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### Authors

Barnett, Miya L  
Brookman-Frazee, Lauren  
Yu, Stephanie H  
[et al.](#)

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## Train-to-Sustain: Predictors of Sustainment in a Large-Scale Implementation of Parent-Child Interaction Therapy

Miya L. Barnett<sup>1</sup>, Lauren Brookman-Frazee<sup>2,3</sup>, Stephanie H. Yu<sup>4</sup>, Teresa Lind<sup>2,3</sup>, Joyce H. L. Lui<sup>4</sup>, Susan Timmer<sup>5</sup>, Deanna Boys<sup>5</sup>, Anthony Urquiza<sup>5</sup>, Debbie Innes-Gomberg<sup>6</sup>, Daphne Quick-Abdullah<sup>6</sup>, Anna S. Lau<sup>4</sup>

<sup>1</sup>University of California, Santa Barbara, Department of Counseling, Clinical, & School Psychology

<sup>2</sup>University of California, San Diego, Department of Psychiatry

<sup>3</sup>Child and Adolescent Services Research Center

<sup>4</sup>University of California, Los Angeles, Department of Psychology

<sup>5</sup>University of California, Davis

<sup>6</sup>Los Angeles County Department of Mental Health

### Abstract

Sustainment of evidence-based practices is necessary to ensure their public health impact. The current study examined predictors of sustainment of Parent-Child Interaction Therapy (PCIT) within a large-scale system-driven implementation effort in Los Angeles County. Data were drawn from PCIT training data and county administrative claims between January 2013 and March 2018. Participants included 241 therapists from 61 programs. Two sustainment outcomes were examined at the therapist- and program-levels: 1) PCIT claim volume and 2) PCIT claim discontinuation (discontinuation of claims during study period; survival time of claiming in months). Predictors included therapist- and program-level caseload, training, and workforce characteristics. On average, therapists and programs continued claiming to PCIT for 17.7 and 32.3 months, respectively. Across the sustainment outcomes, there were both shared and unshared significant predictors. For therapists, case-mix fit (higher proportions of young child clients with externalizing disorders) and participation in additional PCIT training activities significantly predicted claims volume. Furthermore, additional training activity participation was associated with lower likelihood of therapist PCIT claim discontinuation in the follow-up period. Programs with therapists eligible to be internal trainers were significantly less likely to discontinue PCIT claiming. Findings suggest that PCIT sustainment may be facilitated by implementation strategies including targeted outreach to ensure eligible families in therapist caseloads, facilitating therapist engagement in advanced trainings, and building internal infrastructure through train-the-trainer programs.

\*Correspondence mbarnett@ucsb.edu.

## Keywords

evidence-based practice; sustainment; community implementation; parent-child interaction therapy; survival analysis

In the pursuit of improved quality of care for children and families, large-scale systems have invested millions of dollars towards implementing evidence-based practices (EBPs) into publicly-funded community mental health care and child welfare systems (Bruns et al., 2008; Fixsen et al., 2013; Purtle et al., 2016). For example, Parent-Child Interaction Therapy (PCIT), an EBP shown to be effective in treating child disruptive behavior disorders and child maltreatment, has been rolled out across several state- and county-level systems of care (Beveridge et al., 2015; Herschell et al., 2015; Timmer et al., 2016). Deriving from the Exploration, Preparation, Implementation, and Sustainment framework, the majority of studies on implementation rollouts have focused on outer context characteristics (e.g., state and federal-level sociopolitical and economic influences) and inner context characteristics (e.g., structures and processes at the organizational-level) that influence the implementation phase (Becan et al., 2018; Moullin et al., 2019, Stahmer et al., 2018). Significantly less research has investigated the sustainment of EBPs, defined as the extent to which an implemented practice is maintained or embedded within the routine operations of a system of care following the initial supports involved in implementation (e.g., training and consultation) to impact public health (Lau & Brookman-Frazee, 2016; Proctor et al., 2011; Sheldon, Cooper, & Wiltsey Stirman, 2018). The current study seeks to contribute to this limited body of literature by identifying predictors of sustainment of PCIT within the rollout of this intervention in Los Angeles County Department of Mental Health (LACDMH), the largest county public mental health system in the United States.

Successful EBP implementation requires sizeable investment, with a multitude of direct costs incurred from procuring provider training, supervision, consultation, and fidelity monitoring, as well as opportunity costs of lost revenue from non-billable provider hours spent in training and organizational leader time focused on implementation-related activities (Brookman-Frazee et al., 2018; Lang & Connell, 2017; Saldana et al., 2014). Given the costs necessary to support large-scale EBP dissemination, it is crucial to examine factors that contribute to long-term sustainment of adopted interventions to ensure a return on investment. Poor sustainment risks not only the waste of such investments, but also diminished community and workforce confidence in the public health impact of these efforts. Implementation and sustainment failures may damage buy-in, with detriments to leadership and workforce responses to future implementation initiatives, and consequences for policymaker support for devoting resources to EBP scale-up (Hunter et al., 2017; Johnson et al., 2018).

Moreover, knowledge on factors predicting EBP sustainment over time is necessary for families to reap the benefits of EBPs being implemented in community settings. Several studies provide evidence of medium-to-large effect sizes of community-delivered PCIT in driving positive child (e.g., behavior, functioning) and caregiver outcomes (e.g., parenting skills, stress) in comparison to usual care (Fowles et al., 2018; Lieneman et al., 2019; Lyon

& Budd, 2010; Pearl et al., 2012; Self-Brown et al., 2012; Stokes, Wallace & McNeil, 2018; Wallace et al., 2018). PCIT has also been associated with reduced risk of child maltreatment in comparison to usual care (Chaffin et al., 2012; Lanier et al., 2012). However, factors predicting sustainment of community-implemented PCIT remain largely unknown, reflecting the limited research on EBP sustainment overall (Bond et al., 2014; Hunter et al., 2015; Palinkas et al., 2016; Proctor et al., 2015; Scudder et al., 2017).

The need to empirically study factors that facilitate or hinder EBP sustainment is underscored by findings that EBPs are generally not sustained post-implementation or after the discontinuation of grant funding (Aarons et al., 2014; Hunter et al., 2015). Multiple studies have found that therapists frequently do not sustain delivery of EBPs following their initial training and certification. For example, approximately one third of providers trained in evidence-based parenting interventions did not use the intervention following training and accreditation (Sanders et al., 2009; Charest & Gagné, 2019). Studies of community-implemented PCIT have cited a host of challenges to sustaining the practice, including difficulties with recruiting appropriate clients into care, clinician turnover, time constraints, and funding and service reimbursement (Pearl et al., 2012; Stokes, Wallace & McNeil, 2018).

