect of time, such that depression scores decreased by an average of 0.88 points each session, β_{100} = -0.88, SE = 0.07, p < .001, approximate Cohen's d = 0.85. Among completers, the average baseline PHQ-9 score was 15.20, and there was a significant effect of time, with depression scores decreasing by an average of 0.90 points each session, β_{100} = -0.90, SE = 0.07, p < .001, approximate Cohen's d = 1.28.

Given the high number of treatment noncompleters, we reran the above models looking only at noncompleters. Patients who dropped out of treatment before completing a final session still exhibited a significant reduction in PCL-5 (β_{100} = -2.60, SE = 0.53, p < .001, approximate Cohen's d = 0.44) and PHQ-9 (β_{100} = -0.67, SE = 0.17, p < .001, approximate Cohen's d = 0.37) scores. At their last completed session, 28.5% of treatment noncompleters were below a score of 20 on the PCL-5, which has been used as an indicator of good end-state (Resick & Wachen, 2013), and 28.5% were below 33, the suggested clinical cut-score for PTSD (Bovin et al., 2016).

SUSTAINABILITY OUTCOMES

A total of 48 (80%) of the original 60 clinicians completed the 6-month follow-up survey. This included responses from seven clinicians who dropped out or did not meet requirements for rostering. Forty (98%) of the forty-one clinicians who met requirements for rostering completed the 6-month follow-up survey, and their data were of greatest interest to us.

Of the 40 clinicians who met rostering requirements and completed the follow-up survey, all (100%) had offered CPT to at least one patient, and almost all

(95%) reported delivering CPT to at least one patient since completion of the LC. Almost all (95%) reported continued use of the PCL-5 to monitor treatment progress, and almost all of these (94.6%) continued to do so on a weekly basis during treatment, as was done during training. A substantial minority of clinicians (35%) reported continuing to engage in regular supervision or peer consultation focused on CPT.

The median rate of offering CPT to eligible patients was 100% (M = 89.4, SD = 17.7, Mode = 100, Range 33-100). The median rate of initiating CPT with eligible patients was expectedly lower: 65% (M = 59.6, SD = 32.8, Mode = 100, Range 0-100). In the 6 months since completing training, clinicians who met rostering requirements reported initiating CPT with an additional 241 patients, 87 of whom had completed treatment by the 6-month follow-up. Except for one individual provider, every agency with a clinician who met rostering requirements completed the follow-up. All of these agencies had at least one rostered clinician still using CPT.

Discussion

This first reported CPT LC targeted both clinical competence and treatment sustainability in community treatment settings. Results provide information about the feasibility of the training approach, which can inform future training efforts. Most clinicians completed the LC (73%), and most successfully completed rostering requirements (93% of LC completers; 68% of LC initiators), the majority attaining the highest level of rostering. Clinician dropouts/removals were primarily due to insufficient time to devote to training or lack of appropriate training cases.

While it is discouraging to have 27% of clinicians drop out, our clinician attrition rates are similar to some other trainings (Creed et al., 2016; Levin, Owen, Stinchfield, Rabinowitz, & Pace, 1999; Miller, Yahne, Moyers, Martinez, & Pirritano, 2004). For example, Creed et al. (2016) retained 78.7%; Levin et al. (1999) retained 66%; and Miller et al. (2004) retained 76% of clinicians at 4 months, 54% at 8 months, and 45% at 12 months. However, our training outcomes are lower than some from training programs in the VA, in which completion rates range from 82% to 96% (Karlin et al., 2012; Karlin, Trockel, Taylor, Gimeno, & Manber, 2013; Stewart et al., 2015; Walser, Karlin, Trockel, Mazina, & Taylor, 2013). These differences in training outcome should be considered in light of several study differences. First, clinicians learned different treatment modalities. There were also differences in training requirements. For example,

many VA trainings require clinicians to submit several session recordings, whereas clinicians in our program could be rostered without audio review. However, some of the above-cited VA trainings did not require completion of more than one clinical case. Thus, it is possible that requiring completion of two cases may have reduced the number of rostered clinicians in the present program. Five of the 19 clinicians who dropped, were removed, or otherwise could not meet rostering requirements were unable to secure or complete a second case.

More similar to our training program, the VA's CPT training program requires that trainees complete two cases and does not require session recordings. In one report, researchers from the VA CPT training program noted that more than 90% of workshop participants who responded to a posttraining survey reported either "complete" or "mostly complete" achievement of CPT training objectives (Chard, Ricksecker, Healy, Karlin, & Resick, 2012). However, the survey response rate was not reported, so it is possible that a response bias occurred with more training completers responding versus training non-completers. Additionally, the inclusion of "mostly complete" requirements is difficult to compare to our completion rates.

It is also possible that other differences between community and VA providers contribute to different rates of training completion. With the VA's strong emphasis on EBTs, providers may have greater expectations and support to complete training than those in community settings. Future research is clearly needed to determine more conclusively whether the training elements of the LC methodology produce comparable completion rates relative to less intensive training methods, both in the VA and in community settings, and whether the additional training elements add value in terms of patient outcomes and agency-level implementation and sustainability.

Patients treated as part of the LC exhibited statistically and clinically significant decreases in PTSD and depression symptoms. It is possible that clinician treatment fidelity and patient outcomes are enhanced by inclusion of additional LC training elements (e.g., follow-up, in-person training sessions that include advanced skills practice, monthly affinity calls), but further research comparing LC approaches to other training models is necessary to know whether such training components actually improve outcomes. It will be particularly critical to identify specific, effective training approaches, as they vary widely from study to study.

Although patient symptom outcomes were encouraging, it is noteworthy that 57% did not complete treatment. Unfortunately, across PTSD treatments,

patient dropout is common, with a recent meta-analysis reporting that the average dropout rate from trauma-focused treatments in clinical trials was 36% (Imel, Laska, Jakupcak, & Simpson, 2013). Dropout from community treatment may be even higher (Barrett, Chua, Crits-Christoph, Gibbons, & Thompson, 2008). There could be several reasons for the observed dropout rate. Although we discussed patient engagement strategies as part of consultation, therapists were learning a new treatment, which may have led them to be less confident and less able to retain patients who were avoidant or ambivalent about treatment. Additionally, clinicians may have been motivated to enroll a high number of patients to increase their odds of finishing two cases. Patients who were not a good fit for CPT (e.g., due to scheduling or transportation difficulties) or were ambivalent about treatment may have been enrolled and subsequently dropped out. Finally, some patients who were counted as "dropouts" may have, in fact, experienced significant symptom improvement and felt that they did not need additional treatment, even though their clinician did not have the opportunity to complete the required final CPT session. In a recent study examining CPT treatment dropouts, Szafranski and colleagues (2017) found that 35–55% of study participants who had previously been counted as study dropouts had met good end-state criteria. Consistent with this interpretation, patients who dropped out of treatment exhibited significant reductions in PTSD and depression symptoms, with a substantial minority (28.5%) below the clinical cutoff for PTSD (Bovin et al., 2016).

Finally, clinicians and agencies reported promising implementation and sustainability outcomes. Penetration rates suggested that clinics were able to transfer a high rate of potentially eligible patients into treatment. That we did not see an increase in rates of informing patients of or enrolling patients in CPT may be limited by a ceiling effect because teams started out relatively high in these rates (93% and 68%, respectively). Lower rates of enrolling in CPT compared to informing patients of CPT is not surprising given that there are many factors that affect whether a patient enrolls in treatment, including whether PTSD is the primary concern and whether the patient is open to trauma-focused treatment and able to commit to weekly sessions.

Additionally, that 95% of clinicians who met rostering requirements and 100% of agencies with rostered clinicians were still using CPT at the 6-month follow-up is encouraging. Ensuring sustainability is essential to maximize the investment in training. Although these rates appear promising relative to previously reported sustainability rates (e.g., Rosen et al., 2017), our outcomes cannot be directly compared to other studies due to numerous methodological differences and lack of a direct comparison group. For example, clinicians in the Rosen et al. (2017) study were trained in the VA and in a different EBT for PTSD (PE), which is exposure-based. Clinicians might have held different views of these therapies that contributed to outcomes over and above the effect of training methodology. Additionally, it is unknown how many clinicians in the VA study were required to participate in training versus volunteered due to interest, though this factor could have also varied in the present study. Future research is needed to directly compare sustainability outcomes from different training approaches.

The promising outcomes observed in this LC should be weighed against the time commitment and level of engagement required by participants to complete such training. For example, the LC requires the involvement of a senior leader. In our sample, of the 13 multiperson teams, only one senior leader dropped out. Of note, all of our teams were community-based clinics, and almost none were from research-affiliated sites. This suggests that involving a senior leader in community treatment settings is feasible. Additionally, our sample included predominantly master's-level clinicians, which is consistent with the background of typical community-based providers. These were also general service settings where PTSD was not the only diagnosis being treated. Taken together, these factors suggest that the outcomes obtained in the present study are feasible to attain in community-based treatment settings. These outcomes fit with previous studies of LCs within the mental health domain, each of which has indicated that the LC methodology was feasible and acceptable to providers (Nadeem et al., 2014).

Limitations and Future Directions

While the results of the current program are promising, the conclusions that can be drawn are limited by the lack of a direct comparison group. While we have noted outcomes of prior training programs as a basis of comparison, we acknowledge that these studies varied from the current study in several respects and are thus an imperfect comparison. More research is needed to directly compare the LC model to other implementation strategies for training in CPT and other EBTs. However, there is growing research indicating that more comprehensive training strategies strengthen implementation outcomes; in one RCT, more comprehensive training strategies helped mitigate the effects of barriers to treatment adoption and enhanced the effects of facilitating factors related to treatment adoption (Harned, Dimeff, Woodcock,

& Contreras, 2013). Similarly, research is needed to identify specifically which elements of training have the greatest effect on outcomes. In the present study, it is not possible to separate the effects of the implementation support elements from the effects of additional training contact (e.g., having three in-person training sessions). Also, because the LC model is longer and more time-intensive than traditional training models, future research should evaluate the method's cost-effectiveness.

It should be noted that this LC did not include all the potential elements that could be included in a LC (Nadeem et al., 2014). We did not implement Plan-Do-Study-Act cycles, although we did incorporate other quality improvement approaches. For example, we had teams monitor quality improvement data through monthly metrics and readiness assessments, and we synthesized these data and provided feedback to individual teams as part of problem-solving sessions to overcome implementation obstacles. Another consideration about our program is that we made two allowances in recruitment: First, we allowed single providers to participate. Second, individuals could serve simultaneously in both clinician and senior leader roles; in fact, 13 out of 18 senior leaders participated in CPT training. Allowing overlap in roles prohibited us from offering a separate track of senior leader activities at Learning Sessions. It is unclear if allowing overlap in roles affected any outcomes. Regarding the feasibility of allowing providers to fulfill the dual roles, two (15%) of the participants who were serving as both clinicians and senior leaders ultimately dropped the clinician role to focus on their senior leader duties; however, the rest were able to successfully sustain both roles. The one senior leader who dropped out was serving dual roles and did not complete either role. Future research is also needed to identify which senior leader leadership characteristics predict the best team outcomes.

Some of our measures could be strengthened in future studies. For example, while we obtained 6-month follow-up data, we did not assess fidelity or collect patient-level data at follow-up due to concerns about feasibility and burden. Thus, we do not have a complete picture of posttraining sustainability. Future research will be needed to assess the full breadth of sustainability outcomes associated with LCs. Additionally, the monthly metrics data were provided by senior leaders who were asked to gather past-month data from each of their team members. This approach may have resulted in imprecise estimates or variability in data quality across sites. Additionally, although teams completed organizational readiness assessments,

these measures were not validated measures. Future LCs should use validated measures of these constructs and evaluate changes in readiness over the course of training.

It should also be noted that the fidelity data were not obtained from a random selection of sessions as might be the case in an RCT. Instead, we selected Sessions 1, 4, and 12 to rate and allowed clinicians to select which of their patients' sessions to submit. Clinicians could submit additional recordings from other patients when they did not pass standards, which is common in training. For example, Creed et al. (2016) allowed clinicians who did not initially demonstrate competency to submit additional work samples. However, this may have led to higher fidelity rates than would have been seen if the training team randomly selected sessions to rate.

We also note that our sample size was relatively small ($n = 60$). We included community therapists who applied to participate in training. Therefore, we expect this sample reflects training-seeking therapists across a variety of community settings. However, with training provided free of charge, one question worth further study is whether engagement in the LC would be the same if participants were expected to contribute to training costs. Having participants contribute financially may increase buy-in and promote greater engagement. Alternatively, training costs might discourage participation from under-resourced agencies.

Conclusions

This project highlights that the LC model, an intensive training methodology focused on both training and sustainability, is a promising approach to disseminate CPT, an EBT for adult PTSD, to community clinicians. Future research should continue to evaluate the LC approach as a potential means of enhancing implementation outcomes within community practice settings.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

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