



## Improving teamwork in multidisciplinary cross-sector teams: Adaption and pilot testing of a team training for Child Advocacy Center teams

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### ABSTRACT

**Background:** Effective teamwork is critical to the mission of Child Advocacy Center (CAC) multidisciplinary teams. Team interventions designed to fit the unique cross-organizational context of CAC teams may improve teamwork in CACs.

**Methods:** A collaborative, community-engaged approach was used to adapt TeamSTEPPS, an evidence-based team training for healthcare, for CAC multidisciplinary teams. The adapted training was piloted with one team and evaluated using mixed methods. Team members completed pre-training (n = 26) and follow-up surveys (n = 22) and participated in qualitative interviews (n = 9).

**Results:** The adaptation process resulted in the creation of TeamTRACS (Team Training in Roles, Awareness, Communication, and Support). Participants rated TeamTRACS as highly acceptable, appropriate, feasible, relevant, and useful for CAC teams. They identified positive and negative aspects of the training, ideas for improvement, and future uses for TeamTRACS.

**Conclusions:** TeamTRACS is a feasible approach to team training in CACs, and team members find the content and skills relevant and useful. Additional research is needed to test the effectiveness of TeamTRACS and identify appropriate implementation strategies to support its use.

### 1. Introduction

Child maltreatment and its sequelae are critical concerns with substantial long-term costs for children, families, and the systems that serve them (Chen et al., 2010; Hillberg et al., 2011; Norman et al., 2012; Peterson et al., 2018; Sedlak et al., 2010; Widom, 2014). Over the past few decades, multidisciplinary teams have become the standard of care for responding to allegations of child sexual abuse (Herbert et al., 2020; Herbert & Bromfield, 2017, 2019). The most common model in the United States is the Children's Advocacy Center (CAC) model, with more than 900 CACs nationwide (National Children's Alliance, 2023). CACs provide coordinated interagency responses to allegations of sexual abuse and other maltreatment and comprehensive, trauma-sensitive investigations and services for child victims and their families (Elmqvist et al., 2015; Herbert & Bromfield, 2019).

The multidisciplinary team is the foundation of the CAC model. In addition to CAC administrative staff, the multidisciplinary team includes representatives from law enforcement, child welfare, prosecution,

medicine, mental health, victim advocacy, and potentially other disciplines (e.g., schools, probation) (National Children's Alliance, 2021). Because CACs rely on multidisciplinary team members employed by separate organizations, effective teamwork is critical (McGuier et al., 2022).

There is compelling evidence from other settings that team functioning impacts team performance and service quality. Team functioning (i.e., how teams think, feel, and act) includes processes and states that may be cognitive (e.g., shared knowledge), affective (e.g., trust, respect), or behavioral (e.g., information sharing) (Kozlowski & Bell, 2013; Kozlowski & Ilgen, 2006; Shuffler et al., 2018). Team functioning influences team performance (e.g., work quality, efficiency, productivity) in diverse work settings (Bisbey & Salas, 2019; DeChurch & Mesmer-Magnus, 2010; Kozlowski & Bell, 2013; Salas et al., 2017). Team functioning is also positively associated with patient safety (e.g., medical errors) and clinical outcomes (e.g., operating time, length of hospital stay) in healthcare settings (McCulloch et al., 2011; Miller et al., 2018; Reiss-Brennan et al., 2016). For multidisciplinary teams

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responding to child abuse, descriptive research has identified aspects of teamwork, including shared knowledge, trust and respect among team members, and effective communication, as critical to collaboration quality (Darlington & Feeney, 2008; Ghan, 2016; Herbert et al., 2020; Herbert & Bromfield, 2019; Lewandowski & GlenMaye, 2002; McGuier et al., 2022; Newman et al., 2005; Newman & Dannenfelser, 2005; Smith, 2011).

### 1.1. Team training

Team interventions can improve team functioning and clinical outcomes (Hughes et al., 2016; Klein et al., 2009; McEwan et al., 2017; Miller et al., 2018; Salas et al., 2008; Shuffler et al., 2011, 2018). Most team interventions have been developed in university laboratories or military settings and are designed for teams within a single organization (Salas et al., 2008; Shuffler et al., 2011). Team interventions in healthcare are increasingly common, but mostly focused on acute care settings (Baker et al., 2017; Capella et al., 2010; Clancy & Tornberg, 2007; Fransen et al., 2012; Neily et al., 2010; Sheppard et al., 2013). Trainings currently provided to CAC teams are resource-intensive, incorporate a broad array of topics (e.g., creating team protocols, meeting accreditation standards), and have not been rigorously evaluated. Effective and accessible interventions for CAC multidisciplinary teams and their unique cross-organizational context are needed.

Team training is a specific type of team intervention that targets affective, behavioral, and cognitive team functioning by teaching teamwork knowledge, skills, and abilities (Hughes et al., 2016; Klein et al., 2009; Salas et al., 2008; Shuffler et al., 2011). For example, team training may target shared knowledge within the team, back-up or supportive behaviors, or effective communication skills (Shuffler et al., 2011). Increased use of teamwork skills improves behavioral processes as well as affective and cognitive states in the team. For example, increased use of communication skills (e.g., assertive statements) may improve conflict management processes, team cohesion, and members' shared understanding of the problem. Meta-analytic findings indicate that team training has medium-to-large positive effects on team functioning (McEwan et al., 2017; Salas et al., 2008). In healthcare settings, team training improves knowledge, use of skills, and organizational and patient outcomes (Hughes et al., 2016). Team training is a promising approach to enhancing team functioning in CACs, improving the quality of care, and fully realizing the desired outcomes of the CAC model.

### 1.2. TeamSTEPPS

TeamSTEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety) is an evidence-based team training intervention for healthcare. TeamSTEPPS was developed by the Agency for Healthcare Research and Quality and is the most widely used team training approach in healthcare, with an estimated 35% of all healthcare workers exposed to the model (Agency for Healthcare Research and Quality, 2019a; Baker et al., 2017). It targets knowledge, skills, and attitudes related to communication, leadership, situation monitoring, and mutual support, and it has been shown to improve team functioning and patient outcomes (e.g., fewer errors, shorter time to procedures) (Capella et al., 2010; Clancy & Tornberg, 2007; Mahoney et al., 2012; Mayer et al., 2011; Parker et al., 2019; Sawyer et al., 2013; Sheppard et al., 2013).

TeamSTEPPS is a flexible, modular approach that can be used in whole or in part (i.e., selection of specific tools to meet team needs), with trainings ranging from 1-hour workshops focused on a specific component to a 2-day train-the-trainer workshop. Training materials are freely available (<https://www.ahrq.gov/teamstepps/curriculum-materials.html>). Initially developed for hospital-based teams, it has since been adapted for other healthcare settings (e.g., long-term care, office-based care) (Agency for Healthcare Research and Quality, 2019a), and more recently, for school-based mental health teams (Kuriyan et al., 2021; Wolk et al., 2018, 2019). The flexible nature of TeamSTEPPS and

previous successes in adapting it to new settings suggest it is a promising model for use in CACs. "Scaling out" evidence-based interventions by delivering them to new populations and/or through new delivery systems can increase their spread and impact, but adaptations to the intervention may be needed to ensure that it is feasible and acceptable in a new context (Aarons et al., 2017).

