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EBT Fidelity Trajectories Across Training Cohorts Using the Interagency Collaborative Team Strategy

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Abstract

The Interdisciplinary Collaborative Team (ICT) strategy uses front-line providers as adaptation, training and quality control agents for multi-agency EBT implementation. This study tests whether an ICT transmits fidelity to subsequent provider cohorts. SafeCare was implemented by home visitors from multiple community-based agencies contracting with child welfare. Client-reported fidelity trajectories for 5,769 visits, 957 clients and 45 providers were compared using three-level growth models. Provider cohorts trained and live-coached by the ICT attained benchmark fidelity after 12 weeks, and this was sustained. Hispanic clients reported high cultural competency, supporting a cultural adaptation crafted by the ICT.

Keywords

Implementation; Fidelity; Cultural competency; Interagency Collaborative Team

Introduction

Public sector social services systems, including child welfare systems, often use contracts with multiple community-based organizations (CBOs) to serve their clients (Horwitz et al. 2012). An emerging challenge for these systems is how to implement, scale-up and sustain a

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single evidence-based treatment (EBT) model across a network of semi-autonomous contracted CBOs. Hurlburt et al. (2014) describe an Interagency Collaborative Team (ICT) strategy designed to achieve successful adaptation, implementation, scale-up, quality control, and sustainment of an EBT within these types of multi-agency systems. Initial articulation of the ICT strategy occurred during a system-wide project to implement the SafeCare® home-based parenting model across a network of semi-autonomous CBOs under contract with a large urban county child welfare agency. As with other EBT implementation strategies, the overarching aim of the ICT strategy is to successfully install an EBT system-wide at scale, maintain its quality and fidelity over time in the face of workforce or CBO turnover, and facilitate long-term sustainment. The ICT strategy goes somewhat further in aiming to do so in a way that it is locally embraced, creates high-level local expertise and a cadre of local EBT champions, and balances model fidelity with local adaptation and cultural competency interests (Willging et al. 2014). The ICT strategy includes processes spanning the four implementation phases described by the EPIS framework (Aarons et al. 2011)—Exploration, Preparation, Implementation and Sustainment, highlighting key steps and inter-relationships at each stage that affect successful implementation. The ICT strategy addresses the outer (i.e., system) and inner (i.e., CBO) contexts with corresponding ICT process goals described for each of the four EPIS phases (Hurlburt et al. 2014). This study focuses on ICT tasks occurring during the EPIS Preparation and Implementation phases, for which the corresponding steps include ICT member selection, ICT funding, training the ICT in the EBT, adapting the EBT, and ultimately training subsequent interagency provider cohorts and maintaining their fidelity.

An ICT is a formalized collaborative structure created during the Preparation phase of an implementation process whose membership spans traditionally separate CBO stakeholders. A process schematic showing the steps and system relationship structure is depicted in Fig. 1, with narrative elaboration here. ICT members are hand-picked front-line direct service providers drawn from two or more CBOs in the contracted CBO network. ICT members are first and foremost direct service providers who will be actively delivering the EBT themselves on a regular and ongoing basis. ICT member selection emphasizes high credibility among their direct service peers, understanding the needs of the local client population, employment stability, high and infectious enthusiasm for the EBT, and strong potential to engage and mentor future EBT trainees. Selection also favors more experienced providers to whom their less experienced peers already turn for mentoring or guidance. ICT members should be formally housed and employed at different CBOs and retain direct service delivery duties, but are given a reduced client workload so that they can interact regularly with fellow ICT members and take on new implementation related responsibilities. These additional duties ordinarily require additional funds added to the contracts of the CBOs from which ICT members are drawn. The initial ICT members are also referred to as the “seed team” in ICT terminology because this team represents the first introduction of the EBT into the system and is the prime agent of the implementation’s ultimate growth and scale-up (Hurlburt et al. 2014). Financial support for the ICT and their new duties was formalized in CBO funding contracts and inter-agency agreements and relationships. Within the CBOs, leadership commitment to the EBT, to inter-agency collaboration and willingness to share key staff and leverage expertise was central (Aarons et al. 2014; Torrey and Drake

2011). It also was critical that the purchasing authority (county child welfare in this instance) provided leadership, formalized supporting administrative structures in CBO contracts, crafted contractual mandates, and contracted with EBT developers and trainers for their role in early phases of the process (see Fig. 1). A key Exploration stage activity was to create these systemic supports and develop commitment to the process (see Aarons et al. (2014) for a description). In this instance, community donors through the local United Way helped finance the initial Exploration, Preparation and Implementation activities and also worked with county child welfare to promote interagency collaboration. These agreements and resources, both formal and informal, formed the structural foundation on which the ICT was based. ICT structure and steps were influenced by input from the purchasing authority, from community stakeholders and from the CBOs themselves during the Exploration phase. For example, the concept of initial seed team membership spanning multiple CBOs and being truly “Interagency” emerged from the stakeholders.

Functionally, the ICT model shares aspects in common with other cascading skill development and fidelity support strategies (Chamberlain et al. 2008), which describe logically ordered sets of activities designed to spread an EBT across a system. Like other cascading approaches, implementation proceeds across successive training cohorts until full scale-up is achieved. The ICT approach also includes elements common to traditional “train-the-trainer” strategies in the sense that ICT members become local workforce trainers, but the overall scope of the ICT is broader. The ICT can address tasks extending well beyond training, such as advising CBO and system leadership on implementation progress and needed supports, problem-solving emerging challenges, working with EBT developers to craft local treatment model adaptations including cultural adaptations (see “Methods” section), providing ongoing quality control via live skill coaching, and ultimately serving as a liaison between EBT model developers and the local service system. ICT training activities also differ in tactics from traditional train-the-trainer strategies that may be limited to workshops and possibly post hoc verbal practice discussion. The ICT training approach begins with didactic training, but moves quickly into ongoing in vivo skill coaching. In this study, ICT members traveled with home-based providers to clients’ homes, observed their practice, modeled key skills, and provided mentoring and feedback, based on a set of coaching procedures previously developed and tested in an earlier SafeCare controlled trial (Chaffin et al. 2012b). Coaching was not limited to ICT member-provider dyads within the same CBO, but could occur across CBOs. For example, a provider from one network CBO might be observed and coached by an ICT member employed at a different CBO.

