

Parents as Teachers Randomized Control Trial in Arizona

6- and 12-Month Outcomes Report

July 2024



LeCroy & Milligan
ASSOCIATES, INC.

Parents as Teachers Randomized Control Trial in Arizona: 6- and 12-Month Outcomes Report

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Founded in 1991, LeCroy & Milligan Associates, Inc. is a consulting firm specializing in social services and education program evaluation and training that is comprehensive, research-driven, and useful. Our goal is to provide effective program evaluation and training that enables stakeholders to document outcomes, provide accountability, and engage in continuous program improvement. With central offices located in Tucson, Arizona, LeCroy & Milligan Associates has worked at the local, state, and national level with a broad spectrum of social services, criminal justice, education, and behavioral health programs.

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EXECUTIVE SUMMARY

This report on the Parents as Teachers (PAT) home visitation program offers an in-depth evaluation of its effectiveness in supporting early childhood development and family well-being. The PAT program is a widespread early intervention strategy in the United States. It is designed to assist families with children from the prenatal stage up to five years old through various services, including personal visits, group connections, child and caregiver screenings, and connections to community resources.

Program Overview: The PAT model focuses on enhancing parenting knowledge, early detection of developmental delays, improving family health and well-being, preventing child abuse and neglect, increasing school readiness, improving family economic well-being, and strengthening community capacity. The program is structured around a curriculum and planning tools that address these outcomes.

Research Context and Methods: This research is being conducted in Arizona, focusing on four Blue Ribbon sites that meet quality standards for program implementation fidelity. It utilizes a randomized controlled trial (RCT) design to assess impacts on child development, parenting practices, family health and safety, and utilization of services. The study involves 767 primary caregivers and their youngest child, with data collected at baseline, 6-, 12-, and 18-month timepoints. This report presents the research findings at 6- and 12-months.

Key Findings at 6 and 12 Months:

1. **Child Development:** At 6 months, PAT children showed significant improvement in communication skills, particularly in talking and listening. At 12 months, children in the PAT group continued to show favorable results on these two outcomes at a lower significance level. Additionally, the study found a positive impact on PAT parents reading more often to their child at both 6 and 12 months, a critical outcome for promoting literacy.
2. **Parenting Practices:** Significant improvements were shown in parenting practices at 6 months in areas of parenting efficacy and hopefulness. At 12 months, the PAT group continued to show improved parenting efficacy over the control group, with a meaningful effect size. At 12 months, PAT parents also showed improvement in social support and role satisfaction. These findings are particularly relevant as this data was collected during the COVID-19 pandemic, which isolated many families and added extra stressors.

3. **Family Health and Safety:** The PAT group demonstrated significant improvements in safety practices at home at both 6 and 12 months, a vital aspect of preventing unintentional injuries and ensuring child well-being. Furthermore, at the 6-month follow-up, this study found a significant impact on reducing parents' Risk Score, which captures depression and parenting stress, the difference between the two groups was diminished at the 12-month follow up.
4. **Service Utilization:** At 6 months, no significant difference was found between the PAT intervention and control group in terms of utilization of resources. However, at 12 months, the PAT group utilized a higher average number of resources compared to the control group (2.9 vs. 2.5), which was marginally significant with a meaningful effect size. The data on current school or job training and employment at 6 months and 12 months revealed too little data for a meaningful analysis. Using exploratory data analysis, the differences were small, but the odds ratios favored the PAT group slightly.

Conclusions:

The PAT RCT provides valuable evidence supporting the PAT program's role in enhancing child development, improving parenting practices, and ensuring family health and safety at 6- and 12-months post baseline. However, several significant differences between the groups became less evident at the 12-month assessment. One possible explanation for the lower number of significant findings at 12 months is that parenting and child outcomes will naturally improve over time as (1) the parent settles into their role and routine, (2) the family finds resources in the community that could affect outcomes, and/or (3) the child ages and develops naturally. This reason is supported by improvements in the control group's outcomes observed over the course of the study, ultimately minimizing differences between groups at 12 months.

Overall, this study results highlight the PAT program's powerful effects on both parent and child outcomes in a relatively short amount of time (6 months), setting families on a good trajectory before potentially unhealthy patterns are given time to develop. Although the effects of the program were not as detectable at the 12-month follow-up, the study showed that families benefited early on from the program, potentially preempting and addressing concerns or issues that could otherwise contribute to longer term negative effects. This study contributes to the broader understanding of early childhood interventions and their efficacy in real-world, community settings. Future studies should explore more nuanced measurement tools and methodologies to better capture the multifaceted impacts of home visitation programs in diverse community settings.

INTRODUCTION

LeCroy & Milligan Associates, Inc. was contracted by Parents as Teacher National Center (PATNC) to conduct a five-year randomized control trial (RCT) study of the Parents as Teachers (PAT) home visitation program in Arizona. This study was launched in April 2019 and funded by Enterprise Holdings Foundation and Arizona’s First Things First. This study utilized an RCT design to test the effectiveness of the PAT home visiting program intervention on child and caregiver outcomes, measured at 6- and 12-months post enrollment, with families randomized to either the PAT intervention group or a control group. This report presents the findings of the outcome study at 6- and 12-months post baseline. This research contributes to the knowledge base by providing a rigorous and recent examination of the effectiveness of PAT home visitation on both child and caregiver outcomes.

The programs selected for the study have a high level of implementation monitoring and fidelity as they are “blue ribbon” programs that meet quality standards put forth by the PATNC. This study includes a wide range of child and caregiver outcomes with families that receive PAT services and seeks to address the limitations of previous longitudinal and experimental evaluations in home visitation research, as well as evaluations of home visiting programs in general. Most home visitation evaluations examine the program impact from only parent attitudes and behaviors (see e.g., Mitchell-Herzfel, 2005; Green et al., 2014). Additionally, this research seeks to address a critical challenge to outcome measurement in home visitation (LeCroy & Krysik, 2020) by exploring a wide range of outcomes to identify outcome indicators that are sensitive to change and closely related to program goals.

Home Visitation Programs

Family support programs are considered central to improving the health and development of children, and home visitation remains one of the most frequently used early intervention strategies. In 2010, federal policy expanded financial support for home visitation programs (Haveman et al., 2015), and such programs now exist in every U.S. state, with the majority of participating families having incomes at or below the federal poverty level (U.S. DHHS HRSA, 2023). While widely implemented, home visitation programs are complex as they attempt to intervene on multidimensional factors that promote child and family wellbeing.

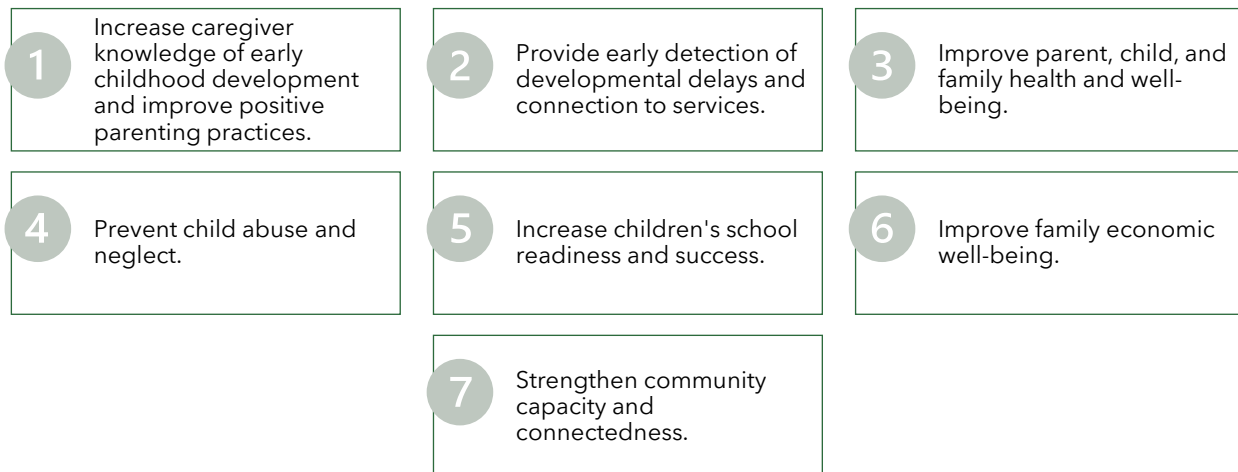
Home visitation outcomes have been measured at the child, parent, family, and community level. Outcomes encompass domains of physical health, mental health, financial stability, educational attainment, crime and violence, parenting efficacy, and linkages to other care services, and have been measured short-term and longitudinally over decades (Duffee, et al., 2017). The U.S. Department of Health and Human Services (DHHS) created the Home Visiting Evidence of Effectiveness (HomVEE) project in 2009 to establish the outcome and evidence base standards for home visitation models (Duffee, et al., 2017). As of 2023, the HomVEE website

cataloged 541 favorable outcomes for home visitation programs (U.S. DHHS ACF, 2023). However, outcome measurement in home visitation has its challenges, which can lead to misleading results and implications for practice (LeCroy & Krysik, 2020).

