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Using a Theory-guided Learning Collaborative Model to Improve Implementation of EBPs in a State Children's Mental Health System: A Pilot Study

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Abstract

Learning collaboratives (LCs) are used widely to promote implementation of evidence-based practices (EBPs). However, there has been limited research on the effectiveness of LCs and models vary widely in their structure, focus and components. The goal of the present study was to develop and field test a theory-based LC model to augment a state-led, evidence-based training program for clinicians providing mental health services to children. Analysis of implementation outcomes contrasted LC sites to matched comparison sites that participated in the clinical training program alone. Results suggested that clinicians from sites participating in the LC were more highly engaged in the state-led clinical training program and were more likely to complete program requirements.

Keywords

Learning collaborative; implementation; evidence-based practices; children

In response to increased calls for the improved quality of care (Committee on Quality of Health Care in America- Institute of Medicine, 2001), state and local policymakers and mental health leadership have been seeking effective and efficient ways to support and sustain implementation of evidence-based mental health interventions (Honberg, Kimball, Diehl, Usher, & Fitzpatrick, 2011). Based on quality improvement collaboratives (QICs) in healthcare (e.g., Institute for Healthcare Improvement, 2003; Nadeem, Olin, Hill, Hoagwood, & Horwitz, 2013; Schouten, Hulscher, Everdingen, Huijsman, & Grol, 2008), learning collaboratives (LCs) have become a popular model in mental health for providing training and ongoing support in large scale efforts to disseminate and implement innovative treatments and improve quality of care. Similar models have been promoted by the Substance Abuse and Mental Health Services Administration (SAMHSA), which has allocated 30 million dollars to assist states in developing "learning laboratories" (Substance

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Abuse and Mental Health Services Administration, 2012). Over 35 states are implementing LCs through the National Council for Community Behavioral Healthcare (NCCBH) (A. Salerno, personal communication, July 1, 2015). Despite their considerable costs (Fremont et al., 2006) and widespread use, few studies have delineated the components of LCs or their effectiveness in improving the implementation of EBPs (Nadeem, Olin, Hill, Hoagwood, & Horwitz, 2014). This is a critical question for public mental health systems that must allocate resources efficiently and effectively.

The implementation of evidence-based treatments in large systems is inherently complex. It has been well-documented that customary, passive education focusing solely on individual care providers is ineffective in changing practice (Davis, Thomson, Oxman, & Haynes, 1995; Ferlie & Shortell, 2001; Raghavan, Bright, & Shadoin, 2008). Active, hands-on training and ongoing consultation is necessary to foster new clinical skills, particularly by frontline staff (e.g., Beidas, Edmunds, Marcus, & Kendall, 2012; Nadeem, Gleacher, & Beidas, 2013; Schoenwald, Sheidow, & Chapman, 2009). Because of the complexity of mental health systems, in addition to consultation, there is a need for targeted implementation strategies that focus on theoretically and empirically-guided processes aligned with both the inner (intra-organizational) and outer context (systems). Key factors include characteristics of the innovation; innovation fit with patient, clinician, and organizational needs and context; leadership; organization cultural and climate; and alignment with the larger policy and fiscal context (e.g., Aarons, Hurlburt, & Horwitz, 2011; Damschroder et al., 2009; Powell et al., 2011). The appeal of LCs lies in their potential ability to address some of these multilevel factors by going beyond typical clinician-focused training efforts and engaging organizational leadership in addressing local implementation challenges.

LCs in the mental health context are adapted from quality improvement collaborative (QIC) models used in healthcare, the most widely cited of which is the Institute for Healthcare Improvement's Breakthrough Series Collaborative (Ayers et al., 2005; Becker, 2011; Ebert, Amaya-Jackson, Markiewicz, Kisiel, & Fairbank, 2011; Institute for Healthcare Improvement, 2003; Kilo, 1998; Mittman, 2004; Ovretveit, 2002). The quality improvement (QI) processes at the core of these collaborative models are rooted in industrial process improvement strategies, particularly the use of ongoing data collection and analysis to identify problems and to drive continuous learning and improvement (Deming, 1986; Juran, 1951; Juran, 1964). In a typical mental health-focused LC, individual sites convene multi-disciplinary teams that take part in a series of in-person, phone, distance learning, and independent activities that are led by LC faculty (content and QI experts).

These LCs have several core processes that are similar to the multi-level elements of theoretical models hypothesized to facilitate practioner and organizational change needed for implementation of EBPs (e.g., Aarons et al., 2011; Damschroder et al., 2009). At the practitioner level, the LC structure provides sites with access to experts in the field, often including treatment developers and QI experts, and contains activities based on adult learning principles designed to engage participants, bridge to real-world practice, and foster reflective learning (e.g., Kolb, 1984; Merriam, 2001). Participants learn to apply QI methods, such as the plan-do-study-act improvement cycle (Deming, 1986), to identify and

address implementation challenges in real time (e.g., clinicians need more prep time for skill development). This process allows teams to refine new practices within the local setting, identify implementation barriers, field test solutions to identified challenges, and share experiences across sites (Pinto, Benn, Burnett, Parand, & Vincent, 2011). At the organizational and systems level, LCs have potential to strengthen social networks and interorganizational learning (Bunger et al., 2014; Nembhard, 2012; Palinkas et al., 2011), leverage the influence of key opinion leaders towards improving the implementation climate for innovative practices (Wilson, Berwick, & Cleary, 2004), and foster a public and tanglible commitment from leadership (Wilson et al., 2004). By establishing mutli-disciplinary, cross-hierarchical teams, LCs may also promote increased team effectiveness (Nembhard, 2009), and can potentially build organizations' capacity for innovation use and continuous improvement (e.g., using data to drive change and promote accountability) (Nembhard, 2012; Singer, Moore, Meterko, & Williams, 2012).