During the first part of the Implementation phase, which in this study lasted about 1 year, ICT members were intensively trained by the EBT model developers with a goal of achieving higher than usual EBT fidelity and competency standards. This included remote EBT trainers traveling to the sites to directly observe and coach services delivered by the ICT members. During this phase, the ICT also served an adaptation and local system tailoring function, working with developers to identify and craft local adaptations and modifications including cultural adaptations, and have them in place before wider implementation with subsequent cohorts of local providers was undertaken. As with all EBT competency development strategies, the system and CBOs must be prepared to assure a steady supply of treatment cases so that ICT members (and later on, the subsequent cohorts

of network service providers) can immediately begin to practice and embed newly learned skills (Whitaker et al. 2012). Toward the end of the Preparation phase, ICT members are certified as trainers by the EBT developer. At this point, the process moves into the second part of the Implementation Phase.

During the second part of the Implementation phase, model developers and remote trainers reduce their active role, and the ICT assumes its ultimate role in interagency workforce training including training successive inter-agency cohorts of CBO providers until system-wide scale-up is completed (see Fig. 1). Thereafter, the ICT is responsible for new hire training and ongoing fidelity maintenance. Throughout this process, the ICT provides mentoring, live coaching, fidelity monitoring, and troubleshooting challenging cases and implementation problems across CBOs. In these respects, the ICT takes over the role sometimes served by remote EBT developers and purveyors. During the Sustainment phase, the EBT developers interact with the CBOs through the ICT, with the ICT acting as liaison. One of the core goals of the ICT approach is to create localized EBT expertise capable of performing key implementation and sustainment functions (e.g. provider training, adaptation, quality control, troubleshooting and fidelity maintenance), which hopefully promote stable long-term sustainment of the EBT within the CBO network. This means sustainment with stable model fidelity, even in the face of workforce turnover, individual CBO turnover within the network, or occasional turnover of individual ICT members. Resilience to turnover is an important advantage of creating a team comprised of members housed in different CBOs. When an individual ICT member leaves, a new provider can be hand picked from any CBO in the system as a replacement with the caveat that ICT membership should span at least two agencies, so that the strategy is robust to the loss of any one CBO from the system.

Given that the ICT members are both hand-picked and “over-trained” by model developers during the Preparation phase, we might expect that their initial level of EBT expertise and fidelity would be consistently high. A key question in evaluating the ICT strategy is whether fidelity can be transmitted by the ICT to subsequent cohorts in the workforce—those who are trained, coached, and fidelity monitored not by developers, but by the ICT. The first research question for the present study is to examine fidelity trajectories, both for the ICT members themselves and most importantly for their first subsequent cohort of interagency trainees. We will use the fidelity achieved by the ICT members themselves as a benchmark against which fidelity among the first subsequent cohort will be contrasted, and will examine EBT fidelity trajectories both in terms of behavioral EBT content and also adoption of the EBT’s theory-based style. A second question for the current study is whether a locally crafted Hispanic cultural adaptation developed by the ICT in collaboration with EBT developers (Finno-Velasquez et al. 2014) achieves good client-reported cultural competency while still retaining fundamental EBT content fidelity and delivery style among Hispanic clients compared to other groups.

Methods

Participants

There were two classes of participants in the study—home visitors and clients. Home visitors ($n = 45$; 9 ICT members and 36 subsequent cohort members), were 88 % female with a mean age of 34 (median = 29, $SD = 9$). On average, they had been employed at their current CBO for 3.8 years (median = 3.3, $SD = 3.0$) and had been delivering home-based services for 5.0 years (median = 3.1, $SD = 5.4$). Home visitors were 70 % White, 15 % African-American, 12 % Native American, and 2 % bi-racial. 74 % were ethnically Hispanic. 29 % had completed a Master's degree, 14 % had completed some graduate degree work, 52 % had completed a college degree, and 5 % had completed less than a college degree. Training disciplines included Social Work (49 %), Psychology (21 %), Marriage and Family Therapy (9 %), and the remainder from other assorted health or social service disciplines. Comparing the cohorts, ICT members tended to be older (40 vs. 31 years), to have more experience as home visitors (10 vs. 3 years), to have been at their CBO longer (5.9 vs. 2.7 years), and tended to be more likely to have a Master's degree (44 vs. 24 %). They did not differ on rates of Hispanic ethnicity (78 vs. 74 %) or gender (89 vs. 88 % female) but were more likely to indicate White race (88 vs. 64 %).

Minimal information about clients was collected, consistent with an IRB approved study protocol that limited collection of individually identifying client information and waived obtaining a potentially identifying signed consent form. Clients received informed consent information when they completed questionnaires about session fidelity. Clients ($n = 957$) described themselves as 75 % female, 66 % White, 14 % African-American, 3 % Asian, 3 % Hawaiian or Pacific Islander, 1 % Native American, and 13 % multi-racial or other. 55 % described themselves as ethnically Hispanic.

Procedures

Brief EBT Overview—The EBT used in this study was the SafeCare model. SafeCare (Edwards and Lutzker 2008) is a home-visitation curriculum designed to improve specific parenting skills and parent-child relationships, including parents' knowledge and ability to respond to health issues, improve and maintain a safe home environment, and build positive interactions with their children, particularly around common parent-child activities such as getting dressed, bath time, and play time. It was originally designed for parents of preschool age children in the child welfare system, most often for child neglect. SafeCare has been tested in more than 20 published studies, ranging from single-subject designs showing concordant changes in targeted skills and behaviors, to fully scaled-up controlled field trials where the model has been demonstrated to lower child welfare recidivism compared to home based services that were identical in all respects, except for use of the SafeCare curriculum (Chaffin et al. 2012b). To our knowledge, this later trial is the largest controlled trial that has demonstrated child welfare recidivism impact. Uptake of the SafeCare model within child welfare contracted CBO networks has accelerated in recent years, so the present study offers a timely examination of one possible strategy for spreading the model and taking it to scale. However, we also believe that the ICT strategy is not exclusively bound to the SafeCare model or to home-based services, and potentially is applicable to other EBTs

implemented across multi-CBO networks, including clinic-based EBTs or EBTs requiring a differently credentialed workforce.