Increasingly, intervention research has focused on implementation noting that outcomes are likely to vary widely by site (Casillas, et al., 2016; Jones Harden, et al., 2012), accreditation (DuMont, et al., 2008) and program monitoring (Black, et al., 2015; Korfmacher, et al., 2019; McCabe et al., 2012). Home visiting research continues to focus on how program outcomes can be impacted by different implementation and site location, and more research is needed to better understand how program outcomes are influenced by these factors.

Parents as Teachers Program

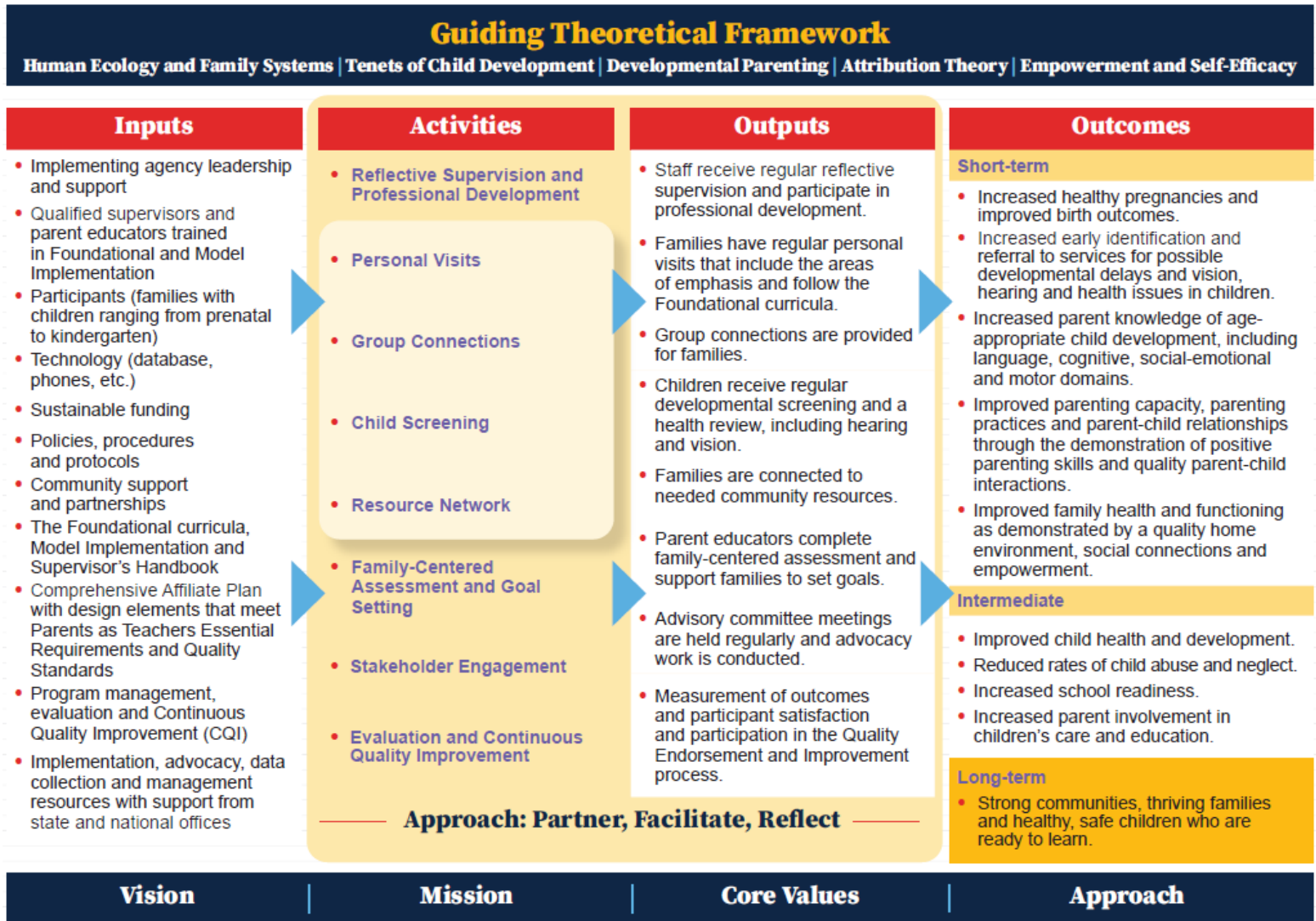
This study investigated the effectiveness of the PAT a home visitation model that operates in 49 states as well as four countries outside the U.S. PAT is an evidence-based caregiver education and family engagement model serving families with children from prenatal through kindergarten (OPRE, 2021, PAT, 2023). Families receive **personal visits**, typically in their homes, from certified home visitors. Families also attend **group connections** sessions with other families, children receive developmental, health, hearing, and vision **screenings**, and families receive resources and referrals to **community resources**. Home visitors use a structured curriculum and planning tools to address **seven outcome domains**.



The program is adaptable to the needs of diverse families, cultures, and special populations. PAT is the comprehensive home visiting and parent education model implemented by the NSC PAT affiliate in St. Louis, MO. This evaluation utilized a mixed methods approach with process (implementation) and outcome (impact) components. The PAT Program Logic Model that guides this evaluation is shown in Exhibit 1.

Exhibit 1. PAT Program Logic Model

 **parents as teachers** Evidence-Based Home Visiting Logic Model



Understanding the effectiveness of the PAT program is critical in the realm of early childhood education and family support services. Early childhood experiences significantly influence a child’s cognitive, social, and emotional development, laying the foundation for future academic success and overall well-being (Barnett, 1998; Jimenez et al., 2016). Investigating the impact of the PAT program is essential to ascertain its role in fostering positive parenting practices, improving child outcomes, and promoting family stability.

Existing Research on PAT and Home Visitation

Past PAT studies that meet U.S. DHHS standards for well-designed research have shown favorable effects in 11 outcome measures related to child development, family economic self-sufficiency, and positive parent practices; no effect in 189 outcome measures; and unfavorable or ambiguous effects in 6 outcome measures (U.S. DHHS HomVEE, 2019). However, many of these studies were conducted more than 20 years ago, with publication dates of 2001 and earlier (U.S. DHHS HomVEE, 2019). Other randomized trials and published studies exploring the effectiveness of the PAT program have also yielded varying results. Further, while some research has found clear short-term benefits, documenting the long-term impact of the PAT program on children’s academic achievement and socio-emotional development is more challenging.

Parenting and Child Development

Two early studies of PAT examined multiple outcomes from participation in the PAT program and found limited effects on parenting and child development outcomes (Wagner et al., 1999; Wagner et al., 2002). Wagner et al.’s 1999 randomized trial involved two PAT sites, finding small and inconsistent program impacts. Wagner et al.’s 2002 study was a randomized trial of over 600 families and found few significant effects. Drotar et al.’s 2009 randomized trial of the PAT program using the Born to Learn curriculum found that the program resulted in higher mastery motivation at a 36-month assessment, while other developmental outcomes showed limited effects.

An RCT longitudinal study conducted by Smith (2015) reported significant gains in language development and cognitive skills among children enrolled in the PAT program compared to a control group. Similarly, Jones Harden et al. (2012) found a positive association between PAT program participation and increased parental knowledge and confidence in supporting their child’s learning, and Schaub et al.’s (2019) randomized controlled trial in Switzerland found that the intervention positively affected children’s development milestones including language. These studies used different measurement tools to assess parenting skills and child development, which further complicates how program outcomes are researched and interpreted.

Child Academic Success

A study by Zigler et al. (2008) used longitudinal data to examine program impact and found that PAT parenting practices promoted school readiness and subsequent academic achievement. A similar but more recent study (Lahti et al., 2019) conducted a quasi-experimental evaluation and findings indicated that compared to a non-PAT comparison group, the PAT student group performed better in terms of reading and math achievement and had a significantly lower rate of absenteeism, in-school-suspensions, and out-of-school-suspension. No randomized trials specifically about PAT and child academic success have been published.

Child Maltreatment

Chaiyachati et al. (2018) conducted a rigorous quasi-experimental study using propensity score matching and investigated the effectiveness of PAT on child maltreatment prevention. They found a 22% decreased likelihood of Child Protective Services substantiations (hazard ratio [HR] 0.78) for families receiving home visiting and a trend toward decreased out-of-home placement. A meta-analysis of 77 experimental and quasi-experimental studies identified certain home visitation program components as statistically associated with reduced child maltreatment (Gubbels et al., 2021).