The need for clearly outlining specific elements of LCs that are used in a given implementation effort and developing an evidence base for their effectiveness and cost-effectiveness has been repeatedly noted in the implementation literature (Dückers, Spreeuwenberg, Wagner, & Groenewegen, 2009; Leatherman, 2002; Mittman, 2004; Schouten, Grol & Hulscher, 2010; Schouten et al., 2008). This is also important from a practical standpoint as systems seek to field LC models that are effective and feasible under real world resource constraints. Recent systematic reviews of QICs across healthcare fields revealed 14 commonly reported elements; studies reported the inclusion of, on average, six or seven components —most commonly, in-person learning sessions, PDSA cycles, multidisciplinary quality improvement teams, and data collection for quality improvement (Nadeem, Olin, et al., 2013; Nadeem et al., 2014). With respect to outcomes, studies that had comparison groups showed the greatest impact of the QICs on provider-level process-of-care variables; patient-level findings were less robust (Nadeem, Olin, et al., 2013; Nadeem et al., 2014; Schouten et al., 2008). However, because of the imprecise reporting, it was not possible to draw conclusions about QICs in general and there appeared to be no standardized model (Nadeem, Olin, et al., 2013).

A recent research review of studies in the behavioral health context that included pre to post quantitative data revealed 16 distinct LC studies with targets ranging from depression screening and engagement in services, (Cavaleri et al., 2006; Cavaleri et al., 2010; Katzelnick, Von Korff, Chung, Provost, & Wagner, 2005; Vannoy et al., 2011) to implementation of complex evidence-based practices (Ebert et al., 2011; Roosa, Scripa, Zastowny, & Ford, 2011). Although the majority of studies reported favorable trends in either patient or provider outcomes from baseline to post LC, only one study had a comparison condition (Nadeem et al., 2014). This study by Gustafson and colleagues (2013) used a randomized controlled design to test the effects of four different components of the LC model (i.e., in-person learning sessions, individual site coaching, interest group calls, combined model). They found that both the combined LC model and the individual site coaching model had positive impacts on new patient admissions and agency wait times. However, the costs of the combined LC model exceeded individual site coaching. Together, these findings underscore the need for further research on LCs and their use in the behavioral health context, how the model is grounded in the theoretical literature on quality

improvement and organizational change, and how it can be feasibly implemented in a public mental health context.

The purpose of the current study was to develop and pilot a brief, theory-based, manualized LC and determine whether community mental health clinics participating in the LC were more likely to implement a new practice being rolled-out in a statewide clinician training program compared to clinics participating in the state's training program as usual. There was particular interest in fielding the LC in the state mental health policy context because of the substantial financial investment that many states make in workforce training and technical support, the extended time and resource commitments required by LC participants, and the need to understand the potential value of LCs in implementing new practices. There was also a need to field a model that was contextualized within and tailored to fit the goals and realities of public mental health organizations.

This study was embedded within the New York State Office of Mental Health (NYS OMH)'s Evidence Based Treatment Dissemination Center (EBTDC). Since 2006, EBTDC has offered free training to child-serving mental health clinics in a range of evidence-based treatments (Gleacher et al., 2010). In 2013–2014, EBTDC offered training in the Managing and Adapting Practice (MAP) system (Olin et al., 2015; PracticeWise, 2014). The LC model piloted in this study was designed to be an augmentation to the clinical skills training program (MAP) offered to frontline clinicians. The LC's focus was to use QI methods to address implementation challenges and more successfully embed MAP into clinic's routine practice. The goals of the current study were to develop and pilot a practical and feasible, theory-driven LC model, and obtain preliminary implementation outcome data on the LC plus the clinical training program (MAP) versus the clinical training program alone. Studies like this one can set the stage for future large-scale tests of LC models as well as dismantling studies that examine specific LC components.

Method

Participants

The study investigators invited all 12 child-serving clinics (representing 10 community agencies) from New York City that had signed up for NYS OMH EBTDC's MAP training. The clinics varied in their structure, size, and array of services, but all sites were non-profit agencies or hospital-based programs that provided services to children and families as part of the public mental health system, and were licensed by the NYS OMH. The LC was described as an organization-focused implementation strategy to augment the EBTDC MAP training, which was primarily focused on training clinicians in a set of clinical skills and clinical practice improvement tools. Participation in the LC required each site to set up a multidisciplinary QI team representing administrative leadership, a clinical supervisor, and a frontline clinician. The team was also asked to include QI specialist, or someone who could report on the team's progress. All time commitments for the LC were in addition to the existing MAP training and clinical consultation program for clinicians. Study recruitment began before EBTDC's clinical training in MAP began. Information was communicated via webinar, email, and phone meetings. Of the 12 clinics, seven initially indicated interest in the LC and five signed up. One clinic site dropped out prior to the first LC meeting and the