The SafeCare curriculum is modular in its structure, with modules focusing on Parent–Child Interactions (The Planned Activities Training and Parent–Infant Interaction modules), Home Safety, and Child Health. Functional modularity means that modules can be administered in any order depending on assessed priorities or client interest. Modules share several dimensions that can include, (a) psycho-education to explain the goals and rationale for each SafeCare program module and activity, (b) teaching and modeling skills and behaviors and directly observing parents as they practice those skills/behaviors, (c) feedback and reinforcement for parents as they are observed practicing specific skills and behaviors, (d) assigning and reviewing activities for parents to practice between home visits (i.e., homework), and (e) providing a standard set of resource materials needed for some modules (e.g. providing materials to check and track a child’s health). The curriculum was designed to be delivered by paraprofessional through graduate degreed home visitors, and the curriculum can be embedded within a multi-function home visiting package (e.g. where home visitors also make linkage and referrals or help families obtain concrete resources).

Cultural Adaptation—SafeCare has been implemented internationally and the standard unadapted model has been rated as highly culturally competent by American Indian populations (Chaffin et al. 2012a). Prior to the implementation forming the basis for this study, the EBT materials and protocol had not been translated into Spanish nor adapted specifically for diverse Hispanic cultures in Southern California. The implementing system served a large number of Spanish-speaking families including very recent immigrants who might speak very little English and who have strong ties to the cultures of Mexico or Central America. During the Preparation phase, the ICT and system leadership identified a flexible Hispanic cultural adaptation as a necessary step prior to beginning the Implementation phase. Adaptation priorities included, (a) direct mirroring of core SafeCare modules and fidelity dimensions; (b) flexibility, so that adapted and unadapted elements could be interchanged; and (c) including both language translation and deeper cultural aspects of how materials are translated and presented (Dumka et al. 2002). Anticipating this need, ICT “seed team” members were selected during the Exploration phase to include bilingual and Hispanic providers with extensive experience serving these communities, and the CBOs also identified local translators and expert consultants. The cultural adaptation was led by the ICT in collaboration with developers, University-based experts and local experts. For a more detailed description of the cultural adaptation process see Finno-Velasquez et al. (2014). Ongoing feasibility testing was done by the ICT as they delivered adapted elements. Development followed an iterative process of adapting, testing and evaluating until the ICT, EBT developers, and consultants agreed that a feasible final product was in hand. The final product included adaptations in three domains, including both surface and deeper content domains: (a) Language adaptations, including translation and back translation of SafeCare materials, focused on conveying meaning in ways likely to be understood; (b) Latino cultural adaptations, for example adding information to the Health module about some home remedies common among local subcultures and changing the psycho-educational dimensions of modules so that the rationales offered better reflected commonly embraced

cultural themes; and (c) Structural, for example allotting more sessions if module content was unfamiliar to clients. These adaptations did not alter the fundamental structure of SafeCare, its component modules, fidelity measurement targets, or the general behavioral delivery style. Adaptations remained recognizably SafeCare. Subsequent implementation cohorts were trained in both standard and adapted variations. In keeping with the flexibility objective, the standard and adapted materials could be intermingled, and home visitors were free to select materials and presentations that they felt best fit the individual case. Our impression is that most Hispanic clients received some of the adapted materials and presentation, and consequently ratings of cultural competency among Hispanic clients might reflect both the adapted materials and presentations, and the skill of the home visitor in using them flexibly.

Measuring SafeCare Fidelity—By fidelity, we mean adherence to basic behaviors prescribed by the model, and not necessarily the expertise with which a behavior is executed. We opted to measure fidelity via client report for three reasons. It allowed us to capture fidelity data at every session across a large number of sessions, which suits trajectory modeling; it did not involve the questionable ability of providers to judge their own practice (Love et al. 2007); and we suspected that client ratings might better reflect not simply whether a model element occurred, but whether the client was aware and ‘got’ that it occurred (i.e. that the element at least minimally impacted the client). Clients anonymously and privately completed a 2–5 min post-visit questionnaire about their home visitor’s behaviors and the content completed in the home visit, placed the completed questionnaire in an envelope, sealed the envelope, and returned it to the research team via the home visitor who waited in another area. Clients were compensated two dollars for each questionnaire, and were assured by the study that the questionnaire would not be viewed by or shared with their home visitor, the CBO or the child welfare system. Home visitors were assured that fidelity data would not be shared with their employer. Clients did not place their names on the questionnaire or on the consent document. The questionnaire was available in either English or Spanish. Sample copies are available from the first author upon request.

The questionnaire had two sections—a general service delivery style section and a home visitor behavior section corresponding each SafeCare module. The general service delivery style section asked about 16 qualities. It included items reflecting an overall structured, planned, skill-oriented, and behavioral style (e.g., “My home visitor told me exactly what we would be working on today,” “My home visitor had a clear plan for what we would be working on today.”). Several of these stylistic items were adapted from a client-report fidelity measure developed for Multisystemic Therapy (Schoenwald et al. 2000). A structured style been identified as common among many EBT’s (Garland et al. 2008). Also included were styles deemed inconsistent with a structured behavioral curriculum (e.g. “We spent time chatting or making small talk;” or “My home visitor tried to get me to talk about things like my feelings and stuff from my own childhood”).The stylistic questionnaire section included cultural competency items (e.g., “The home visitor respected my family’s values and beliefs”) adapted from the Client Cultural Competency Inventory (Switzer et al. 1998). An exploratory factor analysis was planned in order to inform aggregation of these 16 stylistic items into meaningful scales and is described in the Results section.

The second or home visitor behavior section of the questionnaire focused on the specific prescribed content of the SafeCare module used during that day's session. For example, if the visit was a Home Safety module visit, the client was directed to the Home Safety module section of the questionnaire, and did not answer items about other modules. Home visitor behavior items were adapted for client-report from National SafeCare Training and Research Center training checklists. For example, if the visit was a Parent–Child Interaction module visit, the questionnaire directed the client to answer a set of items including, “My home visitor told me why it’s important to have lots of positive interactions with my children,” “My home visitor picked an activity and showed me how to do it,” “My home visitor watched me practice the activity with my children,” “My home visitor told me what things I was doing well,” and “My home visitor gave me homework to do before the next home visit.” For each item, parents responded 0 (did not occur at all), 1 (occurred to some degree), or 2 (occurred a lot). No items used in the study failed to span the full range of responses.