Program Implementation

Woolfolk & Unger (2009) studied the implementation of PAT programming and concluded that: “rather than solely focusing on child outcomes as is typically done to indicate success of home visiting programs, evaluations should include the goals that parents are pursuing to address their parenting and family concerns” (p. 197). As the author noted, such goals are likely mediating factors that lead to better child outcomes or serve as successful parent outcomes. Indeed, one of the strong findings from the federal Mother and Infant Home Visiting Program Evaluation (MIHOPE) was that PAT produced the largest increase in parental supportiveness in comparison to other home visitation programs (Michalopoulos et al., 2019). Other studies have highlighted challenges and limitations of home visitation implementation. Jones Harden et al. (2012) identified issues related to program fidelity and sustainability, noting disparities in outcomes across different implementation sites.

Study Aims, Hypotheses, and Objectives

The aim of the Arizona PAT RCT is to determine the effects of PAT home visiting services delivered by Parent Educators compared to a control condition on four domains (1) child development, (2) parenting practices and family functioning, (3) family health and safety, and (4) resource utilization. The underpinning hypothesis was that significant differences between the PAT intervention and control groups would be observed in the four domains at 6- and 12-months post baseline. This report presents the 6- and 12-month findings. Please see LeCroy, Morrill, & Schmidt (under review) for the report of 6-month findings.

METHODS

Procedures

The study, approved by an Institutional Review Board, conducted recruitment from January 2019 to July 2022 at four PAT affiliate sites in Arizona. Families, consisting of primary caregivers and their youngest child aged from birth to 4 years, were recruited through either a centralized intake hub or direct referral. Eligibility criteria excluded families with children older than 4 years, prenatal or foster families, those residing on tribal lands, children with developmental disabilities, caregivers with inadequate English or Spanish proficiency, families with recent PAT involvement, or those cohabitating with another PAT participant family (see Appendix A for more information about study ineligibility criteria).

Eligible families received information and underwent the informed consent process facilitated by trained bilingual and bicultural research staff. Randomization to either the PAT intervention or control group was conducted by the research team using a computer-based random generator. Initially employing a 1:1 randomization, the study later adopted a 2:1 ratio favoring the intervention group so that the PAT affiliates could continue to meet enrollment numbers required by funders. This adjustment aimed to bolster statistical power while upholding randomization principles to prevent bias and ensure baseline equivalence (Dumville, et al., 2006).

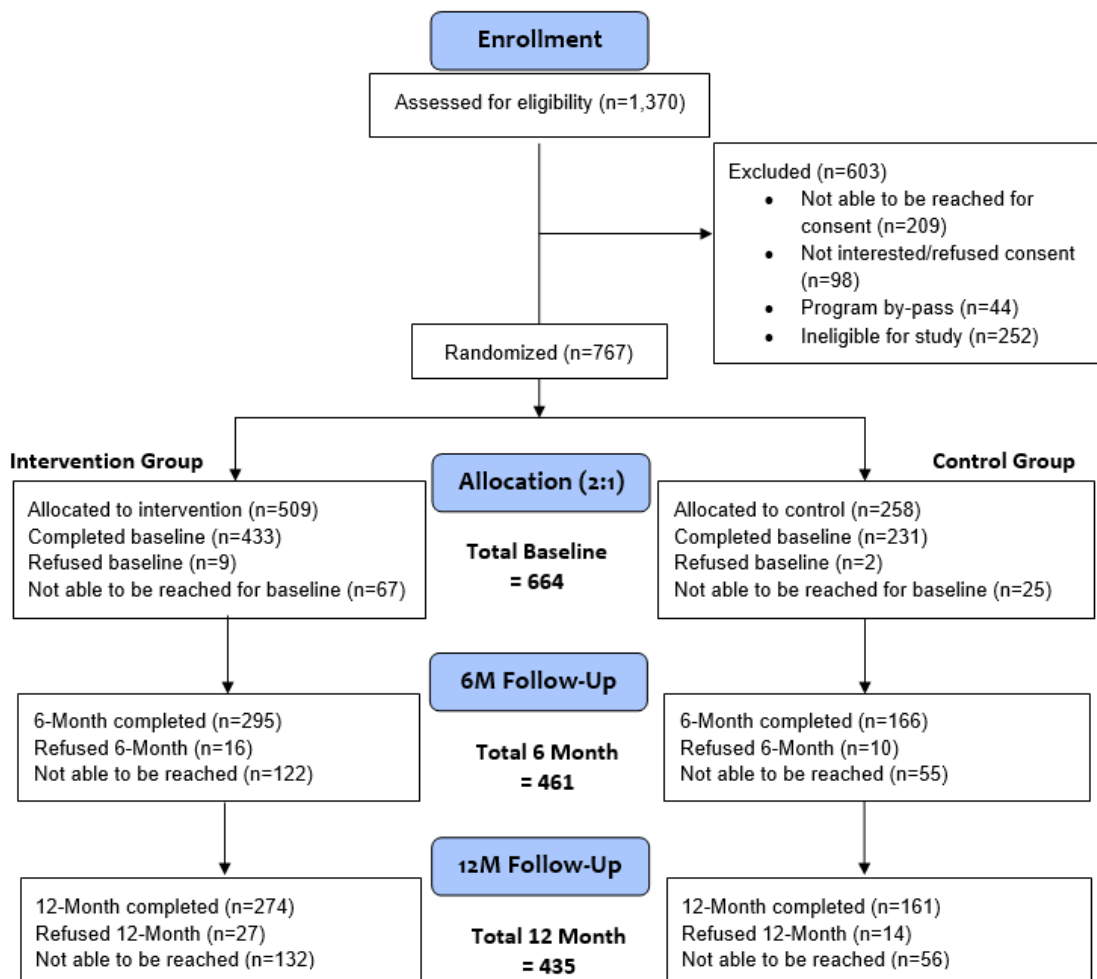
Families assigned to the PAT intervention group were directed to the appropriate affiliate for program enrollment, while both groups scheduled baseline visits with a data collection team member. Data collection, conducted by female, bilingual, and bi-cultural (White, Hispanic) staff, occurred at baseline, 6-month, and 12-month follow-ups, either in person or virtually. Virtual data collection happened primarily during the COVID-19 pandemic. Retention strategies tailored for high-risk populations, such as detailed participant information collection, regular contact, incentive scheduling, flexible scheduling, and web-based locator services, were implemented.

In addition to randomization, each site reserved a limited number of "slots" for direct referrals into the PAT program outside of the randomized process. This practice assisted with the acceptability of implementing an RCT in a community-based setting (LeCroy & Sullins, 2024). These families were excluded from the study sample.

Consort Flow Diagram

Exhibit 2 shows the Consort Flow Diagram for this study from recruitment through the 12-month follow-up assessment. Of the 1,370 families interested in PAT services, 767 (56%) met the study eligibility criteria, signed an informed consent form, and were subsequently randomized to either the PAT intervention group (n = 509) or control group (n = 258). A total of 664 (86%) of families completed a baseline assessment after randomization. A \$20 gift card incentive was provided to families who completed data collection at baseline, 6 months, and 12 months. Additionally, small incentives (e.g., \$5-\$10) were provided to families who informed project staff of changes in contact information to help reduce attrition. A total of 461 families completed the 6-month follow-up data collection using the same study protocol, which is a 69% retention rate (n = 295 for intervention and n = 166 for control), with comparable retention rates for intervention and control groups (differential attrition between the study groups was 3.7%). At 12 months, 435 families completed a follow-up using the same study protocol, for a 66% retention rate (n = 274 for intervention and n = 161 for control), with differential attrition between the study groups at 6.4%.

Exhibit 2. Consort Flow Diagram



Description of the Intervention

The PAT intervention group families received standard PAT program services alongside participation in baseline, 6-month, and 12-month data collection. Following data collection, these families received a monetary incentive and an age-appropriate book for their child. The PAT model comprises four components: Personal Visits, Group Connections, Child and Caregiver Screenings, and Resource Network, all adhering to fidelity and quality standards ensuring program effectiveness and replication. Personal visits, a core PAT element, cover four key areas and follow foundational curricula. The core focus of the PAT program encompasses four main domains:

1. **Encouraging positive child development** through engaging in age-appropriate activities with families and fostering realistic caregiver expectations.
2. **Supporting child health** by facilitating regular well visits and utilizing healthcare and community resources effectively.
3. **Strengthening the parent-child relationship** by fostering attachment and fostering positive interactions between parents and children.
4. **Enhancing outcomes** across the family's life course by promoting positive mental health, facilitating goal setting and problem-solving, supporting continued education and training, and providing referrals for assistance with substance abuse, mental illness, and interpersonal violence.