research team terminated a second site's participation. Both of these clinics had encountered major leadership changes that made it difficult for them to form a stable QI team that could consistently participate in the LC. This left a total of four distinct clinics (one hospital, two community, one school-based clinic). The community and school-based clinics were from one large agency with several locations. Although there was one common agency-wide leader involved in the LC, each clinic was treated as its own site because each site was physically separate, made an individual decision to participate in the LC, and had unique clinic directors, supervisors and staff. Although the four clinics served very similar populations and were located in the same urban center, each one had its own operational structure and characteristics. The school-based program was staffed primarily with LCSWs who co-located into different school sites and served their clients within that context. As such, they had a relatively decentralized operational structure compared to the community-based and hospital-based clinics. They did have routine meetings where staff across sites came together for weekly meetings, however. The two community clinics were similar to one another in their general operational structure, and could be described as typical outpatient mental health settings staffed primarily by LCSWs. Supervisors across the clinics included both psychologists and LCSWs. In addition, the community and school clinics had a younger frontline workforce made up primarily of LCSWs, compared to the hospital-based program was comprised of seasoned and older staff that included LCSWs, psychologists, and psychiatrists. The older hospital-based staff, in particular, articulated challenges related to IT, use of data to monitor treatment, and clinical orientation.

Four comparison clinics were chosen from the same region, and were matched to our participating clinics by type (e.g., school-based) and size. Organizational size was chosen because it is a structural factor that may be a proxy for capacity and resources available to implement new practices, QI, and take part in training (Damschroder et al., 2009; Greenhalgh, Robert, MacFarland, Bate, & Kyriakidou, 2004). These clinics are among the group of 12 clinics that were originally offered participation in the LC. Clinic type was chosen as a matching factor to provide some comparability on setting context and types of services and populations served. The comparison clinics came from four distinct agencies, as there were no equivalent large agencies with multiple clinic sites in the region. Across the eight comparison and LC clinics, there were 51 clinicians participating in the MAP training program. Clinicians were included as long as they attended one MAP clinical consultation call. The average number of clinicians that each clinic sent to the MAP training was 6.38 (SD= 3.46; ranging from 4 to 14). All participants provided active consent to participate in this study.

EBTDC MAP program—The EBTDC MAP program has been described in detail elsewhere (Olin et al., 2015). It included a five-day training in modular cognitive behavioral therapy and how to use the PracticeWise resources (i.e., searchable web database of evidence-based practices, practice guides, progress and outcome monitoring tools) (Chorpita, Bernstein, & Daleiden, 2008; Chorpita & Daleiden, 2009; PracticeWise, 2014). The training was delivered as a combination of in-person and interactive webinar trainings over five days. Bi-weekly clinical consultation took place for nine months, and focused on clinical skills acquisition and proficiency in MAP use. Clinicians who successfully

submitted a portfolio, a detailed record of two MAP cases with documentation of practice elements and outcome monitoring, received NYS OMH MAP certification. Content and format for the EBTDC MAP program were aligned with what the PracticeWise team has provided in other contexts (Southam-Gerow et al., 2014).

LC Intervention

Intervention development—The LC intervention was developed from a detailed structured review of the extant literature. First, the research team undertook a systematic review of the theoretical literature on QI collaboratives (e.g., Berwick, 1989; Mittman, 2004; Schouten et al., 2010; Wilson et al., 2004) and the core elements of LCs across fields of mental health and health care (Nadeem, Olin, et al., 2013; Nadeem et al., 2014; Schouten et al., 2008). Second, the research team reviewed and adapted materials from the IHI's Breakthrough Series (Institute for Healthcare Improvement, 2003) and the Breakthrough Series College, which was attended by the lead author. The team also reviewed the National Child Traumatic Stress Network's Learning Collaborative Toolkit, an adaptation of the IHI BTS model for trauma services and mental health context (Ebert et al., 2011; Markiewicz, Ebert, Ling, Amaya-Jackson, & Kisiel, 2006).

To adapt these materials for the project and develop a formal LC manual, the research team consulted with state policy leaders, national experts on EBP implementation in mental health, the EBTDC MAP training director, and clinic leaders. This approach represents an adaptation of the "expert panel" process that is often used by the IHI and other QI collaboratives; it includes consulting with content experts to develop specific goals, target issues and strategies, and develop data monitoring systems prior to launching the LC. Based on feedback from these partners, the research team prioritized *feasibility* (i.e., developing a model that was *feasible* for clinics operating in the public mental health sector and that accounted for staffing, time constraints) and *focus* (i.e., developing a model that targeted QI and implementation issues within organizations). As a result, there are some differences between the LC in the current study and those that have been reported in the mental health literature. For example, the length of in-person learning sessions was shorter than what has been reported in other studies (half a day to one day vs. one to three days) (Nadeem, Olin, et al., 2013; Nadeem et al., 2014). In addition, the primary focus of the LC was the targeted development of QI skills related to EBP implementation by multidisciplinary, cross-hierarchical teams. Clinical skill development by frontline staff was addressed via complementary and synergistic activities with EBTDC MAP. Other LCs models, in contrast, have focused on both clinician training and organizational implementation issues within a single LC structure (e.g., Bunger et al., 2014; Cavaleri et al., 2010; Ebert et al., 2011; Roosa et al., 2011). The final LC model is described below, organized by the key structural components of LCs that are typically reported in the QIC and LC literature. The description includes key reporting elements recommended by Proctor and colleagues (2013).