In order to track fidelity over time across modules with different prescribed content we identified five common content dimensions into which SafeCare module content is conceptually grouped. These dimensions were: (a) *Psychoeducation*, or the introductory explanation of why the content for the module was important; (b) *Teaching or Modeling*, the particular skill and instructing the client in how to do it; (c) *Feedback*, including providing support, praise and correction while observing the parent practice the skill in the session; (d) *Homework*, or assigning specific content tasks from the module to practice during the intersession interval; and (e) *Resources*, or providing concrete materials needed for the session or the homework (e.g. providing electrical outlet covers during the Home Safety module or providing a health kit for the Health module). A single module might span multiple home visits. Dimensions were scored according to where in a sequence of visits the content was supposed to occur. Thus, dimension scoring reflected not only whether an element was ever done at all, but also if elements were done in the intended order for that module. Some dimensions were not applicable for a particular module and so were coded as missing. For example, no *Homework* dimension is included in the Health module. Other dimensions (e.g. *Teaching or Modeling* and *Feedback*) were represented across all modules. In the rare instance (less than 1 % of visits) where more than one module was delivered during a single visit, dimension scores were averaged. This scoring yielded five SafeCare dimension scores (labeled as PsychoEd, Teach-Model, Feedback, Homework and Resources) for each visit, reflecting a multi-dimensional or multi-indicator conceptualization of fidelity.

Data Analysis—Fidelity trajectories over time were analyzed using three-level growth models. Data consisted of sequential series of session ratings over time. The structure of the data was sessions ($n = 6,001$ of which 5,769 or 96 % had usable data) nested within clients ($n = 957$; session count ranging from 1 to 25) nested within providers ($n = 45$). A provider-level cohort variable was the main predictor of interest in the study, and was used to test whether fidelity trajectories over time differed between the ICT (cohort 0) and the subsequent interagency training cohort (cohort 1). To the extent that the subsequent cohort's fidelity comes to approximate that of the ICT, the skill development, ongoing quality control and some early sustainment aims of the ICT strategy would be supported.

To adjust cohort estimates for client differences between the cohorts, client-level predictors were included in all models, including the client's gender, Hispanic ethnicity, and race (collapsed to manage sparse categories). Session level predictors included which SafeCare module was delivered in the session and whether or not the session had in vivo fidelity coaching present during that session. *In vivo* coaching was present in 542 or 9 % of all sessions. Positive correlations were noted between a client's session number and their fidelity rating—that is, clients sometimes gave higher ratings as services progressed. Consequently, we opted to model two random time slopes—a client level slope (i.e. changes in fidelity across weeks enrolled for each client, beginning at the client's service initiation) and an overall provider level slope across all clients (i.e. changes in fidelity for weeks delivering SafeCare beginning with the provider's initial case). Provider-level intercept and slope estimates were modeled conditional on cohort and these were the main effects of interest. Given the intensive longitudinal structure of the data, we explored adding autocorrelated relationships to the model (Bollen and Curran 2004), but these did not consistently reach significance and did not meaningfully change the main estimates of interest and so were dropped in favor of the more parsimonious model.

The five fidelity dimension ratings for each session (*PsychoEd*, *TeachModel*, *Feedback*, *Homework*, and *Resources*) were intercorrelated ($\alpha = 0.77$), and consequently a multi-indicator growth model structure was selected for initial testing, where all five content dimensions were jointly modeled as reflecting a single latent “fidelity” construct. The structure of this model is diagrammed in Fig. 2. Equality constraints on individual indicator loadings for the latent variable were imposed across levels in order to preserve invariance and simplify latent variable interpretation. Effect size estimates and variance homogeneity estimates between the two cohorts at the provider level were calculated based on the outputted home-visitor level intercepts and slopes for the multi-indicator latent variable. Univariate follow-up models were planned to explore effects for the each of the five fidelity dimensions separately. Finally, in order to better contrast the ICT and subsequent implementation cohort at different points in time across their implementation fidelity trajectories, a set of follow-up models were estimated centering the provider time variable at 12, 26, 54, and 104 weeks, and examining the resulting intercept contrasts and outcome variable means at these points. This was done to estimate a zone of effect for any cohort differences found in the initial model.

In order to identify underlying dimensions among the 16 general service delivery style indicators, an exploratory factor analysis was conducted in order to inform scale construction and data reduction for these items. One-factor through four-factor models for ordered categorical items with an oblique rotated solution were constructed. Resulting general service delivery style scales were then modeled using the three-level growth strategy described above. All three-level growth models were executed in MPlus 7.2 software (Muthen and Muthen 2012) using the Bayes estimator. Code is available upon request.

Results

Multi-Indicator and Follow-Up Trajectories for Home Visitor Behaviors

Two time series plots for the *TeachModel* dimension, one for the ICT and one for the subsequent training cohort, are shown in Fig. 3 in order to illustrate the fidelity trajectories visually. Model results are displayed in Table 1. Initial (i.e. intercept) post-training fidelity for the ICT “seed team” was significantly higher than initial post-training fidelity for the subsequent interagency training cohort (estimate = -0.23 , $p < 0.001$), consistent with the visual depiction in Fig. 3. The cohort effect size on the intercept estimate was 1.1. The cohort effect on the slope did not reach significance (estimate $p = 0.19$). Its direction was slightly in favor of the subsequent cohort. Exploring the cohort contrasts at the 12, 26, 52, and 104 weeks time points, in addition to the significant baseline (i.e. 0 week) contrast, the cohort effect remained marginally significant at 12 weeks (estimate = -0.12 , $p = 0.04$), but did not approach significance thereafter. After one year of delivering SafeCare, the initial ICT members’ and subsequent cohort members’ fidelity were virtually identical (cohort effect estimate on intercept centered at 52 weeks = 0.004 , $p = 0.48$). In other words, all cohort differences in fidelity were observed early, during the first 12 weeks after beginning service delivery, but not thereafter. Examining Fig. 3 suggested cohort differences in fidelity intercept variability. A simple post hoc test of this was constructed by outputting model-based intercept values for the provider-level latent fidelity variable and then using Bartlett’s test for variance homogeneity. Initial fidelity variability was significantly greater among the subsequent training cohort ($SD = 0.12$ for the subsequent cohort vs. 0.04 for the ICT; Bartlett’s $K^2 = 13.71$, $p < 0.001$). By the 12-week time point, variability differences between the cohorts were no longer evident ($SD = 0.07$ for both cohorts) and did not approach significance.