In a systematic review of 125 studies related to sustainment and sustainability, Stirman and colleagues (2012) noted the methodological limitations of evaluating sustainment and suggested a number of vital directions for researchers, including unifying definitions of sustainment across studies, developing rigorous quantitative and qualitative measures of sustainment, and characterizing multilevel factors that impact whether or not EBPs are sustained. Measures of sustainment may include whether therapists continue to deliver an EBP following the removal of external implementation supports (e.g., training and consultation by intervention developers or purveyors), the length of time that they sustain a practice, and the number of families that they reach to realize the public health impact of the EBP (Brookman-Frazee et al., 2016; Brookman-Frazee et al., 2018; Moulin et al., 2019). A growing literature since Stirman et al.'s (2012) review has laid groundwork on factors that predict sustainment over time. Studies identified outer context characteristics (e.g., funding stability, community support or involvement), inner context characteristics (e.g., characteristics of clients served, organizational capacity, supervisor turnover, provider perspectives on the complexity and utility of a practice), and implementation strategies (e.g., fidelity monitoring, training strategies, adaptations of practice to increase fit) that influence sustainment (Bond et al., 2014; Brookman-Frazee et al., 2018; Hailemariam et al., 2019; Hunter et al., 2015; Lau et al., 2020; Moullin et al., 2019; Rodriguez et al., 2018; Scudder et al., 2017).

Administrative claims data have been identified as a valuable source of data to investigate indices of intervention sustainment within large systems of care, including the volume of EBP services delivered by therapists and the length of time that a therapist continues to deliver an EBP (Brookman-Frazee et al., 2016; Brookman-Frazee et al., 2018; Chambers & Rupp, 2015; Hoagwood et al., 2016). Within the LACDMH context, survival analyses were used to identify the length of time until therapists discontinued the use of six EBPs, although PCIT was not examined. On average, therapists continued to deliver at least one EBP for a

little under two years, with characteristics of the agency, therapists (e.g., degree type, bilingualism), and case-mix (e.g., ages and diagnoses seen) associated with survival (Brookman-Frazee et al., 2018). Although qualitative research has identified implementation strategies associated with provider-reported sustainment, limited research to date has been able to identify how various strategies relate to sustainment as measured by administrative claims data (Brookman-Frazee et al., 2018; Rodriguez et al., 2018; Scudder et al., 2017). To expand on past studies, we examined therapist background characteristics, caseload characteristics, and implementation strategies as predictors of two sustainment measures of PCIT delivery indexed by administrative claims: volume of PCIT services provided during the sustainment phase, and the length of time PCIT was sustained at the therapist and program level.

## Context of Current Study

The current study is situated within a large-scale effort to disseminate PCIT across Los Angeles County over a 5-year period. PCIT implementation in LACDMH was supported by two initiatives. First, LACDMH launched the Prevention and Early Intervention (PEI) plan in 2009 to train, support, and incentivize providers to deliver EBPs. By December 2014, LACDMH listed 33 EBPs, including PCIT, as approved for PEI reimbursement funded by a state voter-approved tax revenue stream dedicated to funding expanded mental health services. Second, PCIT received additional implementation support from First 5 LA – an independent public agency funded by revenue from a voter-approved tobacco tax for early intervention services. First 5 LA awarded a \$20 million grant to LACDMH and the University of California at Davis PCIT Training Center to train therapists from up to 100 county agencies in the delivery of PCIT. The grant funded training and expenditures for resources to support implementation such as capital improvements to install PCIT treatment rooms (equipped with one-way mirrors and audio set up), encrypted videoconferencing and telehealth training technology, stipends to compensate programs for the loss of revenue from therapists' billable hours when in training, and a special funding stream to claim for PCIT services delivered during the active training and certification process (Timmer et al., 2016).

## Fiscal and Training Implementation Strategies toward Sustainment

While LACDMH was tasked with agency selection, reimbursement coordination, and general implementation support (e.g., monthly support groups, consultation, outreach, program analysis), the PCIT trainers provided initial PCIT trainings and advanced workshops, and oversaw therapist certification. In order for trainees to be certified in PCIT, they were required to complete two PCIT cases successfully and demonstrate competency with the intervention (Timmer et al., 2016). Reimbursement claims for PCIT services prior to therapists' completion of certification were covered by First 5 funding. Once trainees were certified in PCIT, they submitted PCIT claims to PEI for reimbursement, engaging a fiscal implementation strategy to sustain PCIT within LACDMH after the initial and time-limited First 5 LA training investment.

Given high staff turnover and overall difficulty with trainee retention in community mental health systems, a number of implementation strategies were deployed by LACDMH and the

PCIT trainers to address training and retention barriers, including community outreach presentation efforts to increase client referrals appropriate for PCIT, technical assistance site visits, and additional trainings. Furthermore, a train-the-trainer model was employed, in which PCIT therapists who completed four PCIT cases with positive outcomes were eligible to become internal trainers within their agencies (Herschell et al., 2010; Timmer et al., 2016). Therapists trained by internal trainers were eligible to bill PCIT claims to PEI immediately (rather than claiming to First 5 during the certification period) in order to ensure ongoing fiscal support as First 5 funding was beginning to sunset as the training began to cascade.

## Current Study Aims

The PCIT implementation effort in Los Angeles County offers a unique opportunity to study sustainment using data gathered from administrative claims in the context of both fiscal and training implementation strategies intended to support the sustainment of this EBP. Due to the nature of the PEI plan and First-5 LA grant, in which outer context factors such as funding, reimbursement policies, and revenue stream are held relatively constant across agencies, we focused only on inner context factors – including therapist-level demographics, caseload, and training characteristics, and program-level caseload, training, and workforce characteristics – as predictors of sustained PCIT delivery.

### Aim 1: Identify Inner Context Predictors of PCIT Claim Volume

An important indicator of the sustained impact of implementation is the volume of EBP services provided to patients within an implementation effort (Brookman-Frazee et al., 2016; Lau & Brookman-Frazee, 2016). Claims data in the current study allowed us to examine the number of patient encounters utilizing PCIT at both the therapist- and program-levels, measured by the volume of PCIT claims (Brookman-Frazee et al., 2016; Proctor et al., 2011). Thus, our first aim sought to describe inner context factors that predicted PCIT claim volume per therapist and program.