LC structure—The LC in the current study had three primary aims towards achieving these goals: 1) Establish and build an effective multidisciplinary team that can develop internal capacity for QI, 2) Use local qualitative or quantitative data to drive improvements, provide feedback, and promote accountability, and 3) Build interagency networks through

cross-site learning. LC activities were led by the LC faculty, which included two core members of the research team who had prior experience and training in QICs and LCs, implementation of EBPs in community settings, and organizational psychology. In addition, the EBTDC training director participated in LC activities, as needed. Activities followed a similar structure to other LCs (Ebert et al., 2011; Institute for Healthcare Improvement, 2003; Markiewicz et al., 2006) and included a "pre-work" (or pre-implementation) phase, three in-person meetings (or learning sessions), and monthly cross-team phone calls. In between the in-person meetings, "action periods" provided teams the opportunity to apply QI methods and use local data to identify and field solutions to implementation challenges. LC faculty also provided as needed individual site consultation, and routine progress feedback to all sites based on clinician participation data from the EBTDC MAP training program. Table 1 provides an overview of the LC structure and provides sample agenda items and activities. Below we detailed the key activities and processes that occurred within each of the structural elements of the LC.

Pre-work period—The pre-work period was focused on two tasks: 1) Setting the goals, overarching framework, and data reporting structures and benchmarks for the LC, and 2) Engaging and preparing sites for participation. To accomplish the first goal, the LC faculty established an overarching framework for the collaborative which included a statement of the issues (i.e., the need for the clinical workforce to be proficient in evidence-based treatments in the face of a shifting policy and fiscal climate), the mission of the collaborative (i.e., to build organizational capacity for EBP implementation and QI, enhance team effectiveness), and set specific goals (e.g., enhance their clinician MAP training completion rates and work towards sustained EBP use) and expectations (e.g., engage in local QI efforts, and report on progress). The LC faculty also established key performance indicators that could be tracked during the collaborative to identify site-specific challenges and track progress. These indicators were designed to either be abstracted from the existing EBTDC attendance tracking systems or obtained using the LC's information sharing platforms. Indicators included attendance on EBTDC MAP clinician consultation calls, number of MAP cases, and submission of MAP portfolios.

To guide the work of the LC participants, the LC faculty developed an implementation framework (an adaptation of the IHI's "change package"), which provided a conceptual model for EBP implementation, along with specific examples of implementation challenges and potential solutions aligned with the implementation framework. This working model or framework was based on the conceptual model of Aarons and colleagues (2011), which delineates the multi-level factors that influence EBP implementation in public sectors. For each level, a delineation of sample barrier that clinics may face was specified as well as a sample solution or strategy. For example, at the individual clinician level, a possible issue could be clinician skill and comfort with technology, which would be supported through further training or a "buddy system" in which clinicians work together to set up their initial MAP dashboards. A possible organizational level issue was the lack of time or resources to prioritize MAP in the context of other organizational priorities and initiatives. Potential strategies included mechanisms for top down and bottom up communication, temporary

reductions in caseloads, or creative scheduling of other meetings to allow for preparation time.

Once sites signed on to participate in the LC, the LC faculty helped each site establish a three to five person multidisciplinary, multi-level QI team that included administrative leadership, clinical supervisors and frontline clinicians, and a local QI specialist. If the organization did not already have a QI staff member, the site selected someone to be the point person for the site's QI efforts. LC faculty met with each site 1–2 times in order to review LC structure, goals, and commitments (i.e., participation in calls and meetings, QI activities between meetings, reporting structures), and provide consultation on constructing an effective QI team. Generally, the teams had little prior experience or training in QI. This was particularly true for frontline clinicians and supervisors, but it is important to note that administration often had limited experience as well. During the pre-implementation period, clinicians and clinical supervisors from each of the sites participated in the initial five-day EBTDC MAP training described above.

In-person learning sessions—The LC included three in-person meetings beginning in November, 2013 and ending in June, 2014. The first learning session focused on: 1) Goals for the LC, 2) Review and initial application of the multi-level framework for understanding and addressing implementation issues, 3) Introduction to continuous quality improvement, including the value of using data to track progress and the PDSA cycle, 4) Clarification of roles and responsibilities on QI teams, and 5) Planning for first local next steps. Specific issues that the teams were already encountering or predicted would be challenges in implementation were discussed. Examples included leadership challenges, alignment of MAP with other clinic priorities (e.g., financial strain, launching of electronic medical records), engaging clinicians in MAP, and time management to support clinician learning. Activities were interactive and provided opportunity for participants to discuss application to their local settings, draw upon existing knowledge and experience, and share within and across the teams.

The second learning session focused on summarizing EBTDC MAP implementation data to date (call attendance and MAP usage), review and further elaboration of the implementation framework, team presentations focused on top implementation challenges and successful strategies, role plays, and discussion of applied MAP clinical and supervisory issues identified by the teams during cross-site QI team calls.

The final learning session included a review of progress data, team presentations, group discussion of leadership and QI issues, and sustainability planning. Feedback gathered during this session was also analyzed in order to collate overarching feasibility and acceptability of the LC components from the view of the LC participants.

