Providers Advancing School Outcomes (PASO)

Final Impact Study, 2014-2017

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Providers Advancing School Outcomes (PASO)

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Executive Summary

This report represents the culmination of a five year evaluation of the Providers Advancing School Outcomes (PASO) program operated by the Colorado Statewide Parent Coalition.

Program Description

The PASO program strives to fulfill the following theory of change: by providing high-quality professional development through training sessions and in-home coaching visits to Family, Friend, and Neighbor (FFN) childcare providers in low-income, Latino communities, PASO will improve the quality of early childhood education in these settings to enable children served to enter kindergarten ready to learn, leading to improved early literacy outcomes and reducing the achievement gap.

Prior Research

Augenblick, Palaich and Associates (APA), the independent evaluator for PASO, has conducting this rigorous, five year evaluation study as part of a Social Innovation Fund (SIF) grant through Mile High United Way. Prior to this evaluation, research on the program was largely anecdotal and did not address child outcomes.

Study Design

APA's five year evaluation of the program has documented the program's theory of change by: (1) confirming that the program was implemented with fidelity and quality through a full implementation study completed in 2014 and ongoing implementation monitoring; and (2) measuring the program's impact on providers and children over a period of three years.

Evaluation Measures and Analysis

For ongoing implementation monitoring, APA relied on document review, interviews, and surveys conducted of providers twice a year to measure program fidelity and quality. For the program impact analysis, APA examined the impact PASO has on (1) providers, using a locally developed rubric, the Protocol to Estimate Progress of the Environment and Interaction (PEPEI), which is aligned with the evaluation measure and credential expectations of the nationally recognized, Council for Professional Recognition's Child Development Associate (CDA), as well as a document review to determine which providers receive the CDA credential following PASO training; and (2) children, using the nationally normed Child Development Profile-3 (DP-3) assessment and a short interrupted time series (SITS) design. This SITS design uses assessment scores collected before a child's caregiver begins PASO training to establish a baseline score for each child. These baseline assessment scores were then compared with scores on assessments administered during and at the end of the PASO training, allowing children in the treatment group to serve as their own control group.

Results for provider and child outcomes are pooled across three years and include the 2014-15, 2015-16, and 2016-17 cohorts.

Final Evaluation Findings, 2014-2017

Program Implementation

The first link in PASO's theory of change is to "Provide professional development training sessions and in-home coaching to FFN providers in low-income, Latino communities." Based upon the findings of the 2014 implementation study and ongoing implementation monitoring, APA finds that PASO met this objective by implementing the program in a manner consistent with its program model (as outlined in the logic model on page 6).

Provider Outcomes

The second link in PASO's theory of change is to "Improve the quality of childhood education in these FFN settings." Based on self-reported data, providers' comfort level, skill level, and quality of care are demonstrably higher after participating in the PASO program. There is also a statistically significant improvement in overall provider quality and in the quality of care provided as measured by the PEPEI, an evaluation tool aligned with the nationally recognized CDA measure. Overall, provider scores on the PEPEI increased dramatically before and after PASO training; on average providers earned 17 percent of possible points on their pre-assessment, compared to earning 83 percent of possible points on their post-assessments. Improvement was made in all CDA competency areas including (1) health, safety, and learning environment; (2) child physical and intellectual development; (3) social and emotional development/guidance; (4) relationships with families; (5) program management; and (6) professionalism.

Child Outcomes

The third link in PASO's theory of change is to "Enable Latino children served to enter kindergarten school ready." The DP-3 assessment measures child progress in areas related to being school ready, including the skill areas of (1) physical, (2) adaptive behavior, (3) social-emotional, (4) cognitive, and (5) communication; all of these sub-scores are summed into a sixth "general development" score. Given that the DP-3 standard scores provide a norm-referenced interpretation, the scores account for typical child development.

Overall, *APA found positive and statistically significant results for the three-year pooled sample*, with children increasing their DP-3 scores by an average of 11 NCE points, an effect size of 0.52. For the average child in the program, an increase of 11 NCE points translated to the child moving from the sixth percentile to the 17th percentile. The highest percentile gains were on the Cognitive Development subcomponent.

Contribution of Study

Level of Evidence Generated by the Study

The five-year study has achieved its targeted moderate level of evidence for child outcomes. The study team adhered to the Short Interrupted Time Series research design detailed in the Subgrantee Evaluation Plan approved by the reviewers for Corporation for National and Community Service (CNCS)

as meeting the requirements for a moderate level of evidence; this includes three levels of nesting for the Hierarchical Linear Model. Additionally, data used in this analysis included three time points from before and at least three time points after the PASO intervention (the study included six time points after the start of the training program), which is consistent with the SIF guidelines for moderate levels of evidence. Although the strongest study design for moderate level of evidence would include a separate comparison group, a separate comparison group was difficult to create in this context. The PASO program serves a Latino population that is "under the radar". In other words, the childcare providers and children ages birth through five in their programs are not a population that is easy to locate. Therefore, there is no readily available assessment data for children served in non-PASO FFN homes. Given this practical reality, the current study design used a Short Interrupted Time Series that allowed the children impacted by the PASO program to serve as their own control group. Further, the study includes high levels of internal validity with design elements in place to mitigate threats to internal validity.

Strengths and Limitations of the Study

As noted, since the population served by PASO is often "under the radar" a limitation of the study is that a separate comparison group could not be created. However, a strength of the study is the use of a quasi-experimental research design that addresses this constraint in which the students who received exposure to the PASO treatment served as their own control cases. This study design provided robust information regarding the relationship between exposure to the PASO program and child outcomes.

Another limitation to the current study is that it involved no direct assessment of children. As the program provides indirect treatment of children through the providers it trains, direct assessment of children was not an existing program element and the costs of doing so exceeded available evaluation resources. While this is a weakness to the current data collection process, it is a strength of the longevity of the PASO program. More specifically, having trained PASO assessors collect student-level information as opposed to members of the research team, PASO is able to continue analyzing student-level outcomes following completion of the current study.

Finally, the loss of one PASO site during the final year of analysis limited the research team's ability to do comparative analyses for all years of the study. However, the pooled sample includes information from both sites for two of the three years in the analysis, supporting the generalizability of the study's findings.

Connection of this Study to Future Research

This study was intended to not only contribute to the deficit of literature surrounding FFN-provided early childhood education but also to build upon the existing and growing importance of provider coaching strategies by analyzing the "Tia" model which emphasizes regular, direct visits to FFN provider facilities. The study was also intended to provide research on a constructive and efficacious model to "close the achievement gap," as children served by FFN providers are regularly over-represented by low-income and other "at-risk" demographics. Future research could include examining the program as it is replicated or expanded into other communities.

I. Introduction

The Providers Advancing School Outcomes (PASO) program, operated by the Colorado Statewide Parent Coalition (CSPC), is an innovative, community-based model that has been operating in Boulder County, Colorado since 2005. PASO has also recently expanded to additional Colorado communities, including Aurora, Jefferson County and Weld County. The service areas included in this study are Boulder County and Aurora for the 2014-15 and 2015-16 cohort years. For the 2016-17 cohort year, only a cohort from Boulder County was included; due to funding challenges, CSPC was unable to operate a cohort in Aurora.

PASO is designed to train and support child care providers who are family, friends, and neighbors (FFN providers) of preschool-aged children in the area's low-income, Hispanic communities. In doing so, PASO enhances the capacity of these FFN providers to ensure school readiness of Latino children from birth to five years of age. PASO's core program components include the following:

1. Annual cohorts of at least 20 FFN child care providers from low-income, Latino communities – providers who are frequently difficult to find and may be reticent to accept services or support;
2. Trained instructors/coaches (referred to as "Tías");
3. A nationally recognized early childhood education (ECE) curriculum, HighScope, and the Child Development Associate (CDA) professional development and credentialing process;
4. At least 30 professional development sessions for FFN providers addressing a variety of topics, such as environment/safety concerns, health, early childhood literacy and numeracy, social skills, family support, and other early education services; and
5. In-home coaching at least twice monthly for FFN providers and ongoing support by Tías to monitor FFN provider implementation and understanding of material.

The program elements described above are intended to have the short-term outcomes of (1) positive change in FFN provider practice and (2) an increased number of credentialed FFN providers, which will lead to the intermediate outcome of improving the school readiness of students served by PASO-trained providers. Additional long-term outcomes that PASO aims to contribute to include (1) improving the quality of FFN early childhood care in the Latino community, (2) improving third-grade literacy outcomes, and (3) reducing the achievement gap.

Overview of Study

Augenblick, Palaich and Associates (APA) is the independent evaluator for PASO. APA is a Denver-based research and consulting firm. Founded in 1983, APA has worked in all 50 states addressing key education issues including school finance, educator effectiveness, early childhood education, and program evaluation.

This multi-year study that was conducted from 2012 to 2017 included several components: (1) a feasibility analysis to determine the most appropriate measures to use in assessing the program's impact on children, (2) an implementation analysis to ensure the program is operating with fidelity to its

stated design, and (3) a program impact evaluation to establish a moderate level of student impact evidence, as defined by the Corporation for National and Community Service.

The first component, a feasibility analysis, was completed in early November 2013 and was conducted primarily to determine the student outcome measure to be used in the impact evaluation. The criteria used to select the student assessment included: (1) the quality of data produced, (2) the number of children for whom the assessment is applicable, (3) the level of evidence possible, (4) training and level of effort required to administer and collect data, and (5) the costs associated with personnel time and purchasing the assessment. A final report was submitted in November 2013. Based upon the findings of that feasibility study, the final Impact Evaluation Subgrantee Evaluation Plan which outlined an evaluation approach to determine a moderate level of evidence was submitted and subsequently approved by CNCS-appointed reviewers in 2014.

The second component of this multi-year study was an implementation evaluation to determine the program's fidelity to its model (including "Tía" coaching and instruction, the professional development/credentialing process, ECE curriculum and dosage of the program delivered to providers). This work was intended to establish a causal chain for the program's design and provide a foundation for the program impact analysis. This implementation study was completed in November 2014. Ongoing implementation monitoring at a lesser scale continued in Years 4 and 5.

The final component of the evaluation was the impact evaluation, which was conducted over a three-year period. For this program impact analysis, APA examined the impact PASO had on (1) providers, using a locally developed rubric, the Protocol to Estimate Progress of the Environment and Interaction (PEPEI), which is aligned with Child Development Associate (CDA)'s nationally recognized evaluation measure and credential expectations, as well as a document review to determine which providers receive the CDA credential following PASO training; and (2) children, using the nationally normed Child Development Profile-3 (DP-3) assessment and a short interrupted time series (SITS) design. This SITS design used assessment scores collected before a child's caregiver begins PASO training to establish a baseline score for each child. The baseline assessment scores were then compared with scores on assessments administered during and at the end of the PASO training, allowing children in the treatment group to serve as their own control group.

This report presents the final findings of this multi-year study, including pooled results for provider and child outcomes over the past three years.

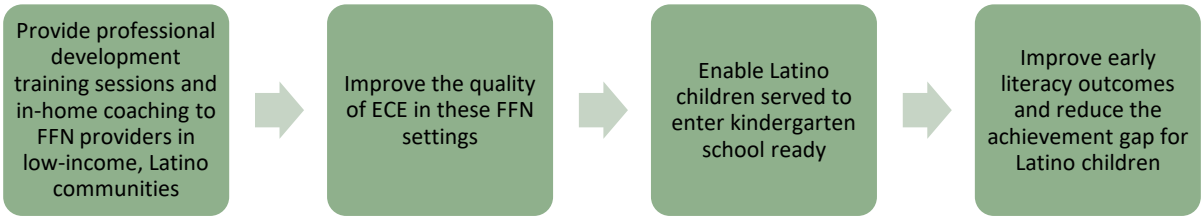
II. Program Components in Detail: Program Theory, Logic Model, and Outcomes of Interest

Program Theory

PASO strives to achieve the following theory of change:

> *By providing high-quality professional development through training sessions and in-home coaching visits to FFN providers in low-income, Latino communities, PASO will improve the quality of ECE in these settings to enable children served to enter kindergarten school ready, leading to improved early literacy outcomes and reducing the achievement gap.*

Figure 2.1
PASO's Theory of Change



This theory of change (and the corresponding logic model) is firmly grounded in research. As indicated in the theory of change, PASO provides professional development and coaching of FFN providers in order to achieve increased student learning outcomes. Research conducted over the past 20 years has confirmed that the single most important school-based factor in strengthening students' educational achievement is the quality and effectiveness of the educators who teach (Barber & Mourshed, 2007; Darling-Hammond & Bransford, 2005; Kane, Taylor, Tyler, & Wooten, 2010; Rivkin, Hanushek, & Kain, 2005; Sanders & Rivers, 1996; Hanushek, 2002; Hanushek & Rivkin, 2010).

Research also strongly supports PASO's belief that quality FFN childcare providers that teach school readiness skills will improve children's school outcomes. Findings show that both academic and nonacademic school readiness skills at entry to kindergarten are significantly related to reading and mathematics achievement in fifth grade (Le, Kirby, Barney, Setodji, & Gershwin, 2006). Research in neuropsychology and other fields has consistently shown that ECE programs offer a unique opportunity to increase student performance and reduce gaps in early childhood learning experiences.

Logic Model and Outcomes of Interest

From this theory of change, well grounded in research, the program's logic model includes a number of elements, including (1) inputs, (2) activities, (3) outputs, (4) short- and intermediate-term outcomes, (5) long-term outcomes and (6) impact.

Inputs – The primary inputs of the program are the trained instructors/coaches, referred to as "Tías;" the nationally recognized HighScope ECE curriculum; and CDA's professional development process,

which includes the credentialing process for all participating providers to receive the CDA certification if they choose.

1. Tías: Tías are recruited directly from the communities in which they are expected to work, with emphasis on hiring individuals who (1) have close connections with the community to be served and (2) demonstrate passion for working with children and providers of early childhood education and care. As the program has expanded, greater emphasis has been placed on recruiting Tías with prior preschool training or experience, but this experience is still not necessarily required. Training is then needed to ensure Tías are equipped with the skills and knowledge needed to be effective regardless of their background. PASO's leadership trained the Tías by conducting discussions of assigned reading content and curriculum, and by modeling how training sessions, provider site visits, and provider assessments should be conducted.
2. CDA Professional Development process: The CDA framework and CDA Credential that results from this process is a widely recognized credential in ECE that providers can apply for at the end of the PASO program. The CDA framework is based on core competency standards designed to meet the following goals: (1) establishing and maintaining a safe, healthy learning environment; (2) advancing physical and intellectual competence; (3) supporting social and emotional development and providing positive guidance; (4) establishing positive and productive relationships with families; (5) ensuring a well-run, purposeful program that is responsive to participant needs; and (6) maintaining a commitment to professionalism.
3. HighScope ECE curriculum: Materials from the HighScope ECE curriculum are used to supplement CDA professional development materials as needed. The HighScope educational approach emphasizes "active participatory learning" and includes the curriculum areas of (1) approaches to learning; (2) social and emotional development; (3) physical development and health; (4) language, literacy, and communication; (5) mathematics; (6) creative arts; (7) science and technology; and (8) social studies.

Activities – Key activities of PASO include recruitment and retention; training; coaching; and evaluation.

1. Recruitment and Retention: The program seeks a cohort of at least 20 FFN providers in each service area where the program is offered in a given year. Providers come from low-income, Latino communities. Over the past several years, word of mouth regarding the program has spread within these communities. The program accepts providers who meet the criteria – providing home-based care for at least two children (who are not their own) ages birth to five years old – on a first-come, first-served basis. Remaining providers who express interest are placed on a waiting list and are likely to be enrolled in the program the following year. The intensive support, as described below, includes consistent contact several times a month, which promotes FFN provider retention.
2. Training: FFN providers receive at least 30 training sessions over the training year led by Tías.
3. Coaching: FFN providers also receive in-home coaching visits at least twice a month from the Tías to monitor and support providers' implementation of training.

4. Evaluation: The Tías conduct routine observations of FFN providers in their homes to measure FFN provider growth in key areas using PASO's Protocol to Evaluate Progress, Environment, and Interaction (PEPEI) rubric. This rubric asks the Tías to rate providers in a variety of areas including rating them on the condition, quality, and safety of their provider facilities and on the nature of their interactions with the children served.

Outputs – Related outputs include the number of (1) providers who participate in the program; (2) providers who complete the program; (3) providers who have a change in their in-home Tía observation score, as measured by the PEPEI; (4) providers who receive CDA certification; (5) children impacted by the program; and the (6) change in the assessment scores of students served by PASO-trained childcare providers.

Short- and Intermediate-Term Outcomes – The efforts of the program are intended to have the following short-term outcomes: (1) positive change in PEPEI observation scores and (2) an increased number of credentialed FFN providers. These short-term outcomes are expected to lead to the intermediate outcome of improving the school readiness of the children served, as demonstrated by improved assessment scores.

Long-Term Outcomes – PASO's long-term outcome goals include (1) improving the quality of FFN early childhood care in the Latino community and (2) improving third-grade literacy outcomes.

Impact – Finally, the impact of the evaluation is intended to (1) support replication of PASO in other communities and (2) make a meaningful contribution to the literature on FFN care interventions. PASO's overall intended impact is to reduce the achievement gap between Latino children and their peers in the communities served.

PASO's logic model is illustrated on the following page. *Note: the logic model identifies relevant study questions for both the implementation study (I1-8) and the impact evaluation (confirmatory questions C1-2 and exploratory questions E1-3). Please refer to page 10 for the impact questions that will be addressed in this report.*

Figure 2.2- PASO Logic Model

Theory of Change: By providing high-quality professional development through training sessions and in-home coaching visits to FFN providers in low-income, Latino communities, PASO will improve the quality of early childhood education in these settings to enable children served to enter kindergarten school ready, leading to improved early literacy outcomes and reducing the achievement gap.