Certified Parent Educators, trained and supported by the PAT National Center, deliver the program, often sharing characteristics with enrolled families. PAT mandates affiliates to provide a minimum number of personal visits annually based on the family's high-needs characteristics.

Personal visits, lasting at least 60 minutes, were offered in-person and virtually during the study, predominantly during the COVID-19 pandemic. PAT emphasizes cultural competence, tailoring services and regularly updating curricula based on emerging research. Affiliates are urged to incorporate culturally responsive strategies, such as adjusting materials and communication. More details about the PAT model are available on the PAT website and in technical and peer-reviewed publications.

Intervention sites were chosen based on meeting or surpassing PAT National Center's quality standards and enrolling a substantial number of new families annually, particularly in metropolitan/urban areas. The majority of intervention group families (83%) were actively engaged in the PAT program, receiving six or more home visits, with an average of 13.29 visits at 6 months and an average of 25.48 visits at 12 months.

Description of the Control Condition

Control group families engaged in baseline and 6- and 12-month data collection time points with the research team. During these sessions, data collectors administered child developmental assessments, supplied a roster of community resources, offered a monetary incentive, and provided an age-appropriate book for their child. While these families did not receive the PAT intervention, they retained the option to utilize any services accessible to families with young children in the community.

Measures

The study outcome measures evaluated four domains: child development, parenting practices and family functioning, family health and safety, and resource utilization. Scale reliability tests are shown in Exhibit 3.

Exhibit 3. Measure and Scale Reliability Results

Scale Name (Instrument)	Domain	Sample Size	Number of Items	Cronbach's Alpha
Listening & Understanding (Vineland II)	Child Development	677	7	.807
Relating to Others (Vineland II)	Child Development	676	11	.909
Talking (Vineland II)	Child Development	657	24	.953
Playing (Vineland II)	Child Development	670	9	.909
Home Environment (HFPI)	Parenting Practices	661	10	.778
Role Satisfaction (HFPI)	Parenting Practices	669	6	.781
Parent/Child Interaction (HFPI)	Parenting Practices	661	10	.807
Parenting Efficacy (HFPI)	Parenting Practices	650	6	.827
Problem Solving (HFPI)	Parenting Practices	675	6	.786
Social Support (HFPI)	Parenting Practices	678	5	.848
Depression (HFPI)	Parenting Practices	673	9	.825
Personal Care (HFPI)	Parenting Practices	673	5	.780
Mobilizing Resources (HFPI)	Parenting Practices	677	6	.801
Hope Hearth Index	Parenting Practices	671	12	.882

Note: Scales were assessed using baseline data. The analyses include data from participants with no missing items for each scale.

Child Development

The early years of childhood are pivotal for cognitive, emotional, and social development, with research consistently affirming the enduring impact of experiences during this period on a child's future. Studies, exemplified by the work of Shonkoff and Phillips (2000), underscore the rapid brain development in early childhood and the enduring consequences of early experiences. Parental behaviors and the family environment wield significant influence over a child's cognitive and emotional maturation. Bronfenbrenner's ecological systems theory (1979) identifies the family as a primary microsystem where early development unfolds. Programs like PAT, which prioritize enhancing parental skills and knowledge, align directly with this theory of child development. Early childhood initiatives facilitate the prompt detection of developmental delays or special needs, paving the way for timely interventions. Research underscores that early intervention can yield superior outcomes for children facing developmental challenges (Guralnick, 1998). PAT and similar programs are instrumental in early screening and referral for specialized services when necessary.

To measure child development, we utilized the **Vineland Adaptive Behavior Scales, Second Edition (Vineland-II)** (Sparrow et al., 2005). The Vineland-II serves as a widely employed tool for assessing the adaptive behaviors and skills of young children, boasting robust internal consistency, test-retest reliability, and interrater reliability, and validated against comparable measures (Sparrow et al., 2005). We employed four Vineland-II subscales tailored to the ages of children in our study (birth to 4 years): Listening and Understanding (7 items), Talking (24 items), Relating to Others (11 items), and Playing and Leisure (9 items). Responses ranged from 0 (Never) to 2 (Usually), with subscale scores computed by summing the respective items. All subscales exhibited strong construct reliability, with Cronbach alpha values ranging from $\alpha = 0.80$ to 0.95 . Additionally, we incorporated a single item assessing the caregiver's **frequency of reading to their child** over a seven-day period, categorized into two groups for data analysis purposes: Reading every day (1) and Not reading every day (0).

Parenting Practices and Family Functioning

Consistently, research underscores the profound impact of positive parenting behaviors on various facets of child development, encompassing cognitive, emotional, and social domains. Evidence suggests that supportive, nurturing, and responsive parenting correlates with improved developmental outcomes in children (National Scientific Council on the Developing Child, 2004; Azzi-Lessing, 2017). Such practices are associated with a reduced occurrence of behavioral and emotional difficulties in children, and they play a crucial role in fostering resilience among children confronting adversity. Research indicates that robust, supportive parenting can shield children from the adverse effects of factors like poverty, trauma, or other challenging experiences (Masten, 2001). Moreover, parenting programs hold promise for promoting the cultural adaptability and relevance of parenting practices. Given the diversity of communities and their distinct parenting norms and values, programs such as PAT can be

assessed and tailored to ensure cultural sensitivity and effectiveness across diverse populations (Chao & Tseng, 2002).

The assessment of parenting practices and family functioning employed two inventories with demonstrated reliability and validity: the **Healthy Families Parenting Inventory (HFPI)** (LeCroy & Milligan, 2017) and the **Hearth Hope Index** (Dufault & Martocchion, 1985; Herth, 1991). The HFPI encompasses five subscales related to parenting practices, including Home Environment (10 items), Role Satisfaction (6 items), Parent/Child Interaction (10 items), Parenting Efficacy (6 items), and Problem Solving (6 items). Additionally, it includes four subscales concerning family health and functioning: Social Support (5 items), Mobilizing Resources (6 items), Depression (9 items), and Personal Care (5 items). A recent validation study demonstrated the predictive validity of pre-intervention HFPI composite and subscale scores for future official maltreatment reports (Kelly & LeCroy, 2022). Ratings for all HFPI items range from 1 (Rarely or Never) to 5 (Always or Most of the Time), with scores computed by summing items within each subscale. All subscales exhibited strong construct reliability ($\alpha = 0.78$ to 0.85). The Hearth Hope Index comprises 12 items assessing a general sense of hope across three dimensions: Temporality and Future (4 items), Positive Readiness and Expectancy (4 items), and Interconnectedness (4 items). Ratings for each item range from 1 (Strongly Disagree) to 4 (Strongly Agree), with scores computed by summing all items. The index demonstrated strong construct reliability ($\alpha = 0.88$).

Family Health and Safety

Home visitation programs frequently prioritize the enhancement of parenting skills, recognizing their direct influence on children's health and safety. For instance, Duggan et al. (2004) observed that parents engaged in home visitation programs exhibited enhanced parenting practices, resulting in safer home environments and a decreased risk of accidents. LeCroy & Krysik (2020) similarly noted improved safety practices compared to control groups, emphasizing the significant social and financial benefits of mitigating unintentional child injuries, a primary cause of child mortality (Deal et al., 2000). A systematic review by Cramer et al. (2003) supported the efficacy of home visiting programs in lowering childhood injury rates compared to standard community support. While unintentional harm differs from child maltreatment, efforts promoting child safety are likely to reduce neglect charges stemming from inadequate supervision (Barth, 2009).

To assess family health and safety, we utilized the **Home Safety Scale** from the **IT-HOME** (Caldwell & Bradley, 1984, 2003), measuring the presence of safety items in the home, such as fire extinguishers and smoke detectors, with binary scores (1 for Yes, 0 for No). Additionally, the Family Risk Score, comprising 7 items from the HFPI indicating parental depression and caregiver distress, was reverse scored on a 5-point scale. Furthermore, we included inquiries

about the caregiver and child's **current health insurance status**, measured as binary variables (1 for Yes, 0 for No).

Resource Utilization

Prioritizing resource utilization in early childhood development is imperative as it can significantly alleviate the impact of challenging home environments on children's growth and well-being (Azzi-Lessing, 2017). Given the critical nature of early childhood, ensuring access to resources such as quality early education, healthcare, and nutrition can cultivate a supportive and nurturing environment conducive to cognitive, emotional, and social development. Effective resource utilization also plays a pivotal role in addressing disparities so that all children, irrespective of their background, have equitable opportunities to realize their full potential.