### Aim 2: Identify Inner Context Factors Predicting PCIT Discontinuation

Understanding the extent to which providers continue to deliver a practice, and for how long, is crucial to ensure the public health impact of implementation. In our second aim, we sought to describe inner context factors at the therapist- and program-levels that predicted the duration of PCIT delivery, using survival analysis to index the time to PCIT claim discontinuation. Survival analysis is an analytic method measuring the duration of time until a designated event occurs and has been used in mental health services research to examine outcomes such as therapist turnover and client retention in care, but recently has been used to measure sustainment of EBPs (Brookman-Frazee et al., 2018; Roseborough et al., 2016).

## Methods

### Data Source

Data were derived from two sources: PCIT training data and administrative claims data. Data related to training progress and outcomes were collected as part of the First 5 LA PCIT

Training initiative to monitor the effectiveness of training. The administrative claims data were extracted from county management information systems (Lau & Brookman-Fraze, 2016). Claims for any PEI practice between January 2013 and March 2018 for youth under 21 years of age were included. Descriptions of the six most frequently claimed for PEI practices (i.e., over 1% of total claims) in children's mental health are included in Supplemental Materials to provide perspective of the larger implementation context. The two data sources were linked by national provider identification numbers. There were 241 therapists who initiated PCIT training between January 2013 and March 2017 and had at least one PEI claim between January 2013 and March 2018 (see Figure 1).

## Participants

Participants in the sample frame included therapists who were trained between January 2013 and March 2017, who also had at least one PEI claim for PCIT. Of the 241 therapists from 61 programs that initiated training, 174 completed training and 165 of those claimed for PCIT (see Figure 1). Therapists were predominantly female (93.9%) and licensed (81.2%). The majority of therapists were Marriage and Family Therapy counselors (51.5%) or Social Workers (43.6%). Approximately half of the therapists (47.3%) were able to deliver PCIT in Spanish. Looking at therapists' full PEI caseloads, 53.2% of their PEI-funded clients on average were children aged 2 to 7 years old and 27.6% had a primary diagnosis of an externalizing disorder (e.g., oppositional defiant disorder, conduct disorder, disruptive behavior disorder, attention-deficit hyperactivity disorder). Forty-one (29.7%) of therapists billed for PCIT delivery from multiple agencies, signifying that they sustained PCIT in the LACDMH system even if they left the agency where they were initially trained. See Table 1 for additional information regarding therapist demographics and diagnoses of clients in therapists' caseloads.

## Sustainment Outcome Variables

Outcome variables of interest were the total number of therapists and programs that initiated PCIT delivery, the volume of PCIT claims at the therapist and program level, and the survival time of PCIT delivery at the therapist and program level.

**Aim 1: Volume of PCIT Claims**—The volume of PCIT claims was calculated by summing the total number of PCIT claims per therapist, as well as the total number of PCIT claims per program.

**Aim 2: Discontinuation of PCIT Delivery**—Using the approach applied in previous analyses of LACDMH claims data (Brookman-Fraze et al., 2018), discontinuation of PCIT delivery was indexed by the hazard ratio, or the likelihood of a therapist or program discontinuing PCIT delivery, and average survival time of PCIT delivery in months during the study period.

## Therapist-Level Predictors

**Therapist Demographic and Professional Characteristics**—Therapist-level predictors included therapist demographic and professional characteristics drawn from the administrative claims data (see Table 2 for descriptives). These included information



regarding therapist discipline (marriage and family therapy, counseling/psychology, social work, and other), whether the therapist was a member of the program's permanent staff or a trainee (e.g., intern), and the primary language in which the therapist provides services (English or Spanish). Data on therapist gender and licensure status were also drawn from the administrative claims.

**Therapist Caseload Characteristics**—Characteristics of the therapists' caseload were calculated from administrative claims data, with the number of any PEI claims made by the therapist during the study period as the denominator. The following therapist-level variables were calculated: the percentage of therapists' cases with children aged 2 to 7 years old, the percentage of therapists' claims made in an outpatient setting, and the percentage of therapists' cases with a particular presenting concern listed as the primary diagnosis on the administrative claims (externalizing disorder, internalizing disorder, trauma/adjustment disorder, or other disorder). Externalizing disorders included oppositional defiant disorder, conduct disorder, disruptive behavior disorder, and attention-deficit hyperactivity disorder. Internalizing disorders included anxiety disorder and mood disorder. See Table 2 for descriptives.

**Therapist Training Characteristics**—Data regarding therapist training characteristics were obtained from the PCIT trainers. This included: 1) whether the therapist completed the training and whether the therapist met criteria to become an internal trainer (described below), 2) if therapists attended additional coding training and advanced workshops, 3) therapist training cohort year (earlier cohorts had longer follow-up periods within the available claims data), and 4) time until enrolling first PCIT case after training. In addition, the total number of EBPs the therapist delivered was obtained from the administrative claims data.

### **Training Completion.**

Therapists were coded as completing training if they had engaged in the training model, which included a 10-hour, "PCIT for Traumatized Children" web course, in-person training and ongoing consultation provided via telehealth video conferencing equipment. As trainees' clients progressed through treatment, trainees worked to demonstrate that they could perform 55 required competencies (e.g., coaching skill). Trainers signed off competencies when trainees were able to perform these elements correctly and without assistance based on live observation and in vivo feedback or videotape review. Training was complete when all competencies were signed off and trainees submitted documentation showing that they had completed two cases with good outcome (i.e., outcome data showing caregivers used targeted parenting skills with high frequency and child behavior problems had significantly decreased).

### **Eligibility to be an Internal Trainer.**

Once therapists were certified and completed 4 cases with good outcomes, they were considered as eligible to train within their own agencies. Therapists sent logs of their outcomes to the UCD PCIT training team and in return would receive a certificate attesting that they had met the requirement to be eligible to train, as well as a Trainer's Manual.



## Program-Level Predictors

**Program Workforce and Casemix Characteristics**—Information regarding the workforce composition and the overall casemix of a program was obtained from the administrative claims data. The percentage of trainees in a program was calculated by dividing the number of trainees that claimed for any PEI during the study period by the total number of therapists from the program that claimed for any PEI during the study period. Characteristics of a program's casemix were also calculated from administrative claims data, using the same method as the therapist casemix variables, except the denominator was the number of any PEI claims made by the program during the study period. These included: the percentage of cases at the program with children aged 2 to 7 years old, the percentage of program's claims made in an outpatient setting, and the number of cases in the program with a particular presenting concern as the primary diagnosis listed on the administrative claims (externalizing disorder, internalizing disorder, trauma/adjustment disorder, or other disorder).