Action periods: Quality improvement activities—Between each learning session, QI teams were expected to identify specific challenges that they encountered in implementing MAP at their sites, and use QI methods (e.g., PDSAs) to address these issues. To support this work, the LC included cross-team QI calls, individual site coaching calls, data progress

summaries, and email and web-based progress reporting to foster accountability and cross-site learning.

Cross-site phone calls: Each monthly cross-site call had an agenda that was collaboratively generated by the LC faculty and the QI teams. The goal of these calls was for teams to be able to continue their learning related to QI and implementation from the learning sessions, and discuss implementation issues. During each call, one of the QI teams was assigned to lead a portion of the discussion by focusing on a particular issue that they were dealing with or a strategy that they were employing for addressing an identified implementation challenge. The specific QI issues that teams were addressing locally drove cross-site call topics. Examples included leadership strategies (e.g., developing messaging about the MAP project that would speak to clinician-level needs), engagement of frontline clinicians (e.g., meetings for obtaining clinician feedback about their experienced barriers), prioritization of MAP skill development for clinicians (e.g., reducing minutes from other meetings to allow for prep time, establishing a MAP buddy system where clinicians had time to work together on MAP), and innovation-setting fit (e.g., implementation of MAP with an eye towards alignment with electronic health records). Calls agendas also included discussion of progress on PDSAs and data updates, and included opportunity to obtain feedback from their peers and from the LC faculty. Although the particular PDSAs varied from team to team each month, each team reported that they grappled with similar QI issues at their sites.

Individual site coaching: Individual site coaching calls were held with the team slated to present on the upcoming cross-site group call in order to help support planning for the call, enhance team functioning, or to trouble shoot with a team around an emerging issue (e.g., staff turnover, leadership strategies). In total there were nine monthly cross-site calls and 13 individual site calls. Each team participated in at least two individual site calls and all of the QI team calls.

Data infrastructure: The LC included an email and a web-based platform for teams to log their PDSA efforts, share materials, and track implementation benchmarks. In parallel, the LC faculty routinely accessed and summarized available data from EBTDC's ongoing tracking of MAP progress indicators, such as clinician attendance on EBTDC MAP consultation calls. However, because it became immediately apparent that the clinics lacked local data infrastructure and had limited access to publicly available shared information sharing platforms (e.g., Google docs, Dropbox), LC faculty worked one-on-one with each clinic site to track data such as the number of MAP cases per clinicians and the use of MAP tools either via biweekly phone or email surveys with the QI specialist or supervisors, or through direct communication with frontline clinicians. The LC faculty synthesized this information and provided routine feedback to the LC participants.

LC Fidelity—Adherence to the LC manual by the LC faculty was tracked through direct observation by independent coders who were provided a fidelity checklist aligned to the LC core components, call agenda and specific goals for each call and learning session. Coders also rated participant responsiveness (by clinic site) on three items assessing level of interest and involvement, understanding of the goals of the session or call, and how well the leader

applied the information to his or her local site. Each item used a five-point Likert scale with item-specific anchors. Items included: *1) Respondent's level of interest and involvement on the consultation was: very low (1), low (2), neither high nor low (3), high (4), very high (5); 2) Please estimate the respondent's understanding of the goals of the call/session: limited (1), partial (2), about half (3), majority (4), complete (5);* and *3) Please rate your impression of how well the leader applied information to his/her local site: not well at all (1), somewhat well (2), in the middle (3), well (4), very well (5).*

Initially, two coders independently rated the LC activities; when high inter-rater agreement was established (100% agreement), a single coder coded the remainder of the LC activities. The coders included research staff that were not part of the LC faculty, but had some involvement in data management or collection for the project. All coding was conducted live. Across the LC calls and in-person learning sessions, the LC faculty delivered the model with 100% adherence. Participant responsiveness for each site across all three of the learning sessions was rated as a 5 across all three responsiveness domains. During the QI phone calls, all scores ranged from 4 to 5.

Measures

Measurement focused on implementation outcomes related to use of MAP at local sites and progress toward NYS OMH MAP certification for clinicians. Data were abstracted from either EBTDC attendance records or baseline survey data administered to EBTDC MAP clinicians. The study assessed the following indicators, which were aggregated at the clinic level for both LC and matched control sites.

EBTDC MAP consultation call participation—Attendance by clinicians on MAP clinical consultation calls was summarized as an average for each site. This data was abstracted from the EBTDC MAP call attendance tracking system, which was completed by EBTDC clinical consultants during each call that they held. The total possible number of calls was 11.

Implementation outcomes—Two site-level indicators were used for implementation outcomes: 1) Average number of MAP cases per clinician and 2) Percent of clinicians who started MAP training who successfully submitted a portfolio. This data was gathered directly from sites by the research team. The MAP portfolios contained detailed case information on two cases (including documentation of practice elements and outcome monitoring), caseload information, and a clinician self-assessment of skills used in the course of treatment. Evaluation of MAP portfolios is the method typically used by PracticeWise, LLC to evaluate clinicians' implementation of MAP and determine whether they can be certified as MAP clinicians (PracticeWise, 2014; Southam-Gerow et al., 2014). The PracticeWise team, who were blind to study condition, evaluated quality of MAP portfolios and provided an overall pass or fail score for each portfolio. After initial review ensured the completeness and basic quality of the submitted portfolio, case material elements on the two cases included in the portfolio (e.g., clinical dashboards, client information, service quality) were rated on a three-point Likert scale, and then averaged. Portfolios that included average scores of 1.7 and above were considered passing. Because virtually all submitted portfolios obtained passing

scores and the range of scores was restricted, we used the percentage of submitted portfolios per site as our outcome variable.