To gauge community resource utilization, respondents were presented with a list of resources (e.g., nutrition assistance, services for addressing developmental delays in children, early childhood education services, etc.) and asked if they had utilized them within the past year, with each resource coded as a binary variable (1 for Yes, 0 for No). Additionally, respondents could identify other resources utilized through an open-response format. The **total number of resources utilized** was tallied to establish a **Resource Utilization measure**. Furthermore, items in the interview protocol assessed the caregiver's **current education, job training, and employment status**, measured as binary variables (1 for Yes, 0 for No).

Data Analysis

Preliminary analyses provided descriptive statistics on study participants at baseline and tested their equivalence across groups. We tested hypotheses constructed around the outcome measures and examined the significance of statistical tests and effect sizes (Cohen, 1988). For the outcomes analysis, we adhered to an intent-to-treat protocol and analyzed all participants according to the groups they were randomized to, irrespective of the number of sessions attended (Piantadosi, 1997). Almost all scales had complete data with very little missing data in the study. Given largely complete outcome data and low differential attrition, no imputation was conducted for missing outcomes and covariate information.

For the 6-month data, between group differences in outcomes were assessed using one-way analysis of variance (ANOVA), with pre-test scores included as the covariate in each model (i.e., analyses of covariance or ANCOVA). This approach was selected for two primary reasons: (1) to ensure post-test differences were truly the result of PAT participation and not due to random differences in pre-test scores between groups. In all ANCOVA analyses, the relationship between the covariate (pre-test scores) and treatment condition was examined to reduce bias resulting from unequal pre-test mean scores. When significant differences in mean pre-test scores between the groups were identified, we removed the covariate from the model and an

ANOVA was conducted using unadjusted means. For the 12-month data, we conducted a linear regression (for continuous outcomes) or logistic regression (for binary outcomes) analysis to examine the relationship between study group (independent variable) and each outcome (dependent variable). For each outcome, we reported the unstandardized regression coefficients (B) for linear regressions and Odds Ratios (OR) for logistic regressions, p-values, and effect size (Cohen's *d*).

All analysis results were conducted with a two-tailed approach, adhering to the conventional significance level of $p \leq 0.05$ and utilizing 95% confidence intervals. Additionally, we draw attention to marginally significant differences between the PAT intervention and control group that resulted in p values that are > 0.05 and ≤ 0.10 . Effect sizes were computed using Cohen's *d* (Cohen, 1988; Rosenthal, 1991), allowing for the detection of meaningful differences even in cases where p-values do not reach conventional significance levels (Rosnow et al., 2000). These methodologies align with existing literature on the evaluation of home visitation programs (Michell-Herzfeld & Izzo, 2005; LeCroy & Lopez, 2020). Data cleaning and analyses were conducted using IBM SPSS Statistics Version 29 and STATA Version 18.

RESULTS

Participant Characteristics and Baseline Equivalence

Descriptive statistics for key demographic data from the full sample and by study group are shown in Exhibit 4, along with the results of tests of equivalence. Demographic variables collected from participants include four recognized by the Title IV-E Prevention Services Clearinghouse as critical for baseline equivalence (Wilson et al., 2019): (1) caregiver and child age at enrollment (measured in years for adults and months for children); (2) caregiver and child gender (male/female); (3) caregiver race/ethnicity (condensed into four categories representing the most prominent sample groups: White, Hispanic; White, non-Hispanic; Other Race, Hispanic; Other Race, non-Hispanic); and (4) family is a beneficiary of the Supplemental Nutrition Assistance Program (SNAP) as a proxy for socio-economic status.

Key demographic characteristics of caregivers and children were comparable across intervention and control at baseline for those measured, with all two-tailed p-values > 0.05. Briefly, most of the caregivers in the study were female (97.6%), with nearly all identifying as the mother of the child. The age of caregivers ranged from 18 to 89 years (M = 32.1 years, SD = 6.9). The average age of children was 19.9 months (SD = 13.7), and just over half were male (51.2%). Of the full sample, 42.2% identified as White, Hispanic, 23.1% identified as White, non-Hispanic, and 20.0% were beneficiaries of SNAP, with no significant difference observed between the study groups. These comparisons confirm that the random assignment was effective and the groups were equivalent at baseline.

Exhibit 4. Baseline Equivalence of Study Groups

Demographic Characteristic	Full Sample (N = 664)	PAT Intervention Group (n = 433)	Control Group (n = 231)	Test for Difference (two-tailed p-value)
Caregiver Gender, Female (%)	97.6	97.2	98.3	0.41
Child Gender, Male (%)	51.2	52.4	48.9	0.39
Mother of Child (%)	97.0	96.3	98.3	0.16
Caregiver Age, Mean (SD)	32.1 (6.9)	32.2 (6.9)	31.8 (6.7)	0.46
Child Age in Months, Mean (SD)	19.9 (13.7)	20.4 (13.4)	19.1 (14.3)	0.24
Caregiver Race/Ethnicity (%)				0.14
White, Hispanic	42.2	39.8	46.8	
White, non-Hispanic	23.1	25.3	19.0	
Other Race, Hispanic	20.3	19.5	21.6	
Other Race, non-Hispanic	14.4	15.3	12.6	

Demographic Characteristic	Full Sample (N = 664)	PAT Intervention Group (n = 433)	Control Group (n = 231)	Test for Difference (two-tailed p-value)
Beneficiary of SNAP (%)	20.0	19.2	21.6	0.45
Mean household size (SD)	4.3 (1.5)	4.3 (1.4)	4.4 (1.5)	0.39
Mean number of children (SD)	2.1 (1.1)	2.1 (1.1)	2.1 (1.1)	0.41
Single parent (%)	15.8	15.5	16.5	0.73
Highest level of education (%)				0.34
Less than high school	11.2	10.0	13.5	
High school or GED	30.4	29.9	31.3	
Technical or trade school/some college	22.8	22.5	23.5	
College degree or higher education	35.5	37.7	31.7	
Employment status (%)				0.98
Full time	23.8	23.8	23.6	
Part Time	15.3	15.5	15.0	
Not currently employed	60.9	60.7	61.4	
Caregiver has health insurance (%)	77.3	77.0	77.9	0.79
Family has prior child protective services involvement (%)	8.7	9.0	8.2	0.73

Outcomes

As shown in Exhibit 5, analyses revealed **significant differences at the 6-month follow-up between treatment and control groups, favoring the treatment group, on 6 outcome measures.** Significant differences were found in 3 of 4 domains: child development, parenting practices, and family health and safety. Estimated effect sizes for significant measures ranged from 0.12 to 0.28 and thus were in the range of what would be considered to have a meaningful impact when compared with similar studies.

Exhibit 5. Outcomes at 6-Month Follow-up by Study Group

Measure	PAT Intervention Group Mean (SD)	Control Group Mean (SD)	Mean Difference (95% CI)	Two-tailed p-value	Effect Size Cohen's d
Child Development					
Vineland II					
Listening and Understanding	12.03 (2.62)	11.23 (3.04)	0.80 (0.23-1.33)	0.00	0.28
Talking	31.69 (12.23)	30.22 (12.85)	1.46 (0.09-2.83)	0.04	0.12
Relating to Others	20.67 (2.44)	20.38 (2.87)	0.29 (-0.21-0.79)	0.25	0.11
Playing and Leisure	13.85 (4.03)	13.70 (4.12)	0.15 (-0.62-0.93)	0.70	0.04
Reading to child (% every day)	41.4	32.5	-	0.04	0.12
Parenting Practices and Family Functioning					
HFPI					
Parent/Child Interaction	44.71 (4.69)	44.77 (4.65)	-0.07 (-0.83-0.70)	0.86	-0.01
Home Environment	43.46 (5.45)	43.70 (5.70)	-0.24 (-1.17-0.68)	0.60	-0.04
Problem Solving	25.17 (3.66)	25.02 (4.04)	0.15 (-0.47-0.76)	0.63	0.04
Role Satisfaction	24.77 (4.56)	24.29 (4.96)	0.48 (-0.29-1.25)	0.22	0.10
Parenting Efficacy	25.38 (3.84)	24.61 (3.90)	0.78 (0.17-1.38)	0.01	0.20
Social Support	21.60 (4.20)	21.39 (4.42)	0.21 (-0.43-0.85)	0.52	0.05
Mobilizing Resources	24.07 (4.79)	23.63 (4.69)	0.44 (-0.38-1.26)	0.29	0.09
Depression	40.77 (4.55)	40.47 (4.74)	0.30 (-0.47-1.07)	0.44	0.07
Personal Care	19.41 (3.94)	19.06 (3.95)	0.35 (-0.29-1.00)	0.28	0.09
Hearth Hope Index	41.84 (4.66)	41.13 (4.93)	0.71 (-0.10-1.52)	0.05	0.15
Family Health and Safety					
Home Safety Scale - IT-HOME	6.29 (1.35)	5.97 (1.51)	0.32 (0.05-0.59)	0.00	0.23
HFPI Family Risk Score	31.56 (4.00)	30.72 (4.31)	0.84 (0.05-1.62)	0.02	0.20
Resource Utilization					
Resources Utilized in Past Year	2.51 (1.84)	2.44 (2.09)	0.08 (-0.29-0.45)	0.69	0.04

Notes: Analytical N = 461, n = 295 for PAT intervention and n = 166 for control. Pre-test scores were included as a covariate and adjusted means are presented for all subscales except for Vineland II: Listening and Understanding, Relating to Others, and Playing and Leisure scales, where the covariate was removed. For these three scales, unadjusted means are presented. Reading to child was analyzed using a cross tabulation and chi square test, with Cramer's V calculated as the effect size. The Hearth Hope Index, Home Safety Scale, and HFPI Family Risk Score were analyzed using nonparametric tests due to the distribution of the data.