**Program Training Characteristics**—Data regarding therapist training characteristics obtained from the PCIT trainers was used to calculate program-level training characteristics. These included: whether defined as at least one therapist in the program completing training, whether the program had at least one therapist that met criteria to become an internal trainer, whether the program had at least one therapist who participated in additional coding training and advanced workshops, program training cohort year, average time until the first PCIT case was enrolled after training, and the total amount of time PCIT trainers spent with the program. In addition, the total number of EBPs delivered at the program was obtained from the administrative claims data. Table 2 contains descriptive information regarding these variables.

## Analytic Plan

**Aim 1: PCIT Claim Volume**—Descriptive statistics were run on: a) therapist-level volume of PEI claims for PCIT by therapists who completed training, and b) program-level volume of PEI claims for PCIT made by all therapists at programs with a therapist who completed training. For the therapist-level model predicting therapist claim volume, a null model was run for the outcome of PCIT claim volume to determine if there was a significant amount of variance attributable to the program level. Results showed a significant amount of variance at the program level ( $ICC = .23$ ). Therefore, a multilevel model was run with two levels, with therapists at level 1 ( $n = 241$ ) and programs at level 2 ( $n = 61$ ). Negative binomial models were used for both of the models predicting therapist PCIT claim volume and program PCIT claim volume. The outcomes of therapist and program PCIT claim volume both had non-normal distributions (therapist:  $skewness = 2.33$ ,  $kurtosis = 6.73$ ; program:  $skewness = 7.35$ ,  $kurtosis = 55.95$ ). Therefore, two models were run to explore PCIT claim volume: 1) a multilevel negative binomial regression model predicting therapist PCIT claim volume, and 2) a flat negative binomial regression model predicting program PCIT claim volume. The models controlled for cohort year the therapist or program began training, as well as the total number of PEI claims per therapist or program.

**Aim 2: PCIT Claim Discontinuation**—The discontinuation outcome was modeled as a binary variable indicating whether a therapist or program made a PCIT claim during the last six months (October 2017 through March 2018) of the five-year (January 2013 through March 2018) study period. In addition, the mean and median lengths of therapist and program PCIT claiming (i.e., survival times) were calculated as the number of months between a therapist or program's first PCIT claim to their last PCIT claim. Tables 3 and 4 present the results for the models predicting therapist and program discontinuation. In these models, the outcome was a dichotomous representation of cessation of PCIT claiming (i.e., a failure event) or PCIT claiming sustainment (i.e., right censorship). For categorical predictor variables, hazard ratios indicate how high the risk of discontinuing delivery is for a therapist or program in one group compared to a therapist or program in another group, if all other variables are held constant. For continuous predictor variables, the hazard ratio indicates a change in the risk of discontinuing delivery if the variable/predictor of interest is increased by one unit. Two multilevel Cox regression models were run to predict therapist discontinuation of PCIT claiming and to predict program discontinuation of PCIT claiming. Given the impact on when therapists began training on likelihood to discontinue, models controlled for the cohort year the therapist or program began training, as well as the total number of PEI claims per therapist or program. All analyses were performed in Stata/SE (15.1; StataCorp, 2017).

## Results

### Aim 1: PCIT Total Claim Volume

**Therapist Claim Volume**—On average, therapists made 74.8 PCIT claims ( $SD = 120.1$ ) across all active months. A multilevel negative binomial regression was run predicting the total number of PCIT claims per therapist during the follow-up. Therapist caseload characteristics and participation in additional training workshops significantly predicted therapist PCIT claim volume. Therapists with a higher proportion of cases with children aged 2 to 7 years old ( $B = 0.04$ ,  $SE = 0.01$ ,  $p < .01$ ), a higher proportion of cases with children with externalizing disorders ( $B = 0.02$ ,  $SE = 0.01$ ,  $p < .01$ ), or a higher proportion of claims in an outpatient clinic setting ( $B = 0.02$ ,  $SE = 0.004$ ,  $p < .01$ ) had significantly higher volume of PCIT claims. In addition, therapists who attended an additional training workshop also had a significantly higher volume of PCIT claims ( $B = 0.61$ ,  $SE = 0.24$ ,  $p < .05$ ). Finally, therapists in the most recent training cohort (Fiscal Year 16/17) had a significantly lower volume of PCIT claims, compared to therapists in the first training cohort (Fiscal Year 13/14;  $B = 3.65$ ,  $SE = 1.66$ ,  $p < .01$ ).

**Program Claim Volume**—Programs claimed for an average of 870.9 PCIT claims ( $SD = 2,890.1$ ). A negative binomial regression was run to examine predictors of program PCIT volume. No program caseload, training, or workforce characteristic significantly predicted program PCIT claims volume.

### Aim 2: PCIT Claim Discontinuation

**Therapist PCIT Discontinuation**—Of the 165 therapists who initiated PCIT claiming after training, 49 (29.7%) were still claiming for PCIT during the final six months of the

study period (October 2017 to March 2018), and 116 (70.3%) had no claims for PCIT during the final six months. Therapists claimed for PCIT for 17.7 months on average ( $SD = 13.1$ ). Table 3 displays the results of the multilevel mixed-effects survival model predicting therapist discontinued claiming for PCIT. Attending an additional training workshop predicted therapist survival, wherein additional workshop attendance was associated with a lower likelihood of therapist PCIT claiming discontinuation ( $HR = 0.56$ ,  $SE = 0.13$ ,  $p < .05$ ). In addition, therapists with a social work discipline were significantly less likely to discontinue PCIT claiming ( $HR = 0.64$ ,  $SE = 0.14$ ,  $p < .05$ ), compared with therapists with a marriage and family therapy discipline.

**Program PCIT Discontinuation**—Of the 55 programs that initiated PCIT claiming after therapist training, 39 (70.9%) were still claiming for PCIT during the final six months of the study period (October 2017 to March 2018). On average, programs had a survival time for claiming PCIT of 32.3 months ( $SD = 16.3$ ). Table 4 displays the results of the multilevel mixed-effects survival model predicting programs' discontinued claiming for PCIT. The only significant predictor of PCIT discontinued claiming was related to having an internal trainer. Programs that employed a therapist who met requirements to be an internal PCIT trainer were significantly less likely to discontinue PCIT claiming ( $HR = 0.11$ ,  $SE = 0.11$ ,  $p < .05$ ). Figure 2 shows the Kaplan-Meier survival curve for program PCIT claiming survival by group, comparing survival of PCIT claiming for programs with and without an internal trainer.

## Discussion

Sustainment of implementation investments has been described as “one of the most significant translational research problems of our time” and is currently critically understudied (Proctor et al., 2015). In response to this gap, we sought to strengthen existing knowledge on multilevel factors that influence the sustainment of PCIT within a large-scale, system-driven EBP implementation (Timmer et al., 2016). This study used administrative claims data to investigate predictors of two measures of sustainment at the therapist and program levels: 1) volume of PCIT claims provided following certification, and 2) discontinued claiming for PCIT.