Clinic provider profile—Basic demographic data on participating clinicians were gathered at baseline and also summarized by clinic site. Variables included clinician age, gender, and level of education (bachelors, masters, doctorate). Two additional background variables were used to characterize the sample: prior experience with technology and prior experience with CBT. Prior experience using technology was assessed because use of the web and excel are prominent features in the MAP program. Clinicians were asked to rate their experience with and attitudes towards the utility of information technology and computers on a 13-item measure (rated on a 1 to 4-point scale from Strongly Disagree to Strongly Agree), derived from a longer measure of technology adoption (Richardson, 2011). Cronbach's alpha in our sample was 0.91. Total scores on this measure ranged from 13 to 52, and were used to provide background on clinician's general comfort with technology.

The baseline survey assessed prior experience with CBT through a single item in which clinicians were asked to report how many cases they have used CBT with. Based on visual inspection of the raw data, natural cut points emerged. It was determined that a cut off of 50 cases was indicative of high CBT use, and the variable was categorized as high, medium, and low CBT usage. Based on the distribution of the data, scores of 0–10 were considered *low,* scores of 11–50 were considered to be *medium*, and scores of 51 or higher were considered *high.* This item was considered to be a proxy indicator of general openness to using CBT.

Analysis strategy—All data were aggregated by clinic site because the LC targeted clinic level implementation of MAP. Because of the small sample of clinics involved, we present only descriptive data. In line with recommendations for the analysis of small sample studies in which hypothesis testing cannot be conducted (Hopkin, Hoyle, & Gottfredson, 2015), analysis was conducted via visual inspection of the data, focusing on differences between matched pairs.

Exploration of the perceived usefulness of LC Components

In addition to the primary analysis described above, the research team explored the value and utility of the LC component through review and analysis of researcher notes that were taken by throughout the LC. In addition, as part of the final learning session, LC teams discussed what was most helpful or not helpful to their sites during the course of the LC, and what elements were challenging to utilize. Information was analyzed according to case study analysis methodology, which capitalizes on non-traditional data collection approaches (e.g., experiential data-gathering, meeting notes, interviews, observations of naturally occurring decisions and processes (Yin, 2009), and has been identified as a useful for understanding programs and interventions that are in the midst of a dynamic development process (Gamble, 2008; Patton, 2011). Specifically, the lead author synthesized available information about LC components, and evaluated how easy/difficult it was to implement and how important it appeared to be in facilitating QI capacity and implementation of MAP. A written summary of the analysis was distributed to coauthors for feedback, which focused on

facilitating consensus and refining the analysis. In the event of diverging perspectives, consensus was achieved through group discussion.

Results

Sample characteristics—Table 2 provides an overview of clinic clinician profiles for each matched pair in the study. Overall, the average clinic-level clinician ages ranged from approximately 31 to 54 years old. In the case of one of the pairs (Matched Pair 1), the LC clinic had older clinicians on average (53.5 vs. 33.2) and in another pair (Matched Pair 2) the control clinic had older clinicians on average (40.1 vs 32.4). Across the sample, seven out of eight of the clinics sent clinicians with masters or higher level education to the EBTDC MAP training. The percent of clinicians with prior CBT use did vary across the clinics (range from 0% to 50%). In two of the matched pairs the LC clinic had a higher percentage of clinicians with high level of self-reported prior CBT use. This pattern was reversed in one of the pairs. Finally, the average prior experience with technology varied from a mean score of 36.7 to 42.5, however none of the pairs appeared different from one another.

Implementation outcomes—Table 3 summarizes findings related to implementation of MAP. We compared the matched pairs on three key implementation outcomes: the average number of EBTDC clinician consultation calls attended by clinicians from each site, the average number of MAP cases held by clinicians from each site, and the percentage of clinicians from each site who submitted MAP portfolios for certification. With respect to the average number of consultation calls attended, in each of the pairs, the LC clinics had better attendance. With respect to the number of MAP cases held by clinicians at the end of the LC, the LC clinics had higher averages in all but one of the pairs (Matched Pair 3), which were the same. With respect to submission of MAP portfolios per site, the LC sites outperformed the control sites in all but one pair (Matched Pair 1). Two of the control sites submitted no MAP portfolios.

Exploration of the perceived usefulness of LC Components—Results from the analysis of research team notes and participant feedback related to the value and utility of the LC components indicated that there was an overall positive response to the LC in several key areas. Specifically, across all LC activities, participants reported that they valued the opportunity to gain specific consultation and support related to organizational leadership skills (e.g., messaging to staff around new initiatives, engaging frontline staff), innovation-setting fit, team functioning, and quality improvements methods as an augmentation to the clinical support offered to clinicians. Individual site consultation, which was conducted as needed throughout the LC, appeared to be critical to helping sites to apply these concepts. These individual calls and meetings often allowed sites to gain additional consultation, identify and discuss site-specific challenges, and obtain further support on team effectiveness and leadership skills. There was a perception among research team members and LC participants that the coaching appeared to result in more effective and productive use of the group phone calls and in-person meetings. With respect to the group calls and in-person meetings, participants reported that they valued the opportunity to share and learn from others. Over the over the course of the collaborative, the teams were increasingly able

to lead discussions and freely share ideas and strategies with one another. However, there was little evidence of between-site communication outside of planned LC calls and activities via email or direct site-to-site phone calls.