At the session and client levels, fidelity was significantly higher for the PAT and HS module sessions relative to the Health module sessions, but the presence or absence of an in vivo coach did not impact client fidelity ratings. There were non-significant trends for Hispanic clients to give higher initial overall fidelity ratings and to improve their ratings more as time progressed.

Univariate Follow-Up Trajectories—Significant cohort effects in favor of the ICT were found for the *TeachModel* dimension intercept (estimate = -0.22 , $p < 0.01$). Trends were observed and for the *PsychoEd* intercept (estimate = -0.10 , $p = 0.10$) and the *Feedback* intercept (estimate = -0.12 , $p = 0.14$). Cohort effects on the *HomeWork* and *Resources* dimension intercepts did not approach statistical significance. No cohort effects on slopes for any dimension reached significance. At the client level, *TeachModel* fidelity ratings were higher for Hispanic clients (estimate = 0.08 , $p = 0.02$), and trends in favor of the ICT were found for the *PsychoEd* (estimate = -0.10 , $p = 0.06$) and *FeedBack* (estimate = -0.12 , $p = 0.07$) dimension intercepts.

Delivery Style and Cultural Competency Trajectories

Exploratory Factor Analysis—A one-factor solution of the 16 general style items was a weak fit with the data (RMSEA = 0.12 , SRMR = 0.18 ; CFI = 0.80). Fit of the two-factor

solution improved (RMSEA = 0.07, SRMR = 0.08, CFI = 0.95), and improved further with a three-factor solution (RMSEA = 0.03, SRMR = 0.03, CFI = 0.99). The four-factor solution did not greatly improve fit, and was interpretatively ambiguous (RMSEA = 0.02, SRMR = 0.02, CFI = 0.99). The three-factor solution corresponded well with the logic model of the items (*Prescribed style*, *Proscribed style*, and *Cultural Competency*), and so was accepted. One style item (“The home visit today was lively and interesting”) did not load sufficiently on any single scale and so was dropped.

The first general style factor reflected the EBT’s *Prescribed* structured, skill-oriented behavioral style. A six-item additive scale based on this factor was constructed and included the following items: “My home visitor showed me things I could do to help me as a parent” (factor loading = 0.92); “My home visitor told me exactly what we would be working on today” (factor loading = 0.87); “My home visitor and I worked together well as a team” (factor loading = 0.80); “I learned skills today that I will be able to use as a parent” (factor loading = 0.80); “My home visitor had a clear plan for what we would work on today” (factor loading = 0.72); and “My home visitor asked about homework or things I learned from a previous session (factor loading = 0.60). The second factor reflected a style *Proscribed* by the EBT, which was either confrontational, upsetting, affect or insight focused, and/or lacking structure or a clear goal orientation. A five-item additive scale based on this factor was constructed and included the following items: “The home visit upset me because of something my home visitor said or did” (factor loading = 0.83); “My home visitor tried to get me to talk about things like my feelings and stuff from my own childhood” (factor loading = 0.78); “My home visitor was negative and critical with me” (factor loading = 0.77); “There were silences and pauses where it seemed like my home visitor didn’t know what to say” (factor loading = 0.72); and “We spent time chatting or making small talk” (factor loading = 0.45). The third factor reflected *Cultural Competency*. A four-item additive scale based on this factor was constructed and included the following items: “The home visitor understood what is good about my family” (factor loading = 0.96); “The home visitor respected my family’s values and beliefs” (factor loading = 0.92); “The home visitor understands my world, my community and my family” (factor loading = 0.82); and “The home visitor talked in a way that I could understand” (factor loading = 0.40).

Style Trajectories—Initial examination of the style scales showed significant positive correlation between the *Prescribed* style and *Cultural Competency* (Spearman’s Rho = 0.41, $p < 0.001$), but neither of the other two pairwise correlations exceeded a value of 0.10. Consequently, trajectories were modeled for the three style variables individually with no initial multi-indicator model. A cohort effect on the *Prescribed* style intercept was found in favor of the ICT ($estimate = -0.07$, $p = 0.03$). The estimated *Prescribed* style intercept value was 1.87, suggesting very high adoption of a structured behavioral style, but slightly higher among the ICT than the subsequent cohort. The cohort effect on slope did not approach significance. The cohorts were contrasted at 12, 26, 52 and 104 weeks. Other than the small week 0 intercept effect, no differences at the subsequent time points approached significance, the overall *Prescribed* style mean values for both cohorts remained very high at all points and the mean slope did not significantly differ from zero.

The cohort effects on the *Proscribed* style intercept and slope did not approach significance. The overall intercept value for the *Proscribed* style was 0.31 on a 0–2 scale with 0 indicating “Not at All”, again reflecting good stylistic consistency with the EBT’s theory model. *Proscribed* style ratings remained about this same low level at the 12, 26, 52 and 104 week estimates, none of which differed by cohort. The overall slope for the *Proscribed* style did not differ from zero.

At the client level, Hispanic clients reported slightly higher use of the Prescribed style (estimate = 0.04, $p = 0.02$), supporting retention of the basic behavioral service delivery style among clients likely to have received some culturally adapted materials or presentation. This supports the inference that adapted aspects or materials, or their flexible application with Hispanic clients, did not alter the basic behavioral service style, which was an objective of the ICT-led adaptation.