Convergent and divergent predictors of the two sustainment measures can inform directions for implementation strategies to support sustained use of EBPs by therapists, programs, and systems. Fit between the EBP and therapist caseload, both in terms of the percentage of the therapists' clients within the appropriate age range (i.e., 2 to 7 years old) and presenting concern (i.e., with an externalizing disorder), predicted the volume of PCIT claims they provided. These findings are consistent with previous mixed-methods studies where EBPs were more likely to be sustained when they fit the client population served and when organizations were able to support therapists in developing specialization in specific practices based on their clinical interests, such as early childhood mental health (Rodriguez et al., 2018). Caseload mix did not predict discontinuation of PCIT, which may be more related to staff turnover or advancement within the organization and therefore not impacted as directly by the clients seen by a therapist. Furthermore, the case-mix at the program level did not predict any sustainment outcomes.

Nonetheless, adequate referrals of appropriate clients are critical for multiple outcomes of PCIT implementation. For example, PCIT therapists with a higher caseload gain more skills after participating in consultation calls (Jackson et al., 2017). Within LA County, the PCIT trainers emphasized the importance of building appropriate referrals and LACDMH provided an “Outreach Stipend” for therapists to conduct presentations on PCIT to community stakeholders (e.g., Head Start). However, even with this support, some agencies had difficulties maintaining an appropriate client flow, which has been identified as a barrier to implementing EBPs (Regan et al., 2017; Timmer et al., 2016). Overall, findings on the importance of having an appropriate caseload for therapist level delivery of PCIT, point to the need for dissemination and implementation efforts to move beyond increasing the supply of EBPs by training clinicians (i.e., *push strategies*), but also include *pull strategies*, which are consumer-facing strategies focused on increasing the demand for and engagement in EBPs such as PCIT (Barnett et al., 2020). This may be especially salient for caregiver-mediated interventions, given recognized challenges of engaging caregivers in their children’s treatment (Barnett et al., 2019).

Regarding implementation training support, therapists who completed additional trainings in PCIT were more likely to provide a higher volume of PCIT services and be less likely to discontinue PCIT. Additional trainings were available at least twice a year on a range of topics such as coaching challenging behaviors in session, addressing trauma symptoms in PCIT, and engaging parents in treatment. These trainings likely supported therapist competence and engagement with the model and allowed therapists to build a network of PCIT therapists for additional peer-to-peer support. However, the relationship between engagement in additional training and sustainment outcomes is likely transactional, as therapists may self-select into additional training given their enthusiasm and intentions to continue to deliver PCIT. Furthermore, although the grant initially provided a training stipend to cover lost productivity for attending trainings, programs eventually needed to approve therapist attendance at these events. Thus, programs that were more committed to PCIT implementation were more likely to support continued therapist capacity building in the model.

At the program level, the only significant predictor of sustainment, as measured by not discontinuing PCIT, was if programs employed a therapist who had met requirements to serve as an internal trainer. In train-the-trainer models, local staff are trained by external experts to provide training and ongoing consultation as an implementation strategy to build internal capacity (Triplett et al., 2020). The train-the-trainer model has the potential to address challenges and offset costs associated with staff turnover, as future staff can be trained without re-contracting with EBP developers. Furthermore, internal trainers have local expertise on the culture of the organization and client population, which may facilitate their ability to supervise therapists within their agency, further supporting sustainment (Westman, Daleiden, & Chorpita, 2019). Internal trainers likely also serve as local champions who provide social as well as technical facilitation of EBP sustainment (Rodriguez et al., 2018).

Overall, our findings echo previously documented challenges with EBP sustainment, despite substantial investments in implementation. Of the 165 therapists who completed training and initiated PEI claims for PCIT within the system of care, approximately 70% had

discontinued delivery within the 5-year study period, with average length of about 18 months of continued PCIT delivery following certification. Notably, this study was able to track how long therapists claimed for PCIT within the LACDMH system even if they moved across programs, with about 30% of therapists having claimed for PCIT in more than one agency. Challenges with sustained delivery at the therapist level are not unique to PCIT, with well documented implementation barriers related to therapist turnover (Beidas et al., 2016). In comparison to other EBPs implemented within the PEI context, PCIT had a similar survival length, and was a few months longer than two other caregiver-mediated interventions (i.e., Triple P and Child-Parent Psychotherapy), with an average survival time of about 16 months on. The past study also found that therapists were more likely to continue to deliver any PEI practice as opposed to a specific EBP (Brookman-Frazee et al., 2016). These findings suggest that therapists may continue delivering EBPs in a system even if other factors (e.g., moving to an agency that does not have equipment to provide PCIT) limit delivery of a specific practice. It is important to note that exiting the LACDMH system and PEI claims does not necessarily indicate that therapists no longer delivered PCIT in another context. Indeed, data suggest that mobility is high among community mental health therapists, who often begin careers in the public sector and take developed expertise into private sector care or other settings (Beidas et al., 2016). Nonetheless, these data may provide information on the longevity of EBP training investments within a defined system in similar public sector contexts.

In spite of these challenges, successes within this implementation effort also point to facilitators of sustainment. Anecdotally, therapists sometimes discontinued providing PCIT as they were promoted to leadership positions, which may actually help to sustain a practice. For example, in programs with train-the-trainer model, therapists who are trainers may have less time for direct provision of PCIT, but become necessary EBP champions to sustain a practice overtime. In fact, an encouraging finding in this study was that the majority of programs (63.9%) continued claiming for PCIT until the final six months of the five-year period, especially when the program had a therapist who was eligible to be an internal trainer. These findings point to the importance of organizations preparing to sustain a practice over time, in the face of turnover and career advancement of employees, which is simultaneously challenging and predictable within community mental health (Beidas et al., 2016).