As shown in Exhibit 6, analyses revealed **significant differences between treatment and control groups at the 12-month follow-up, favoring the treatment group, on 2 outcome measures at $p \leq 0.05$ and 4 outcome measures at $p \leq 0.10$** . Significant differences ($p \leq 0.05$) were found in 2 of the 4 domains: parenting practices and family health and safety. Marginally significant differences ($p \leq 0.10$) were observed in 3 of 4 domains: child development, parenting practices, and resource utilization. Estimated effect sizes ranged from 0.17 to 0.21 and thus were in the range of what would be considered to have a meaningful impact when compared with similar studies. These results underscore the importance of examining effect sizes when considering outcomes. For example, the effect size for reading to their child was 0.21 ($p = 0.07$), which is higher than the effect size of 0.20 estimated for the Home Safety Scale ($p = 0.05$).

Exhibit 6. Outcomes at 12-Month Follow-up by Study Group

Measure	PAT		B	Two-tailed p-value	Effect Size Cohen's <i>d</i>
	Intervention Group Mean (SD)	Control Group Mean (SD)			
Child Development					
Vineland II					
Listening and Understanding	12.83 (1.7)	12.70 (1.7)	0.13	0.47	0.07
Talking	37.76 (10.45)	35.88 (10.87)	1.88	0.08	0.18
Relating to Others	21.25 (1.73)	21.04 (1.99)	0.21	0.24	0.01
Playing and Leisure	15.42 (3.08)	14.83 (3.45)	0.59	0.07	0.18
Reading to child (% every day)	42%	34%	1.46 (OR)	0.07	0.21
Parenting Practices and Family Functioning					
HFPI					
Parent/Child Interaction	44.83 (4.74)	44.68 (4.5)	0.15	0.75	0.03
Home Environment	44.75 (5.02)	44.26 (4.91)	0.49	0.33	0.09
Problem Solving	25.35 (3.32)	24.91 (3.64)	0.45	0.19	0.13
Role Satisfaction	25.20 (4.24)	24.55 (4.80)	0.71	0.11	0.16
Parenting Efficacy	25.27 (3.75)	24.47 (4.10)	0.80	0.04	0.21
Social Support	21.99 (3.81)	21.32 (4.28)	0.67	0.09	0.17
Mobilizing Resources	24.46 (4.80)	24.03 (4.77)	0.43	0.37	0.09
Depression	40.94 (4.01)	40.50 (4.61)	0.43	0.30	0.10
Personal Care	19.38 (3.81)	19.17 (3.71)	0.21	0.58	0.05
Hearth Hope Index	41.99 (4.55)	41.88 (4.90)	0.11	0.81	0.02
Family Health and Safety					
Home Safety Scale - IT-HOME	6.58 (1.8)	6.32 (1.48)	0.26	0.05	0.20
HFPI Family Risk Score	31.71 (3.66)	31.22 (4.09)	0.49	0.20	0.13
Resource Utilization					
Resources Utilized in Past Year	2.88 (1.95)	2.52 (1.93)	0.36	0.07	0.18

Note: Analytical N = 434, n = 273 to 274 for PAT intervention and n = 161 for control. Beta coefficient is unstandardized and presented for continuous outcomes. Odds Ratio is presented for binary outcomes.

Child Development

At the **6-month follow-up**, data analyses showed significant differences favoring the treatment group for 3 of 5 child development outcome measures: Vineland-II Talking, Vineland-II Listening and Understanding, and frequency of reading to their child. After controlling for the effect of the pre-test score as a covariate, an ANCOVA test showed that PAT intervention children had a significantly higher average Vineland-II Talking score at 6 months compared to control group children ($F(1, 446) = 4.39, p = 0.04, d = 0.12$). Additionally, PAT intervention children also had a significantly higher average score on the Vineland-II Listening and Understanding scale compared to control group children ($F(1, 458) = 8.70, p = 0.00, d = 0.28$). Estimated effect sizes for these measures show meaningful impacts (Carey et al., 2023). No significant between-group differences in scores were observed for Vineland-II Relating to Others and Playing and Leisure.

For the child development measure of reading to one's child, a higher percentage of PAT intervention families (41.4%, $n = 122$) reported reading to their child every day compared to control families (32.5%, $n = 54$) at the 6-month follow-up. These results were significant and indicated a meaningful intervention effect ($\chi^2 = 6.37, df = 2, p = 0.04, \text{Cramér's } V = 0.12$).

At the **12-month follow-up**, data analyses showed that significant differences at $p \leq 0.10$ level were observed favoring the treatment group for 3 of 5 child development outcome measures: Vineland-II Talking, Vineland-II Playing and Leisure, and frequency of reading to their child. Linear regression showed that PAT intervention children had higher average scores for Vineland-II Talking ($b = 1.88, p = 0.08, d = 0.18$) and Playing and Leisure ($b = 0.59, p = 0.07, d = 0.18$) at 12 months compared to control group children. Results show meaningful effect sizes for these measures (Carey et al., 2023). No significant between-group differences in scores were observed at 12 months for Vineland-II Listening and Understanding and Relating to Others.

For the child development measure of reading to one's child, consistent with 6-month findings, a higher percentage of PAT intervention families (42.3%, $n = 116$) reported reading to their child every day compared to control families (33.5%, $n = 54$) at the 12-month follow-up. A binary logistic regression showed that the results indicated a meaningful intervention effect ($OR = 1.46, p = 0.07, d = 0.21$).

Parenting Practices and Family Functioning

At the **6-month follow-up**, results showed two significant differences in indicators of parent behavior and family functioning: the HFPI Parenting Efficacy subscale and the Hearth Hope Index. After controlling for pre-test scores, the ANCOVA revealed a higher average 6-month HFPI Parenting Efficacy score for PAT intervention families compared to control group families ($F(1, 450) = 6.23, p = 0.01, d = 0.20$). The effect size showed a meaningful impact of the intervention on this outcome. We performed a nonparametric Mann-Whitney U test of differences to compare Hearth Hope Index scores by study group at the 6-month follow-up. PAT intervention participants had significantly higher Hope scores at 6 months compared to participants in the control condition ($z = 1.91, p = 0.05, d = 0.15$). No significant between-group differences were observed for other HFPI subscales related to parenting practices and family functioning.

At the **12-month follow-up**, linear regression showed that HFPI Parenting Efficacy continued to have a significant difference and meaningful effect size between the PAT intervention and control groups ($b = 0.80, p = 0.04, d = 0.21$). The HFPI Social Support scale showed a marginally significant difference between the two groups ($b = 0.67, p = 0.09, d = 0.17$) and the HFPI Role Satisfaction subscale was approaching significance ($b = 0.71, p = 0.11, d = 0.16$), both favoring the PAT group. No significant between-group differences were observed for other HFPI subscales related to parenting practices and family functioning. At the 12-month follow-up, the PAT group had a slightly higher average Hope Hearth Index score of 41.99 compared to the control group's average score of 41.88, however the results were not significant.

Family Health and Safety

To examine safety in the home, we examined whether the PAT intervention group showed more documented safety practices in comparison to the control group at both 6 and 12 months. Using the Home Safety Scale from the IT-HOME, results showed that all 7 safety practices assessed were documented at higher rates for the PAT intervention group than the control group at **6 months**. A nonparametric Wilcoxon Signed Rank Test ($z = 3.07, p = .00$) showed a significant difference between the treatment and control group comparing safety practices that favored the PAT intervention group. A linear regression of the Home Safety Scale at **12 months** showed that the PAT intervention group continued to have a significantly higher safety score compared to the control group with a meaningful effect size ($b = 0.26, p = 0.05, d = 0.20$).

At **6 months**, a linear regression showed significant differences in Family Risk Score, with PAT intervention families, on average, reporting higher scores (favorable) ($b = 0.84, p = 0.04, d = 0.20$). However, at **12 months**, differences in average Family Risk Scores favoring the PAT group did not show significance ($b = 0.49, p = 0.20, d = 0.13$).

The study also examined health insurance coverage between the PAT group and the control group. At 6 months, the PAT intervention odds for having health insurance was 3.84 and the control group odds was 2.77, creating an odds ratio of 1.39. This data suggests that the odds of caregivers having health insurance were 1.39 times higher among PAT participants at 6 months. With regards to child health insurance, the PAT odds was 45.67 and the control group odds was 7.62 leading to a 5.99 odds ratio. The odds of the child having health insurance were nearly 6 times higher among PAT participants at 6 months. While these results favor the PAT intervention group, results did not reach statistical significance ($p = 0.15$, $p = 0.12$, respectively). At 12 months, binary logistic regression showed no differences between groups and health insurance as most caregivers and nearly all children who participated in the 12-month data collection had health insurance.

Although the PAT program promotes childhood immunizations, links to primary care providers, and other health outcomes, many of these indicators were not evaluated in this study because there was a generally high rate of all parents utilizing these resources, regardless of study group. For example, data on being up to date on immunizations found the PAT intervention group had a 93.3% immunization rate and the control group had a 92.8% immunization rate.

Resource Utilization

When examining whether the PAT intervention group used more community resources than the control group at **6 months**, no significant differences were found between the groups ($F(1, 459) = 0.18$, $p = 0.68$). However, at **12 months**, a linear regression showed that the PAT group utilized a higher average number of resources of 2.9 (SD = 1.9) compared to the control group (2.5, SD = 1.9) that was marginally significant with a meaningful effect size ($b = 0.36$, $p = 0.07$, $d = 0.18$). The services most used by PAT participants included: free/reduced lunch, Arizona Department of Economic Security services (e.g., subsidized childcare), preschool or childcare center services, mental health treatment, parent support groups, and developmental speech therapy for children. The data on current school or job training and employment at 6 and 12 months revealed too little variation between groups for a meaningful analysis. Using exploratory data analysis, the differences were small, but the odds ratios favored the PAT group slightly.

Overall Intervention Effect

In order to examine the overall impact of the PAT program, we conducted a Wilcoxon Signed-Rank test to study the impact across all outcomes at 6 and 12 months. The research hypothesis was that the intervention and control groups would have an equal chance of performing better on each of the 21 outcome areas. If the intervention was not having any impact, we could expect the positive outcomes to be equal across both the treatment and control group. The measures for this analysis included: Vineland-II (4 subscales): listening and understanding, talking,

relating to others, playing and leisure; HFPI (9 subscales): parent child interaction, home environment, problem solving, role satisfaction, parenting efficacy, social support, mobilizing resources, depression, personal care, and risk level. Other measures included: Hope Hearth Index, reading to child, Home Safety Scale (IT-HOME), health insurance coverage for the caregiver, and current school or job training. At the **6-month** follow-up, the PAT intervention group performed better than the control condition in **18 of the 21 outcomes** and the composite difference was statistically significant ($z = 2.87, p = 0.00$). At the **12-month** follow-up, the PAT intervention group performed better than the control condition in **20 of the 21 outcomes** and the composite difference was also statistically significant ($z = 3.63, p = 0.00$).

Qualitative Findings

On the 12-month survey protocol, parents and caregivers were asked to respond to an open-ended question: “Describe yourself as a parent.” As quantitative measures can be limited, we conducted a qualitative analysis of PAT parents’ responses to this question using qualitative software to code and group responses into themes. A total of 272 12-month intervention participants responded to this question and key themes, sub-themes, and example quotes are shown in Exhibit 7. Three key themes that emerged from the data include: parenting approaches and style, emotional and supportive engagement, and self-reflection and improvement.

Exhibit 7. Description of Self as a Parent - Key Themes from PAT Parent Survey at 12 Months

Theme	Sub-theme	Example Quotes
Parenting Approaches and Styles	Positive and Patient Parenting	"I'm hands on and use a positive approach." "I am loving, I do my best to be consistent and try to do activities. I try to create a loving family culture."
	Learning and Adapting	"Trying to learn how to give my attention to both - needy in their life right now." "Have meaningful things every day - faith, time outside, memories, trips, nature."
	Balanced and Disciplined	"I'm not strict, I put limits. I'm open minded and let my daughter be outspoken." "Strict but I'm a good parent. I want the best for my child. I still want to be better than I am now."
Emotional and Supportive Engagement	Affection and Nurturing	"I have a lot of patience. I have three children, and everyone tells me I'm very patient. I try to understand and play with them. I am very affectionate."
	Creating Memories and Quality Time	"I take my kids to the park and provide for them. I put my daughter first. I know these are the most important years in her life and that's why I dedicate a lot of time for her."
	Support and Openness	"I'm a friend more than a parent. I want them to know whatever happens they can always come to me and not be afraid to tell me what's going on in their lives."

Theme	Sub-theme	Example Quotes
Self-Reflection and Improvement	Awareness and Self-Care	"I am a growing parent, single mother trying to learn gentle parenting. Trying to help my son grow up to be obedient and respectful without putting too much pressure on him."
	Acknowledging Challenges and Mistakes	"I've gotten more sleep. I feel I'm doing a good job and my patience has gotten better before having a child."
	Continuous Learning	"Caring. Try to find a different way to do things. Always learning." "I continue to keep learning how to improve in my parenting."

(N=272)

DISCUSSION

The PAT RCT in Arizona provides a comprehensive evaluation of the PAT home visitation program's impact when implemented in a community setting in Arizona with a large percentage of White, Hispanic families. Our findings contribute significantly to the understanding of home visitation program outcomes, particularly in the context of PAT's structured approach, focusing on several key domains, including child development, parenting practices and family functioning, family health and safety, and utilization of services.

The study observed positive impacts on early childhood development at both 6 and 12 months. At 6 months, children in the PAT group had higher scores in the domains of talking and listening and understanding. At 12 months, children in the PAT group showed a marginally significant improvement in talking and playing and leisure. Additionally, the study found a positive impact on PAT parents reading more often to their child at both 6 and 12 months. This study adds to existing research by showing gains in child development that can be attributed to the PAT program (Drotar et al., 2009; Wagner et al., 1999). Most home visitation evaluations examine the program impact from only parent attitudes and behaviors (see, e.g. Mitchell-Herzfel, 2005; Green et al., 2014). Finding direct effects on child development and reading is a robust addition to the evidence that home visiting programs like PAT can promote child development outcomes. In one study, Read et al. (2021) found that during the pandemic, there was a significant decrease in the number of adults reading to children. This study's finding of improved reading at 6 and 12 months is an important finding since investing in early childhood development is not only beneficial for the individual child and family but can also offer significant economic returns. Heckman et al. (2010) provide compelling evidence for the high rate of return on investments in high-quality early childhood programs, arguing that such investments yield better outcomes in education, health, sociability, economic productivity, and reduced crime.

Significant improvements were also noted in parenting practices at 6 months in areas of parenting efficacy and hopefulness. At 12 months, the PAT group continued to show improved parenting efficacy over the control group, with a meaningful effect size. PAT parents also showed a marginally significant improvement in social support and role satisfaction was approaching significance. These findings underscore the PAT program's effectiveness in enhancing parenting skills, crucial for fostering a nurturing and supportive family environment. These results are particularly poignant when considered against the backdrop of COVID-19, which took place during the study. A literature review on the impact of COVID-19 on family well-being concluded that "the results show that family income loss/economic difficulties, job loss, worsening mental health, and illness were reported in some families during the COVID-19 pandemic" (Gayatri et al., 2022, p. 606). It is likely that some of the impacts of PAT were dampened during the pandemic, however, a key feature that would seem critical for parents is

a sustained sense of parenting efficacy. While we are unable to determine what specific aspects of the PAT program led to greater parenting efficacy, we hypothesize that these benefits were likely driven by PAT's focus on building parenting knowledge and skills related to maternal and child health and child development, and providing parents with the information they need to bolster their confidence as parents and their perceived ability to be responsive to their child's needs. Parenting efficacy is directly linked to positive child outcomes. Parents who feel competent and effective are more likely to engage in positive parenting practices, which are vital for children's development, especially in stressful times (Coleman & Karraker, 2003). At the 12-month follow-up, open-response data from PAT parents showed a diverse range of parenting philosophies and approaches, from being hands-on and positive-minded to fostering consistency and love within the family. PAT parents emphasized the importance of meaningful activities and open communication with their child. While some parents focused on setting limits while maintaining an open-mind, others shared that they strive to continue improving as a parent. With a commitment to gentle parenting and personal growth, PAT parents open response data suggests a recognition of the evolving nature of parenthood, emphasizing the need for continuous learning and adaptation.

At the 6-month follow-up, this study found a significant impact on reducing parents' Risk Score, which captures depression and parenting stress, however no additional improvements were observed at 12 months. Reducing depression and parental stress risk levels can buffer against this stress and potential burnout caused by the prolonged nature of the pandemic, helping parents maintain patience and understanding with their children (Mikolajczak et al., 2015). Reducing the level of risk that parents face in parenting young children is crucial for both the immediate and long-term well-being of families (Sameroff, 2000). This topic has been extensively studied, and the literature provides compelling evidence about the importance of mitigating parenting risks. When parenting risks are reduced, parents are more likely to engage in nurturing, responsive, and supportive parenting behaviors (Brooks-Gunn & Markman, 2005).

The PAT group demonstrated significant improvements in safety practices at home at both 6 and 12 months, a vital aspect of preventing unintentional injuries and ensuring child well-being. Preventing accidental childhood injuries by promoting safety practices among parents is an essential aspect of child health and well-being. Accidental injuries are a leading cause of morbidity and mortality in children worldwide, and many of these injuries are preventable through effective safety practices and parental education (Peterson et al., 2000). The literature provides substantial evidence on the importance of this issue, for example, Morrongiello & Schwebel (2017), discuss how effective parental supervision and the implementation of safety practices in the home are critical in preventing accidental injuries. Educating parents about risks and safety measures, such as the use of car seats, safe sleeping practices, and poison control, can significantly reduce the incidence of accidental injuries (Gielen et al., 2016). Additionally, at 6 months there were trends indicating increased health insurance coverage among PAT families,

although these were not statistically significant. At 12 months, most caregivers and nearly all children had health insurance of those who participated in the 12-month data collection.

While providing linkages and referrals to services, such as early intervention, childcare, and/or benefits programs, are key components to many home visitation models, including PAT, published research on home visitation effectiveness has largely not measured this outcome. At 6 months, no significant difference was found between the PAT intervention and control group in terms of utilization of resources. However, at 12 months, the PAT group utilized a higher average number of resources compared to the control group (2.9 vs. 2.5) that showed a meaningful effect size. The pandemic prompted an expansion of community and online services to support families in crisis. This increase in available resources might have been equally accessible to both intervention and control groups, thereby minimizing differences in service utilization. Further, many services transitioned to virtual platforms due to COVID-19 restrictions. This shift could have made community-based services more accessible to a broader range of families, including those in the control group, who might not have utilized such services under normal circumstances (Courtenay & Perera, 2020). Also, the pandemic led to heightened public awareness and outreach regarding available support services. Finally, Isasi, et al. (2023) notes that the unprecedented stress and challenges of the pandemic might have motivated families (in both groups) to seek out available services proactively. The universal impact of the pandemic could have diminished differences typically seen between intervention and control groups in service utilization.

One possible explanation for the lower number of significant findings at 12 months compared to 6 months is that parenting and child outcomes will naturally improve over time as (1) the parent settles into their role and routine, (2) the family finds resources in the community that could affect outcomes, and/or (3) the child ages and develops naturally. This is supported by improvements in the control group's outcomes observed over the course of the study, ultimately minimizing differences between groups at 12 months.

Overall, this study highlights the PAT program's powerful effects on both parent and child outcomes in a relatively short amount of time (6 months), setting families on a good trajectory before potentially unhealthy patterns are given time to develop. Although the effects of the program were not as detectable at the 12-month follow-up, the study showed that families benefited early on from the program, potentially preempting and addressing concerns or issues that could otherwise contribute to lasting negative effects down the line.

Limitations and Future Directions

While this study provides valuable insights, it also acknowledges certain limitations. Conducting an RCT in a community setting presents several challenges that can impact the feasibility, reliability, and validity of the study (LeCroy & Sullins, 2024). While RCTs are the gold standard for determining causal relationships and the efficacy of interventions, implementing them in community settings adds layers of complexity. One of these challenges is related to study design and finding an appropriate balance between study rigor and acceptability. In the current study, the control group was provided with basic resources to increase the study's acceptability to stakeholders, limiting the contrast between the two conditions, and subsequently making impact differences more difficult to detect. The control condition included child development assessment and ongoing "support" from data collectors who kept regular and open communication with the study participants. Additionally, the impact of conducting a study during a pandemic is a clear limitation, as the PAT group may have received virtual services for a time, potentially limiting the level of engagement between caregivers and home visitors.

This study included multiple outcome instruments in order to continue to learn what measures might be the most sensitive to measuring program impacts. The complexity of measuring multidimensional outcomes in home visitation programs poses challenges (LeCroy, 2019). Future studies could explore more nuanced measures and methodologies (LeCroy & Sullins, 2024). Home visitation programs like PAT are by nature multilevel interventions and building a measurement model to capture the different dimensions of programming remains difficult.

Other limitations include accounting for the variability in implementation. Although the study included well-established sites with extra accreditation, the nature of programming in terms of demographics, culture, and community resources all influence the variability in intervention implementation. This variability can impact the intervention's fidelity and, consequently, the validity of the study's findings.

In conclusion, the RCT provides valuable evidence supporting the PAT program's role in enhancing child development, improving parenting practices, and ensuring family health and safety at 6 and 12 months. However, several significant outcomes at 6 months were not sustained at 12 months or the results showed marginal significance. These challenges highlight the need for careful consideration of external factors, such as the impact of the COVID-19 pandemic on service availability and utilization. This study contributes to the broader understanding of early childhood interventions and their efficacy in real-world, community settings.

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APPENDIX A. REASONS FOR STUDY INELIGIBILITY

Reasons that families could be ineligible for this study include the following.

- **They are a prenatal family** – Due to some assessments of the study requiring observation of caregiver and child interaction, and the child completing a developmental test, prenatal families were excluded in order to ensure that all families had the likelihood for as many assessments possible over the 18-month data collection window.
- **They received the PAT program within the last two years** – Some families that participate in PAT choose to reenroll into the program with subsequent births. Due to the skills and benefits families may have received from previous PAT support, these families would not be a true “control” family if they were randomized into the control group, thus they have been excluded from the study.
- **They are a family that has a child with special needs** – In Arizona there are some specific programs available for families with children with special needs. One example of these is the SENSE program which stands for Substance Abuse Newborn Safe Environment. This program works with families with substance exposed newborns to ensure the child’s safety and needs are met while making behavioral changes with parents. Other types of special needs programs are for children with severe developmental disabilities, for example. After much discussion with programs participating in the study, and due to the small number of PAT families that utilize these programs, it was decided to bypass these families from the study and allow them to be directly enrolled.
- **They are a family that lives on tribal lands** – In Arizona, there are 22 federally recognized tribes. In order to conduct research with tribal members living on tribal lands, a data sharing agreement/Memorandum of Understanding must be in place with each tribal government to gain permission to enroll their tribal members. Due to there being a very small percentage of PAT families served that live on tribal lands, these MOUs were not pursued with each tribe, thus families that live on tribal lands must be excluded. Families are eligible, however, that are enrolled or affiliated with any tribe if they do not live on tribal lands.

- **The family's youngest child is older than 4** – Due to PAT programs only enrolling children younger than 4, families were deemed ineligible to enroll in the study if their child was 4 or older. This ensures that the population of children in the control group age-wise would be similar, and that there would be enough potential time to complete an 18 month follow up if the family enrolled into the program for the desired two years.
- **They are a foster family** – For this study, it is important to follow families for the 18-month time period in order to demonstrate outcomes one year (and beyond) program enrollment to be eligible as meeting US DHHS' criteria for an evidence-based home visiting service delivery model. Due to foster families often having short term placements, these families were excluded from the study.
- **The primary caregiver cannot speak English or Spanish moderately well** – The data collection interview with families contains 10 assessments and is usually an hour to an hour and a half long. Due to the privacy issues around data collected, and staffing resources, families that could not speak either English or Spanish moderately well are excluded because external translators were not an appropriate option for this study, and due to the importance of collecting accurate information.
- **The PAT affiliate chose to bypass the family from the study into their program** – Each PAT program that participates in this study are given three families per year (Catholic Charities is given six to due larger enrollment targets) that can be bypassed from the study and enrolled directly into their programs. Programs can decide how best to use those bypasses and those families are tracked as bypasses by the study team.