## 2. Current study

The current study used a collaborative, community-engaged approach to adapt TeamSTEPPS for use with CAC multidisciplinary teams. Based on our literature review and discussions with CAC leadership, we anticipated that scaling out TeamSTEPPS to a new population (i.e., from healthcare teams to teams responding to child abuse) would require adaptations to content (e.g., removing references to patients, changing examples) as well as modifications to improve its fit in the new setting, as the structure and context of CACs differs considerably from the healthcare settings for which TeamSTEPPS was designed. We then piloted the adapted training, TeamTRACS (Team Training in Roles, Awareness, Communication, & Support), with one CAC multidisciplinary team. In this paper, we describe the adaptation process (Study 1) and present a mixed methods evaluation of the pilot study (Study 2).

## 3. Study 1: Adaptation of TeamSTEPPS

We worked collaboratively with community members to adapt TeamSTEPPS through a systematic and participatory adaptation process (Escoffery et al., 2019). Collaborators' engagement was assessed throughout the study. The resulting intervention, TeamTRACS, is designed for multidisciplinary teams working with Child Advocacy Centers.

### 3.1. Methods

#### 3.1.1. Participants and procedures

A Community Advisory Committee of nine individuals with relevant experience and expertise was formed to guide the adaptation process. Community collaborators were recruited through recommendations from colleagues and community members, with the goal of maximizing representation from the different disciplines typically involved in CAC teams. All but one individual invited to participate agreed; the individual who declined identified another member of the organization who agreed to participate. Members represented multiple disciplines (e.g., child welfare, law enforcement, forensic interviewing, medical), had varied levels of experience with the CAC model (5.5 years to 30 years), and included both frontline professionals ( $n = 6$ ) and individuals in local, regional, and national leadership positions ( $n = 3$ ). The Community Advisory Committee met virtually every other week at the start of the project and then less frequently (typically monthly) for the remainder of the study; there were 13 meetings over 14 months. Meetings were 1–2 h and included review and discussion of multidisciplinary teams (e.g., team structure, common challenges), goals of team training, and TeamSTEPPS materials. The committee also reviewed and provided feedback on data collection procedures, measures, and preliminary results of the pilot study. Participants received \$60 per meeting and \$60 per hour for time spent reviewing and providing feedback on materials outside of meetings. All procedures were approved by the University of Pittsburgh Institutional Review Board.

#### 3.1.2. Measurement of collaborator engagement

We assessed engagement processes (e.g., recruitment, participation) and proximal outcomes (e.g., usefulness of meetings) based on Ray and Miller's framework and best practice recommendations (Guise et al., 2013; Ray & Miller, 2017). Committee members were asked to complete brief anonymous surveys at the end of each committee meeting and an additional survey at the midpoint and end of the project. The post-

meeting surveys asked committee members to rate the effectiveness of the meeting and the relevance of the discussion to improving team functioning in CACs on a 4-point scale from 0 ‘not at all’ to 3 ‘very much’ and respond to open-ended questions. Partnership quality was assessed at the midpoint and end of the project with the Partnership Assessment in Community-based Research (PAIR) survey (Arora et al., 2015). The PAIR contains 31 items rated on a 5-point scale from 1 ‘almost never true’ to 5 ‘almost always true.’ Items reflect five dimensions of partnership quality: communication, collaboration, partnership values, benefits, and evaluation.

3.1.3. Adaptation process

Our phased approach to adapting TeamSTEPPS followed Escoffery et al. (2019) consolidated framework for adapting evidence-based interventions. Table 1 lists each step and briefly describes how the step was completed in this study. The adaptation process took approximately one year. Initial steps were completed by the research team prior to the start of the study; later steps were completed in collaboration with the community advisory committee described above. We used the Framework for Reporting Adaptations and Modifications-Enhanced (FRAME; Stirman et al., 2019) to characterize and document modifications (e.g., what, when, why).

3.2. Results

3.2.1. Collaborator engagement

Participation in community advisory committee meetings ranged from 44 to 100%, with a mode of 89%. Committee members most often missed meetings because of work conflicts (e.g., court) or scheduled time off. Post-meeting surveys were completed by most meeting attendees (M = 84%; range 67–100%). Team members reported the meetings were effective (M = 2.34, SD = 0.66) and relevant to improving teamwork and services provided in CACs (M = 2.34, SD = 0.60). Table 2 presents ratings of each dimension of partnership quality. Committee members rated all dimensions positively (>4 on 1–5 scale) with small increases from study midpoint to study end.

**Table 1**  
Consolidated Steps for Adapting Evidence-Based Interventions (Escoffery et al., 2019).

Step	Application in this study
1. Assess community	<ul style="list-style-type: none"> <li>Reviewed literature and assessed needs through informal conversations before the start of the study.</li> </ul>
2. Understand the intervention	<ul style="list-style-type: none"> <li>Reviewed team training research, interventions, and materials before the start of the study.</li> </ul>
3. Select intervention	<ul style="list-style-type: none"> <li>Chose TeamSTEPPS before the start of the study based on evidence base, use in multiple contexts, and availability of materials.</li> </ul>
4. Consult with experts	<ul style="list-style-type: none"> <li>Consulted with an expert in team training during adaptation process.</li> </ul>
5. Consult with stakeholders	<ul style="list-style-type: none"> <li>Formed community advisory committee. Met regularly throughout study.</li> <li>Partnered with specific organization for pilot. Met regularly with director throughout study.</li> </ul>
6. Decide what needs adaptation	<ul style="list-style-type: none"> <li>Community advisory committee reviewed TeamSTEPPS materials and identified adaptation needs.</li> </ul>
7. Adapt the original program	<ul style="list-style-type: none"> <li>Research team and committee revised training materials through iterative process.</li> <li>Characterized adaptations using FRAME (Stirman et al., 2019).</li> </ul>
8. Train staff	<ul style="list-style-type: none"> <li>Created detailed training materials to minimize training requirements. No training was needed for the pilot.</li> </ul>
9. Test the adapted materials	<ul style="list-style-type: none"> <li>Piloted training with partnering organization.</li> </ul>
10. Implement	<ul style="list-style-type: none"> <li>Recorded implementation activities.</li> <li>Assessed implementation outcomes.</li> </ul>
11. Evaluate	<ul style="list-style-type: none"> <li>Documented adaptations using FRAME (Stirman et al., 2019).</li> <li>Conducted mixed methods evaluation of pilot.</li> </ul>

**Table 2**  
Partnership Quality Ratings.

	Study Midpoint (N = 9)	Study End (N = 8)
	M (SD)	
Communication	4.22 (0.52)	4.35 (0.63)
Collaboration	4.02 (0.63)	4.25 (1.02)
Partnership values	4.60 (0.41)	4.67 (0.44)
Benefits	4.06 (0.69)	4.35 (0.75)
Evaluation	4.07 (0.62)	4.33 (0.78)

3.2.2. Training adaptations

The starting point for adaptations was the TeamSTEPPS 2.0 Fundamentals version of TeamSTEPPS (Agency for Healthcare Research and Quality, 2019b). Table 3 describes modifications to context (i.e., format, setting, personnel, population), training, evaluation, and implementation activities. After deciding to scale out TeamSTEPPS to a new population and setting (i.e., from healthcare teams to teams responding to child abuse), we modified training and implementation activities to maximize fit with available resources and existing training infrastructure for CAC teams. For example, we chose to use an external, rather than internal, trainer because CACs frequently use trainings provided by regional organizations and most do not have enough staff to allow for an internal trainer. Table 3 lists specific reasons and goals for each modification.

Although we initially expected to make relatively minor adaptations to TeamSTEPPS content (e.g., tailoring language, changing examples), committee members identified a need for more extensive changes. These changes included adding elements (e.g., specific information about roles on CAC multidisciplinary teams), removing elements (e.g., communication skills designed for acute healthcare settings), condensing content, and reordering content. For example, the ‘Situation Monitoring’ module was renamed ‘Shared Awareness’ because of negative reactions to the idea of “monitoring” and moved earlier in the training. Content modifications are described in detail in Appendix A.

All changes are believed to be consistent with the core functions of TeamSTEPPS except for two content modifications. First, the Leadership module was removed from the team training. Committee members expressed concerns that this training content did not fit with the non-hierarchical structure of CAC multidisciplinary teams and could create conflict between team members. Much of the content was integrated into other modules; for example, content on debriefs was moved into the ‘Reflection and Goal-Setting’ module (see Appendix A for more details). However, removal of this component is a departure from the original TeamSTEPPS model. Second, a goal-setting intervention was integrated into the final training module, adding a new core function. Although this change diverges from the TeamSTEPPS model, the content was drawn in part from the materials provided for TeamSTEPPS trainers and intended to improve the fit of the training with available resources and training infrastructure.

All changes were made systematically and proactively during the pre-implementation/planning phase. Adaptations were made at the system/community and organizational levels to fit the CAC context instead of the healthcare context. The decisions to modify the setting, personnel, and population were made by the principal investigator (PI) prior to the start of the study. All other changes were made collaboratively by the PI and community advisory committee; the PI made the final decisions. Given the extent of the changes, we chose to rename the adapted training TeamTRACS (Team Training in Roles, Awareness, Communication, & Support).

3.2.3. Adapted Training: TeamTRACS (Team training in Roles, Awareness, Communication, & Support)

TeamTRACS consists of five training modules: 1) Team Structure and Roles, 2) Shared Awareness, 3) Communication, 4) Mutual Support, and 5) Reflection and Goal-Setting. Table 4 lists the training modules and

**Table 3**  
Modifications Made to TeamSTEPPS to Create TeamTRACS.

Modification <i>Changed from...</i>	Goal(s) of Modification								Reason
	Adoption	Feasibility	Fit	Satisfaction	Cost	Reach	Fidelity	Sustainability	
<i>Format</i> in-person to virtual.	◆	◆			◆	◆		◆	COVID restrictions. Facilitate team member involvement. Decrease cost and improve sustainability with limited resources.
4–6 h to < 4 h.	◆	◆	◆		◆	◆			Facilitate team member involvement. Reduce time/resources needed.
<i>Setting</i> healthcare to CACs/teams responding to child abuse.	◆	◆	◆	◆		◆		◆	Decision to scale out team training to new setting/population.
<i>Personnel</i> trainer(s) chosen from within organization to external trainer(s)	◆	◆	◆	◆	◆		◆	◆	Fit with available resources and existing training infrastructure.
<i>Population</i> healthcare staff to CAC team members.	◆	◆	◆	◆		◆		◆	Decision to scale out team training to new setting/population.
<i>Training</i> internal trainer completing master course to experienced external trainer without specific training.	◆	◆	◆	◆	◆		◆	◆	Fit with available resources and existing training infrastructure.
<i>Evaluation</i> internal evaluation by trainer to research evaluation.		◆							Fit with available resources.
<i>Implementation Activities</i> internal trainer leading to external trainer leading. Reduced number and scope of activities; incorporated implementation activities into goal-setting module.	◆	◆	◆	◆	◆		◆	◆	Fit with available resources and existing training infrastructure. Fit with available resources and existing training infrastructure.

**Table 4**  
Training Modules and Targets for TeamTRACS and TeamSTEPPS.

Adapted Intervention: TeamTRACS		Original Intervention: TeamSTEPPS	
Module	Target (Knowledge, Skills, Attitudes)	Module	Target (Knowledge, Skills, Attitudes)
1. <i>Team Structure and Roles</i>	Shared mental model of team (i.e., understanding of team structure and roles)	1. <i>Introduction</i> 2. <i>Team Structure</i>	Shared mental model of team (i.e., understanding of team structure and roles)
2. <i>Shared Awareness</i>	Shared awareness and mutual performance monitoring	5. <i>Situation Monitoring</i>	Shared awareness and mutual performance monitoring
3. <i>Communication</i>	Effective information exchange Assertion and conflict management	3. <i>Communication</i>	Effective information exchange
4. <i>Mutual Support</i>	Supportive behavior	6. <i>Mutual Support</i>	Supportive behavior Advocacy and assertion
5. <i>Reflection and Goal-Setting</i>	Reflexivity (planning and reviewing performance) Goal-setting	4. <i>Leading Teams</i> 7. <i>Summary – Putting it All Together</i>	Planning and reviewing performance Conflict management

targets for TeamTRACS alongside those for TeamSTEPPS. The aspects of teamwork targeted by TeamTRACS remain consistent with those targeted by TeamSTEPPS. Presentation slides, detailed instructor guides, and worksheets were created for each module and are available from the first author. TeamTRACS is designed as a half-day (4 h) training incorporating didactic instruction, discussion, and interactive activities. Modules vary in length from 20 to 45 min. It can be delivered virtually or in-person. As part of the training, team members are encouraged to identify specific goals for their team and make plans to use specific strategies from the training.

3.3. Summary

Through a systematic and collaborative process, we created TeamTRACS, an adapted version of TeamSTEPPS designed for CAC multidisciplinary teams. Community advisory committee members were highly engaged in the adaptation process and rated the community-academic partnership positively. TeamTRACS is a brief modular

training that aims to improve multidisciplinary team members' understanding of team structure and roles, shared awareness, communication, supportive behavior, and reflexivity.

4. Study 2: Pilot of TeamTRACS

TeamTRACS was piloted with the multidisciplinary team at a partnering CAC and evaluated using simultaneous mixed methods (QUAN + QUAL). The partnering CAC was not involved in the adaptation process described above. The evaluation framework for the pilot study was based on Kirkpatrick's levels of evaluation (Kirkpatrick & Kirkpatrick, 2016). The primary goal of the pilot was to evaluate reactions to the training, including its feasibility, acceptability, and appropriateness, and identify aspects of the training needing further refinement. A secondary goal of the pilot was to explore the effect of TeamTRACS on learning, transfer (i.e., use of skills), and results (i.e., changes in team functioning) in the participating team.

## 4.1. Methods

### 4.1.1. Participants

Participants were members of the multidisciplinary team at the partnering CAC, none of whom were involved in the adaptation process. The CAC is in rural northwestern Pennsylvania and serves approximately 175 children annually. We expected team members to change during the study period and included only current team members at each timepoint. The CAC director identified current team members prior to each assessment.

### 4.1.2. Procedures

**4.1.2.1. Training delivery.** TeamTRACS was delivered in one half-day training session. Content was slightly condensed to fit in the 3.5 h allotted for training instead of the 4 h initially planned. All five modules were completed, and no additional adaptations were made during the training. The training was delivered through videoconferencing (Zoom), with participants joining individually from locations of their choosing and trainers joining from private offices. The training was co-facilitated by the PI (a psychologist with experience leading groups) and a director of another rural CAC with experience training multidisciplinary teams. This director was a member of the Community Advisory Committee and therefore familiar with the theoretical background and rationale of the training. Trainers met prior to the training to review materials and divide responsibilities.

The study team had prior contact with leadership of the participating CAC to prepare for training (e.g., identify who should attend, review evaluation procedures and results, discuss training logistics). The CAC provided 4 gift cards (\$25 each) that were raffled off to attendees during the training. The research team did not provide any incentives.

**4.1.2.2. Assessment procedures.** Data was collected through brief post-training surveys, a longer survey at baseline and 4-month follow-up, and qualitative semi-structured interviews shortly after the training. All team members were invited to participate in baseline and follow-up surveys; only training attendees were invited to participate in post-training surveys and qualitative interviews. The research team recorded training attendance. Participants received \$30 for completing each of the longer surveys and \$45 for completing an interview. Interviews were conducted via videoconference, audio-recorded, and transcribed. All procedures were approved by the University of Pittsburgh Institutional Review Board.

### 4.1.3. Post-training survey

Immediately after completing each TeamTRACS module, participants were asked to complete a brief anonymous survey. They rated the module's relevance and usefulness on a 5-point Likert scale (1 'completely disagree' to 5 'completely agree') and the likelihood of using the skills and strategies from the module on a 5-point scale (1 'not at all likely' to 5 'extremely likely'). Participants also provided open-ended comments on what they found most useful, what they found most challenging, and suggestions for improvement. After completing all modules, participants rated overall relevance, usefulness, and likelihood of using skills/strategies and provided additional open-ended comments. They also rated the acceptability, appropriateness, and feasibility of the overall training; each outcome was assessed with 2 items from Weiner et al. (2017) rated on a 5-point scale from 1 'completely disagree' to 5 'completely agree.'

### 4.1.4. Baseline and follow-up survey

At baseline (prior to training) and 4 months after training, an online survey (<30 min) assessing team functioning was conducted. The survey was constructed in REDCap, a secure, web-based software platform (Harris et al., 2009, 2019), and individual survey invitations were

emailed to all team members.

**4.1.4.1. Background information.** Participants reported their discipline, years of experience in their current CAC and with any CAC. Participants also reported their gender, race, ethnicity, and age.

**4.1.4.2. Implementation outcomes: Acceptability, appropriateness, feasibility.** At baseline and follow-up, participants were provided a brief description of TeamTRACS and rated its acceptability, appropriateness, and feasibility (Weiner et al., 2017). As in the post-training survey, each outcome was assessed with 2 items rated on a 5-point scale from 1 'completely disagree' to 5 'completely agree' (Weiner et al., 2017). Internal consistency for scales was high at both timepoints ( $\alpha$ 's > 0.97).

**4.1.4.3. Team functioning.** Team members rated the aspects of team functioning targeted by the training. Understanding and respect for team roles was assessed with 5 items from existing measures of respect (Cronin et al., 2011) and collaboration (Mattessich et al., 2001) ( $\alpha$  = 0.95). Items from the TeamSTEPS Teamwork Perceptions Questionnaire (T-TPQ; Battles & King, 2010) were used to assess shared awareness (7 items;  $\alpha$  = 0.91), information exchange (7 items;  $\alpha$  = 0.63), conflict management (5 items;  $\alpha$  = 0.86), and mutual support (4 items;  $\alpha$  = 0.59). Some T-TPQ items were modified to better fit the context of CACs and be consistent with the language used during the training. For example, Situation Monitoring items were adapted to emphasize shared awareness and deemphasize monitoring (e.g., "staff monitor each other's performance" was changed to "team members pay attention to how other team members are doing"). Mutual support was also measured with a 5-item scale assessing emotional and instrumental supportive behaviors (Aubé & Rousseau, 2005) ( $\alpha$  = 0.93). Team reflexivity was assessed with 4 items assessing the extent to which the team discusses and reflects on processes (Schippers et al., 2007) ( $\alpha$  = 0.88). All items were rated on a 5-point scale from 1 'strongly disagree' to 5 'strongly agree,' except for the measure of supportive behaviors, which used a 5-point scale from 1 'not at all true' to 5 'totally true.'

### 4.1.5. Qualitative interviews

Semi-structured qualitative interviews with training attendees were designed to complement quantitative survey data by providing more specific information about needed refinements, opportunities for elaboration, and a deeper understanding of any potential impact of the training. The interview guide assessed reactions, knowledge, behavior change, and results of the training (Kirkpatrick & Kirkpatrick, 2016).

### 4.1.6. Analyses

For our quantitative data, we calculated survey response rates, looked for patterns of missing data, and examined descriptive statistics. We also plotted and visually examined scores on team functioning measures at baseline and follow-up. Following recommendations for pilot studies, we did not conduct hypothesis testing (Leon et al., 2011).

We conducted directed content analysis of qualitative data (Hsieh & Shannon, 2005). Prior to analysis, we constructed preliminary codebooks with *a priori* codes for responses to the training (e.g., reactions, knowledge, behavior change, results) and each of the dimensions of team functioning targeted by TeamTRACS. Two coders (first and second authors) read all transcripts and then refined and added codes as needed through an iterative analysis process. After finalizing the codebook, all transcripts, as well as open-ended comments from the post-training and follow-up surveys, were independently coded by the same two coders and discrepancies were resolved through consensus. Coders then reviewed all coded data to identify common themes. Lastly, we integrated survey and interview data to examine triangulation (i.e., compare results from each method; function: convergence) and elaborate on quantitative findings (i.e., deepen understanding; function: complementarity) (Palinkas et al., 2011).

## 4.2. Results

### 4.2.1. Participants and training participation

As expected, there were some changes in team composition during the study because of turnover, changing job demands, and new hires. We invited 37 team members to participate in the baseline survey, 36 team members to the training, and 39 team members to the follow-up survey; 34 members were consistent across timepoints. Fig. 1a shows the disciplines included on the team.

Most team members (70%;  $n = 26$ ) participated in the baseline survey, and 53% of team members participated in the follow-up survey ( $n = 22$ ). Ten qualitative interviews were completed with 9 team members. Team members were fairly experienced. At the time of the baseline survey, only one team member had been with the team for less than a year (27% 1–3 years, 42% 4–7 years, 27% >7 years).

More than half of team members invited to the training attended (53%;  $n = 19$ ). All disciplines on the multidisciplinary team were represented except for law enforcement (see Fig. 1b; 1 probation team member attended). Excluding law enforcement team members ( $n = 11$ ), 76% of team members participated in the training. Two team members left the training early due to emergent demands. Of the 34 team members invited to participate in the baseline survey, training, and follow-up survey, 16 (47%) participated in all three activities and 9 (26%) other members participated in at least one activity (i.e., baseline survey, training, or follow-up survey).

### 4.2.2. Reactions to training

Ratings of the relevance and usefulness of individual training modules were generally high. Average relevance ratings ranged from 4.38 to 4.65, and usefulness ratings ranged from 4.25 to 4.59. Similarly, average ratings for the likelihood of using the skills and strategies from specific modules ranged from 3.94 to 4.56. The Team Structure & Roles module, which included fewer specific skills than the other modules, had the lowest rating for the likelihood of using the skills and strategies but the highest ratings for relevance and usefulness. The Communication module had consistently high ratings across all three items. Ratings for TeamTRACS overall were quite positive (relevance  $M = 4.60$ ,  $SD = 0.52$ ,

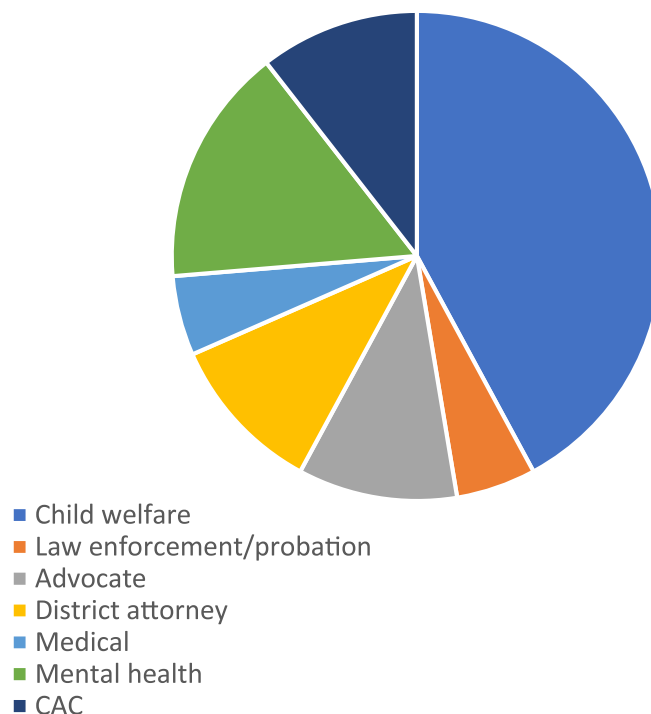


Fig. 1b. Disciplines of Training Attendees (N = 19).

range 4 ‘agree’ to 5 ‘completely agree’; usefulness  $M = 4.60$ ,  $SD = 0.52$ , range 4 ‘agree’ to 5 ‘completely agree’; likelihood of skill use  $M = 4.50$ ,  $SD = 0.53$ , range 4 ‘very likely’ to 5 ‘extremely likely’). Fig. 2 illustrates average ratings for each module and the overall training.

Participant ratings of acceptability, appropriateness, and feasibility are shown in Fig. 3. We report baseline ratings from all participants ( $n = 25$ ) and post-training and follow-up ratings from only those who attended the training ( $n = 10$ ;  $n = 15$ ). With one exception, the average rating at each assessment was greater than 4 (‘agree’), suggesting TeamTRACS was perceived as acceptable, appropriate, and feasible for CAC multidisciplinary teams.

Our qualitative findings expand on the quantitative data by providing additional depth and specific ideas for improvement. Table 5 presents results for positive and negative aspects of training, specifically reactions to training content, discussion opportunities, training length and timing, and the virtual training format. Quotes have been edited for clarity.

Overall, training content was considered relevant and useful, consistent with the high ratings from the post-training survey. The Team Structure module, particularly the discussion of team member roles and misconceptions, was viewed especially positively. The training materials were also viewed positively; team members considered the slides and case examples helpful and relevant. The skills and tools were generally seen as useful, with a few team members noting specific tools that were not as relevant to their team because of existing procedures or processes. Finally, team members expressed a desire for more support in moving forward after the training and taking actions to improve teamwork.

Team members appreciated that the training included only individuals from their team, allowing for discussion of their specific team’s strengths and challenges, and reported that the training encouraged open and honest discussions. The training used an online brainstorming tool (Ideaboardz) that allowed team members to anonymously add “sticky notes” in response to discussion questions and return to the Ideaboardz throughout the training (and afterwards). Participants viewed this tool extremely positively, highlighting the value of anonymous responses in creating honest discussions. The use of external, neutral facilitators was also a strength. Challenges to discussion within

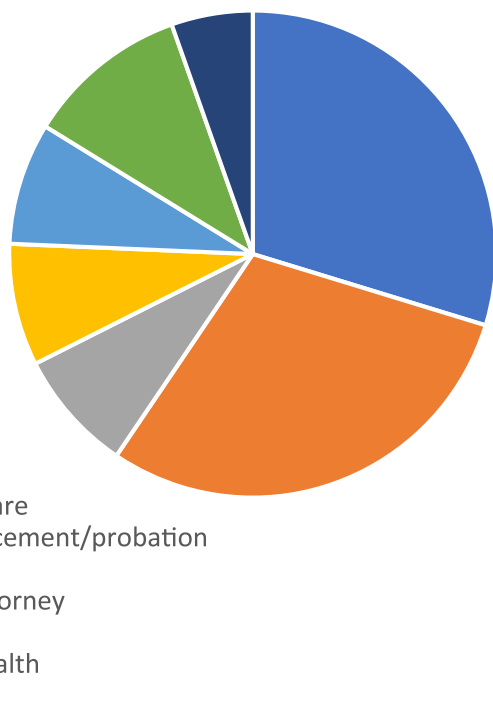


Fig. 1a. Disciplines of Team Members at Baseline (N = 37).

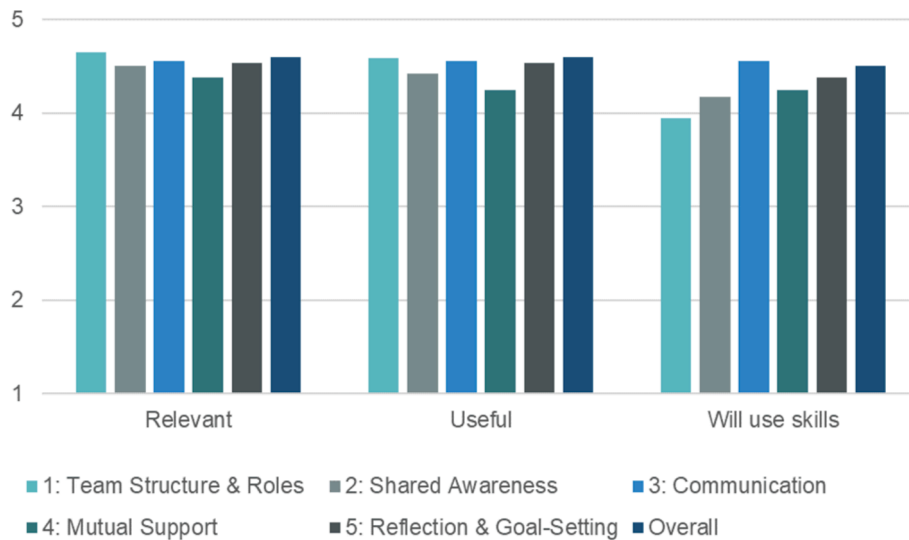


Fig. 2. Ratings of Training Content from Post-Training Survey.

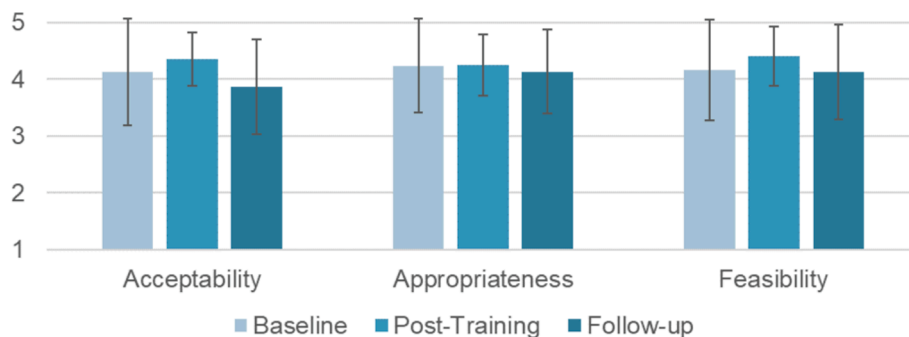


Fig. 3. Acceptability, Appropriateness, and Feasibility Ratings. Note: Bars depict mean ratings. Error bars depict standard deviations.

the training were confusion during breakout groups, which did not include a facilitator, and concerns about hierarchy and power dynamics between frontline workers and supervisors within agencies. Opportunities for anonymous responding through Ideaboardz were helpful in reducing these power dynamics.

The length and timing of training was generally viewed positively, with most team members reporting that it went quickly. A few team members felt some parts were rushed, and a common theme was a desire for a longer training to allow for more discussion. Some team members reported difficulty fitting the training into their schedule and suggested breaking it into shorter blocks of time. Lastly, participants reported a strong preference for in-person training over virtual training. Disadvantages of virtual training included more distractions for some participants, a general dislike of virtual trainings and “Zoom fatigue,” and fewer opportunities for informal conversations and relationship building among team members during the training. Most recognized some advantages of the virtual training format, including the potential for more team members to attend and simple, easy opportunities for anonymous responding.

#### 4.2.3. Impact of TeamTRACS

Table 6 presents qualitative results for the impact of TeamTRACS on learning, transfer (i.e., use of skills), and results (i.e., changes in team functioning and effectiveness). Participants described increases in knowledge about the purpose and goals of the team, as well as learning new strategies to improve shared awareness and communication. Participants reported relatively little behavior change or use of specific skills; they described increased efforts to understand other team

members’ perspectives and more thoughtfulness about team involvement. Most participants reported that TeamTRACS had not yet had a noticeable impact on team functioning or effectiveness, although some participants perceived improvements in case review meetings. Consistent with these qualitative findings, ratings of team functioning from the 4-month follow-up survey were similar to or slightly lower than ratings from the pre-training survey (Fig. 4).

#### 4.2.4. Ideas for improvement and future use of TeamTRACS

Interview participants provided multiple ideas for improving the training, including suggestions related to training content, facilitators, length, and format (see Table 7). Suggestions related to content included removing an icebreaker activity and beginning discussion as early as possible. Participants recommended continuing to use external facilitators, ideally facilitators with CAC experience, and including facilitators in breakout rooms to provide clarity and focus for discussions. Many participants expressed a desire to extend the length of the training to allow for more discussion time. Consistent with participants’ preferences for in-person training over virtual training, participants suggested delivering the training in-person instead of virtually.

When considering how TeamTRACS could or should be used in the future, participants recommended adding additional supports before and after training to maximize training impact, allowing flexibility in how it is used, and extending it to multiple audiences (see Table 7). As previously noted, participants wanted more support moving forward after the training. Although the final module included a goal-setting activity, the team struggled to develop an action plan within the allotted time and suggested extending this activity. Another suggestion

**Table 5**  
Qualitative Results: Positive and Negative Aspects of Training.

Training Content	
Positives	Negatives
<p>Training content was relevant and useful <i>I don't think there was a part that wasn't valuable to me. It was all useful. And it was all information that is useful moving forward on how to make our MDTs better.</i></p> <p><i>It's a lot of information...I hope you don't get a lot of feedback to cut anything out. Because...all of this is important for everybody to know. I don't think there's anything that should be cut from that unless you make a totally separate training and divide it.</i></p> <p>Presentation materials were helpful <i>The... slides weren't overwhelming... And again, that sticky note, the post-it boards. That was great being able to type in there and to have access to all of them throughout the training so that you can see them up and see how things were added. I really liked that.</i></p> <p><i>The case examples were awesome. ... some of those case examples were where we got the richest amount of discussion...I think they were very relevant to things we're discussing now.</i></p>	<p>Some tools not as relevant [referring to pre- and post-interview checklists] <i>For a team that's already functioning, they already have those protocols set in place, and I think that's just an extra set of paper that nobody would use.</i></p> <p>Not enough support for next steps <i>It started good discussion. I just want to know a way to continue that good discussion.</i></p> <p><i>The biggest question I've been asked afterwards is like "What do we do next?" Like, what do you want to do? Like are we going to meet again, or we can have...? and I'm like, 'I don't know.'</i></p>
Discussion Opportunities	
Positives	Negatives
<p>Opportunity to talk as a team <i>I thoroughly enjoyed it. I thought was the first time I'd seen our team, from my short time here, start to have some honest conversation... I wish more people were able to participate or we had a variety of disciplines on there, but yeah, I thought it was really good.</i></p> <p><i>...it was our team that was involved and not other counties' teams. That was very useful...having those people that are in our team.</i></p> <p>Use of anonymous "sticky note" boards to respond to questions <i>Because of the anonymity I loved that... it takes the emotional out of it, gets to the heart of what we want to talk about</i></p> <p><i>They like the anonymity of it and the fact that it was like something that you continue working with, you know, it's something that's fluid as a document that you could always go back to</i></p> <p>Use of external facilitators <i>I thought our trainers [were] wonderful. I was very appreciative of ... the time put into it and really trying... [to] get people to speak up and give 'em different methods like through the chat, through this, through that.</i></p>	<p>Confusion in breakout groups <i>Whenever we would go into the breakout groups...there wasn't a lot of direction, like as far as like what we were supposed to be doing. So, everybody was just like I'm not sure what we're supposed to be doing.... So, it really didn't go anywhere whenever we were in the breakout groups because nobody was really sure what to do.</i></p> <p>Concerns about power dynamics <i>I realized on that training there was a couple of administrators. And I noticed, possibly because of that, there's a hesitancy for some of the direct line workers to speak up because it might run counter to what their admin is telling them what to do or say and so they didn't feel safe and really being more a part of that discussion, but you did see it in the [anonymous sticky note boards].</i></p> <p><i>There [were] a lot of people who didn't want to say anything and if we're able to split into two groups...for some of the discussions, like the direct workers versus the management, they might realize our approach is completely different.</i></p>
Training Length and Timing	
Positives	Negatives
<p>Went quickly <i>I think it was the perfect length. I couldn't believe that it went by as fast as it did.</i></p> <p><i>Clear, concise, and nice flow.</i></p> <p><i>It flew by... The breaks were perfect. The setup was perfect, as far as the sections and each module I think it could be longer and it would still be valuable.</i></p>	<p>Some parts felt rushed; desire for more time <i>We want more time because it just felt rushed. There was a lot of things that were rushed.</i></p> <p><i>That was a huge aha moment. But it happened in the last half hour of the training, so there wasn't a lot of time to delve into it and explore that more.</i></p> <p>Hard for some to fit into schedule <i>We have a lot of cases and trying to</i></p>

**Table 5 (continued)**

Training Content	
Positives	Negatives
	<p><i>squeeze in four hours all at once was kind of hard, but if it would have been split up between two different two-hour sessions it would probably be easier to squeeze in. Then more people would probably participate in the training.</i></p>
Virtual Training Format	
Positives	Negatives
<p>May increase training attendance <i>this was the easiest way to get our team together</i></p> <p><i>Travel might not be an option so virtual to make sure that each discipline is present or as many team members as possible</i></p> <p>Made anonymous responding easier <i>the Zoom format...it's workable and obviously that's shown through the Ideaboardz because that's not something in person that would work, right? But on Zoom it worked fabulously.</i></p>	<p>More distractions <i>when you are in an office setting or at work and you are trying to do them on Zoom, people who aren't in the training do not care you are in a training. So, it can get very distracting.</i></p> <p><i>on Zoom I'm constantly having to...turn off my camera because I'm getting messages in or I'm getting whatever it is</i></p> <p>Dislike of virtual trainings <i>I just don't like the virtual trainings... that's just how I am...it's nothing to do with the actual information just personal preference of not doing anything on Zoom</i></p> <p>Fewer opportunities for informal conversations between team members <i>I think as a team those side conversations that happen while trainers are presenting are sometimes just as valuable. So, if something sparks an idea or sparks a thought and you're sitting next to someone and you start talking about that, I think there's more that can happen in an in-person [training], as far as teams go...if there's trust lacking you're more apt to build trust in-person, rather than on a computer.</i></p>

Note: MDT: multidisciplinary team.

was to take steps before the training to increase buy-in within the team. Participants also expressed a desire for flexibility in how TeamTRACS is used, including the ability to change the order of modules and the amount of time spent on each topic to allow for more discussion. Lastly, participants viewed the training as applicable to multiple audiences, including teams in different stages of development. One participant suggested that TeamTRACS could be used with students likely to enter associated professions (e.g., social work). Participants recommended that it be used repeatedly, with team members participating in annual or refresher training.

**5. Discussion**

In our first study, we adapted TeamSTEPS for CAC multidisciplinary teams, creating TeamTRACS. In our second study, we pilot tested TeamTRACS with one team and used mixed methods to evaluate reactions to the training, identify potential improvements, and explore its effects. TeamTRACS is designed to be a brief, focused training that can be easily disseminated through existing infrastructure with limited resources. By focusing on specific teamwork knowledge, skills, and abilities, TeamTRACS can equip team members with the skills needed to continuously improve team performance and services.

In our pilot study, we found that TeamTRACS was viewed positively by participating team members, with high ratings for relevance, usefulness, and likelihood of using skills, as well as acceptability, appropriateness, and feasibility. Participants identified many strengths of the training as well as areas for improvement. Although the pilot study was not designed to test the effectiveness of this training, quantitative and qualitative data suggested little behavior change, and participants described a need for more structured follow-up after the training



**Table 6**  
Qualitative Results: Training Impact.

Domain	
Interview Question(s)	Results
<b>Learning / Knowledge</b> Tell me what you learned from the training.	<p>Better understanding of multidisciplinary team (MDT) purpose and goals  <i>I think I did learn a little bit more about the purpose of what the MDTs are... I guess I never really understood why because I never really felt like we saw any kind of outcome from it. But hearing input about MDT, I did learn a little more about that.</i></p> <p><i>I think seeing some of the team members was useful to me in [getting] a little more of an explanation about what their roles are in the MDTs. That was a little bit helpful. I thought it was useful to get some clarity about who's involved and why.</i></p> <p>New skills and strategies  <i>The STEP tool, ...I hadn't heard of that before, so I liked that.</i></p> <p><i>How to use the STEP program. Working through to- better cohesion between the agencies and the disciplines. How to work better to fulfill the needs and responsibilities of each other instead of just focusing on one discipline versus others. How my investigations can benefit by the MDTs and getting the contacts from the CAC from the SANE and how everyone can support the investigation.</i></p> <p><i>The STEP and the other one I can't remember the name of, the Navy one... Pretty much in everything in the day-to-day for the job. Planning for the family of how to get us not involved with them to trying to prepare for court. Help lay out like what we did, and like we're gonna go through each letter and add the information and make it more cohesive for either court, closing out the family, and helping the family.</i></p>
<b>Transfer / Behavior Change</b> How, if at all, have you used the skills and strategies from the training?	<p>Increased perspective taking  <i>I think explaining our job is one of the things that I would utilize first. There's a lot of misconception with [child welfare] of what we can and can't do. So, I think the communication part about each discipline is very important and I think I would probably utilize that as soon as we're able to all get together. And I would probably be the one to discuss what laws and policies we have.</i></p> <p><i>...the barriers [to] sharing information, especially when it ties into the misconceptions ...I see that a lot in this setting, different disciplines have a perceived view of how the other disciplines should be operating, or what they should or shouldn't be doing. And that, that limits how we communicate sometimes... So, I'm trying to be more cognizant of that and try to find ways to... help educate alongside others to see from the other side, if that makes sense, to put on the other set of shoes.</i></p> <p><i>It has caused me to really work to understand the roles, perceptions, and abilities of the different disciplines.</i></p> <p>Greater planning  <i>I'm trying ...for myself trying to be more playful of how I communicate with people and involving them in that communication from the get-go... I know that I've taken some of those Ideaboardz, and personally, I'm trying to work through them to see how we can apply them to the larger team structure in a [strength-based] way.</i></p> <p><i>I plan out my day more so I can meet the criteria for the cases and get more information</i></p>

**Table 6 (continued)**

Domain	
Interview Question(s)	Results
	<p><i>for the next MDT...and get the most accurate plan moving forward ...from the MDT."</i></p>
<b>Results</b>	<p>No noticeable impact yet  <i>To be honest, I don't know yet 'cause it's so close. So, I don't know what we're changing, you know. I can say personally like me trying to do something and being... more playful about it, but as a team, I don't know if I've seen any real change yet...</i></p> <p><i>I have heard criticism about [specific discipline] still. ...There does not seem to be an impact.</i></p> <p><i>Not positive or negative. I have not seen any impact from this training.</i></p> <p>Some small improvements in case review meetings  <i>Case reviews have improved, however, we still have a ways to go to make the meetings the most effective for the youth, family and agencies.</i></p> <p><i>I believe the team is functioning a bit better than previously. We still have improvements to be made but it seems as if the tension during the meetings is better.</i></p>

workshop. Lower follow-up ratings of acceptability, appropriateness, and feasibility at follow-up may reflect this desire for more support in working toward goals.

Our study does have some limitations. Most team members participated in the training and research activities, although participation from members of law enforcement was poor. We believe this is likely specific to the participating team, which also had low law enforcement participation in team activities unrelated to the training and research study. Police departments in their rural area operate with few staff and have limited capacity to participate in additional activities. With only one team, we were unable to examine how experiences with training and potential impact might be affected by characteristics of team members or the team as a whole. For example, perceptions of team training and the effectiveness of training may be affected by team members' discipline or experience with the CAC model. Training may also affect teams differently depending on their stability and members' history of collaboration (e.g., long-standing teams of experienced members vs. teams with high turnover and frequent membership changes). Future research should test training effectiveness in diverse teams and consider differences in training participation and impact by discipline and other team characteristics.

Team participation in the follow-up survey was lower than participation in the baseline survey. This study occurred entirely during the COVID-19 pandemic, and the director described team members as increasingly exhausted and overwhelmed. Ongoing pandemic-related stress and high job demands may have contributed to the slight decreases in some dimensions of team functioning at follow-up. Efforts to improve teamwork must occur alongside structural changes to reduce job demands and promote team members' well-being (e.g., reducing caseloads, increasing benefits).

The adaptations made to form TeamTRACS were largely consistent with the core functions of TeamSTEPPS. However, additional research is needed to test the effectiveness of TeamTRACS. Studies should quantitatively evaluate changes in individuals' knowledge and use of the teamwork skills taught in TeamTRACS, the most proximal indicators of training effectiveness, as well as more distal team outcomes. In addition, future research must address the identified need for structured support and follow-up. Implementation strategies should provide teams with structure and guidance for implementation and require few, if any, external resources. Existing training infrastructure has very limited

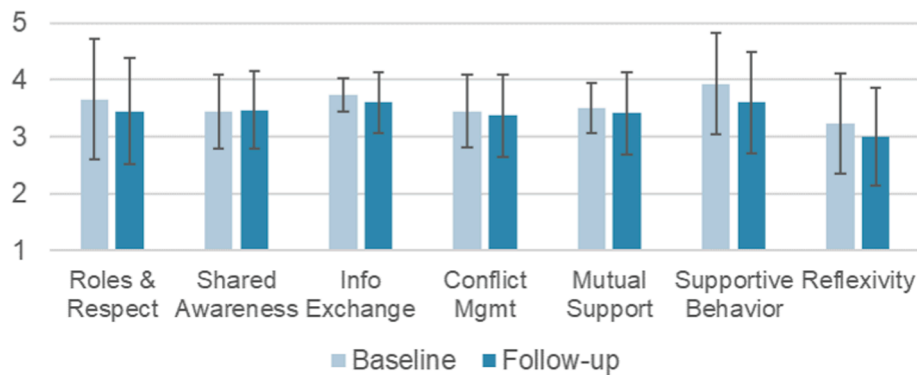


Fig. 4. Quantitative Results: Training Impact. Note: Bars depict mean ratings. Error bars depict standard deviations.

Table 7

Qualitative Results: Ideas for Improvement and Future Use.

#### Ideas for Improving TeamTRACS

Revise some training content

*...take off any cutesy stuff at the beginning completely. Just do away with it. Throw that out the window and just start right into, 'This is me. This is you... Let's introduce each other.*

*I really loved the myths and misconceptions. I wish we could spend more time on that. I think if you could start with that in the training...so that, from the get-go you're getting the team to talk more.*

Use facilitators

*You definitely need two people facilitating...having another person, especially [someone who] ...has been at some point a part of a CAC team in any role really brings legitimacy.*

*I think the facilitator should be [in the breakout rooms] too. I think participants would engage more if they're listening to somebody that's actually in the room with them.*

Extend training length

*Honestly, three and a half hours isn't enough time to start making people feel comfortable enough to really feel like...being open and talking.*

*...if you were to do this again, I would make it maybe a four hour [training]... even having that extra half hour may have allowed a little bit more discussion and not to feel as rushed.*

Deliver training in-person

*If you could have the [training] in-person, I think that would strengthen this training so much...*

*I think it would be much more productive if it was in person. I think people would maybe even be more inclined to communicate in person.*

#### Future Uses for TeamTRACS

Add additional support before and after training

*I'm really hungry for some next steps with some of those conversations. going through this, there's a lot of probably other discussion I would have had...with team members to build a better infrastructure prior to the training.*

Allow flexibility

*I think the whole thing, overall, was great...I was really surprised at how quick and applicable a lot of it was. I almost think we just need more time, more flexibility in changing up the format of it.*

*The content was really good. I think it just needs to be reformatted to move around a bit so it's more flexible, allows more room for discussion, and you're starting it off with discussion right off the bat.*

Consider extending to multiple audiences

*So, is it completely applicable to CACs? Or developing teams? Absolutely, absolutely 100%.*

*I think it's worth sharing parts of it to students who are in social work.*

*I think it could be part of an annual thing for new people to do and other people a refresher thing.*

capacity to provide teams with ongoing support to implement and sustain this training. Self-guided implementation strategies that empower and equip teams to integrate team training into their ongoing work are a promising approach to the perennial challenge of developing and sustaining effective CAC teams.

The results of these studies suggest that TeamTRACS is a feasible and promising approach to improving teamwork in CAC multidisciplinary teams. Our rigorous, community-engaged approach to intervention adaptation and pilot testing created a strong foundation for future

research. The pilot trial was effective in recruiting participants, demonstrating adherence to the protocol, and obtaining high quality outcome data, suggesting progression to a randomized controlled trial is appropriate (Avery et al., 2017). Future research will focus on increasing the effectiveness and impact of TeamTRACS and supporting its implementation in CACs. Effective team interventions can improve the quality of care in CACs and other team-based settings.

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#### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Data availability

Data will be made available on request.

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#### Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chilyouth.2023.107096>.

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