### Limitations

Findings from this study need to be interpreted through its limitations. First, as with all studies that use administrative claims data, the data are not able to indicate whether a practice continued to be delivered with fidelity (Barnett et al., 2019; Brookman-Frazee et al., 2016; Brookman-Frazee et al., 2018), although the certification process undertaken did ensure that therapists had demonstrated competence in the model prior to the sustainment period. Second, the training data only captured if a therapist was eligible to train internally, which does not necessarily mean that they began training other therapists. As having an eligible trainer predicted sustainment, it is important for future research to identify the extent to which therapists engaged in training within their programs and what factors impacted their success in doing so. Further, the claims data included in this study do not capture the

therapists' delivery of PCIT that may have been paid for by other funding sources or in other settings. Therefore, it is possible that therapist-level sustainment has been underestimated in this study. It is also important to recognize that although the data is prospective, it is observational and not an experimental design. Therefore, predictors of sustainment might not be causal. As previously mentioned, therapist participation in multiple trainings predicted the sustainment outcomes but it is possible that therapists who attended more training activities received more organizational support to engage in PCIT implementation or were more motivated to participate. Indeed, participation in ongoing PCIT consultation calls has been shown to be related to more positive attitudes towards EBPs in general (Nelson et al., 2012). Experimental research is essential to test implementation strategies to determine which ones lead to improved sustainment at the therapist and program levels (Lewis et al., 2018; Powell et al., 2019).

Even with these limitations, this study has a number of strengths. First, the study leveraged training and administrative claims data within the largest PCIT implementation effort in the United States, which served a diverse client population, to contribute to the limited body of literature investigating predictors of sustainment. Continued study of these individual sustainment factors is critical to enhancing public knowledge on how to successfully sustain EBPs when implemented in community systems of care. By identifying sustainment drivers and barriers of this context, we hope to contribute much-needed guidance on how we can sustain our implementation efforts to best serve families and communities in need.

## Conclusions

Sustaining EBPs takes considerable investment from systems of care and mental health agencies. In this study, improved sustainment of PCIT was facilitated by: 1) adequate referrals to build specific therapist caseloads fitting of the practice, which potentially required additional outreach activities, 2) supporting therapist engagement in ongoing implementation supports, such as advanced trainings, and 3) having an internal trainer. All of these implementation supports can be costly and potentially require non-billable time for the agencies. Therefore, systems of care may want to provide additional support, such as the outreach stipends in this implementation effort. This may be especially relevant, as close to 30% of therapists in the current sample claimed for PCIT at more than one agency, suggesting that the system of care may continue to benefit from training a clinician even after they leave the agency that initially supported their training. At the same time, agencies are likely to be driven to continue to provide EBPs in response to policy mandates when these implementation supports are engaged. For example, PCIT is one of the few EBPs approved in the Family First Prevention Services Act, which changes federal child welfare funding to prioritize provision of effective services to maintain the placement of children with their families (Title IV-E Prevention Services Clearinghouse). Therefore, to maximize the public health potential of EBPs such as PCIT and respond to the continuing policy landscape mandating EBP implementation, system change and continued investment in maintaining a trained workforce is needed.



## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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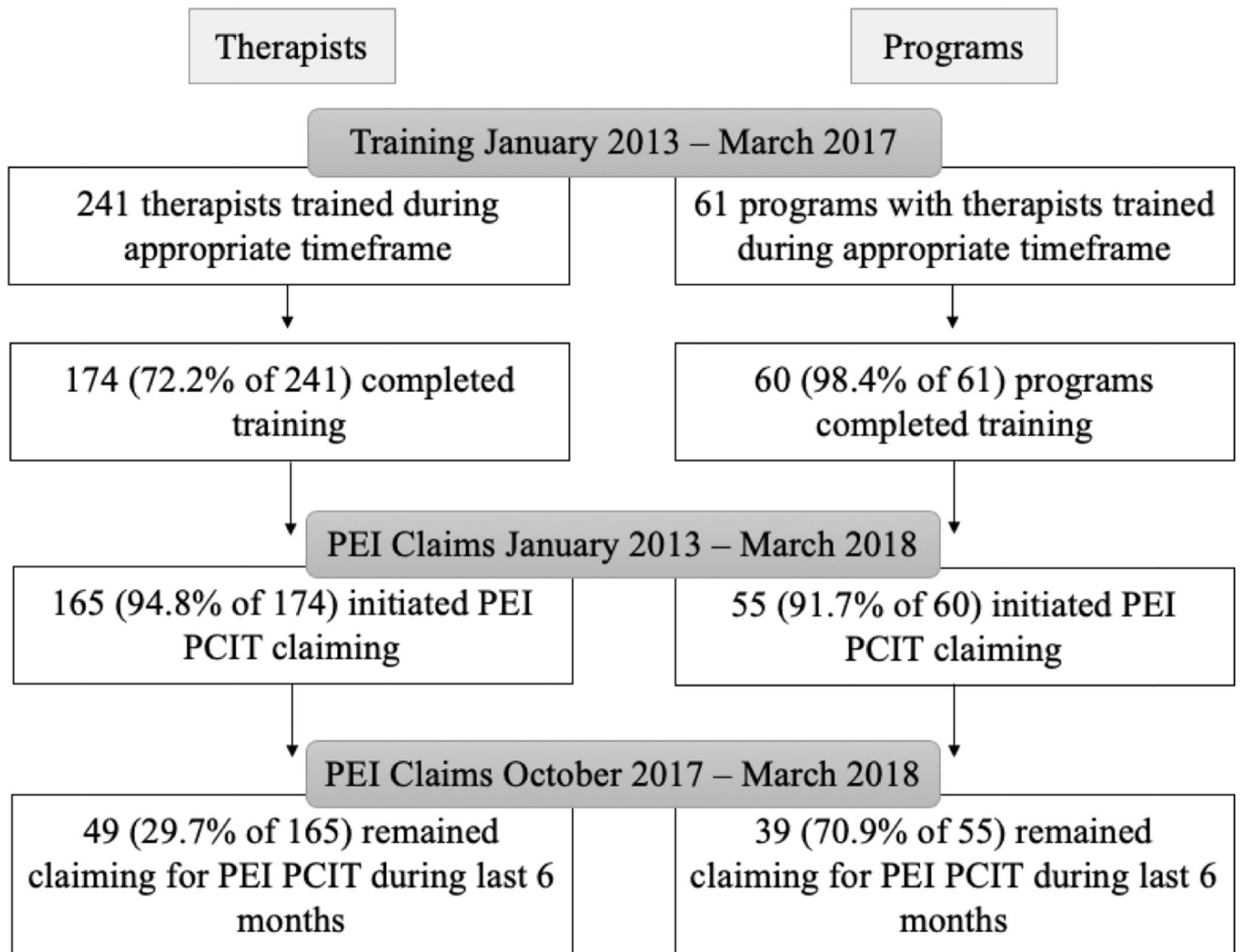
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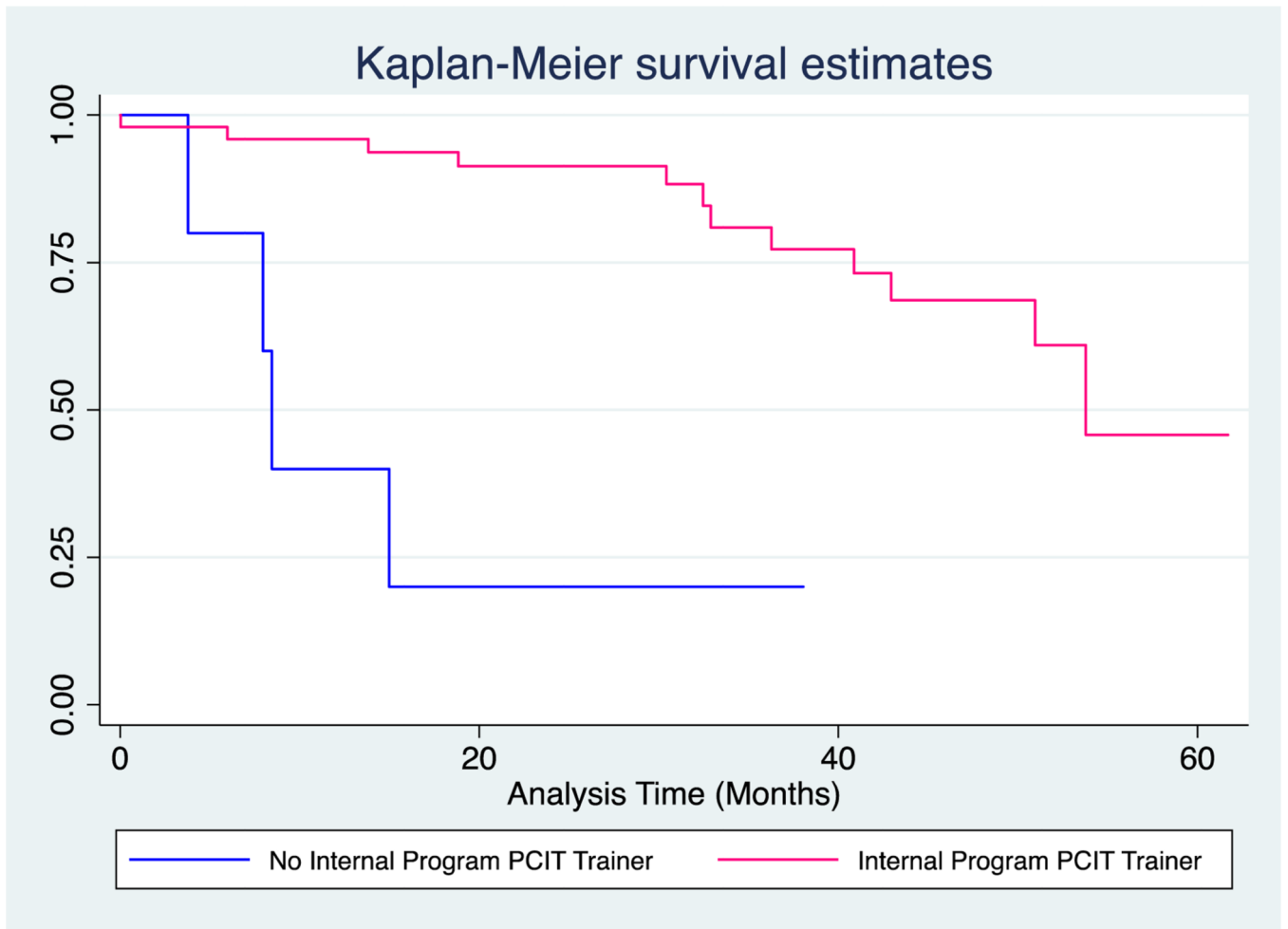
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**Figure 1. Flow of therapists through the training, initiation, and discontinuation of PEI PCIT claiming**