Inputs		***Activities***	***Outputs***		***Short/Intermediate-Term Outcomes***	***Long-Term Outcomes***	***Impact***
• Trained instructors/ coaches (Tias) ***(Question I1)*** • Nationally recognized professional development curriculum/ credentialing process (CDA) ***(Question I2)*** • Supplemental materials and activities from research-based ECE curriculum (HighScope) ***(Question I2)***		• Recruiting and retaining a cohort of at least 20 FFN providers in each service area who serve children in low-income, Latino communities ***(Questions I3, I4)*** • 30 professional development training sessions over a cohort year led by trained instructors/coaches (Tias) ***(Question I5)*** • Bi-monthly in-home professional development coaching sessions over a cohort year led by trained instructors/coaches (Tias) ***(Question I5)*** • Routine in-home observation and measurement of provider growth in key ECE areas using locally developed observation rubric ***(Question I5)***	• # of providers who participate in program ***(Questions I6, I8)*** • # of providers who complete program ***(Questions I7, I8)*** • # of providers who have a Δ in their in-home observation score ***(Question C1)*** • # of providers who receive CDA certification ***(Question C1)*** • # of students impacted by program ***(Question C2)*** • Student assessment scores ***(Question C2)***		**Short Term Outcomes:** • Positive Δ in provider quality from initial provider observation score to end-of-program observation score ***(Question C1, E2, E3)*** • Increased number of credentialed FFN providers ***(Question E1)*** **Intermediate Term Outcomes:** • Improve assessment scores in school readiness areas for children served by PASO providers ***(Questions C2, E2, E3)***	• Improve quality of FFN early childhood care in the Latino community • Improve third-grade literacy outcomes for Latino children in Aurora, Boulder and St. Vrain School Districts	• Reduce achievement gaps for Latino children in communities where PASO operates • Evaluation supports replication of PASO program • Evaluation makes meaningful contribution to the literature on FFN care interventions

III. Study Design

Ongoing Implementation Evaluation

In Year 2 (2012-14) of this multiyear study, APA conducted a full implementation evaluation of the program's ECE curriculum, professional development and credentialing process to establish a causal chain for the program's design and to inform analysis of provider and child outcomes. This implementation study was conducted in two PASO service areas, Boulder County and Aurora, with a report completed in November 2014. Overall, the study team found that the PASO program was implemented with fidelity and at the quality level expected by the program. Further, implementation was generally consistent between the two service areas.

For Years 3 through 5, the study team conducted ongoing program implementation monitoring at a lesser scale. Ongoing implementation monitoring included:

1. Reviewing program documents, including the PASO program manual, training schedules, coaching visit logs, and attendance records;
2. Interviewing with program leaders and Tías to discuss program implementation; and
3. Administering surveys to FFN providers twice during the training year to provide additional information regarding program fidelity and the quality of training and coaching.

These monitoring activities addressed the following questions about the implementation of the program's inputs and activities, as identified in the logic model:

I1: Does the program provide trained instructors/coaches (Tías)?
I2: Does the program have a high-quality professional development curriculum and credentialing process?
I3: Does the program recruit and retain the expected number of providers?
I4: Do the Tías conduct the expected number of training sessions, in-home visits, and provider observations?
I5: Is training and coaching provided at the expected level of quality?
I6: Is the program implemented consistently in both service areas?

Note that for Year 5, the PASO program was only offered in Boulder County due to funding challenges, so question I6 was not applicable.

Data Collection Activities

Implementation monitoring primarily focuses on program fidelity to the model. Fidelity is defined as meeting key program objectives, dosages, and goals as identified by PASO leadership, CDA materials, and other PASO program materials. APA worked with PASO to identify key milestones, dosages, expectations, and definitions that indicate fidelity of implementation. In particular, the fidelity review is important to ensure that the program is being implemented consistently across the two service areas (Boulder County and Aurora) and across years. Program quality is addressed through provider feedback

on training sessions and home visits. Table 3.1 identifies PASO's inputs and activities (as identified in the logic model), as well as the related goal/standard and available evaluation data source.

Table 3.1
Implementation Evaluation – Inputs and Activities, Standards and Data Sources

PASO Inputs and Activities	Related Implementation Question(s)	Goal/Standard	Evaluation Data Sources
Inputs			
Highly trained "Tías" to provide quality instruction and coaching	I1, I5, I6	Fidelity and quality	Interviews with program staff and provider surveys
Child Development Associate (CDA) professional development/ credentialing process, supplemented by HighScope ECE curriculum materials and activities	I2, I6	Fidelity	Interviews with program staff and document review
Activities			
Recruit and retain cohort of FFN providers serving the low-income, Hispanic community to participate in program	I3, I6	Fidelity: 20 FFN providers to receive training	Interviews with program staff and document review
Tías conduct bi-monthly professional development training sessions for FFN providers during program year (twice a month)	I4, I5, I6	Fidelity and quality	Documentation data and provider surveys
Tías conduct monthly in-home visits to FFN providers during program year to provide coaching on relevant topics	I4, I5, I6	Fidelity and quality	Documentation data and provider surveys
Tías conduct routine observations of FFN providers in their homes during the program year	I4, I6	Fidelity	Documentation data and provider surveys

APA found that the program continued to be implemented with fidelity and quality in Years 3-5. Ongoing implementation monitoring findings for Year 5 (the 2016-17 cohort year) are presented in Chapter IV.

Impact Evaluation

The primary focus of Years 3 through 5 was an impact evaluation that addresses the study's confirmatory research questions:

C1: Does participation in PASO improve the quality of care given by FFN providers who completed the program, as measured by self-reported data and the PEPEI?

C2: Do children served by PASO-trained providers show improvement in development areas related to being school ready, as measured by the Developmental Profile-3 (DP-3) assessment?

For this final year, the study also addressed the following exploratory question related to short- and intermediate-term outcomes:

E1: Does the program increase the number of credentialed FFN providers in the communities it serves, as measured by the number of providers who receive their CDA after PASO training?

Given the exclusion of a cohort in Aurora in Year 5, the study is not addressing the additional exploratory questions of impact variance by cohort year or service area.

Further, because the evaluation period is relatively brief and only limited amounts of data can be collected in this period, the long-term outcomes and impact of the program – including third-grade literacy outcomes, reduction of the achievement gap in school districts, and overall improvement in the quality of FFN care in the Latino community – will not specifically be addressed by this study.

Impact Study Approach

Per the Subgrantee Evaluation Plan (SEP), approved in 2014, APA conducted a short interrupted time series (SITS) design to estimate the impact of the PASO program on children's development. The treatment group, children served by PASO trained childcare providers, served as their own control. The counterfactual was established with three pre-intervention measurements one each month in April, May and June during the program's recruiting period (Figure 1). This schedule was intended to avoid testing in July and August when it was anticipated that children might be away for summer break. The measurement for each time point occurred within approximately a one-week window across the providers. Three time points are the minimum needed in order to establish a baseline. For example, the What Works Clearinghouse standards and procedures state that three data points per phase are needed to meet single case design standards with reservations (What Works Clearinghouse, 2014).

Measurements once the intervention began were spaced out over the duration of the intervention's training phases (Figure 1). This measurement schedule provided three time points in both intervention phases, which occurred in September, October, November, February, March and April. The final posttest time point in April was at the end of the training year.

Threats to Internal Validity

The two main threats to the internal validity of a SITS are history and maturation. Each of these threats is discussed below.

History

The threat of history represents a change in the outcome that is caused by events unrelated to the intervention. This is a potential threat to this study because child care is an important policy area, so child care providers and early childhood education are often targets of policy, legislation, and local efforts to address and improve the child development outcomes of underprivileged children. Further, early child development, the outcome for this study, is readily influenced by environmental factors that may reflect historical events.

To address the threat of history, the intervention's effects and any effects of history must not be allowed to be confounded. The study design incorporated two components that allowed the study team

to disentangle the effects of the intervention with effects of external events that could happen over the course of the study. First, the impact analysis sample includes three cohorts of providers and their children from three successive implementation years pooled together for the impact analysis. Any event that might have occurred during implementation for one cohort that could affect child development would likely not occur during the other two cohorts' implementation. This means that any potential effects of the intervention across the entire sample should not have be confounded with any historical event that occurred during an individual cohort's implementation period.

Second, the sample included providers from two communities, Boulder County and Aurora. The inclusion of two different communities in our sample helps disentangle potential intervention effects from local events in either area. This is partly related to the threat of history, because events at the local level are as likely to have an impact on the child development outcome as events on a broader level.

Maturation

The threat of maturation is the confounding of an intervention's effect with the normal growth and development of the individuals participating in the intervention and receiving its treatment. Maturation was a potential threat to the study's internal validity for two reasons. First, the dependent variable for this study is the development of young children. Young children develop rapidly. Large changes in child development are natural for young children and likely to be observed over the course of the program's implementation. Second, the study used an interrupted times series with measurements of the outcome over time. Any study using a longitudinal approach with repeated measurements of an outcome over an extended period of time is subject to the possibility that the intervention's effect will be confounded with any natural maturation that occurs in the dependent variable over time.

The study design reduced the threat of maturation through the choice of the dependent variable. Impacts of the PASO program were estimated using normal curve equivalent scores of the DP-3. Normal curve equivalent (NCE) scores are similar to percentile rank scores except that NCEs are equal interval scores. NCE scores provide a norm-reference interpretation, meaning that the scores are interpreted in reference to a norm group. In the case of DP-3, the norm group is students of the same age. By using a normed-reference interpretation as the outcome measure, maturation is controlled because all children's development is relative to their age mates. For example, a student who obtained the average amount of development from one age to the next would have the same NCE score (e.g., NCE of 50 at age 3 and an NCE of 50 at age 4). Although this child developed between the two measurement periods, the NCE score did not change because the child's development in reference to the norm group remained the same.

Sampling, Measures, and Data Collection

Sampling Plan and Power Analysis

Given the limited number of providers in the program in a given year, APA included all providers from each service area as part of the provider impact analysis. All children served by PASO providers in each cohort were also assessed. The study had sufficient power to show program impact on child outcomes.

The pre-study power analysis was based on the following assumptions: alpha level of .05, a two-tailed test, statistical power of .80, a proportion of shared variance between cohorts of .05 (ICC), three baseline time points, an average of two children per provider, and a total sample of 120 providers (20 per cohort, per service area) over three years. Given these assumptions, the pre-study power analysis indicated a minimum detectable effect size of .26 for the impact on child development. For the first year of a three-year impact study, the analysis sample included 44 providers with an average of 4 students per provider. For the first single year of data, the minimum detectable effect size was 0.59. This effect size changed as additional children were added to the sample; as more children were added to the sample; the final effect size for the pooled sample over three years was 0.52.

Sample Retention

Every effort was made to retain providers in the sample once they were recruited and agreed to participate in the study. The first step to retaining the sample was to fully describe the expectations and time commitments to all prospective candidates. All candidate providers were provided with information regarding the PASO program, the expectations and time commitments for the PASO training, and the expectations and time commitments regarding data collection including the data collection schedule and multiple time points for data collection for both the provider and child outcomes over the course of the study. All providers were asked to sign an informed consent letter that included the details and requirement of participation.

In addition to providing all candidate providers with information regarding participation in the study, all participating providers were given support during the study. All participants had contact information to get information regarding PASO training and study participation to address any concerns or challenges participants had regarding the PASO training. Further, providers were also given gift card incentives ($25 per visit) for participating in the data collection process during each assessment window (pre-, mid- and post-) to encourage participant retention.

As the program had no direct contact with children or their families, there were limited avenues to address child retention for the study. PASO has focused on recruiting providers that serve more than two children so that even with attrition, there was still a sufficient sample size. PASO also kept records of child attendance to monitor child attrition.

Comparison Group Matching

Not applicable, as the design allowed PASO children to serve as their own control group.

Measures

In addition to a pre- and post-training survey, APA employed two measures to be used as part of the impact evaluation: the PEPEI observation rubric for provider outcomes, and the Development Profile-3 (DP-3) assessment to measure child outcomes.

PEPEI provider observation rubric

For providers, scores from PASO's PEPEI were analyzed, looking at change between pre-treatment and post-treatment scores. As part of its existing program model, PASO Tias evaluate providers at least twice during a cohort year- once at the beginning, once at the end, and often during the year for progress monitoring. The PEPEI is a locally developed measure, but was designed to be aligned with the nationally recognized CDA observation measure and credentialing expectations. The PEPEI measures providers over time and is directly aligned with the following CDA competency standard goals (and specific CDA functional areas): 1. Establish and maintain a safe, healthy learning environment (health, safety and learning environment); 2. Advance physical and intellectual competence (physical, cognitive, communication and creativity); 3. Support social and emotional development and provide positive guidance (self, social and guidance); 4. Establish positive and productive relationships with families (families); 5. Ensure a well-run, purposeful program responsive to participant needs (program management); and 6. Maintain a commitment to professionalism (professionalism).

During the feasibility phase, other observation tools, like the Family Child Care Environment Rating Scale (FCCERS-R) or the Classroom Assessment Scoring System (CLASS), were considered, however, it was determined that they would be cost prohibitive and that the use of the PEPEI was appropriate for a number of reasons: (1) the study is targeting a preliminary level of evidence with regard to provider impacts so resources would be better targeted towards measuring child outcomes; (2) the PEPEI is already administered as part of the program's model, including regular training on its use to ensure inter-rater reliability.; and (3) the PEPEI is highly aligned with a valid measure, the CDA's observation tool used during their credential evaluations. A comparative analysis between the PEPEI and CDA's tool concluded that the PEPEI almost completely aligned (nearly 100 percent) with the CDA in regard to areas of observation and indicators of quality. The PEPEI differs in that it uses a three-point scale, allowing for a partially observed score, whereas the CDA tool is a yes/no summative checklist. The program makes use of the slightly expanded scale as a coaching tool that can more precisely reflect provider growth over time and this gradation will allow for a more robust outcomes analysis in this evaluation.

Development Profile-3 (DP-3) child assessment

For children, the DP-3 assessment was utilized to measure the impact of the treatment. The DP-3 is a norm based assessment that measures child development in the areas of: 1. Physical; 2. Adaptive Behavior; 3. Social-Emotional; 4. Cognitive; and 5. Communication. These areas are key to ensuring children enter school ready to learn – a long-term goal of the PASO program – and are indicative of future academic performance. The assessment can be conducted as an interview or parent/caregiver checklist, but for this evaluation it was done as an interview with providers conducted by a trained PASO staff member. This approach had the added benefit of allowing PASO to integrate child assessment into its ongoing, self- evaluation efforts beyond the duration of this study.

Research has been done on both the reliability and validity of the DP-3 by the Office of Planning, Research and Evaluation (OPRE), a unit within the Administration for Children and Families (ACF). Based upon the research OPRE conducted, they assigned the DP-3 their *highest scale ratings for reliability and validity*, with the DP-3 having coefficients at least .65 or higher and .5 or higher, respectively.

Reliability

Looking at internal consistency reliability for the DP-3 in its interview form, "adjusted split-half reliability estimates were reported using the standardization sample by year of age and subscale. For ages 0 and 1 year, Pearson's correlations for subscales ranged from .84 to .93, and the composite GD score coefficient was .97. For ages 2 and 3 years, coefficients ranged from .82 to .88 for subscales, and the GD score coefficient was .95. For ages 4 and 5 years, coefficients ranged from .71 to .86 for subscales, and the GD score coefficient was .92 (OPRE, 2007)." "When considering test-retest reliability, "sixty-six parents from the standardization sample were interviewed a second time, with 13 to 18 days between administrations (average of two weeks). Correlation coefficients for subscale scores ranged from .81 to .88, and the GD score was .92 (OPRE, 2007)."

Validity

Considering content validity, "two exploratory common factor analyses - oblimin rotation and confirmatory factor analyses - indicated that items loaded primarily onto one main factor. Item response theory (Rasch model analyses) showed that the ranges of child ability and item difficulty for each scale were similar. For all scales, the range of person ability extends slightly below and slightly beyond the range of item difficulty, demonstrating that the items in all five scales dependably measure child development within the target skill range (OPRE, 2007)."

Further, an examination of concurrent validity compared the DP-3's interview form scales to scales of "similar constructs in the Vineland Adaptive Behavior Scales, Second Edition (Vineland II); Developmental Assessment of Young Children (DAYC); Peabody Developmental Motor scales, Second Edition (PDMS-2); and Preschool Language Scales, 4th Edition (PLS-4). Correlations between scales of similar constructs on the DP-3 subscales and Vineland II Adaptive Behavior Scales ranged from .68 (DP-3 Adaptive Behavior and Vineland II Daily Living Skills) to .85 (DP-3 Physical and Vineland II Motor Skills), and the Vineland II Adaptive Behavior Composite correlated with the DP-3 GD at .81. Correlations between the same subscales on the DP-3 and DAYC ranged from .64 (Adaptive Behavior) to .71 (Communication), and the DAYC and DP-3 GD scores correlated at .72. The Communication scale on the DP-3 correlated with the PLS-4 Expressive Communication and Auditory Comprehension scales at .53 and .48, respectively. The DP-3 Physical scale correlated with PDMS-2, with coefficients of .56 for the PDMS-2 Grasping scale and .71 for the PDMS-2 Visual-Motor Integration scale (OPRE, 2007)."

Data Collection Activities

For the impact study, the following data collection activities occurred:

1. Providers were evaluated by the program's Tias using the PEPEI rubric twice in a cohort year and PEPEI scores were analyzed to measure changes in provider quality;
2. Children served by PASO providers in a given cohort year were assessed nine times using the DP-3 assessment tool - three prior to their provider starting the PASO training (April, May, and June), three times mid-training (September, October and November), and three times at the end of the training (February, March, and April). The DP-3 was administered as an interview

conducted by a trained PASO staff member and analyzed by APA. Normed scores were analyzed using a short interrupted times series design and a nested hierarchical linear model; and

3. Data was collected by the PASO program and provided to the study team to identify the proportion of PASO providers that received the CDA credential following training.