The challenges were primarily related to the quality improvement component of the LC. While the participants reported that they greatly valued the QI lens, and appreciated the practical training they received, there were challenges in two critical areas. First, for most of the clinic teams there was no existing QI personnel or team structure, making the LC one of the first times that they were required to formalize a multi-level, multi-disciplinary team with an identified QI role. Secondly, the clinics had virtually no data infrastructure that could be leveraged for the QI process in the LC (or for other initiatives they were launching in their clinics), and few resources to support their usage of the basic data tracking systems for monitoring MAP use and PDSAs that were developed by the LC research team. As such, the research team worked very closely with each individual site on their data tracking.

Discussion

Learning collaboratives have become popular as a way to support large-scale implementation and dissemination of new practices. However, few studies have explicitly examined the feasibility of LCs within a real world mental health policy context, aligning LC elements are with the theoretical literature on QI and health care organizational improvement. The purpose of this study was to develop and pilot test a LC model that was derived from the extant literature, and tailored to align with the goals and available resources in a public mental health context. The next step in future research would be to further test such a model on a larger scale, with an eye towards dismantling the key effective components of the LC model.

Overall, our study demonstrated that it is feasible to implement a manualized LC with fidelity that is well-received by clinic participants (as seen in the observed participant responsiveness scores). Like other mental health LCs, when combined with EBTDC MAP, this LC model simultaneously addressed clinical skill acquisition for frontline staff and organization-level implementation challenges. A unique feature of this model was the opportunity to clearly delineate the LC content, and obtain preliminary data on the value added of the LC content to a well-established and comprehensive statewide clinical training program (i.e., EBTDC). Specifically, the LC was designed to help clinics develop metrics for tracking progress using a PDSA cycle (e.g., number of MAP cases), with strategies for addressing barriers to the ongoing use of MAP among clinicians involved in the clinical training (e.g., dedicated supervision/prep time, buddy system to promote peer support).

Results of the study provided preliminary evidence that participation in the LC improved engagement in and completion of MAP training. This was evidenced by the higher rates of attendance on EBTDC clinician calls. Although the number of MAP cases held by clinicians did not vary as dramatically as the other implementation outcomes (probably because NYS MAP certification required only use of MAP with 2 cases), it did appear that in three of the four matched pairs, clinicians from the LC sites were more likely to submit their portfolios for NYS MAP certification. In the one pair, in which the control site outperformed the LC

site, it is notable that the LC site's clinicians were on average 20 years older. Data from the larger MAP training initiative (Olin et al., 2015) showed that age was a significant predictor of clinician dropout from MAP. Thus, this anomaly may reflect key differences in clinician characteristics (specifically age) that impacted MAP implementation; however, this issue requires further investigation in future research. It could be that older workers have a differing perspective on any new training initiative given their additional years in the field or they could have felt that this particular training was not helpful to their practice.

Overall, these findings provide a positive signal for the value of this LC model. However, caution should be exercised due to several limitations. First, this study recruited volunteers for the LC condition. Volunteer sites were likely more motivated and may have performed better than their matched comparison sites without LC participation, underscoring the tremendous need for additional randomized control studies (Gustafson et al., 2013). In addition, there may be unmeasured characteristics of participating and non-participating sites that would be important to understand. Either due to their size or other circumstances, some clinics may not have had the infrastructure and requisite resources needed for participation in an LC (e.g., stable leadership, staff resources). Similarly, the role of larger agency-level infrastructure may directly influence whether and how well supervisors and front-line clinicians can change their practice.

Second, the small sample size precluded more sophisticated data analyses, which would be a critical next step in evaluating the LC model. Third, this LC was developed and delivered within a particular state context, and results might be different in other states and contexts. For example, in some clinically-focused LCs, clinical skills training for frontline providers is considered to be the first learning session (e.g., Bunger et al., 2014; Cavaleri et al., 2010; Ebert et al., 2011; Roosa et al., 2011). The LC is then primarily focusing on supporting frontline staff, with clinic leadership and supervisory support included to help achieve that goal. LCs also appear to vary in the extent to which they are focused on using QI processes and QI team models (Mittman, 2004; Nadeem, Olin, et al., 2013; Nadeem et al., 2014). Other LCs may follow different structures that are aligned to the context that that they are being developed in. The current LC was designed to capitalize on the existing clinical training infrastructure in NYS, and to offer distinct components focused on QI and implementation theory.

While findings from this pilot study are suggestive of potential positive impact, our enthusiasm is tempered by the cost and labor involved. We estimated that approximately 2600 hours were spent by the research team to conduct the LC. This time was over and above the time that clinic sites and research and training staff in both conditions devoted to the EBTDC MAP rollout itself. In addition, while there were no direct costs to clinical sites to participate in the LC, clinic teams made significant time investment (and potentially lost billable hours) in participating in phone calls, engaging in QI activities, and coming to in-person trainings over and above their participation in the EBTDC clinical training program. The costs of clinic participation could not be captured in the current study, but is an important factor in determining the costs associated with any implementation strategy. While costs would likely be reduced in subsequent rollouts, our estimation does highlight the significant investment of time in LCs, as noted by others (e.g., Fremont et al., 2006;

Gustafson et al., 2013; Mittman, 2004). Our experience also highlighted other challenges for clinics that should be addressed in the further refinement of LCs and other implementation strategies. Not all clinics signed onto the research study, and some clinics were not able to participate in the LC due to the pressing concerns such as leadership changes, clinic finances or the inability to form a stable QI team. Within the LC, the ability to establish and maintain QI teams, develop appropriate metrics for tracking progress as well as the leadership skills needed to engage and incentivize clinician success in integrating new practices were significant challenges. Individual site coaching sessions were critical for supporting the implementation of the QI methods. Once appropriate metrics were developed, QI teams were capable of developing change strategies that could be implemented within their local context.

Given the intensiveness of LCs, future studies should examine cost-benefits of LCs in contrast to other approaches. Testing LCs against existing models such as audit and feedback, individual site coaching, or new implementation models that are nimble and theory-based is particularly important for large-scale rollouts. The LC might also be compared and contrasted with the ARC model (e.g., Glisson et al., 2010), which has a similar emphasis on within-site team effectiveness, goal setting, identification of implementation barriers, and feedback systems, but differs in its structure and depth of focus on the overall effectiveness of individual organizations. In addition, Powell and colleagues (2011) have identified a range of implementation strategies that can be used in isolation or jointly to promote effective implementation of new practices. In addition to costs, dismantling studies and studies of the longer-term use of the QI strategies for the sustainment of new programs should also be examined. For example, a recent analysis of a LC focused on trauma-focused CBT highlighted the ways in which the LC may change professional social networks (Bunger et al., 2014), which is consistent with the work of others which has shown the importance of social networks in scaling (Palinkas et al., 2011). It would also be helpful to examine QICs impact on specific QI-related skills, such as the use of data for ongoing monitoring and team effectiveness.

In summary, the current study provides clear specification of methods used to enhance implementation of a clinical program; this has not, to our knowledge, occurred previously (Proctor, Powell, & McMillan, 2013). Although the data suggest a positive impact of a manualized, theoretically-based LC on the implementation of an evidence-based practice, the lack of randomization, small sample size and considerable professional time needed to mount a successful LC suggest that this strategy needs to be evaluated against other implementation strategies, with attention to understanding the impact of each core component of the model on target outcomes.

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Table 1

Learning Collaborative Overview

Pre Work	**Learning Session 1 (Month 1): 1 day sessions**	**Learning Session 2 (Month 4): 1 day session**	**Learning Session 3 (Month 8): 1 day session**
• Individualized phone consultation led by LC Faculty • Set up local CI teams • Leadership planning • Staffing/time allocation • IT/admin support structures • Team goal-setting • EBTDC MAP Training for clinical staff	• LC Overview • Review Goals of LC (learn to use QI; cross-site learning, team effectiveness) • Using local data to guide improvement • Team Planning	• Team reports on experiences with MAP, EBP implementation issues • Review of PDSAs • Discussion of refinements and next steps • Team Planning	• Team Updates • Sharing PDSAs • Advanced policy and practice issues • Highlights of progress • Sustainability and spread planning
Action Periods (9 months long)			
• QI Team implementation of BRIDGE • QI Team tracking of activities/refinements • Monthly QI Team Calls (focus on QI processes, PDSAs)		• Email/web-based communication and support • As needed individual team consultations (email, phone, in-person)	

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Table 2

Background Characteristics by Clinic Site for each Matched Pair

	Clinic *n*	Average clinician age (SD)	% with Masters degree or higher	% of clinicians endorsed high prior CBT use	Average prior technology experience (SD)
Matched Pair 1 (hospital based)					
LC Clinic 1	5	53.5 (11.1)	100%	20%	39.8 (5.4)
Control Clinic 1	7	33.2 (7.5)	100%	17%	39.5 (4.3)
Matched Pair 2 (community-based)					
LC Clinic 2	14	32.4 (10.0)	79%	14%	39.4 (5.7)
Control Clinic 2	7	40.1 (12.5)	100%	30%	38.4 (5.9)
Matched Pair 3 (school-based)					
LC Clinic 3	7	30.3 (3.7)	100%	50%	39.3 (5.6)
Control Clinic 3	3	35 (5.6)	100%	0%	33 (11.3)
Matched Pair 4 (community-based)					
LC Clinic 4	4	31 (14.7)	100%	25%	42.5 (3.4)
Control Clinic 4	4	30.8 (2.6)	100%	0%	36.7 (10.6)

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Table 3

Comparison of Implementation outcomes for each matched pair

	Average % of consultation calls attended (SD)	Average # MAP cases (SD)	% submitted MAP portfolios
Matched Pair 1 (hospital-based)			
LC Clinic 1	80% (.12)	2.1 (1.3)	40%
Control Clinic 1	74% (.10)	1.57 (.78)	85%
Matched Pair 2 (community-based)			
LC Clinic 2	57% (.31)	2 (1.84)	50%
Control Clinic 2	35% (.36)	1.14 (1.12)	14%
Matched Pair 3 (school-based)			
LC Clinic 3	79% (.11)	2.3 (1.1)	72%
Control Clinic 3	70% (.19)	2.3 (.57)	66%
Matched Pair 4 (clinic-based)			
LC Clinic 4	71% (.21)	1.5 (.50)	50%
Control Clinic 4	52% (.18)	1.0 (0)	0%