*Note.* PEI = Prevention and Early Intervention; PCIT = Parent-Child Interaction Therapy.



**Figure 2.** Kaplan-Meier survival curve for program PCIT claiming survival by group (internal trainer vs. no internal trainer)

**Table 1**

Descriptives for Therapist and Program Characteristics.

	<b>Therapists</b>	<b>Programs</b>
	<i>n</i> = 165	<i>n</i> = 55
<b>Demographics</b>	<b>No. (%)</b>	<b><i>M</i> (<i>SD</i>)</b>
Gender: Female	155 (93.9)	---
Licensed	134 (81.2)	---
Discipline		
Marriage and Family Therapy	85 (51.5)	---
Social Work	72 (43.6)	---
Counseling/Psychology	7 (4.2)	---
Other	1 (.6)	---
Therapist trainee status: Trainee	8 (4.8)	10.8 (9.7) <sup>a</sup>
Language		
English	87 (52.7)	---
Spanish	78 (47.3)	---
<b>Casemix</b>	<b><i>M</i> (<i>SD</i>)</b>	<b><i>M</i> (<i>SD</i>)</b>
Percentage of cases with child 2–7 years old	53.2 (23.6)	30.9 (11.7)
Percentage of claims in outpatient clinic setting Client Primary Diagnosis <sup>b</sup>	68.4 (29.5)	59.2 (27.4)
Percentage of cases with externalizing disorder <sup>c</sup>	27.6 (17.2)	25.5 (8.0)
Percentage of cases with internalizing disorder <sup>d</sup>	34.7 (18.8)	38.6 (11.0)
Percentage of cases with trauma/adjustment disorder	23.9 (18.6)	22.4 (10.2)
Percentage of cases with other disorder	13.7 (14.0)	13.4 (7.5)
<b>Training</b>	<b>No. (%)</b>	<b>No. (%)</b>
Completed training	127 (77.0)	55 (100.0)
Eligible to train internally	79 (47.9)	50 (90.9)
Participated in at least one additional coding training	132 (80.0)	54 (98.2)
Participated in at least one additional workshop	109 (66.1)	54 (98.2)
Cohort year		
FY 13/14	59 (35.8)	17 (30.9)
FY 14/15	55 (33.3)	19 (34.5)
FY 15/16	37 (22.4)	13 (23.6)
FY 16/17	14 (8.5)	6 (10.9)
Number of EBPs delivered	5.0 (2.0)	6.4 (1.5)
Months from PCIT training to first competency sign off	1.1 (1.4)	---
Total hours with PCIT trainers per program	---	134.4 (21.7)

Note. PCIT = Parent-Child Interaction Therapy; FY = fiscal year.

<sup>a</sup>Percentage of therapists per program;

<sup>b</sup>Primary diagnosis listed in administrative claims data;

<sup>c</sup>Externalizing disorders included opposition defiant disorder, disruptive disorder, conduct disorder, and attention deficit-hyperactivity disorder;

<sup>d</sup>Internalizing disorders included anxiety disorder, mood disorder.