Statistical Analysis

Pre-Post Analysis for Provider Outcomes

To answer confirmatory question C1 regarding program impact on providers, the study team estimated the impact of the PASO training program on the quality of provider care as measured by the PEPEI using a pre-post analytic model. The pretest was administered in August at the start of the training year for each cohort, and the posttest was administered in May for each cohort. The study team believed, given the resource constraints on the evaluation, that the results of this analysis provided sufficient indication of whether the PASO program showed promise for improving the quality of care. The most relevant indicator of the impact of the PASO program is its impact on child development where the study targeted, and achieved, a moderate level of evidence.

The study team used the following paired sample t-tests to estimate intervention impacts for each outcome.

$$t = \frac{\sum d}{\sqrt{\frac{n\,(\sum d^2) - (\sum d)^2}{n-1}}}$$

Whereby d = mean difference between baseline and posttest outcome variable; and n=number of providers.

Impact Model for Child Outcomes

The following analytic model was approved as part of the SEP and used to estimate the impact of the PASO program. Data from all three cohorts of providers was pooled for the impact estimation. The study team used normal curve equivalent (NCE) scores from the DP-3 as the outcome for the analysis on child development. NCEs are a normed-referenced score, meaning that their interpretation is relative to a norm group. NCEs are similar to percentile rank but have the advantage of being based on an equal interval scale that allows for mathematical operations such as averaging. NCEs from DP-3 are age based, so maturation does not affect a child's NCE score.

The study team considered the three alternative baseline projection models described by Bloom (2003): the nonlinear baseline trend model, the linear baseline trend model, and the baseline mean projection model. A non-linear baseline trend occurs when there is clear evidence that scores are increasing or decreasing in a non-linear fashion, but definitively establishing a non-linear trend with only a few data points is difficult. A linear baseline trend occurs when there is a clear trend of increasing (or decreasing) scores during baseline and continuing after introduction of the treatment. The study team believes a clear trend of increase during the baseline phase is highly unlikely because the baseline phase occurs

prior to any training and the selected outcome measure accounts for maturation. According to Bloom (2003), the non-linear baseline trend model and the linear baseline trend are risky methods to estimate the counterfactual and should only be used if a trend is consistent, clearly evident, and the data strongly suggest the trend would continue across all follow-up time points.

The study team visually inspected the plotted time point data for clear visual evidence of any consistent trends during the baseline phase. Finding a strong non-linear trend, the study team estimated the impact as a point estimate. This approach to the baseline mean projection model can be thought of as a special case of the difference-of-differences method with multiple baseline and multiple posttest observations.

The impact was then estimated with a three-level mixed model with time modeled at level one and children modeled at level two, and provider modeled at level three. The model specification below is for a difference in differences estimate using the three baseline time points as the baseline mean and the last three time points as the posttest mean to answer confirmatory question C2 regarding child outcomes.

The primary analytic model used to estimate the impact of the PASO program is described below. The study team used normal curve equivalent (NCE) scores from the DP-3 as the outcome for the analysis on child development. NCEs are a normed-referenced score, meaning that their interpretation is relative to a norm group. NCEs are similar to percentile rank but have the advantage of being based on an equal interval scale that allows for mathematical operations such as averaging. NCEs from DP-3 are age based, so maturation does not affect a child's NCE score.

The primary analytic model used to estimate the impact of the PASO program is described below; all level 2 and level 3 covariates grand-mean centered:

Level 1 Model: Time Level

$$Y_{tij} = \pi_{0ij} + \pi_{1ij}(\text{TrtTime}_{ij}) + e_{tij}$$

Level 2 Model: Student Level

$$\pi_{0ij} = \beta_{00j} + \beta_{01j}(\text{Preschool}_{ij}) + r_{ij}$$

$$\pi_{1ij} = \beta_{10j}$$

Level 3 Model: Provider

$$\beta_{00j} = \gamma_{000} + \gamma_{001}(\text{HomeVisitHours}_j) + \gamma_{002}(\text{TrainingsAttended}_j) + \gamma_{003}(\text{PEPEI\_2\_RawTotal}_j) + \gamma_{004}(\text{Site}_j) + \gamma_{005}(\text{Cohort 2}_j) + \gamma_{006}(\text{Cohort 3}_j) + \mu_{00j}$$

$$\beta_{01j} = \gamma_{010}$$

$$\beta_{10j} = \gamma_{100}$$

Y_{tij} is the outcome score at time *t* for child *i* and provider *j*, π_{0ij} is the intercept (baseline level) for child i, π_{1ij} is the change in child development scores over time for child *i*, and $TrtTime_{ij}$ is coded 1 if a time point is after training and coded 0 if a time point is prior to training. The error for repeated measures is represented by e_{tij}, β_{00j} is the intercept for provider *j*, and β_{01j} is the coefficients for preschool experience. β_{10j} is the average change in child development scores over time for provider j, and r_{ij} is the deviation from the child's baseline level and the provider baseline. γ_{000} is the grand mean intercept (baseline projection level), γ_{001} is the additional effect of each hour of home visits received and γ_{002} is the added effects for each training attended while γ_{003} is the added effect of a provider's final PEPEI score as a measure of provider. Since $Site_j$ is a dummy variable coded as "1" for sites in the Boulder Valley district, γ_{004} indicates the difference in DP-3 scores between the two service areas. γ_{005} and γ_{006} are dummy variables for each cohort year. μ_{00j} is the deviation of provider *j*'s intercept from the grand mean intercept. γ_{010} is the effect of preschool, fixed across all providers. γ_{100} is the treatment effect — the difference between the grand mean projection line for the baseline time points and the grand mean projection line for the post-test time points — fixed across all providers.

In the previous year's analysis of Cohorts 1 and 2, the low number of students per provider made it impossible to run the model with the third level of nesting at the provider level. However, the analysis of the full pooled sample, including Cohorts 1, 2, and 3, was able to include the third level of nesting, implementing the original analysis plan.

Based upon available data, the study team was able to improve upon the analytic model presented in the SEP by including additional variables at the provider level: number of trainings attended, total hours of home visits received, and final score received by each provider on the PEPEI.

Missing data

Interrupted time series models are a special case of growth models, and growth models are robust to missing time point data. Providers were included in the impact analysis even if they were missing child or provider data from a given time point. There is no minimum number on non-missing occasions needed for a child to be included in the analysis. The model allowed for missing data because estimates are made using maximum likelihood estimation. First, the software creates a likelihood estimate for each student in the data set for each occasion. The software creates these estimates, including those for missing occasions, by using all the data available and the multiplicative property of independent probabilities. Likelihood estimates also include a kind of precision estimate as well. Estimates for occasions with missing data are not very precise. Next, the software combines all the likelihood estimates across the entire sample, taking into account their precision, to create overall estimates for the parameters in the model.

IV. Ongoing Implementation Monitoring Findings, 2016-2017 Cohort

In this section, findings from the evaluation activities are presented in the context of each of the study's implementation research questions. Please note that question I6 – related to program consistency across service areas – is not applicable in Year 5. All findings presented in this section for the 2016-17 cohort year are based on the data sources noted in Table 4.1, below.

Table 4.1
Data Sources for Ongoing Implementation Monitoring, 2016-2017 Cohort

Data Source	Item Count/Analysis Description
Research review on CDA professional development process and HighScope ECE curriculum	Literature review completed in Year 2.
Provider surveys	Data collection from 21 mid-year surveys and 17 end-of-year surveys; descriptive statistics.
Curriculum binder	Review of curriculum binder with all training session materials, included PowerPoint presentations, to record relevant CDA competency areas addressed and to determine whether HighScope curriculum was used.
Training schedules	Review of Boulder County cohort schedules (separate trainings were offered in Lafayette and Longmont) cross-checked by attendance records, to record when training sessions held.
Training attendance and completion records	Review of attendance records to confirm that training sessions were held and to determine attendance/completion rates; descriptive statistics.
Home visit attendance records	Review of home visit records to determine number of home visits and hours of home visits received by each provider; descriptive statistics.
Home visit logs	Review of 410 home visit logs (each one reviewed) to record CDA topic areas addressed and determine whether observation notes are present; descriptive statistics.

Question I1: Does the program provide trained instructors/coaches (Tías)?

According to the program model, each service area where the program is offered should be staffed by two trained instructors/coaches known as Tías. For the 2016-17 cohort year, two Tías served Boulder County. Both Tías were program veterans who received ongoing training through professional development days and additional certifications on topics such as mental health and car seat safety. The Tías also met before each training session to review curriculum, review pre-existing PowerPoint presentations related to the presentation material, and discuss how best to present content to students through real-world examples and activities. Finally, PASO leadership conducted informal observations of the Tías during home visits. Based on these descriptions of the staffing and training of Tías – descriptions that PASO leadership shared with APA – PASO met the expectation to provide trained instructors/coaches (Tías).

Question I2: Does the program have a high-quality professional development curriculum and credentialing process?

PASO's program structure is based on CDA's nationally recognized professional development curriculum and credentialing process, which results in the CDA Credential in ECE. CDA targets a core set of competency standards to meet the goals of (1) establishing and maintaining a safe, healthy learning environment; (2) advancing physical and intellectual competence; (3) supporting social and emotional development and providing positive guidance; (4) establishing positive and productive relationships with families; (5) ensuring a well-run, purposeful program responsive to participant needs; and (6) maintaining a commitment to professionalism.

PASO also supplements its professional development curriculum with materials and activities from the research-based ECE curriculum, HighScope, which emphasizes "active participatory learning" and "includes the curriculum areas of (1) approaches to learning; (2) social and emotional development; (3) physical development and health; (4) language, literacy, and communication; (5) mathematics; (6) creative arts; (7) science and technology; and (8) social studies" (HighScope Foundation, 2012). The well-known HighScope Perry Preschool Project study – a longitudinal study of 123 children who participated in a randomized control trial from preschool to age 40 – demonstrated that the use of the HighScope curriculum "advance[s] the development of children and improve[s] [a child's] chance of living a better life through adulthood" (Schweinhart et al., 2004). The improved outcomes associated with the HighScope curriculum include improved school performances, higher graduation rates and earnings, and lower rates of arrest, compared to children who did not receive high-quality preschool using the HighScope curriculum. Further, "teachers with HighScope training had higher-quality programs than did similar teachers without such training. Higher-quality programs were in turn linked to better developmental outcomes for children" (HighScope Foundation, 2012).

According to a report published by the Wellesley Centers for Women, a series of studies of Massachusetts' early education and care programs in centers, public schools, and family child care homes indicated that providers who held a CDA credential offered significantly higher-quality programs than did providers who did not hold a CDA credential, but who had similar levels of formal education. Specifically, among providers without a college education, providers with a CDA offered higher-quality programs than did providers without a CDA (Marshall, et al., 2003).

Each year APA reviewed how PASO used trainings to implement the CDA professional development process and the supplemental HighScope curriculum. Table 4.2 lists details of all 30 PASO training sessions for Year 5, including information on (1) CDA competency area, (2) whether HighScope was used, and (3) the date each session was provided for each location.

Table 4.2
Training Sessions: Content, CDA Competencies, Use of HighScope Curriculum, and Dates, 2016-2017 Cohort

Session #	Session Content	Related CDA Competency	HighScope Curriculum Used	Date Training Provided	
				Longmont	Lafayette
#1	"Yes I Can"			9/01/2016	8/23/2016
#2	Ensure a Well-Run, Purposeful Program	5: Well-Run Program		9/08/2016	9/06/2016
#3	Child Neglect and Abuse	5: Well-Run Program		9/15/2016	9/13/2016
#4	Observing and Documenting Information About the Growth and Development of Each Child	5: Well-Run Program		9/22/2016	9/20/2016
#5	The Learning Environment and the Theory of Maslow, Part I – Learning Environment	1: Environment		9/29/2016	9/27/2016
#6	The Learning Environment and the Theory of Maslow, Part 2 – Daily Schedule and Routine	1: Environment		10/06/2016	10/11/2016
#7	How to Keep Children Safe	1: Environment		10/20/2016	10/18/2016
#8	First Aid Training	1: Environment		10/27/2016	10/25/2016
#9	CPR Training	1: Environment		11/03/2016	11/01/2016
#10	Contagious Diseases	1: Environment		11/10/2016	11/08/2016
#11	Nutrition	1: Environment		11/17/2016	11/15/2016
#12	Medication Administration	1: Environment		12/01/2016	11/29/2016
#13	Intellectual and Physical Development	2: Intellectual/ Physical Dev.	Yes	12/08/2016	12/06/2016
#14	Child Development Theory (Part I): Piaget's Theory – Sensory Motor Development	2: Intellectual/ Physical Dev.	Yes	1/12/2016	1/10/2017
#15	Child Development Theory (Part II): Piaget's Theory – Cognitive Development	2: Intellectual/ Physical Dev.	Yes	1/19/2017	1/17/2017
#16	Gardner's Theory – Multiple Intelligences	2: Intellectual/ Physical Dev.	Yes	1/26/2017	1/24/2017
#17	Special Needs	2: Intellectual/ Physical Dev.	Yes	2/02/2017	1/31/2017

Session #	Session Content	Related CDA Competency	HighScope Curriculum Used	Date Training Provided	
				Longmont	Aurora
#18	Cognitive, Communication and Language Development	2: Intellectual/ Physical Dev.	Yes	2/09/2017	2/07/2017
#19	Early Reading and Writing	2: Intellectual/ Physical Dev.	Yes	2/16/2017	2/14/2017
#20	The Theory of Play	2: Intellectual/ Physical Dev.	Yes	2/23/2017	2/21/2017
#21	Make and Take	2: Intellectual/ Physical Dev.	Yes	3/02/2017	2/28/2017
#22	Mathematics	2: Intellectual/ Physical Dev.	Yes	3/09/2017	3/07/2017
#23	How to Use the Book: The Elements of Home Childcare	2: Intellectual/ Physical Dev.	Yes	3/16/2017	3/14/2017
#24	Children's Psychosocial Development – Stages of Psychosocial Development, Erickson	3: Social/ Emotional Dev.		3/23/2017	3/21/2017
#25	Children's Social-Cultural Development Theory, Vigotsky	3: Social/ Emotional Dev.		3/29/2017	4/04/2017
#26	Guidance and Discipline	3: Social/ Emotional Dev.		4/06/2017	4/11/2017
#27	Toxic Stress and Behavior	3: Social/ Emotional Dev.		4/13/2017	4/18/2017
#28	Children's Moral Development – Kohlberg	3: Social/ Emotional Dev.		4/20/2017	5/02/2017
#29	Methods to Establish Positive and Productive Relationships with Families	4: Family Relationships		4/27/2017	5/09/2017
#30	Ethics and Professionalism/ Presentations from Community Agencies and Associations	6: Professionalism		5/05/2017	5/16/2017

The first PASO training each year is spent engaging providers and building their confidence. PASO training then skips ahead to CDA's fifth competency standard (ensure a well-run, purposeful program that is responsive to participant needs) to train providers on the basics of running an early childhood home program. This includes training on (1) conducting observations of children to support their growth, (2) understanding signs of child abuse and neglect, and (3) establishing a program schedule and routine. The subsequent trainings then follow the other five CDA competencies in order, with a primary focus on the second competency standard (advancing the physical and intellectual competence of the children in a program's care). Trainings specifically about ECE use supplemental HighScope ECE curriculum. As shown in Table 4.2, PASO offered all expected trainings in each training location in Year 5.

Similarly, APA's review showed that PASO offered all expected trainings during Years 3 and 4 during the impact evaluation.

Training sessions took place in two distinct phases, with the first phase of training (August-November) covering the learning environment and the second phase (December- May) covering child development.

Question I3: Does the program recruit and retain the expected number of providers?

The program expects to recruit at least 20 providers per service area where the program operated; for 2016-17 this meant at least 20 providers in Boulder County. By program design, all participating providers are Spanish-speaking, Latina women who care for at least two children who are not their own. PASO recruits providers through various methods, including word-of-mouth recruitment, door-to-door recruitment, and outreach at neighborhood churches, community centers, and neighborhood schools. APA examined PASO records to document the number of providers who were recruited in each service area, the average training attendance rate, and the training completion rate. A summary of these records are shown in Table 4.3.

Table 4.3
Provider Recruitment and Retention, 2016-2017 Cohort

	# of Providers that Started Training	# of Providers that Completed Training	Attendance Rate	Completion Rate
Boulder County	26	19	96%	73%

As shown in Table 4.3, the program met its stated goal of recruiting at least 20 providers for each service area. A total of 26 providers started the training process, with 19 providers graduating from the program, yielding a 73 percent completion rate. Completion rates have varied from year to year (83 percent in 2014-15, and 91 percent in 2015-16), with this year's rate being the lowest. Of providers that completed the program, the attendance rate was 96 percent. This is the highest attendance rate over the past three years, but all years have been over 85 percent.

Question I4: Do the Tías conduct the expected number of training sessions, in-home visits, and provider observations?

Findings in this area were based on document review. For each cohort year, APA reviewed PASO training schedules and conducted interviews with program staff to confirm that all identified training sessions were offered on the scheduled dates. For the 2016-17 cohort, APA reviewed attendance records and 410 home visit logs that were kept for all in-home coaching visits Tías had made up to that date. Through these reviews, APA aimed to (1) confirm the number of visits made to each provider, (2) confirm the total number of home visit hours each provider received, (3) review CDA competency areas addressed during each home visit, and (4) note whether the Tía had included observations of the providers and the children in their care. APA also reviewed PEPEI records to establish the number of formal observations conducted for each provider.

Training Sessions

According to the program's design, PASO is expected to offer at least 30 trainings over the course of the nine-month training year.

Table 4.4
Training Session Dosage Fidelity, 2016-2017 Cohort

	Expected # of Training Sessions	Actual # of Training Sessions
Boulder County	30	30

Based on a review of program schedules and calendars, APA verified that PASO did conduct at least 30 training sessions in each service area, as shown in Table 4.4.

Home Visits

According to the program model, PASO intended to offer home visits to each provider at least twice a month to conduct observations and provide coaching each year. Each visit was expected to last one to 1.5 hours. PASO leadership has set a goal of increasing home visit frequency to 25 to 30 visits over the nine-month calendar. However, the program standard of a minimum of twice-a-month visits is used as the benchmark for fidelity analysis. APA reviewed home visit and training session attendance data that Tías kept for all visits completed from September through May of the cohort year. Table 4.5, below, shows this dosage information.

Table 4.5
Home Visit Dosage Fidelity, 2016-2017 Cohort

	Expected Visits and Hours		Actual Visits and Hours	
	Expected # of Visits	Expected # of Hours	Actual # of Home Visits (Average)	Actual # of Hours (Average)
Boulder County	18+	16-24	22	28.0

As shown in Table 4.5, each provider that completed the program received an average of 22 home visits over the training year. In both service areas, the average number of visits is above the minimum benchmark of twice-a-month visits, which would have amounted to 18 home visits over the time period. Both service areas also surpassed the total number of hours of home visits that was expected, and therefore, APA finds that the program met its home visit dosage goals in both service areas. For both the 2015-16 and 2016-17 cohorts, the average number of visits and total hours represented an increase since 2014-15, getting closer to reaching the higher benchmark that the program is working towards.

APA also examined the topic areas addressed during home visits by reviewing all 410 home visit logs. During this review, APA found that, in about 67 percent of home visit logs, the section related to CDA competency areas addressed was completed, and was left blank in the other 33 percent of logs. There is insufficient data to determine whether this was due to the content of the visit falling outside the scope of the CDA competency areas, or if the section was just not completed. Results are shown in Table 4.6.

Table 4.6
Competency Areas Addressed During Home Visits, 2016-2017 Cohort

CDA Competency Standards	Percentage of Home Visits that Addressed Each (All records)	Percentage of Home Visits that Addressed Each (Only records with section completed)
1. Establish and maintain a safe, healthy, learning environment	30%	46%
2. Advance physical and intellectual competence	24%	36%
3. Support social and emotional development and provide positive guidance	12%	18%
4. Establish positive and productive relationships with families	7%	11%
5. Ensure a well-run, purposeful program that is responsive to participant needs	33%	49%
6. Maintain a commitment to professionalism	4%	5%

The area most frequently addressed in home visits was ensuring a well-run and purposeful program, followed by establishing and maintaining a safe, healthy, learning environment, and then advancing physical and intellectual competence. This varied from patterns seen in 2014-15 and 2015-16, where the latter two areas were more emphasized than the former.

Informal and Formal Observations by Tías

According to APA's document review of each Tía's records, all providers were formally observed twice during the training year using the PEPEI, as delineated by the program model. The study team's review of home visit logs also examined whether informal observations were recorded for both providers and children in their care (when the children were present during the home visit), as shown in Table 4.7.

Table 4.7
Informal Observations, 2016-2017 Cohort

	Observations Recorded about Providers	Observations Recorded about Children When Present
Boulder County	100%	100%

As Table 4.7 shows, Tías met program expectations by very consistently recording informal observations of the providers and children when they conducted every home coaching visit. These informal observations help inform areas for future coaching emphasis to support provider growth.

Question I5: Is training and coaching provided at the level of quality expected?

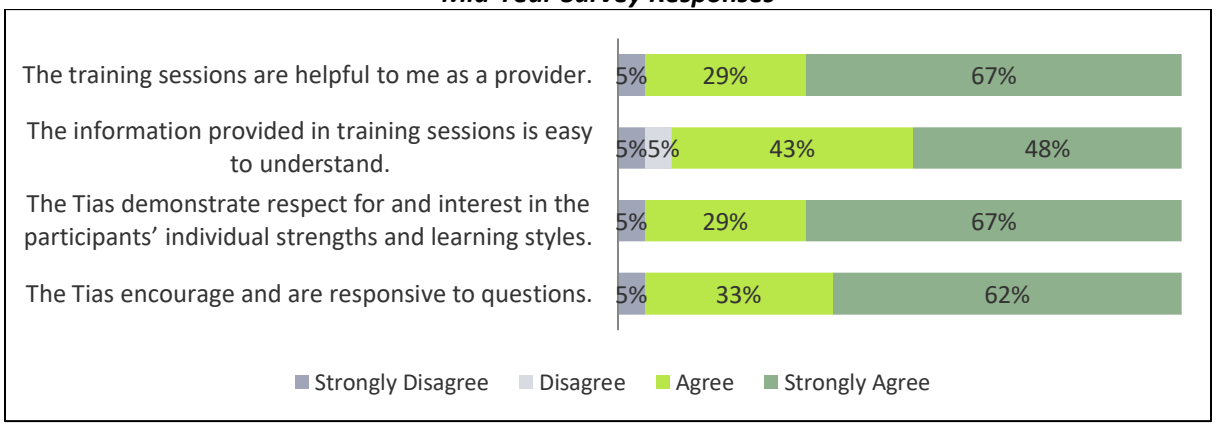
Findings in this area are based on the results of surveys of participating providers that were conducted twice during each cohort training year. APA did not conduct any observations of training sessions or home visits (as was done in Year 2 of the evaluation), since implementation is being monitored on a smaller scale for Years 3 through 5. However, survey questions were well-aligned with the quality areas (e.g. presenting information in an understandable manner and encouraging questions

during training sessions, and modeling best practices and providing feedback during coaching sessions) that were measured during observations conducted as part of the Year 2 Implementation Study.

Provider Survey Responses Regarding PASO Training Sessions

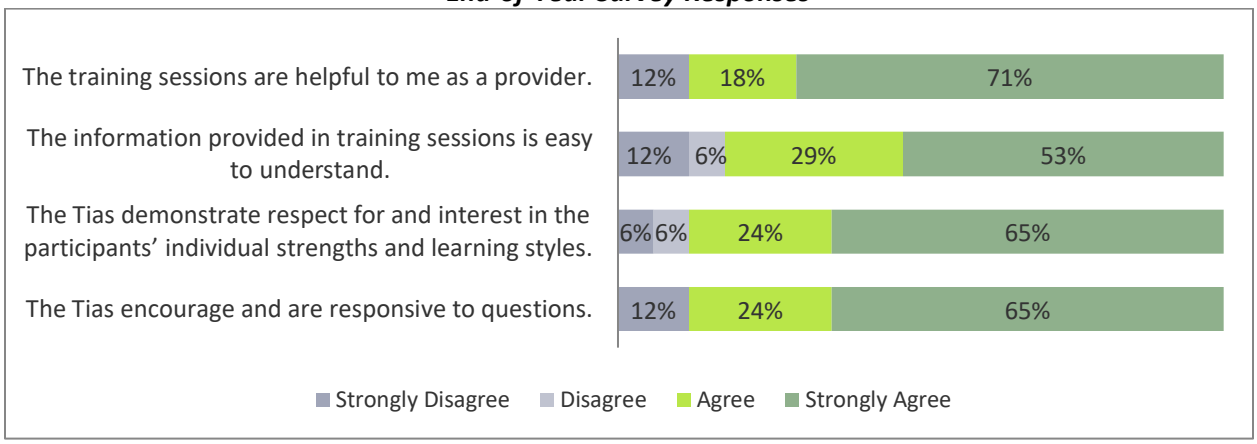
Providers were surveyed twice during the training year, once at the program's midpoint (Figure 4.1) and once at the end of the program (Figure 4.2). Twenty-one providers completed the midpoint survey, and 17 providers completed the survey at the end of the program. Providers were asked to indicate whether they agreed or disagreed with a number of statements similar to APA's observation rubric indicators, designed to elicit inferences about training quality and providers' interactions with Tías.

Figure 4.1
Provider Perspectives on Training Sessions, 2016-2017 Cohort
Mid-Year Survey Responses



As Figure 4.1 shows, over 90 percent of providers (all but one or two providers) indicated that they either agreed or strongly agreed with the survey's statements regarding training quality.

Figure 4.2
Provider Perspectives on Training Sessions, 2016-2017 Cohort
End-of-Year Survey Responses



Provider responses at the end of the year were slightly more negative, but still generally similar to the midpoint responses, with just under 90 percent of providers agreeing with all the statements. Overall, responses for both the midpoint and end-of-year survey were similar to the prior two years of results.

Provider Survey Responses Regarding Tía Home Visits

As noted previously, providers were surveyed twice during the training year and were asked to indicate whether they agreed or disagreed with a number of statements, including statements regarding the quality of both the home visits and interactions with their Tía. Figure 4.3 and Figure 4.4 detail these responses for the mid-year and end-of-year surveys, respectively.

Figure 4.3
Provider Perspectives on Home Visits, 2016-2017 Cohort
Mid-Year Survey Responses

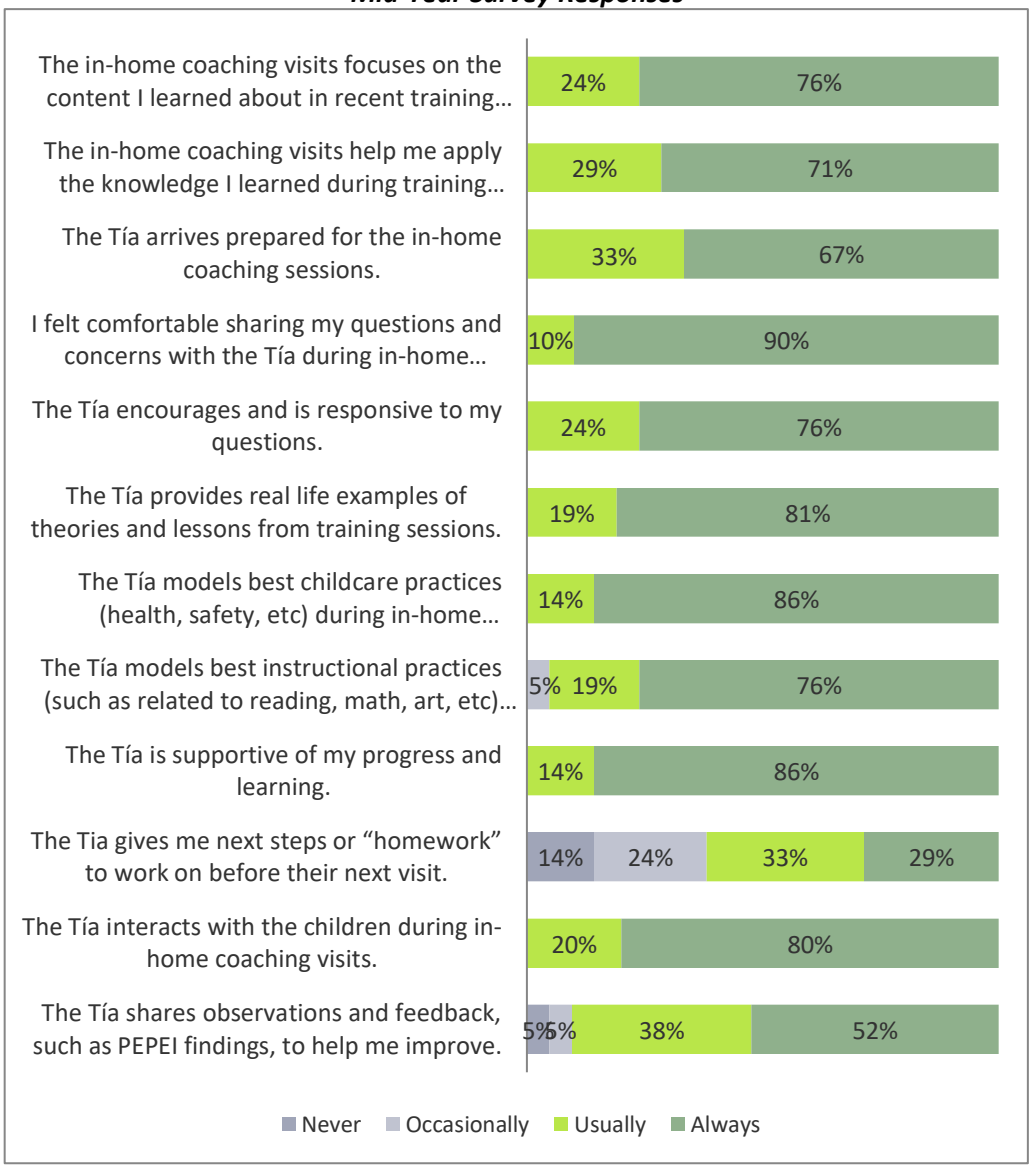
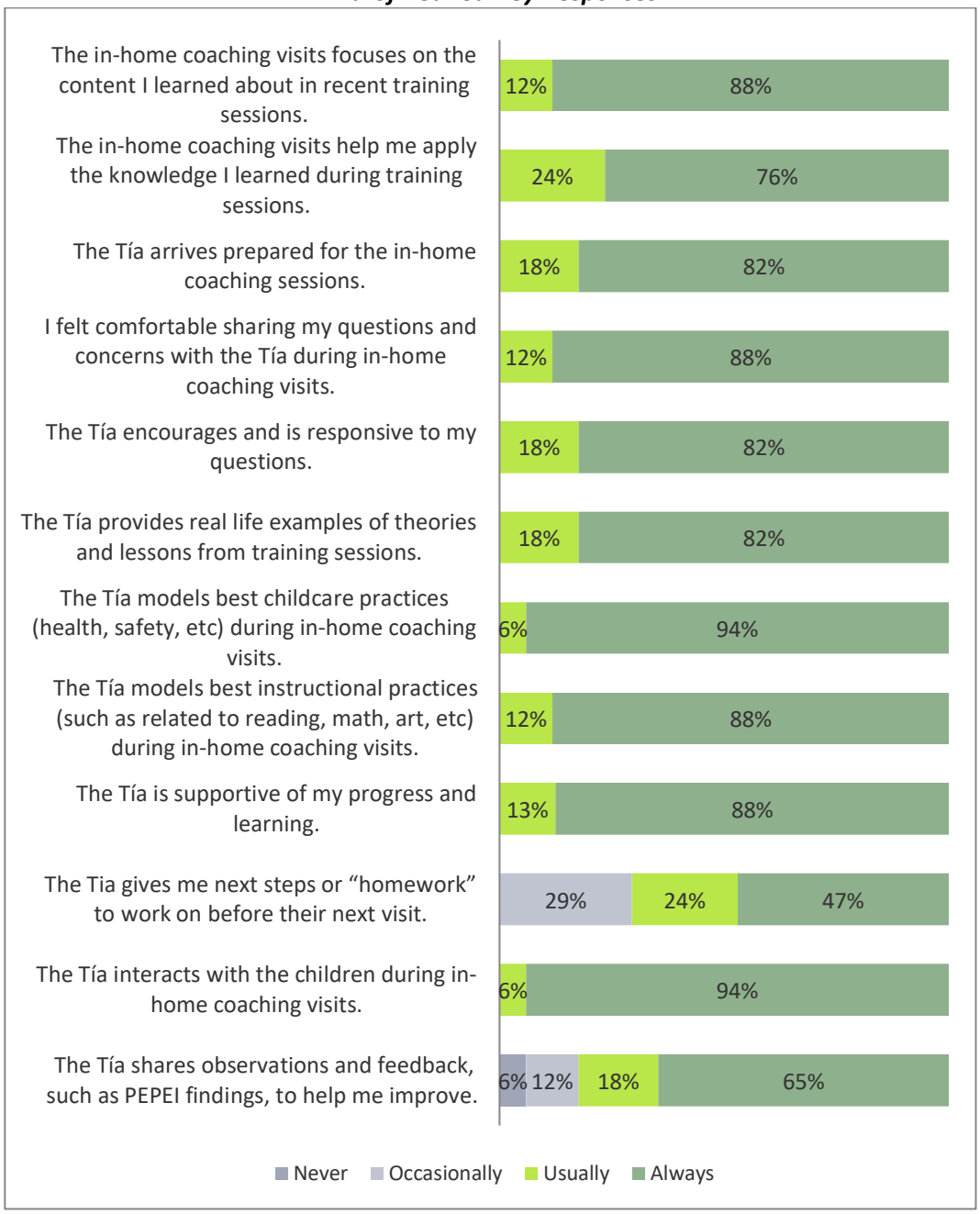


Figure 4.4
Provider Perspectives on Home Visits, 2016-2017 Cohort
End-of-Year Survey Responses



As was the case in the prior two years, provider responses regarding Tía home visits were overwhelmingly positive. For all but three questions in the 2016-17 mid-year survey, and all but two questions in end-of-year surveys, 100 percent of providers still indicated that their Tía usually or always met program expectations. Providing homework or next steps and providing observational feedback are two key question areas where respondents indicated that Tias were not usually or always meeting expectations, so this is an area where the program can continue to improve.

Question I6: Is the program implemented consistently in both service areas?

As the program only operated in one service area for the 2016-17 cohort year due to funding difficulties, this question is not relevant. The program had been consistently implemented in both service areas in the prior two study years, and implementation in Boulder County this year has been consistent with prior years.

V. Final Impact Findings: Provider Outcomes, 2014-2017

Questions C1: Does participation in PASO improve the quality of care given by FFN providers who completed the program, as measured by self-reported data and the PEPEI?

Summary of Findings

Summary of Findings, 2014-17: Based on self-reported data over three years, providers' comfort/skill level and the quality of care they provide was demonstrably higher after participating in the PASO program. There was also statistically significant improvement in overall provider quality and in the quality of care provided, as measured by the PEPEI. On average, providers earned 17 percent of possible points on their PEPEI pre-assessment, compared to earning 83 percent of possible points on their post-assessment. Improvement was made in all CDA competency areas including (1) health, safety, and learning environment; (2) child physical and intellectual development; (3) social and emotional development/guidance; (4) relationships with families; (5) program management; and (6) professionalism.

For this final report, impact findings are presented collectively for the 2014-15, 2015-16, and 2016-17 cohorts.

Information regarding the impact of PASO on providers comes from two sources: (1) a provider survey conducted twice during the training year and (2) data from the PEPEI administered by the Tías at the beginning and end of the training year.

The provider survey includes questions about self-reported change in the care provided after completing the PASO training program. Question topic areas included health and safety, routine, learning environment, communicating with families, and ability to prepare children for school. After completing PASO training, providers were significantly more likely to report they were comfortable or had increased skills in each developmental area, including CPR, first aid, communicating with families, and preparing children for school. They also were more likely to have components of a quality ECE program in place, such as a routine that regularly included key developmental activities and a dedicated, materials-rich learning environment.

Tías used the PEPEI observational tool at the beginning and end of the training year to assess providers' performance in all CDA competency areas, including (1) health, safety and learning environment; (2) child physical and intellectual development; (3) social and emotional development/guidance; (4) relationships with families; (5) program management; and (6) professionalism. On average, providers grew dramatically in all six areas. Provider total scores on the PEPEI increased from receiving 17 percent of possible points to 83 percent of possible points.

Data Sources

Data Sources: Information regarding PASO's impact on the 2014-15, 2015-16, and 2016-17 provider cohorts comes from two sources: (1) a provider survey conducted twice during the training year and (2) data from the PEPEI administered by the Tías at the beginning and end of the training year.

The first source of information on PASO's impact on providers comes from a survey conducted twice during the training year. The mid-year survey asks providers to describe their level of comfort/skill and the care they provided to children prior to PASO training in a number of key areas: (1) health and safety, including level of comfort with CPR and first aid, frequency of providing fruits and vegetables, and frequency of providing 30 minutes or more of physical activity for children per day; (2) presence or absence of a daily routine and frequency of key developmental activities within the daily schedule; (3) learning environment, including presence or absence of a distinct space for children and availability of specific developmental materials; (4) communication with families, including a description of the information shared; and (5) comfort preparing children to be school ready in math and literacy. The end-of-year survey gathers responses in the same areas *after* the training to measure self-reported changes attributable to the PASO program. There were 100 mid-year surveys and 93 end-of-year surveys completed over the three cohort years.

The second source of information is the PEPEI, a locally developed observation tool used by the program Tías prior to PASO training and at the end of the training year to evaluate growth in provider quality and learning environment quality. The PEPEI is aligned with the following CDA competency standard goals (and specific CDA functional areas): (1) establish and maintain a safe, healthy learning environment (health, safety, and learning environment); (2) advance physical and intellectual competence (physical, cognitive, communication, and creativity); (3) support social and emotional development and provide positive guidance (self, social, and guidance); (4) establish positive and productive relationships with families (families); (5) ensure a well-run, purposeful program responsive to participant needs (program management); and (6) maintain a commitment to professionalism (professionalism).

The highest possible score on the PEPEI is 84 points, with providers rated on a three-tiered scale based on whether each of the 84 program elements is observed (one point), partially observed (0.5 points), or not observed (zero points). Results are presented as percentages of total points earned for each subcomponent (which varied between four and 26 points possible) and overall.

Results: Survey Responses, 2014-2017

Survey Responses, 2014-17: Based on self-reported data over three years, providers' comfort/skill level and the quality of care they provide is demonstrably higher after participating in PASO.

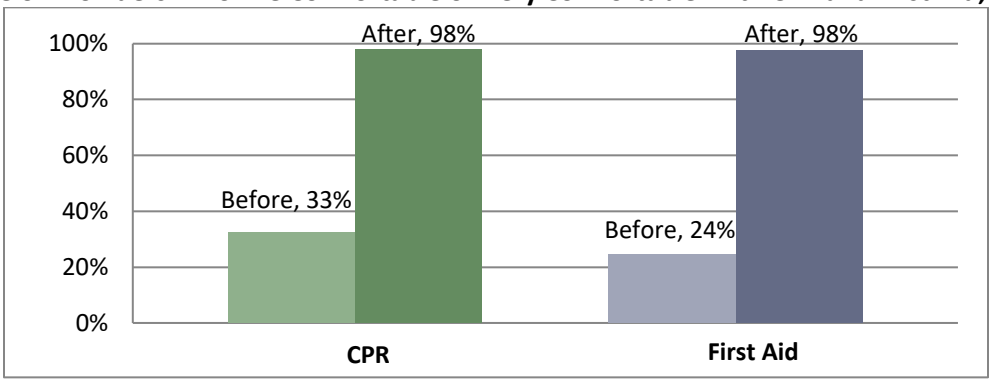
The provider survey includes questions about providers' self-reported change in the care they provided after completing the PASO training program. Question topic areas included health and safety, routine, learning environment, communicating with families, and ability to prepare children for school. Again,

100 providers completed the mid-year survey, and 93 providers completed the end-of-year survey over three years. While pooled results for the 2014-15, 2015-16, and 2016-17 cohorts are presented in this final report, results have been very consistent in each year.

Health and Safety

At the beginning of the PASO program, providers are taught valuable safety skills including CPR and first aid. Figure 5.1 examines provider comfort with CPR and first aid, before and after the training program.

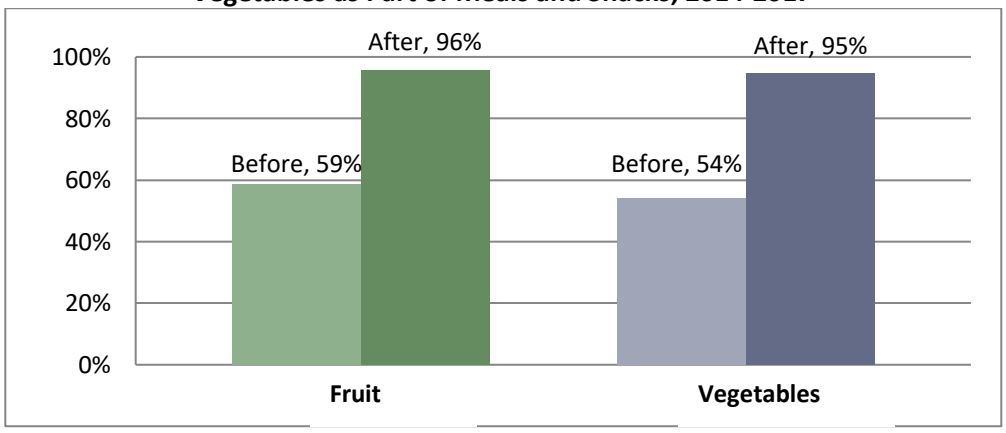
Figure 5.1
Percentage of Providers Who Are Comfortable or Very Comfortable With CPR and First Aid, 2014-2017



As shown in Figure 5.1, 98 percent of providers reported being comfortable or very comfortable with both CPR and first aid after the training. Prior to training, one-third or less of providers indicated the same level of comfort.

PASO also trained providers on the importance of nutrition and physical activity. Figure 5.2 displays the percentage of providers who reported usually or always including fruits and vegetables as part of meals and snacks.

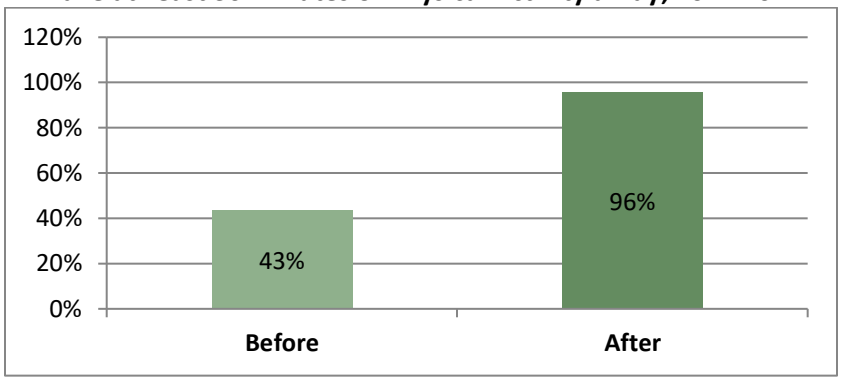
Figure 5.2
Percentage of Providers Who Usually or Always Offer Fruits and Vegetables as Part of Meals and Snacks, 2014-2017



As Figure 5.2 shows, just over half of providers reported usually or always offering fruits and vegetables as part of meals and snacks prior to their PASO training. After PASO training, about 95 percent of providers reported usually or always offering fruits and vegetables.

Figure 5.3 illustrates the percentage of providers who reported that children are usually or always physically active for at least 30 minutes a day.

Figure 5.3
Percentage of Providers Who Report Children Usually or Always Have at Least 30 Minutes of Physical Activity a Day, 2014-2017



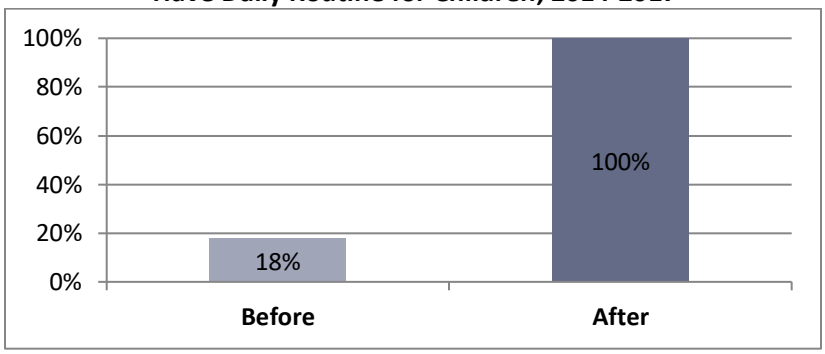
As shown in Figure 5.3, after PASO training, 96 percent of providers reported that children in their care are usually or always physically active for at least 30 minutes a day, compared to 43 percent prior to training.

Daily Routine

A key component of a quality ECE program is the establishment of a routine that regularly includes a broad range of developmental activities. The PASO program believes that establishing such a routine is critical to supporting child development, in that it provides both structure and opportunity for learning.

Providers were asked if they established a daily routine for the children in their care; the results are shown in Figure 5.4.

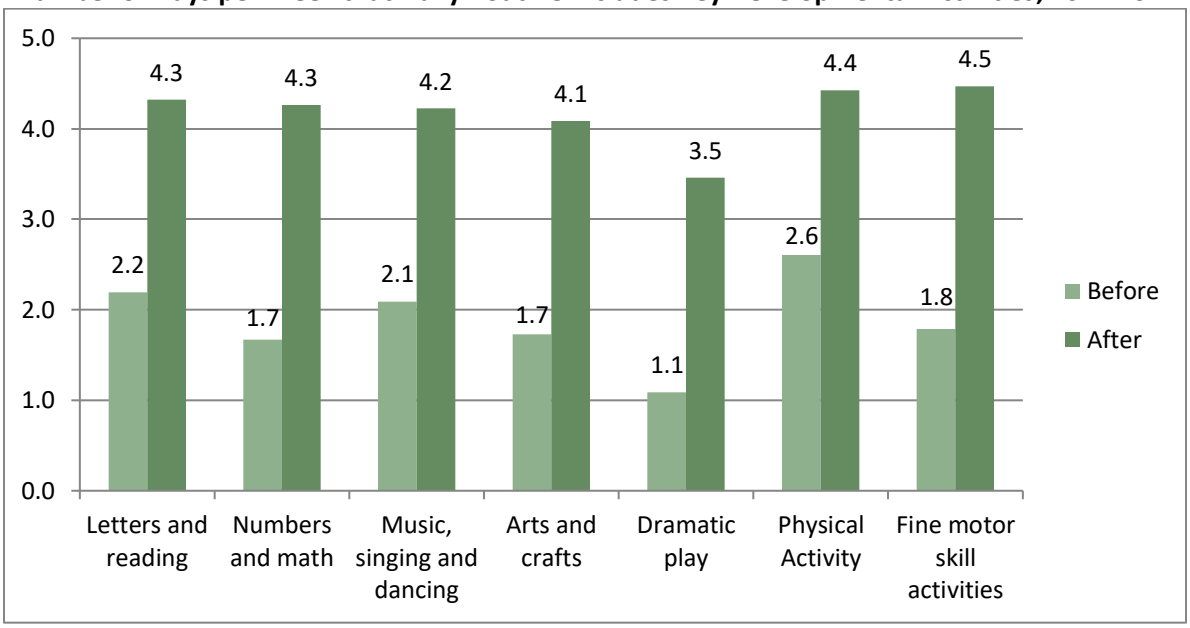
Figure 5.4
Percentage of Providers Who Have Daily Routine for Children, 2014-2017



As shown in Figure 5.4, 18 percent of providers reported having a daily routine for children before completing PASO training, while 100 percent of providers had a daily routine after training.

Providers were then asked the average number of days per week that their routine included seven key developmental activities; the results are shown in Figure 5.5.

Figure 5.5
Number of Days per Week that Daily Routine Includes Key Developmental Activities, 2014-2017

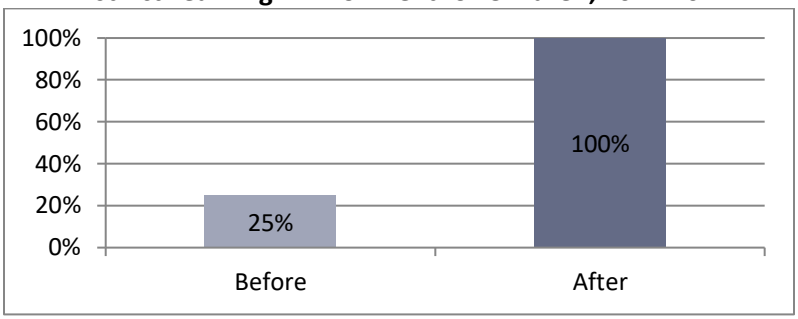


As Figure 5.5 shows, providers increased the number of days a week that they included key developmental activities in their daily routines. Prior to PASO training, physical activity was the developmental activity that was most frequently included in children's daily routines, with the average provider including physical activity 2.6 days per week, compared to two days per week or less for all other activities, on average. After PASO training, providers included all seven developmental activities in daily routines more frequently, typically four days or more per week for all activities except dramatic play (which was instead included 3.5 days a week, on average).

Learning Environment

PASO provides program participants with ECE materials to help them set up a distinct, materials-rich learning environment in their homes (or to improve on an existing learning environment). Figure 5.6 shows the percentage of providers who indicated they had a separate ECE learning environment in their homes, before and after PASO training.

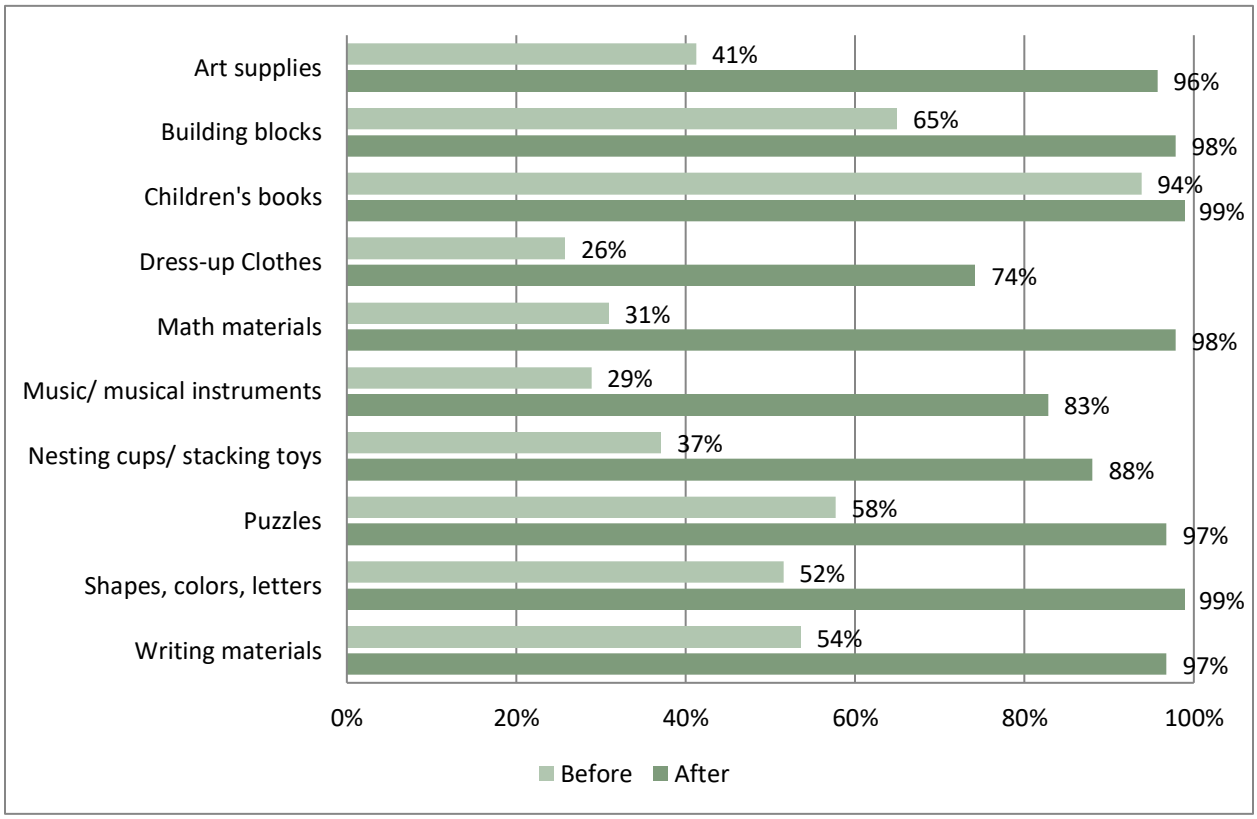
Figure 5.6
Percentage of Providers Who Have a Distinct Learning Environment for Children, 2014-2017



As Figure 5.6 illustrates, a quarter of providers had a distinct learning environment prior to PASO training, while 100 percent of providers did after training.

Figure 5.7 then considers what specific items were available in the learning environment, before and after PASO training. As part of its program, PASO provides many child development items for providers. Items include books, art supplies, blocks, music/musical instruments, puzzles, dress-up clothes, math materials (such as counting beads, plastic numbers, or an abacus), nesting cups/stacking toys, and shapes, colors, and numbers.

Figure 5.7
Percentage of Providers Who Have Specific Items Available in Their Learning Environment, 2014-2017

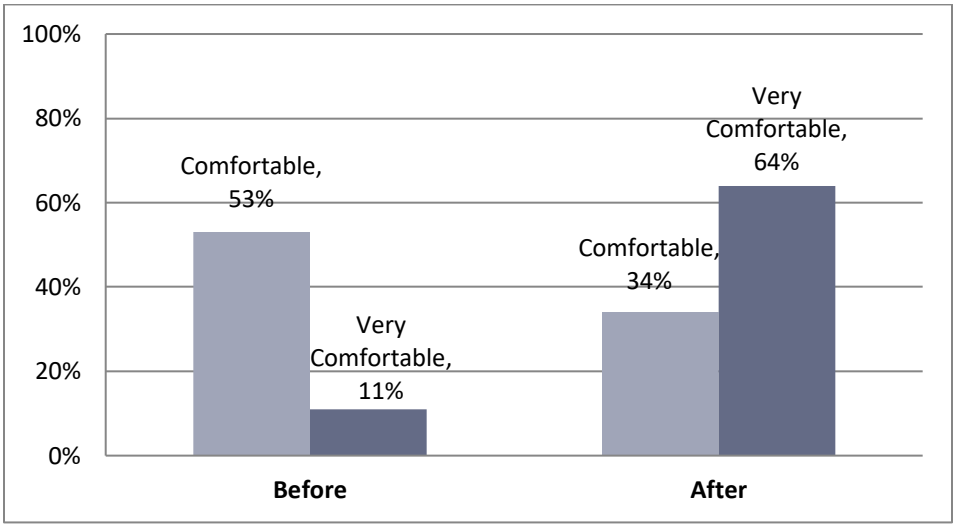


As shown in Figure 5.7, PASO providers initially varied in terms of the materials they had available for children. Prior to PASO training, nearly all providers had children's books and 50 percent or more of providers had blocks, puzzles and shapes, colors and letters. Providers less frequently reported having art supplies, music and musical instruments, dress-up clothes, writing materials, math materials or nesting cups/stacking toys. After the PASO program, which includes giving providers ECE materials[1], the vast majority of providers had a materials rich learning environment that included materials in all categories.

Sharing Information with Families

PASO also helps train providers in how to engage families in their children's development, and how to connect families with community services. Figure 5.8 shows providers' levels of comfort communicating with families regarding children's behavior and/or development, before and after PASO training.

Figure 5.8
Percentage of Providers Who Feel Comfortable or Very Comfortable Communicating with Parents Regarding Their Children's Behavior or Development, 2014-2017

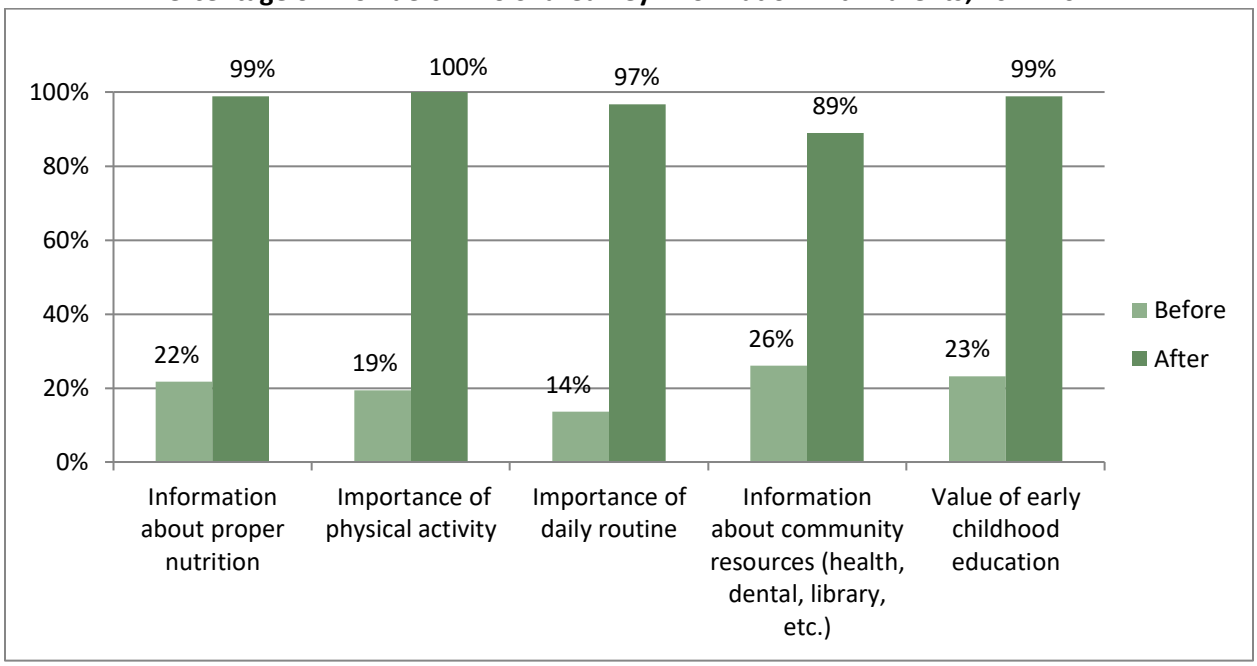


Prior to PASO training, 64 percent of providers were comfortable or very comfortable sharing information with families. Nearly 100 percent of providers were comfortable doing so after PASO training. Further the percentage of providers that reported being very comfortable increased nearly six fold.

Figure 5.9 identifies whether providers shared key pieces of information with families, before and after PASO training.

[1] Materials provided directly by PASO included: furniture, safety materials, storage items, mats, books, art supplies, blocks, puzzles, writing materials, math materials, and shapes, colors, and letters.

Figure 5.9
Percentage of Providers Who Shared Key Information with Parents, 2014-2017



After the PASO program, nearly 100 percent of providers shared information with families about (1) the importance of proper nutrition, (2) the importance of physical activity, (3) the importance of a daily routine, and (4) the value of ECE. About 90 percent also shared information about community resources.

Preparing Students for School

Finally, providers were asked how comfortable they felt preparing children for school in the academic areas of math (Figure 5.10) and literacy (Figure 5.11). Given that PASO aims to enable children to enter kindergarten school ready, provider comfort in these areas is essential.

Figure 5.10
Percentage of Providers who Reported Being Comfortable or Very Comfortable Preparing Children for School in the Area of Math, 2014-2017

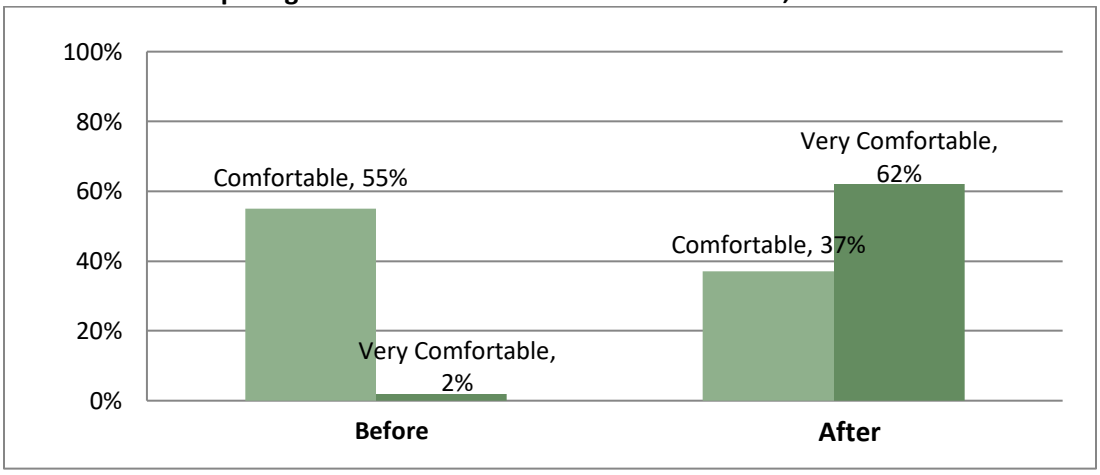


Figure 5.10 shows that 55 percent of providers reported feeling comfortable preparing children for school in the area of math prior to PASO training, and only two percent of providers reported feeling very comfortable in this area. After PASO training, 99 percent felt either comfortable or very comfortable, with a dramatic increase in providers that reported being very comfortable (62 percent).

Figure 5.11
Percentage of Providers who Reported Feeling Comfortable or Very Comfortable Preparing Children for School in the Area of Literacy, 2014-2017

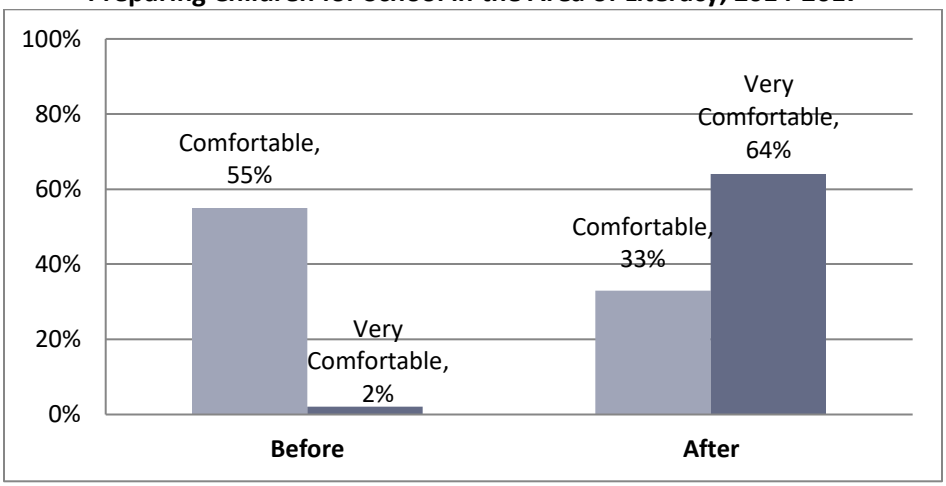


Figure 5.11 shows that provider comfort in preparing children for school in the area of literacy similarly increased after PASO training, with nearly all providers reporting being comfortable or very comfortable in this area after PASO training.

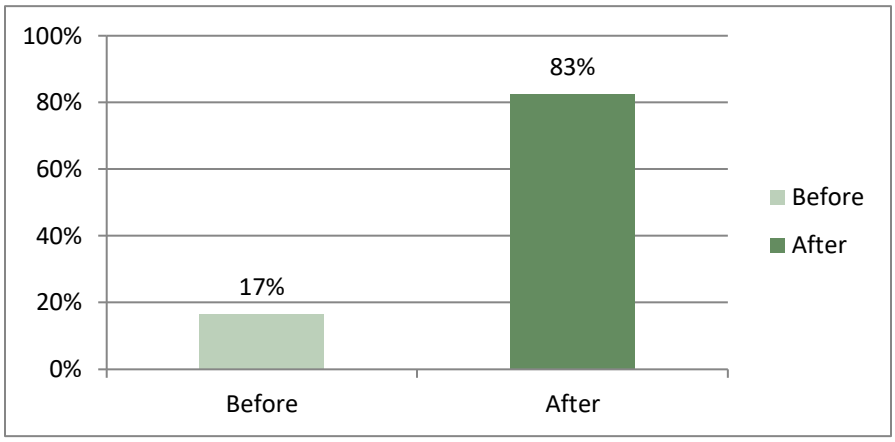
Results: PEPEI, 2014-2017

PEPEI Results, 2014-17: There was statistically significant improvement in overall provider quality and in the quality of care provided for the pooled sample, as measured by the PEPEI. On average, providers earned 17 percent of possible points on their pre-assessment, compared to earning 83 percent of possible points on their post-assessments. Improvement was made in all CDA competency areas including (1) health, safety, and learning environment; (2) child physical and intellectual development; (3) social and emotional development/guidance; (4) relationships with families; (5) program management; and (6) professionalism.

The PEPEI measures provider performance on all CDA competency areas: (1) health, safety, and learning environment; (2) child physical and intellectual development; (3) social and emotional development/positive guidance; (4) relationships with families; (5) program management; and (6) professionalism.

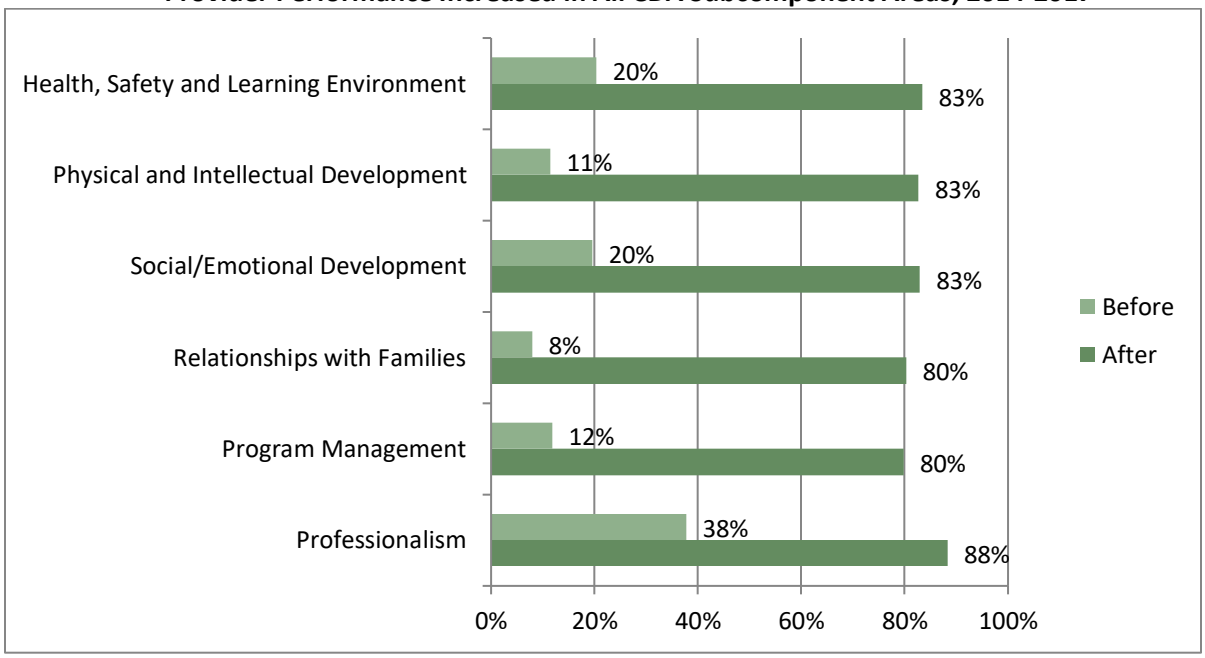
Figures 5.12 presents the overall change in PEPEI results, while Figure 5.13 shows results for each of the CDA competency areas; both are for the pooled sample of the 2014-15, 2015-16, and 2016-17 cohorts.

Figure 5.12
Provider Performance Increased Overall, as Measured by the PEPEI, 2014-2017



Provider scores on the PEPEI assessment demonstrably increased before and after PASO training. Before training, providers earned, on average, 17 percent of possible points on their pre-treatment assessment. After training, providers earned, on average, 83 percent of points possible. Using a paired t-test analysis, APA concluded that the difference in overall pre- and post-treatment scores was statistically significant (p value less than 0.05).

Figure 5.13
Provider Performance Increased in All CDA Subcomponent Areas, 2014-2017



Overall, provider performance in each of the CDA competency areas – as measured by the PEPEI administered by the Tías – increased significantly after providers participated in the PASO training program (receiving 80 percent or more of possible points in each area).

Based upon the specific assessment indicators in each competency area, this means that after the PASO program most providers operate well-run, safe and secure childcare programs where children: (1) have access to a wide range of developmentally appropriate materials in a designated learning environment, and (2) receive care following a routine that includes well-planned and varied developmentally appropriate activities to meet their needs, including:

1. Developing their gross and fine motor skills, through indoor and outdoor activities;
2. Encouraging their cognitive development through hands-on experiences;
3. Supporting their social and emotional development through appropriate guidance and fostering of positive social interactions;
4. Promoting their communication and language acquisition;
5. Encouraging their creativity and expression through enriching experiences with art, music, dance, and dramatic play.

Question E1: Does the program increase the number of credentialed FFN providers in the communities it serves, as measured by the number of providers who receive their CDA after PASO training?

Summary of Findings

Summary of Findings, 2014-17: Assuming that the 2016-17 providers who currently are in process of applying for their a Child Development Associate (CDA) credential receive it, the PASO program will have produced over 75 new credentialed childcare providers in the last three years, increasing the number of credentialed providers in the communities they serve.

A longer-term goal of the PASO program is to increase the quality of care available in the communities it serves. One indicator of this is how many additional credentialed care providers are created by the program, as measured by the number of program graduates who apply for and receive a Child development Associates (CDA) credential. Sixty-two providers from the 2014-15 and 2015-16 cohorts applied for and received a CDA credential following completion of the PASO program (78 percent of all providers who completed the program). Another 14 providers from the most recent cohort year have applied and are in the process of receiving their CDA credential. Assuming these providers receive their credential, the program will have produced over 75 new credentialed childcare providers in the communities they serve over the past three years.

Data Sources

Data Sources: Data collected by PASO staff about providers from the 2014-15, 2015-16, and 2016-17 cohorts that applied for and received their CDA credential following completion of the program.

PASO facilitates the CDA application process for providers who have completed the PASO program. PASO staff provided data on the number of providers in each cohort who had applied for and received their CDA credential.

Results, 2014-2017

Results, 2014-2017: Seventy-eight percent of providers in the 2014-15 and 2015-16 cohorts applied for and received their CDA credential. Of the 19 providers in the 2016-17 who completed the program in May, 74 percent have applied for their CDA credential.

Table 5.1 below presents the number of providers who graduated the program in each cohort year, and the number and percentage of graduates who went on to apply for and/or receive a CDA credential.

Table 5.1
Majority of PASO-Trained Providers, Apply for and Receive a CDA Credential

Cohort Year	Graduated	Applied		Received	
		Count	Percentage	Count	Percentage
2014-15	38	30	79%	30	79%
2015-16	41	32	78%	32	78%
2016-17	19	14	74%	N/A	N/A
Combined	98	76	78%	62	78%

CDA application results have been largely consistent in the three cohort years, with around three-quarters of providers undertaking the process. All providers in the 2014-15 and 2015-16 cohorts who applied for a CDA credential received it, for a total of 62 newly credentialed providers due to the PASO program. The applications for the 14 providers in the 2016-17 cohort who completed the program in May are still in process; assuming these providers receive their credential, the total number of credentialed providers over three years will be 76.

VI. Final Impact Findings: Child Outcomes, 2014-2017

Question C2: Do children served by PASO-trained providers show improvement in developmental areas related to being school ready?

Summary of Findings

Summary of Findings, 2014-2017: For the complete pooled sample, including children from the 2014-15, 2015-16, and 2016-17 cohort years, there were a total of 365 children, who were cared for by 104 providers. The sample demographics were mostly homogenous (low-income, Spanish-speaking, Latino children). Using a short interrupted time-series (SITS) analysis, the study team found that there was a statistically significant, positive improvement – 11 Normal Curve Equivalency (NCE) points gained on average on a child's general development score – for children whose providers participated in the PASO program. For the average child in the program, an increase of 11 NCE points translated to the child moving from the sixth to the 17th percentile on the DP-3 measure of child development. Children showed the highest percentile gains on the Cognitive subcomponent.

The final findings presented in this section are for the combined sample of 365 children who were cared for by 104 providers who participated in PASO in the 2014–15, 2015-16, and 2016-17 cohort years. The 2014-15 cohort had 155 children and 44 providers, while the 2015-16 cohort had 146 children and 40 providers. The 2016 cohort had 64 students, cared for by 20 providers. The demographics of the sample for each cohort year and the combined sample are mostly homogenous: most children in the sample are low-income, Spanish-speaking and Latino.

As detailed in Chapter III, the study employs a SITS design, which uses DP-3 assessment scores from the beginning (summer and fall) and end (spring) of the program year to measure the impact of the program on child development. In this design, the treatment group also serves as its own control group. The DP-3 assessment measures a child's developmental progress in the key areas of (1) physical, (2) adaptive behavior, (3) social-emotional, (4) cognitive, and (5) communication; all of these sub-scores are summed into a sixth "general development" score. Some data challenges from the first cohort analysis persisted in this year of assessment data collection, including issues of data being self-reported by providers and issues of child mobility. When comparing assessment scores across cohorts, a new challenge of variability of scores across years arose.

The study team found that there was a statistically significant, positive improvement – 11 Normal Curve Equivalency (NCE) points gained on average for a child's general development score – for children whose providers participated in the PASO program. For the average child in the program, an increase of 11 NCE points translated to the child moving from the sixth percentile to the 17th percentile. There were significant gains on every subscale of the DP3, with the largest gains on the Cognitive Development Social Emotional subcomponent of the DP-3 assessment.

Further, as initially observed during the first cohort analysis, the observable pattern of developmental gains may be related to the three phases of PASO's training program. The first phase, which was conducted from September through November, focused on improving the learning environment

(including health, safety, routine, and learning materials). The second phase, from December through May, focused on child development (theory and practice). On average, development scores appeared to be relatively flat through November of the training year, with developmental scores increasing from February through April, after child development instruction for providers had been introduced.

Design

Design: APA used a SITS analysis to track child development in the PASO program. This design estimates PASO's impact by comparing PASO children's performance at the end of the program to their performance at the beginning of the program.

APA used a SITS design to estimate the impact of the PASO program on child development. In this design, the treatment group of children served by PASO-trained childcare providers also serves as its own control group. The counterfactual, or estimate of a child's performance had they not participated in PASO, was established with three pre-intervention measures during the program's recruiting period. Once the PASO program began each September, six additional measurements were spaced out over the duration of PASO's two training phases (learning environment and child development). This assessment schedule provided three time points in each of these two training phases. Multiple measurements were taken during each phase of the program in order to meet What Works Clearinghouse standards and procedures, which require three data points per phase to meet single-case design standards with reservations (What Works Clearinghouse, 2014).

Every effort was made to retain providers and their children in the sample once they agreed to participate in the study. All providers received information regarding expectations and time commitments for the PASO training and data collection, including the data collection schedule for both the provider and child outcomes analyses over the course of the study. All providers signed an informed consent letter that included the details and requirements of participation.

Child Sample

Child Sample: APA collected information for all PASO children who attended the program from April 2016 through April 2017 (Cohort 3) and combined that with information about children from the first two cohorts, who attended between April 2014 and April 2015 (Cohort 1) and April 2015 and April 2016 (Cohort 2). The PASO sample is a mostly homogenous group, meaning the children are demographically similar to one another.

APA's study sample for the final analysis included all children who attended PASO from April 2014 to April 2017 (Cohorts 1, 2, and 3) and were assessed between two and nine times during that period. For Cohort Year 3 there were 64 children served by 20 providers in the sample, as shown in Table 6.1.[2]

[2] APA created a person-period dataset, meaning a different observation is recorded for each child for each month.

Table 6.1

Total Number of Providers and Children Who Participated in Data Collection, 2014-2017

	2014-15 Cohort Year	2015-16 Cohort Year	2016-17 Cohort Year	Pooled Cohorts
Total Number of Providers	44	40	20	104
Total Number of Assessed Children	155	146	64	365

The number of providers and assessed children exceeded the study team's expectations from the Impact Evaluation Plan.

As shown below in Table 6.2, children in the PASO sample are mostly homogenous.

Table 6.2
Pooled Child Sample is Mostly Homogenous, 2014-2017

	Mean or Percent	SD
Primary Language: Spanish	90.0%	0.30
Primary Language: English	9.8%	0.30
Eligible for Free or Reduced Price Lunch	87.7%	0.33
Latino	89.0%	0.31
White	96.8%	0.17
Other Race	3.2%	0.09
Female	50.5%	0.50
Concurrent, Non-PASO Preschool Enrollment	34.5%	0.48
Total Hours of Care	604	413.0

For the pooled cohort, about 90 percent of children in the cohort are white, Spanish-speaking, Latino[3], and low-income (as measured by eligibility for free and reduced-priced lunch). Roughly half of the children (51 percent) are female, and about a third (35 percent) concurrently attend another preschool, often partial-day Head Start. There is considerable variability in hours of PASO care received.

Table 6.3 looks at demographics and number of children cared for by all 104 PASO providers in the 2014-15, 2015-16 and 2016-17 cohorts.

[3] PASO collects data separately for each child's race and ethnicity. Most children were listed as racially white, ethnically Latino.

Table 6.3
Demographics of Providers in the Pooled Sample are Homogenous

	Mean or Percent	SD
Female	100%	0.0
Primary Language: Spanish	100%	0.0
Latino	100%	0.0
Average Number of Children Cared For	4.3	2.0

As previously noted, all participating providers are Spanish-speaking, Latina women. Providers cared for 3.5 children on average.

Table 6.4 then presents treatment data for these providers.

Table 6.4
Treatment Received by Providers in Pooled Sample

	Mean or Percent	SD
Number of Home Visits to Providers	19.4	4.7
Hours of Home Visits to Providers	29.0	7.3
Trainings Attended by Providers	27.6	4.1
Service Area- Boulder County	63%	0.48
Service Area- Aurora	37%	0.48

Table 6.4 shows that in the three-year pooled sample, 63 percent of the children served by PASO-trained providers were in the Boulder County service area, while the other 37 percent were in Aurora. During Cohorts 1 and 2, providers were equally split between the two service areas, but the final cohort served providers only in Boulder County. On average, providers in the three-year pooled sample received 19.4 home visits and spent 29 hours during home visits with PASO Tías, and the average provider attended 27.6 trainings offered by PASO through the end of April. Note that the data shown in Table 6.4 was calculated based on the pooled sample from 2014-2017, and these figures are different than those presented in Chapter IV on Implementation Monitoring, which looked specifically at the 2016-17 cohort.

Data Sources

Data Sources: APA gathered demographic and DP-3 assessment standard score information on PASO children served by PASO providers in Boulder County and Aurora between 2014-17. APA also gathered information on PASO providers in the program. Data challenges included data being self-reported by providers, differences in scores across cohorts, and child mobility challenges.

The impact of the PASO program on child outcomes is measured using the DP-3 assessment, as described in Chapter III. PASO program staff conducted DP-3 assessments, with the goal of collecting assessment information for each child nine times during the year: three times prior to the start of the

PASO program (April, May, June), three times at the start of the PASO program in the fall (September, October, November), and three times at the end of the PASO training year in the spring (February, March, April). In each interview, PASO assessors ask providers a series of questions regarding the development of each child in their care. Through this interview process, a child's developmental progress is assessed in the key areas of (1) physical, (2) adaptive behavior, (3) social-emotional, (4) cognitive, and (5) communication; all of these sub-scores are summed into a sixth "general development" score. Because DP-3 scores are norm-referenced, a child's score can be interpreted in comparison with other children of the same age.

Participating providers collected information on child demographics and hours of care received by each child. Demographics included child gender, free or reduced-price lunch program (FRL) eligibility (as measured by family income), primary language, preschool attendance (whether or not a child was concurrently enrolled in a preschool program in addition to PASO), race, ethnicity, and age. PASO Tías collected information on providers' attendance at trainings, the number of home visits completed, and provider quality using the PEPEI observation tool.

The research design for the overall impact study incorporates three years of data to achieve the statistical power necessary to detect the expected effect from the PASO program.

Data Challenges

A key issue for the strength of the evidence in this study is the reliability of the DP-3 assessment data. DP-3 uses an interview protocol to measure child development. As such, assessment scores depend on the way PASO staff administer the interview and on the reports of providers who care for the children being assessed. In discussions with APA, PASO assessors and PASO Tías expressed that, as a result of the assessment and trainings, providers learned what the assessment was looking for in terms of development and began to pay more attention to certain aspects of the development of the children in their care. Because providers developed a better understanding of the DP-3 and because the DP-3 draws upon providers' memories of child behavior, the reliability of the assessment increased over the year.

In the initial year of data, both APA's qualitative findings and a simple visual examination of average DP-3 scores (in NCE units) by month suggested that the first assessment administration period was not consistent with subsequent assessment windows. This may be because PASO assessors were not initially comfortable administering the assessment, because providers were overestimating results to impress the assessor, because providers could not adequately recall information about a child's development, or perhaps for all three reasons. These data and the subsequent decision to disregard scores from the first assessment period in April 2014, given the importance of having reliable scores that have the same interpretation across time periods, are discussed in detail in the Year 3 report.

Figure 6.1
Mean DP-3 General Development Scores (NCE) for Cohorts 1-3

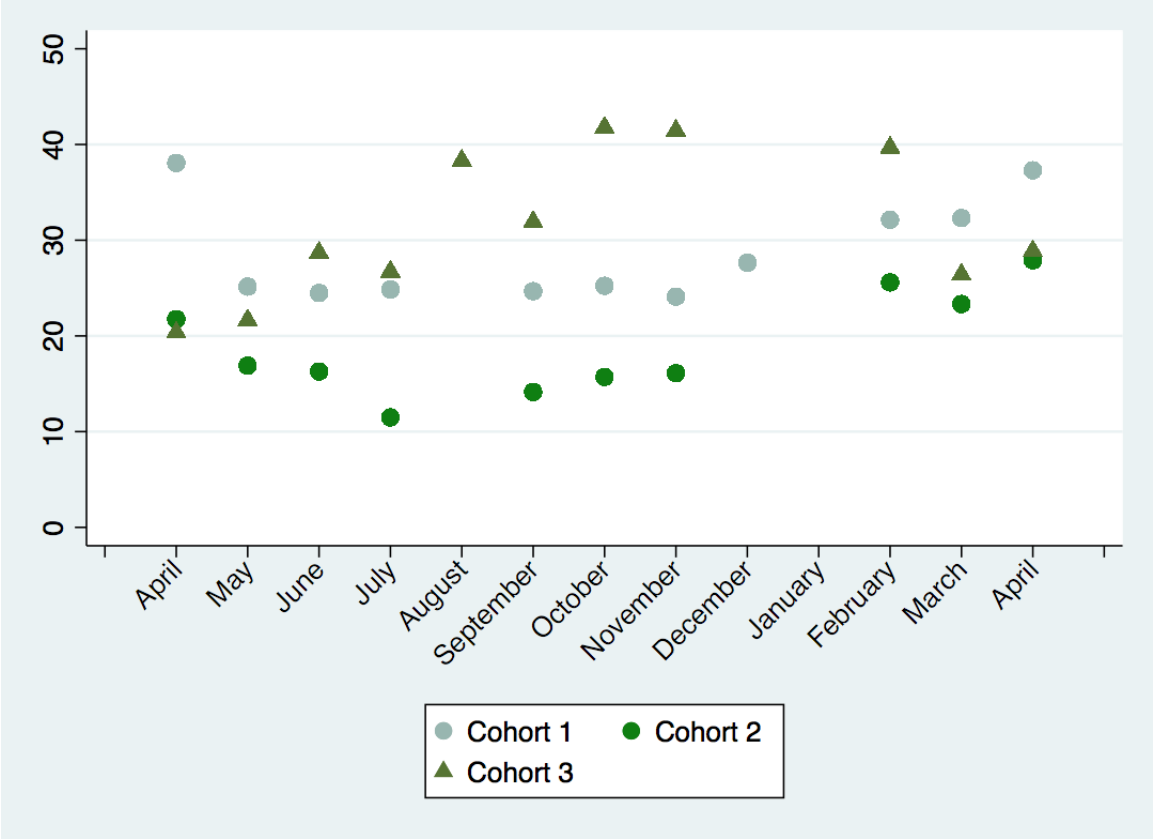


Figure 6.1 illustrates another data challenge, which is the variability of mean DP-3 General Development scores of Cohort 3 across the assessment period. This is likely because Cohort 3 was only half the size of previous cohorts, due to the elimination of the program in Aurora. With fewer children, most of whom were still extremely mobile, moving in and out of provider care, greater variability of scores was inevitable.

The data challenge posed by the differences between overall student DP-3 General Development scores between Cohort 1 (2014-15) and Cohort 2 (2015-16), were discussed in the previous preliminary reports.

The final data issue that should be noted is that there is a large amount of missing data within the sample. Of the 63 children in the 2016-17 sample, none have complete assessment records (with nine assessments), but 33 children had at least six assessments. This is in part due to the high mobility of the target population.

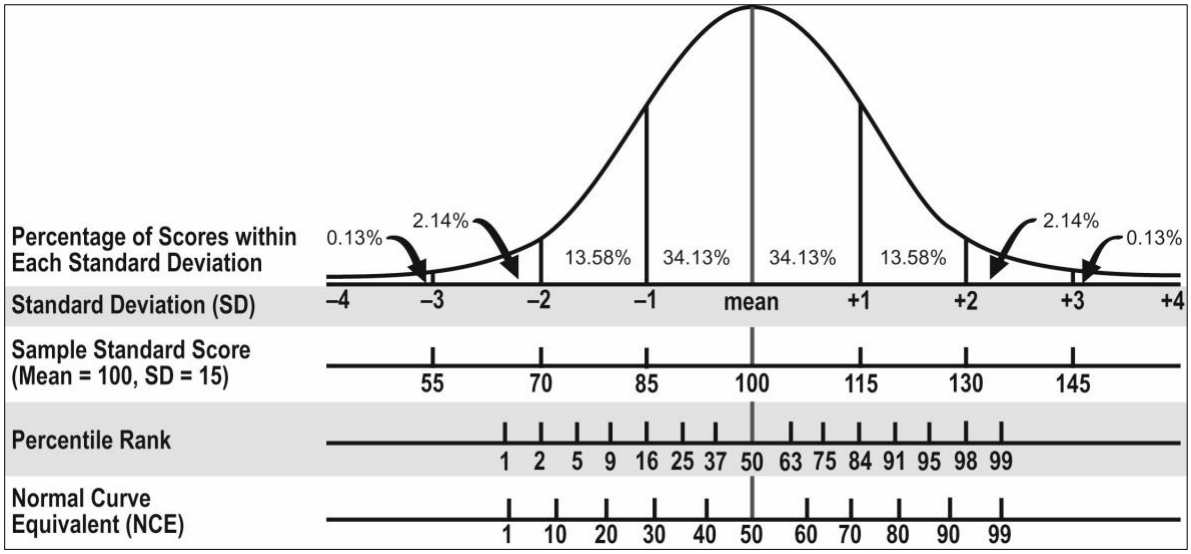
However, as described in the study design section, the statistical model allows for missing data, so this did not prohibit APA from being able to estimate the overall impact of the program.

Converting DP-3 Standard Scores to Normal Curve Equvilant (NCE) Scores

For APA's statistical analysis, the study team converted the DP-3 standard assessment scores into normal curve equivalent (NCE) scores to measure child outcomes. NCE scores offer several advantages for this analysis. First, NCE scores are similar to percentile rank scores except that NCEs are equal interval scores. In percentile ranks, the difficulty of moving from the 50th to the 55th percentile on the DP-3 is much lower than the difficulty of moving from the 90th to the 95th percentile. When using NCE scores, the difficulty of moving from a 50 to a 55 and from a 90 to a 95 are the same. Illustration 6.1 demonstrates the relationship between standard scores, percentiles and NCE scores.

Illustration 6.1

Standard Scores, Percentiles, and NCEs Compared to a Bell Curve



Source: B. Griffin, Georgia Southern University, 2014

NCE scores also still provide a norm-referenced interpretation, meaning that the scores can be used to compare the performance of PASO children to all children who took the DP-3. In the case of DP-3, the norm group is children of the same age. This means that a child's score can be used to compare her to all other children of the same age and that, given an average amount of development over time and in the absence of intervention, a child's score should stay the same as she ages. For example, a child who experienced average development between age three and age four would have the same NCE score (e.g., an NCE of 50 at age three and an NCE of 50 at age four). Although this child develops between the two measurement periods, the NCE score does not change because the child's development remains the same in reference to the norm group.

APA used NCE scores for its analysis. Using an NCE-to-percentile conversion Figure, impact findings were then translated into percentile rankings for ease of interpretation.

Statistical Analysis

Statistical Analysis: As the data suggests a strong non-linear relationship, APA determined the most appropriate estimate of the impact of the program on child development outcomes is the average difference in DP-3 scores between the baseline level and the final three data points at the end of the program year – in other words, a point estimate. APA employed a three-level Hierarchical Linear Model (HLM), with time modeled at level one, children modeled at level two, and providers modeled at level three. This model allowed the study team to estimate the impact of the PASO program on children while controlling for concurrent preschool enrollment and provider treatment.

Impact Model for Child Outcomes

In developing the analysis model for the initial year of analysis for Cohort 1, APA initially examined a visual representation of the data (Figure 6.1) and considered three alternative baseline models as described by Bloom (2003): (1) the baseline mean model, (2) the linear baseline trend model, and (3) the non-linear baseline trend model.[4] APA's visual inspection of the plotted baseline time point data led the study team to conclude that the most appropriate baseline model for Cohort 1 was the baseline mean model. Indeed, the mean baseline level does not seem to change during the first training phase. Further, the baseline mean model is consistent with the program theory of change and expected changes in student outcomes during the phases of provider training. It is only the second phase of training that addresses aspects of child development that directly impact child outcomes as measured by the DP-3. This remained true for the visual representation of Cohort 2 data, so while the data for Cohort 3 is more variable as previously noted due to the small number of added providers, APA continues to use the baseline mean model for pooled cohort data in this final year.

During the review of the data for the pooled cohort analysis, the study team also visually inspected the time point data to examine trends in child development during the two training phases. As discussed previously, the overall data trends were consistent across both years, with data movement particularly noteworthy during the second training phase of the program (child development) when the final few time points appear to show an upward, linear trend. However, in neither cohort nor in the pooled model is there a linear trend present across all time points.

Because of the strong non-linear relationship of mean DP-3 General Development scores over the nine points of assessment, APA determined that the most appropriate estimate of the impact of the program on child development outcomes is the average difference in DP-3 scores between the baseline level and the final three data points at the end of the program year – in other words, a point estimate. The study

[4] The baseline mean model is appropriate when baseline scores vary randomly with no clear indication of a systematic increase or decrease. The linear baseline trend model is appropriate when baseline scores increase at a constant rate across the time points. The non-linear baseline trend model is appropriate when the change in baseline scores is non-linear. It should be noted, however, that Bloom (2003) suggests that both the linear trend and the non-linear trend baseline models are "potentially risky ways to estimate counterfactuals" and should only be used if observed baseline trends are "highly consistent" and if there is good reason to believe the trends will continue in subsequent years.

team believes that this is the most easily interpretable way to represent the program's effect to a broad audience. This approach is also consistent with the program's expectation that the largest impacts on student development would occur only toward the end of the training period. For this reason, APA omitted the midpoint assessment measurements from the model, looking only at the difference between the baseline pre-assessment and the post-assessment points.

Hierarchical Linear Model (HLM): APA estimated the impact of PASO participation on child outcomes using a three-level Hierarchical Linear Model (HLM), with time modeled at level one, children modeled at level two, and providers modeled at level three. This model allowed the study team to estimate the impact of the PASO program on children while controlling for child characteristics and provider treatment.[5]

The full three-level model controlled for all of the following variables (unless otherwise noted, all variables are continuous):

- Preschool experience (coded as 1 for children who are concurrently enrolled in another preschool program),
- Number of hours of training received by each provider,
- Number of trainings each provider attended,
- Service area (Boulder County coded as 1, Aurora coded as 0),
- Provider PEPEI overall score (measured at the end of the program),
- Cohort year, and
- Provider.

Because the children in the sample had similar backgrounds, additional child-specific variables for language, race, ethnicity, and family income were excluded. APA estimated the impact of the program as a point estimate, comparing the average of the three baseline child development scores to the average of the three post-treatment scores of the following year. As was true in the analysis of Cohort 1 and the pooled sample of Cohorts 1 and 2 in prior years, the final three-year pooled analysis uses just the final data point (April) instead of an average of the three post-treatment scores (February, March, and April). As was clear from the visual inspection of the data, assessment scores seem to be increasing over that period. By using an average of the three points, and not just the higher last data point, this analysis presents a more conservative estimate of the program's impact.

Overall findings are discussed in the next section.

[5] For the analysis of cohorts 1 and 2, the small number of students per provider made it impossible to use a model including nesting at the provider level. That issue is discussed and documented at length in the report of that analysis. This year, the additional number of students per provider made it possible to analyze the data using the original three-level model.

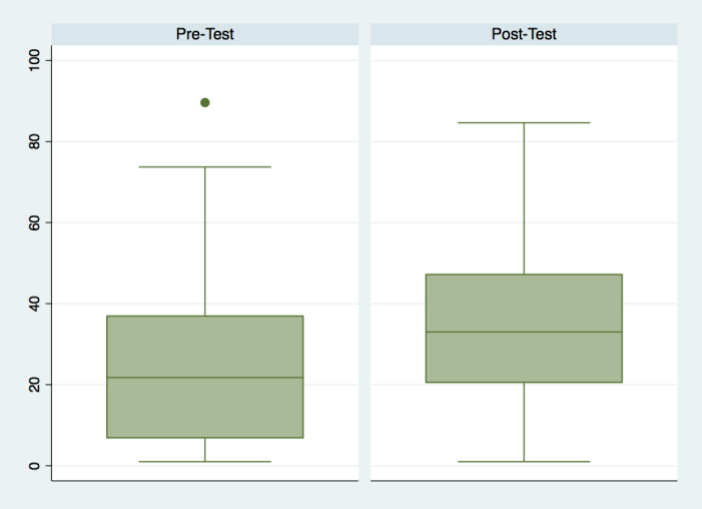
Results from DP-3 Assessments, 2014-2017

Results, 2014-17: APA found that PASO participation increased child development as measured by the DP-3, a statistically significant finding. Children cared for by PASO providers, on average, improved by 11 NCE points. For the average child in the program, an increase of 11 NCE points translated to the child moving from the sixth percentile to the 17th percentile on the DP-3 assessment. There were positive and significant gains on all subscales of the DP-3, with the largest gains were on the Cognitive Development subcomponent.

General Development

Children cared for by PASO providers showed a positive and significant improvement on the DP-3 assessment. Figure 6.2 shows the raw child general development outcome results for the pooled sample of Cohorts 1, 2, and 3, with no child or provider covariates included in the analytic model.

Figure 6.2
General Development NCE Scores for Pooled Analytic Sample
Increased after PASO training, 2014-17



In Figure 6.2, the top and bottom of each box indicate the 75th and 25th percentiles of the distribution, respectively, and the line in the middle of each box indicates the 50th percentile of the distribution, or the median. Children in the sample achieved an average improvement of 11 NCE points from the baseline (termed pre-test in graph) to the final assessment (post-test). When all child and provider covariates were included in the model, the main result remained the same: the average child whose provider participated in PASO experienced an improvement of 11 NCE points, controlling for concurrent preschool enrollment, number of hours of care received, and provider treatment characteristics. This translates to an effect size of 0.52.[6]

[6] This reported effect size of 0.52 is the Cohen's d effect size. The Hedge's g effect size is 0.51.

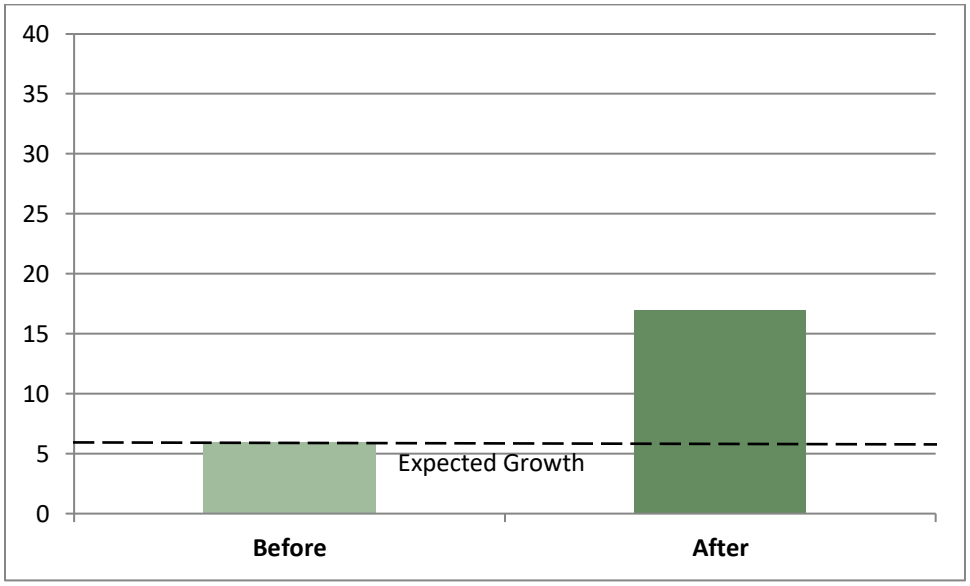
As explained in the Data Sources section, an 11-point improvement in NCE scores can translate to different increases in a child's percentile ranking, depending on the child's starting percentile score. Table 6.3 provides several hypothetical examples:

Table 6.3
Result of an 11 NCE Point Change at Different Percentile Starting Points

Child	Starting Percentile	Ending Percentile	Percentile Difference
Child A	10th	21th	11 points
Child B	25th	45th	20 points
Child C	50th	70rd	20 points
Child D	75th	88th	13 points
Child E	90th	97th	7 points

As Table 6.5 shows, an 11-point improvement in NCE scores can only be translated into percentile rankings in the context of the child's starting percentile ranking. Figure 6.4 presents a comparison of the average[7] PASO child's percentile rank at the beginning of the program and the average child's percentile rank at the end of the program year, while controlling for concurrent preschool enrollment, number of hours of care received, and provider characteristics.

Figure 6.4
Comparison of Pre-treatment and Post-treatment
Average General Development Score (Percentile), 2014-17



[7] An "average child" refers to a child who is average in terms of: (1) hours of care received, (2) preschool experience, (3) hours of home visits his/her program received, (4) average number of training sessions his/her provider attended, (5) PEPEI score of his/her provider at the end of the year, and (6) service area.

The average PASO child improved from the 6th percentile to the 17th percentile over the course of the program. Because the DP-3 assessment is norm-referenced, a child whose score remains unchanged from one year to the next would experience an average amount of development over that period. A child whose DP-3 score increases over the program period has therefore developed more quickly than other children her age. The 11 percentile-point increase estimated by the model indicates that the average child whose providers participated in PASO achieved significantly faster development than typical children of the same age.

APA's examination of other covariates in the model showed that no other child- or provider-level factor has a statistically significant relationship to a child's DP-3 assessment.[8]

DP-3 Subcomponent Scores

In addition to analyzing the DP-3 General Development Score, APA also analyzed DP-3 sub-scores to investigate whether PASO training might influence some components of child development more than others. The results of this analysis are shown in Table 6.6.

Table 6.6
Average Impact of PASO on DP-3 Subcomponent Scores, 2014-17

	Cognitive	Adaptive Behavior	Communication	Social Emotional	Physical
NCE Scores					
Average NCE Pre-Test	21.54	28.82	25.67	29.71	27.61
Average NCE Post-Test	31.60	35.55	34.15	37.28	33.98
NCE Point Difference	*10.07*	*6.73*	*8.48*	*7.57*	*6.36*
Percentile Ranks					
Average Percentile Pre-Test	9	16	13	17	14
Average Percentile Post-Test	20	25	23	27	23
Percentile Difference	*11*	*9*	*10*	*10*	*9*

Note: All differences are significant at or above the 95% level ($p < .05$)

The study team detected a positive and statistically significant difference in child performance on all five subcomponents of the DP-3. Of these gains, children achieved the highest percentile gains on the Cognitive subcomponent.

[8] The cohort 1 analysis found that concurrent preschool attendance had a positive and statistically significant relationship, but that relationship is not present in the pooled cohort.

VII. Final Conclusions, 2014-2017

Program Implementation

The first link in PASO's theory of change is "Provide professional development training sessions and in-home coaching to FFN providers in low-income, Latino communities." Based upon the findings of the implementation study, APA found that PASO is meeting this objective by implementing the program in a manner consistent with its program model (as outlined in the logic model on page 6). APA found that specific program inputs and activities were implemented with fidelity:

> *Program Inputs*: Based on findings from interviews, literature review, and document review, APA found that PASO (1) has trained instructors/coaches (Tías); (2) uses a nationally recognized professional development curriculum and credentialing process (CDA); and (3) uses supplemental materials and activities from a research-based ECE curriculum (HighScope).
>
> *Program Activities:* Relying on findings from interviews, document review, and provider surveys, APA found that PASO (1) recruits a cohort of at least 20 FFN providers in each service area who serve children in low-income, Latino communities; (2) conducts at least 30 professional development training sessions over a cohort year (31 since 2015-16); and (3) conducts routine in-home observation and measurement of provider growth in key ECE areas using a locally developed observation rubric. Provider retention has been greater than 80 percent for each cohort in the last three years.

APA's analysis of provider survey responses indicated that training sessions and home visits meet the program's quality expectations. The vast majority of providers felt that training sessions were helpful and that information provided in the sessions was easy to understand. They felt that the Tías were supportive and encouraging, and that Tías addressed providers' questions and concerns in both training sessions and home visits. Additionally, most providers felt that Tías helped them apply what they learned in training sessions by offering real-life examples, modeling best practices, and interacting with children during home visits. This assessment of program quality by the providers served has been consistent across cohort years.

Program Impact

Provider Outcomes

The second link in PASO's theory of change is "Improve the quality of childhood education in these FFN settings." Based on self-reported data from nearly 100 providers over the past three years, providers' comfort level, skill level, and quality of care are demonstrably higher after participating in the PASO program. Considering the pooled results for the cohorts between 2014 and 2017, there was statistically significant improvement in overall provider quality and in the quality of care provided, as measured by the PEPEI. On average, providers earned 17 percent of possible points on their pre-assessment, compared to earning 83 percent of possible points on their post-assessments. Improvement was made in all CDA competency areas including (1) health, safety, and learning environment; (2) child physical

and intellectual development; (3) social and emotional development/guidance; (4) relationships with families; (5) program management; and (6) professionalism. Assuming that the 2016-17 providers who currently are in process of applying for their a Child Development Associate (CDA) credential receive it, the PASO program will have produced over 75 new credentialed childcare providers in the last three years, increasing the number of credentialed providers in the communities they serve.

Child Outcomes

The third link in PASO's theory of change is "Enable Latino children served to enter kindergarten school ready." The DP-3 assessment measures child progress in areas related to being school ready, including the areas of (1) physical, (2) adaptive behavior, (3) social-emotional, (4) cognitive, and (5) communication; all of these sub-scores are summed into a sixth "general development" score. Given that the DP-3 standard scores provide a norm-referenced interpretation, the scores account for typical child development.

Overall, APA found positive and statistically significant results for the pooled sample of the 2014-15, 2015-16, and 2016-17 cohorts, with children increasing their DP-3 scores by an average of 11 NCE points. For the average child in the program, an increase of 11 NCE points translated to the child moving from the sixth percentile to the 17th percentile. The highest percentile gains were on the Cognitive Development subcomponent.

Contribution of Study

Level of Evidence Generated by the Study

The five-year study has achieved its targeted moderate level of evidence for child outcomes. The study team adhered to the Short Interrupted Time Series research design detailed in the Subgrantee Evaluation Plan approved by the reviewers for Corporation for National and Community Service (CNCS) as meeting the requirements for a moderate level of evidence; this includes three levels of nesting for the Hierarchical Linear Model. Additionally, data used in this analysis included three time points from before and at least three time points after the PASO intervention (the study included six time points after the start of the training program), which is consistent with the SIF guidelines for moderate levels of evidence. Although the strongest study design for moderate level of evidence would include a separate comparison group, a separate comparison group was difficult to create in this context. The PASO program serves a Latino population that is "under the radar". In other words, the childcare providers and children ages birth through five in their programs are not a population that is easy to locate. Therefore, there is no readily available assessment data for children served in non-PASO FFN homes. Given this practical reality, the current study design used a Short Interrupted Time Series that allowed the children impacted by the PASO program to serve as their own control group. Further, the study includes high levels of internal validity with design elements in place to mitigate threats to internal validity.

Strengths and Limitations of the Study

As noted, since the population served by PASO is often "under the radar" a limitation of the study is that a separate comparison group could not be created. However, a strength of the study is the use of a quasi-experimental research design that addresses this constraint in which the students who received exposure to the PASO treatment served as their own control cases. This study design provided robust information regarding the relationship between exposure to the PASO program and child outcomes.

Another limitation to the current study is that it involved no direct assessment of children. As the program provides indirect treatment of children through the providers it trains, direct assessment of children was not an existing program element and the costs of doing so exceeded available evaluation resources. While this is a weakness to the current data collection process, it is a strength of the longevity of the PASO program. More specifically, having trained PASO assessors collect student-level information as opposed to members of the research team, PASO is able to continue analyzing student-level outcomes following completion of the current study.

Finally, the loss of one PASO site during the final year of analysis limited the research team's ability to do comparative analyses for all years of the study. However, the pooled sample includes information from both sites for two of the three years in the analysis, supporting the generalizability of the study's findings.

Connection of this Study to Future Research

This study was intended to not only contribute to the deficit of literature surrounding FFN-provided early childhood education but also to build upon the existing and growing importance of provider coaching strategies by analyzing the "Tia" model which emphasizes regular, direct visits to FFN provider facilities. The study was also intended to provide research on a constructive and efficacious model to "close the achievement gap," as children served by FFN providers are regularly over-represented by low-income and other "at-risk" demographics. Future research could include examining the program as it is replicated or expanded into other communities.