Cultural Competency—The intercept value for the *Cultural Competency* style was 1.93 on the 0–2 scale reflecting very high levels of client-reported cultural competency. No cohort effects on intercepts or slopes approached significance, and the overall slope did not differ from zero. Levels remained high at 12, 26, 52 and 104 weeks, with no cohort effects approaching significance at any of these time points. At the client level, women and White clients rated *Cultural Competency* slightly higher (estimate = 0.07, $p = 0.03$; estimate = 0.08, $p = 0.02$). The client level effect of greatest interest for the *Cultural Competency* rating was Hispanic ethnicity, given the adaptation goal of improving SafeCarefit across diverse Hispanic clients. There was no significant difference between Hispanic and non-Hispanic clients for *Cultural Competency* and ratings were high, although there was a small trend (estimate = -0.05 , $p = 0.09$) toward slightly lower ratings among Hispanic clients. The model was re-executed using only the Hispanic clients. No cohort effects on *Cultural Competency* intercepts or slopes approached significance, the overall intercept value for *Cultural Competency* among Hispanic clients was 1.89 on the 0–2 scale, and the overall slope did not differ from zero.

Discussion

Fidelity Transmission

The ICT strategy was designed to promote locally driven EBT adaptation, implementation, quality control and sustainment over time in system-wide EBT initiatives across multiple CBOs. The core tactic for the ICT strategy is to create, fund, and contractually formalize a highly trained local inter-agency “seed team” comprised of selected front-line providers who serve as EBT trainers, fidelity and quality control agents, local cultural adaptors, strategic advisors, and implementation process change agents. The ICT ultimately mediates between model developers or purveyors and the multi-CBO implementation network during Sustainment, and helps institutionalize and localize EBT expertise and advocacy. One key question for evaluating this strategy is whether localizing adaptation, workforce training, and quality control functions in the ICT, rather than in remote purveyors, yields EBT fidelity across provider cohorts, particularly those who are trained, coached, and fidelity monitored by the ICT. The findings of this study examined the initial fidelity outcomes for this process

and suggest that subsequent interagency training cohort fidelity can be created reasonably rapidly (within about 12 weeks) and then sustained over time using the in vivo coaching tactics of the ICT model. Specifically, study findings suggest that (a) very high and very consistent initial post-training fidelity is evident for the hand-picked and “over-trained” ICT itself during the time it is under supervision and direct in vivo coaching by EBT developers or purveyors; (b) lower and more variable initial fidelity is evident for the subsequent training cohort trained by the ICT which might be expected given the subsequent cohort is neither hand-picked nor “overtrained” as the ICT was; and c) fidelity among the subsequent cohort improves fairly rapidly and becomes comparable to that of the ICT, both in terms of mean level and variability after the first 12 weeks of practicing the EBT under live fidelity coaching provided by the ICT. This observation also supports another core tactic of the ICT strategy, the effectiveness of ongoing coaching during the immediate post-training months. Ongoing in vivo coaching has been demonstrated to offer advantages over alternative post-training quality control and competency development strategies in randomized trials with both the SafeCare curriculum and others types of behavioral services (Chaffin et al. 2012a; Funderburk et al. 2014). Drift occurs easily in EBT implementations. In fact, some degree of “drift” may was suggested among a few ICT members themselves, despite their initial high and consistent fidelity (see Fig. 3), which suggests that the strategy might benefit from adding periodic checks or boosters for the ICT “seed team” itself.

Cohort effects on fidelity trajectories were consistent across a multi-indicator fidelity latent variable and for adoption of the EBT’s general structured behavioral style. An exception to this pattern was the dimension of assigning *Homework* as part of the EBT. The EBT in this case, like many other behavioral or cognitive-behavioral EBTs, prescribes homework assignments, but fidelity on this dimension was relatively weak at all estimated time points for both cohorts. For example, if we set a target value of 1.5 on the 0–2 scale as indicative of strong fidelity, other dimensions would all be around or above this threshold at most tested time points, with the exception of the *Homework* dimension which never reached a mean value of 1.3. Follow-up on previous homework assignments (a part of the overall Prescribed style) also was low, being accomplished at a high level in only 53 % of sessions, compared to other Prescribed style elements which were achieved at a high level in 82–95 % of all sessions. Low homework fidelity is concerning given that, in other contexts, homework compliance improves outcomes (LeBeau et al. 2013). This suggests a need for additional exploration of why *Homework* elements were relatively rarely reported.

Cultural Adaptation

The main local adaptation made to SafeCare by the ICT was cultural in nature in order to accommodate the diverse Hispanic population in the service region. The cultural adaptation was not necessarily a completely freestanding treatment protocol, but rather consisted of a flexible set of adapted SafeCare materials and presentations that providers could select for an individual Hispanic client. In this study, *Cultural Competency* was rated exceptionally high (1.93 on a 0–2 scale) and remained high at all tested time points across both implementing cohorts. There were trends for cultural competency to be rated slightly higher by women and White participants, but no subgroup rated it below 1.5 on a 0–2 scale. Hispanic clients (who were likely to receive some of the adapted aspects or materials) gave a

rating of 1.89 on the 0–2 scale, which did not differ from levels reported by non-Hispanics. A key aim of the study was to test how well the ICT can successfully craft a local cultural adaptation in ways that deliver high cultural competency in the eyes of consumers, while still retaining the prescribed delivery style and behaviors of the original EBT. The findings suggest that cultural competency for Hispanic consumers did not come at a price of relinquishing the structured behavioral *Prescribed* style of the EBT. In fact, Hispanic consumers reported significantly more use of the *Prescribed* style by their home visitors, and adoption of the structured *Prescribed* style was significantly positively correlated with *Cultural Competency* in both the overall sample ($r = 0.41$) and among the Hispanic subpopulation ($r = 0.38$). High levels of cultural satisfaction likely also reflect characteristics of the home visitors in this study. Many home visitors in the study, both ICT members and subsequent cohort members, had intimate familiarity with Hispanic cultures and extensive experience working with Hispanic families. The adapted SafeCare curriculum developed by the ICT might yield lower ratings if implemented by a less adept set of providers.

Limitations

Some study limitations should be borne in mind. Measuring fidelity in a way that yields analyzable and meaningful variability and accuracy is always challenging (Martinez et al. 2014; Mowbray et al. 2003). Fidelity was rated by clients, which we view as both a benefit and a limitation. We selected this method because it offers the advantages of providing a rating for every visit and providing a rating given by someone other than the provider themselves. It also has the advantage of capturing EBT dimensions and behaviors that the client recognized as being done. This measurement approach holds the provider accountable not only for doing an EBT element, but for doing it in a way that the client ‘got’ it. Client ratings may correlate little with provider ratings or observer ratings (Schoenwald et al. 2000), which we believe may reflect that they are rating from different perspectives and on different bases. Also, observers may rate only an isolated session, whereas clients may give ratings that are influenced by previous sessions. This is why we opted to adjust our analytic models for client time slopes. We also cannot determine how a provider’s knowledge of being rated by their clients may have impacted the provider–client relationship or the provider’s motivation to maintain fidelity. Providers were assured by the research study that client ratings would not be shared with their employer, and clients were assured that the ratings they provided would not be shared with their home visitor. But, simply by completing the fidelity rating, clients are inherently informed about what activities are expected from their home visitor, which may increase chances that these activities will occur. The demand characteristics of this data collection approach also could lead to overly favorable ratings, such as an “all-2” response. In this regard, we would note that the full range of responses (0–2) were used, not all content dimensions or prescribed stylistic items were rated consistently high, proscribed items (such as talking about one’s childhood) were rated low despite many having no obvious negative valence, and initial ratings given to subsequent cohort providers showed considerable variability. In other words, ratings varied. We would also point out limitations related to using a single EBT (SafeCare) in a single context (child welfare contracted CBO services) and in a single service network, which

means that generalizations should be made cautiously and consider the broader implementation science literature. Finally, whether the fidelity transfer achieved by the ICT translates into client level outcomes was not examined by this study.

Conclusions

The overall findings support optimism about the ICT strategy as one element of an overall implementation and scale-up effort. An ICT was able to be created from across multiple system CBOs and sustained over time. Collaborative, contractual and funding agreements needed to support the team were created. The ICT was able to work with developers to craft a local cultural adaptation while still retaining key EBT structure and stylistic elements intact. The ICT was able to perform training and cross-CBO quality control functions in a way that developed fidelity among the subsequent interagency training cohort and sustained it across the term of this study. Longer follow-up through the Sustainment phases of the EPIS framework (Aarons et al. 2011) will be required in order to more fully test and identify challenges for the ICT strategy across its longer-term aims. This will include examining (a) fidelity among later interagency training cohorts and new hires; (b) the extent to which the EBT survives in the system long term; (c) how well the ICT can introduce new EBT refinements and innovations into the system; and (d) the long-term viability of the ICT structure itself, especially after initial start-up funding resources diminish and as ICT “seed team” members invariably turnover and are replaced.

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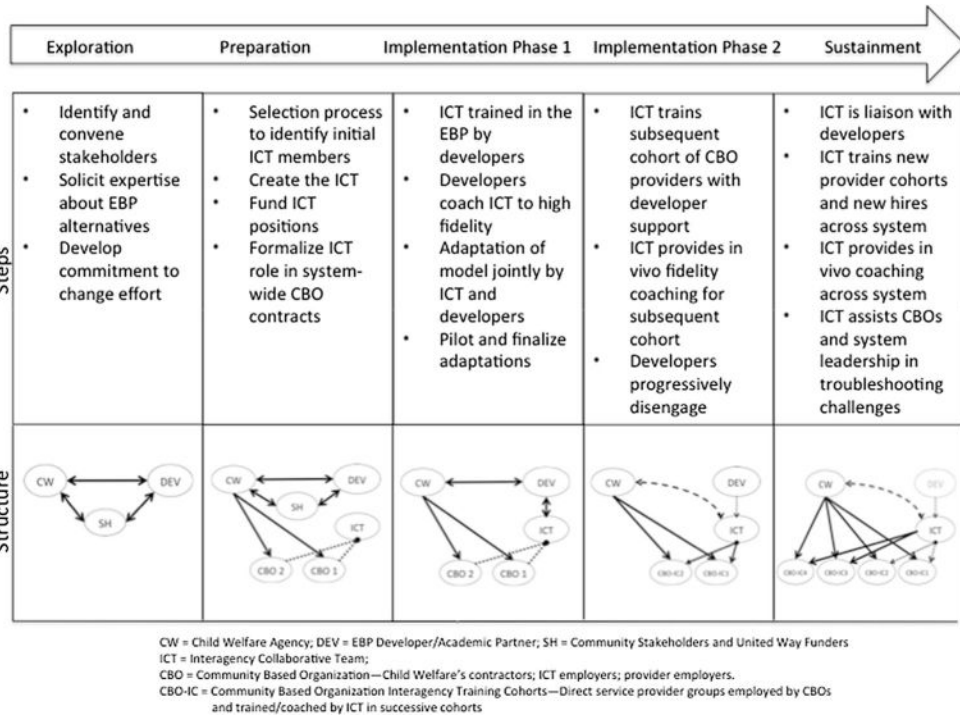


Fig. 1. Schematic diagram of ICT steps and relationships across EPIS phases

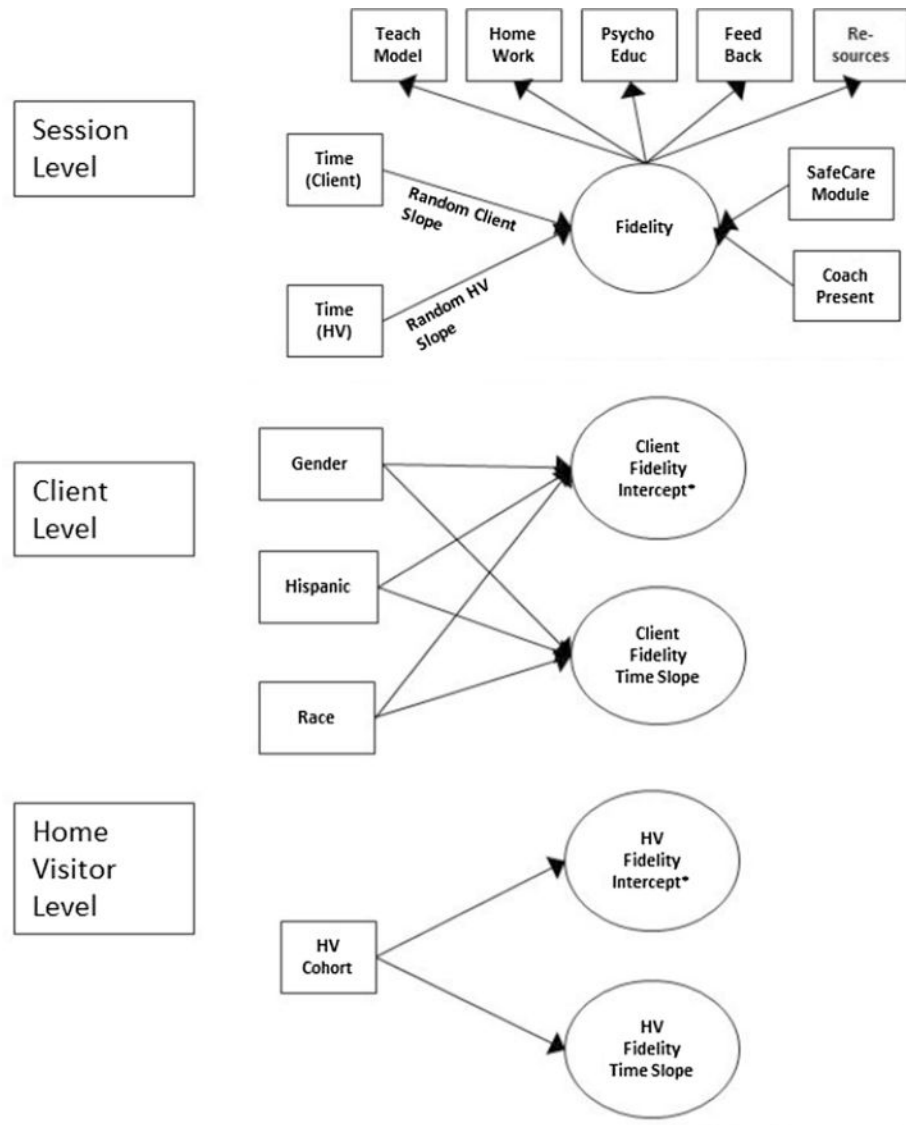


Fig. 2. Structural diagram of multi-indicator three-level model.*Multiple indicators and invariance constraints not shown at client and provider levels

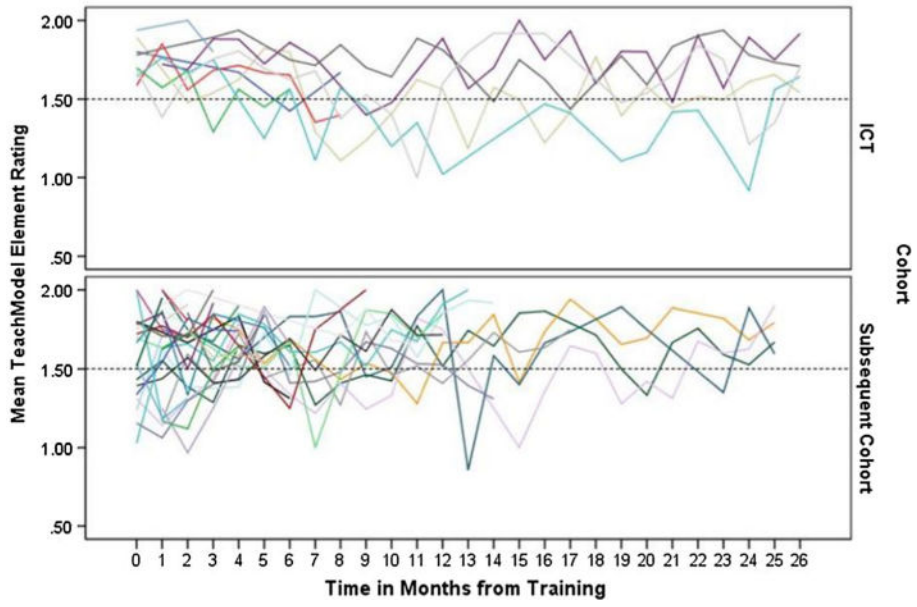


Fig. 3.
Time series plot of “TeachModel” element

Table 1

Three level growth model of fidelity over time

Level	Estimate	SD	95 % CI	p	Sig.
Session level					
Latent fidelity factor loadings, by element					
TeachModel	1.00	0.00	1.00 to 1.00	0.00	
PsychoEducation	0.35	0.02	0.32 to 0.38	0.00	*
Feedback	0.54	0.02	0.50 to 0.57	0.00	*
Homework	0.73	0.04	0.65 to 0.82	0.00	*
Resources	0.82	0.03	0.75 to 0.89	0.00	*
Latent fidelity factor predictors					
Coach present	0.02	0.02	-0.03 to 0.06	0.22	
PII module	0.05	0.03	-0.01 to 0.11	0.05	
PAT module	0.15	0.02	0.11 to 0.18	0.00	*
HS module	0.23	0.02	0.19 to 0.27	0.00	*
Client level					
Intercept predictors					
Male gender	0.03	0.05	-0.07 to 0.13	0.28	
Hispanic	0.07	0.05	-0.03 to 0.16	0.09	
White race	0.06	0.06	-0.05 to 0.16	0.16	
Client time slope (in weeks) predictors					
Male Gender	0.00	0.01	-0.01 to 0.01	0.37	
Hispanic	0.01	0.00	0.00 to 0.01	0.10	
White Race	0.00	0.00	-0.01 to 0.01	0.29	
Provider level					
Intercept on Cohort (ICT = 0)	-0.23	0.09	-0.41 to -0.06	0.00	*
Slope on Cohort (ICT = 0)	0.008	0.01	-0.01 to 0.03	0.19	
Model based dependent variable intercepts (0–2 scale)					
	0 weeks^a	12 weeks^a	26 weeks	52 weeks	104 weeks
PsychoEd	1.87	1.84	1.80	1.78	1.85
TeachModel	1.61	1.52	1.42	1.36	1.54
Feedback	1.76	1.71	1.65	1.62	1.72
Homework	1.29	1.22	1.16	1.11	1.26
Resources	1.64	1.56	1.48	1.43	1.58

Health module is reference category

PII parent–infant interaction, PAT planned activities training (parent–child interaction), HS home safety

^aSignificant cohort difference in factor intercepts with time centered at this point