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**Table 2**

Therapist and Program Claim Initiation, Volume, and Survival Descriptives.

	Therapists ( <i>n</i> = 165)			Program ( <i>n</i> = 55)		
	PCIT	Any PEI	PCIT	Any PEI	PCIT	Any PEI
Claim Volume						
<i>Mean (SD)</i>	74.8 (120.1)	627.9 (638.2)	870.9 (2,890.1)	24,605.7 (2,1820.8)		
<i>Median</i>	14.0	476.0	353.0	18,560.0		
<i>Range</i>	0 – 791	0 – 3,192	0 – 22,622	1 – 116,142		
Claim Discontinuation						
Discontinuation Rate, <i>No. (%)</i> <sup><i>b</i></sup>	116 (70.3%)	126 (59.4%)	16 (26.1%)	3 (4.9%)		
Continuation Rate, <i>No. (%)</i> <sup><i>b</i></sup>	49 (29.7%)	86 (40.6%)	39 (63.9%)	58 (95.1%)		
Survival Time						
<i>Mean (SD)</i>	17.7 (13.1)	37.5 (17.0)	32.3 (16.3)	58.1 (10.9)		
<i>Median</i>	16.2	38.7	31.3	61.7		
<i>Range</i>	.03 – 53.4	.2 – 61.9	.03 – 16.3	.07 – 61.9		

*Note.* PCIT = Parent-Child Interaction Therapy; PEI = Prevention and Early Intervention.<sup>*a*</sup>Percentage of therapist or program who completed training.<sup>*b*</sup>Percentage of therapist or programs who discontinued or continued after initiating PCIT claims.

**Table 3**  
 Multi-level Models of Therapist Sustainment Outcomes: Negative Binomial Regression Predicting Volume of PCIT Claims and Cox Regression Model Predicting Discontinuation of PCIT Claims

	<u>Therapist PCIT Claim Volume</u>	<u>Therapist PCIT Claiming Discontinuation</u>
	<i>B (SE)</i>	<i>Hazard Ratio (SE)</i>
<i>Therapist variables</i>		
<i>Therapist characteristics</i>		
Therapist discipline (Ref = Marriage & Family Therapy)		
Counseling/Psychology	-0.82 (0.55)	1.35 (0.71)
Social Work	0.42 (0.23) <sup>†</sup>	<b>0.64 (0.14)<sup>*</sup></b>
Other	-0.84 (1.11)	3.04 (3.14)
Therapist trainee status <sup>b</sup>	0.90 (0.57)	0.55 (0.27)
Therapist primary language <sup>c</sup>	0.13 (0.23)	0.94 (0.20)
<i>Therapist case/load characteristics</i>		
Percentage of cases with child 2-7 years old	<b>0.04 (0.01)<sup>**</sup></b>	0.99 (0.005)
Percentage of cases with externalizing disorder	<b>0.02 (0.01)<sup>**</sup></b>	1.00 (0.01)
Percentage of claims in outpatient clinic setting	<b>0.02 (0.004)<sup>**</sup></b>	0.99 (0.004) <sup>†</sup>
<i>Therapist training characteristics</i>		
Time from therapist starting PCIT training to first sign off	0.001 (0.001)	1.00 (0.001)
Therapist participated in additional coding training <sup>d</sup>	-0.10 (0.33)	0.73 (0.21)
Therapist participated in additional workshops <sup>e</sup>	<b>0.61 (0.24)<sup>*</sup></b>	<b>0.56 (0.113)<sup>*</sup></b>
Therapist training cohort year <sup>f</sup>		
FY 14/15	0.40 (0.65)	2.33 (1.18) <sup>†</sup>
FY 15/16	-2.05 (1.19) <sup>†</sup>	2.36 (2.12)
FY 16/17	<b>-3.65 (1.66)<sup>**</sup></b>	7.77 (10.18)
Number of therapists who completed training at program	0.14 (0.12)	0.81 (0.09) <sup>†</sup>
Program has therapist eligible to be internal PCIT trainer	0.74 (0.45) <sup>†</sup>	0.52 (0.23)

Notes. Analyses controlled for the total number of PEI claims per therapist. PCIT = Parent-Child Interaction Therapy; FY = fiscal year.

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- <sup>b</sup>Therapist trainee status was coded 1 = therapist was a trainee, 0 = therapist was a staff member;
- <sup>c</sup>Therapist primary language was coded as 1 = primary language Spanish, 0 = primary language was English;
- <sup>d</sup>Participation in additional coding was coded as 1 = therapist participated in any additional coding training, 0 = therapist did not participate in any additional coding training;
- <sup>e</sup>Participation in additional workshops was coded as 1 = therapist participated in any additional workshops, 0 = therapist did not participate in any additional workshops;
- <sup>f</sup>Training cohort year reference group was the earliest cohort (FY = 13/14).

<sup>+</sup>  $p < 0.10$ ,

<sup>\*</sup>  $p < 0.05$ ,

<sup>\*\*</sup>  $p < 0.01$

**Table 4**  
 Models of Program Sustainment Outcomes: Negative Binomial Regression Predicting Volume of PCIT Claims and Cox Regression Model Predicting Discontinuation of PCIT Claims

	<u>Program PCIT Claim Volume</u>	<u>Program PCIT Claiming Discontinuation</u>
	<i>B (SE)</i>	<i>Hazard Ratio (SE)</i>
<i>Program caseload characteristics</i>		
Percentage of cases in program with child 2-7 years old	0.01 (0.01)	1.00 (0.03)
Percentage of cases in program with externalizing disorder	-0.004 (0.01)	1.01 (0.04)
Percentage of claims in program in outpatient clinic setting	0.005 (0.01)	1.01 (0.01)
<i>Program training and workforce characteristics</i>		
Program training cohort year <sup>a</sup>		
FY 14/15	0.04 (0.37)	0.74 (0.49)
FY 15/16	0.06 (0.39)	1.75 (1.85)
FY 16/17	-0.11 (0.49)	<.001 (<.001)
Number of therapists who completed training	0.02 (0.13)	0.51 (0.19)
Program has therapist eligible to be internal PCIT trainer	0.25 (0.52)	<b>0.11 (0.11)*</b>
Total hours with PCIT trainers per program	0.003 (0.01)	1.02 (0.01)

Note. Analyses controlled for total number of PEI claims per program. PCIT = Parent-Child Interaction Therapy; FY = fiscal year.

<sup>a</sup>Training cohort year reference group was the earliest cohort (FY = 13/14).

<sup>+</sup>  $p < 0.10$ .

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .