

Characteristics Associated with Participant Attrition and Retention in a Perinatal Home Visiting Program

Rema Ramakrishnan^{a,b,c}, PhD, MPH, Virginia Holland^d MPH, Ngozichukwuka Agu^a MPH, Carol Brady^d MA, Jennifer Marshall^a MPH, PhD

Affiliations: ^aCollege of Public Health, University of South Florida, Tampa, FL, USA; ^bNuffield Department of Women's and Reproductive Health, University of Oxford, Oxford, UK; ^cUniversity of New South Wales, Sydney, Australia; ^dFlorida Association of Healthy Start Coalitions, Tallahassee, FL, USA

Address correspondence to: Jennifer Marshall, 13201 Bruce B Downs Blvd, MDC 56, Tampa, FL, 33612 USA, jm@usf.edu, +1 (813) 396-2672

Compliance with Ethical Standards

- **Funding:** This study was supported by the Florida Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Initiative, Florida Association of Healthy Start Coalitions, Inc. Project #6405107040 (Funded by the Health Resources and Service Administration (HRSA) of the U.S. Department of Health and Human Services (HHS), Grant # D90MC25705).
- **Conflicts of interest/Competing interests:** This evaluation was conducted by an independent evaluation team, funded by the Florida MIECHV Initiative. The authors are comprised of the University evaluators, the Florida MIECHV Initiative Data Manager, and Florida MIECHV Project Director

- **Ethics approval:** This study was reviewed and considered exempt by the Institutional Review Board at a large public university in Florida as it involved secondary data analysis (not human subjects research) and was part of a program evaluation.

Abstract

Using data from the Florida Maternal, Infant, and Early Childhood Home Visiting (MIECHV) funded programs, we examined program- and participant-level characteristics associated with participant retention by time of enrollment. Analyses of data for 1,807 women enrolled in 11 sites across three years included descriptive statistics; Kaplan-Meier survival curve estimation and multilevel survival analyses using shared frailty model to assess participant- and program-level characteristics overall and by time of enrollment (during pregnancy or post-delivery). Median retention time for MIECHV participants was 462 days. The primary reason for attrition was loss-to-follow-up (59.4%) due to change of address/telephone. We found participant age >25 years (compared to <20 years), enrollment during pregnancy, and an average of 1.5-2.0 home visit/month to be protective, while current/history of substance abuse was a risk factor for attrition. To improve participant retention, the Florida MIECHV program may need to bolster efforts to support housing stability, increase outreach and engagement to younger women, address barriers to achieving two home visits per month throughout the program, and target differential predictors of participant attrition depending on time of enrollment.

Keywords: Home visiting, attrition, multilevel survival analysis

Introduction

Evidence-based home-visitation has been encouraged as an effective early-intervention strategy that can complement maternal and child health care and facilitate linkage to needed community resources and referrals for high-risk families (Council on Child and Adolescent Health, 1998; Dodge et al., 2014; Duffee et al., 2017; McKelvey et al., 2012). Through partnerships with clinicians, resources can be provided to these families to ameliorate negative outcomes associated with adverse childhood experiences and promote health equity (Finello et al., 2016). The nationwide Maternal, Infant, and Early Childhood Home Visiting (MIECHV) program, initially funded through the Affordable Care Act and now funded through the Bipartisan Budget Act of 2018, is one such initiative. Initial findings from the national MIECHV evaluation note promising outcomes in areas such as the quality of the home environment, parent-child interaction (reduced frequency of parental aggression towards the child), fewer child emergency department visits, and less child behavior problems (Michalopoulos et al., 2019).

The Florida MIECHV initiative currently serves families living in 24 high-need communities and four contiguous counties across Florida through three evidence-based home visiting models, Nurse-Family Partnership (NFP), Healthy Families America (HFA), and Parents as Teachers (PAT) (Florida Maternal Infant & Early Childhood Home Visiting Initiative [MIECHV], n.d.). These models differ in their curricula, staffing and focus (for example, NFP employs nurses and has a focus on healthy pregnancy and birth outcomes, while HFA paraprofessionals focus on family well-being and maltreatment prevention and PAT has a child development focus) yet all work towards common federal benchmarks, collect shared metrics, collectively participate in quality improvement initiatives and trainings, and align efforts under the MIECHV umbrella (Florida MIECHV, n.d.).

Programs funded by Florida MIECHV to provide evidence-based home visiting services are selected based on required statewide needs assessments ranking community, family, maternal, and child risk factors for poor health outcomes such as preterm birth, low-birth weight infants, infant mortality, child maltreatment, poverty, crime, domestic violence, high-school dropout, substance abuse, and unemployment. These risk factors are suggested by Health Resources and Services Administration (HRSA) but can be determined by states, with assessments conducted every ten years (Florida Association of Healthy Start Coalitions, 2021; HRSA, 2021). The 28 counties or smaller geographic communities within counties that Florida MIECHV serves include both large metropolitan areas and rural settings. This initiative started in 2013 and is implemented through a public-private partnership and is administered by the Florida Association of Healthy Start Coalitions, Inc. Depending on the home visiting model, participants may enroll early in pregnancy or shortly after the infant is born. At the time of this study, the programs extended through the child's second year (NFP to age two, HFA and PAT to age three). Thus, enrollment may span over 3 years if the participant enrolled during pregnancy. All Florida MIECHV funded programs are expected to conduct two home visits per month with each family.

Improving participant completion rates is vital for achieving the goals of MIECHV, as those who drop out do not receive the intended number of home visits – and therefore screening, education and support – thereby potentially reducing the positive impacts and cost-effectiveness of the program (Ingoldsby, 2010). However, participant engagement and retention may be particularly challenging as common predictors of low participant retention overlap with many of the MIECHV target population characteristics (maternal and child health risk factors). Individual-level characteristics such as maternal age ≤ 18 years, being Black, being unmarried (O'Brien et al., 2012), lower maternal education, maternal smoking during pregnancy (Latimore

et al., 2017), depression (Girvin et al., 2007), non-cohabiting relationships (Bae et al., 2019), limited English language proficiency, and residential instability (Maternal and Early Childhood Home Visiting, 2015) have been found to be risk factors for early attrition and low engagement of participants in home visiting programs (Goyal et al., 2014). Individual participant factors may relate to program attrition due to logistical (scheduling, housing), relational (cultural sensitivity, language), or programmatic (policies around enrollment, engagement, accommodation, and dismissal) dynamics (Holland, et al., 2014). Living in disadvantaged communities may exacerbate individual risk factors. Bae et al found that mothers with housing instability, mental health problems, or those in non-cohabiting relationships were more likely to be disengaged when they lived in highly disadvantaged communities (defined as having concentrated poverty, residential instability, and lack of social capital) versus when living in communities with low disadvantage (Bae et al., 2019).

Program-level factors such as high staff turnover (Ingoldsby, 2010) and shorter length of home visitor employment (O'Brien et al., 2012) may contribute to increased participant attrition rates, whereas perceived provider cultural competence (Damashek et al., 2020), increased rapport with the home visitors and linkage of families to community resources such as mental health services, housing assistance, and child care may contribute to increased retention of these participants in the program (Azzi-Lessing, 2011). When families perceive that the benefits and resources outweigh their time investment in the program, they are more likely to drop out (Ingoldsby, 2010). In addition to these factors, provision of culturally modified programs with family systems' factors (Azzi-Lessing, 2011; Brand & Jungmann, 2014; Ingoldsby, 2010; Korfmacher et al., 2008; Maternal and Early Childhood Home Visiting, 2015), and the ability of the home visitor to modify and adapt the curriculum to be more culturally sensitive may lead to

increased retention of participants (Azzi-Lessing, 2011; Korfmacher et al., 2008; Maternal and Early Childhood Home Visiting, 2015).

This study was a component of the ongoing evaluation of engagement and retention in the Florida MIECHV program. We specifically investigated: i) reasons for participant attrition from the program, ii) participant attrition by time of enrollment (during pregnancy and after delivery), and iii) participant- and program-level characteristics associated with participant attrition from the program. This study contributes to a growing body of literature by presenting results from an evaluation of retention during the first several years of implementation in a large multisite MIECHV initiative that serves a diverse population.

Methods

Data and Participants

Data for 1,807 mother-child pairs enrolled in the Florida MIECHV programs from April 2013 – September 2016 were retrieved from the Florida Home Visiting Information System using the database, Efforts to Outcome. These data are collected by home visitors at all sites as specified in the initiative’s Data Collection Manual (Florida MIECHV, 2019). Participants from 11 sites comprising 14 counties (Alachua, Bradford, Broward, Duval, Escambia, Hillsborough, Manatee, Miami-Dade, Orange, Pinellas, Putnam, Lee, Collier, and Hendry) that had information for program-level characteristics were included in the study. Participants were included if they had received at least one home visit during the study period. This study was reviewed and considered exempt by the Institutional Review Board at a large public university in Florida.

Participant Characteristics

The participant characteristics included in the study were based on the previous literature – maternal age, race/ethnicity, education, employment, marital status, household poverty, primary language spoken at home, insurance status, current/past maternal substance abuse, maternal depression, current/history of childhood abuse/neglect, intimate partner violence (IPV), average home visits/month, and parental stress. Though the home visiting models had different variable names, their definitions were uniform which aided easy pooling of data from these models.

Maternal age was categorized into 5-year groupings as, <20, 20-24, 25-29, 30-35, and 35+; maternal race/ethnicity was categorized into White Non-Hispanic, Black Non-Hispanic, Hispanic, and other; maternal education was dichotomized into less than high school and \geq high school; maternal employment was classified into unemployed, part-time, and full-time; maternal marital status was dichotomized into single/separated/widowed and married/co-habitation; primary language spoken at home was categorized into English, Spanish, and other; and health insurance was categorized into uninsured, public, private, and other. Household poverty was expressed as living below the 100% Federal Poverty Level (FPL); current/history maternal substance abuse, history of childhood abuse/neglect, and outcome of screening for IPV were each dichotomized into no and yes. Maternal depression was based on the results of the Edinburgh Postnatal Depression Scale (Cox & Holden, 2003); a score ≥ 10 was defined as being positive for depression. Parental stress was measured by the 10-item version of the Perceived Stress Scale (PSS). The score for this variable was obtained by reversing the responses to the four positively stated items (items 4, 5, 7, & 8) and then summing all ten scale items (Cohen & Williamson, 1988; Lee, 2012). The PSS sum score ranges from 0-40, with no standard cutoff criteria. However, other studies with this population have used a threshold score of 16+ to

1 indicate high stress (McFarlane, Burrell, Duggan, & Tandon, 2017). Thus, the PSS score was
2 retained as a continuous variable for the analysis. The average number of home visits/month was
3 categorized into 0–1.0, >1.0–1.5, >1.5–2.0, and >2.0 that approximated the quartile distribution
4 of frequency of home visits. We also included information about reasons for participant attrition
5 from the program that were documented by the home visitors.

6 Some participant characteristics were measured only at specific time points. PSS was
7 completed at 2- and 12-months post-enrollment for those who enrolled after delivery and at child
8 ages 2 and 12 months for those enrolled during pregnancy. Similarly, maternal depression and
9 IPV were measured at specific time points that varied between models.

11 **Program-level characteristics**

12 Program-level characteristics included median days of home visitor employment (the
13 number of days home visitors in the program had been employed in the program to indicate
14 turnover), age of the program in days (how long the program had been operating as a MIECHV
15 program), and home visiting model (PAT, NFP, and HFA).

17 **Outcome**

18 The event of interest was participant attrition. Any participant who completed the program (3
19 years with a maximum of 3.3 years) or continued to be enrolled on September 30, 2016 was
20 considered censored (i.e. the event of interest was not observed). We used days in the program
21 since enrollment until attrition or censoring as the timescale.

23 **Statistical Analysis**

Participant-retention patterns were examined using Kaplan-Meier survival curves for the entire sample and stratified by time of enrollment and home visiting model. Cox proportional hazard regression models were used to calculate hazard ratios of attrition by participant characteristics stratified by type of home visiting model. Multilevel survival analyses with random effect at site-level were conducted using a shared frailty model (mixed proportional hazard model) that accounted for within-cluster correlation (Van den Berg & Drepper, 2016) to examine participant- and program-level characteristics for the entire sample and by time of enrollment. These analyses yielded hazard ratios for the entire study period and at three- and twelve-months post-enrollment. The proportional hazards assumption was verified using Schoenfeld residuals. Complete data were available for 1,033 women. PSS had the maximum percentage of missing values (22.7%) followed by maternal depression (16.0%) and IPV (15.9%). Comparison of characteristics between women who had complete with women who had missing values for at least one variable showed non-Hispanic Black, single/separated/widowed women who spoke English as the primary language, lived below 100% FPL, had public insurance, and received less than one average home visit per month to have higher percentage of missing values. Women who had missing data also had higher attrition rates (68% versus 49%) with a median retention time of 326 days compared to women (585 days) who had complete data (Online Resource Table 1). We used multiple imputation by chained equations (MICE) to account for missing data where we created 40 imputed datasets that resulted in a relative efficiency nearly equal to one. All analyses were conducted using the SAS 9.4 (SAS Institute Inc., Cary, NC, USA).

Results

Most participants had enrolled during pregnancy, had less than or equal to high school education, and public insurance, lived below 100% FPL, were unemployed, single/widowed/separated, and non-Hispanic, did not have a history of substance abuse and childhood abuse/neglect, screened negative for IPV and maternal depression, had moderate stress scores ranging from 10-13 on the PSS, and reported speaking English as the primary language spoken at home (Table 1). At the time of this study, the median age of the Florida MIECHV programs was 972 days (i.e. the program had been providing MIECHV services an average of 2 years, 8 months) and staff in these programs were employed for a median of 675 days (1 year, 10 months) (data not shown). The home visiting model that had the largest number of participants was PAT, followed by NFP (Table 1).

There were differences in all individual- and program-level characteristics between participants who were enrolled during pregnancy and after delivery/birth except for maternal depression, IPV, and average home visits/month. Not surprisingly, most of the participants who enrolled during pregnancy were from NFP programs consistent with eligibility criteria (no later than 28 weeks pregnant) whereas the majority who enrolled after delivery was from programs implementing the PAT model (Online Resource Table 2).

Participant characteristics by the type of home visiting model followed a similar trend as for the overall sample except that most HFA and NFP participants were Black non-Hispanic (Table 1). In addition, compared to the overall sample, PAT participants reported a higher percentage of current/history of substance abuse. Furthermore, more than half of HFA participants received >2 visits/month whereas, for NFP and PAT, no specific trends were observed for average home visits/month (Table 1).

Reasons for participant attrition

Out of 1,001 (55.4%) participants who dropped out of the program, the primary reasons for attrition were loss to follow-up and repeated missed appointments (Online Resource Table 3). An interesting finding was that 2.8% of dropouts were due to program-related reasons such as home visitor safety, inability to accommodate requested schedule, and participant's refusal of new home visitor. When these reasons were examined by type of home visiting model, loss to follow-up remained the primary reason for program attrition for all models.

Retention at 3-months, 6-months, and 12-months post-enrollment was 94.8%, 83.3%, and 62.9%, respectively. Participants remained in the program for a median of 462 days (95% confidence interval [CI]: 433, 497) (Figure 1) indicating that 50% of the participants remained in the program for 462 days with higher retention among women who enrolled during pregnancy compared to women who enrolled after delivery (603 days (95% CI: 557, 651) versus 351 days (95%CI: 315, 378) (p-value for comparison: <0.001) (Figure 1).

Program and participant-level reasons for attrition

The multilevel survival analysis revealed maternal age >25 years, current/history of substance abuse, and an average of >1 home visit/month to be associated with participant attrition in the Florida MIECHV program during the entire study period (Table 2). Women aged 30–34 years and >35 years had 35% and 36% lower risk, respectively, of leaving the program in comparison to women <20 years old. Women with current/history of substance abuse had 48% higher risk of attrition. We repeated the analyses after removing one county which had a substantially higher percentage of women with substance abuse; there were minimal changes to the results for substance abuse (hazard ratio: 1.53 vs 1.48). For average home visits/month, the highest protective effect was for >1.5–2.0 average home visits/month with participants who received on an average 1.5–2.0 home visits/month 78% less likely to leave the program

1 compared to those who received on an average 0-1.0 home visits/month. In contrast to this,
2 women with a current/history of substance abuse had 1.5 higher risk for attrition compared to
3 women without a current/history of substance abuse.

4 Ninety-three (5.2%) and 670 (37.1%) women left the program 3- and 6-months post-
5 enrollment, respectively. Enrollment during pregnancy, being non-Hispanic Black, and >1.5–2.0
6 average home visits/month were found to be important protective factors for participant retention
7 at 3-months post-enrollment. At 12-months post-enrollment, participants who enrolled during
8 pregnancy, were 30-34 years, and had an average of >1 home visit/month were less likely to
9 leave the program whereas a current/history of substance abuse was associated with increased
10 attrition (Online Resource Table 4).

11 **Program and participant-level reasons for attrition by time of enrollment**

12 The multilevel survival analysis by time of enrollment revealed maternal age >25 years
13 (only for participants enrolled after delivery/birth), current/history of substance abuse, and an
14 average of >1 home visit/month to be associated with participant attrition in the Florida
15 MIECHV program (Online Resource Table 5). The lowest risk for attrition was for women who
16 received >1.5–2.0 average home visits/month. Women who received on an average 1.5–2.0
17 home visits/month during pregnancy and after delivery/birth were 73% and 71%, respectively,
18 less likely to leave the program compared to women who received on an average ≤ 1.0 home
19 visits/month. Irrespective of the time of enrollment, women who reported current/history of
20 substance abuse had 1.5 times higher risk for attrition compared to women who reported no
21 current/history of substance abuse.

22 **Discussion**

Engagement and retention are key factors in connecting implementation to outcomes. This evaluation sought to examine participant- and program- level factors associated with program attrition using the data available across the first three years of statewide implementation to inform targeted improvements. The improvements informed by results could focus on specific periods in which participants may drop out as well as subgroups at higher risk of dropout due to a variety of reasons, including life circumstances, program factors, or staff-participant dynamics.

During the time period of this evaluation, the overall attrition rate of Florida MIECHV participants was 55.4%, which is similar to what has been found nationally in MIECHV (54%, with a range of 47-61% attrition across studies; Duggan et al., 2018) and in other state MIECHV programs (34.6% in Alabama, 52% in Arkansas) that serve communities with concentrated risk factors (Fifolt et al., 2016; McKelvey & Fitzgerald, 2020). Over half of participants with early attrition in this study left due to "loss to follow up" which means they are no longer available at the previous telephone number/address. The impact of housing instability on loss to follow-up deserves further examination in future study and may point to the need for programmatic policies to better support continuity of care when families are in crisis or relocate.

In addition and perhaps related to family factors that may impact retention, there are some participant groups (younger mothers age <25 years, current/history of substance use) who were less likely to stay in the program for the full duration, while enrollment during pregnancy and an average of >1.5-2.0 home visits per month associated with longer retention. Over half of participants enrolled in Florida MIECHV (50.5%) are mothers under age 25, including 20.5% under age 20, and therefore specific strategies to retain these participants are needed, such as those suggested by Seed, Juarez, and Alnatour (2009). Fifolt et al. (2016) also found that younger maternal age was associated with MIECHV attrition, with qualitative findings indicating

maintained relationships with home visitors to be protective for program retention. Mckelvey & Fitzgerald (2012) noted family risks associated with attrition, with the time home visitor spent supporting parent-child interaction moderating this association. Parallel to Mckelvey & Fitzgerald's study, we found that an average of >1.5-2 visits per month to be protective, suggesting that regular and consistent contact strengthens relationships. We found that substance abuse was a risk factor for participant attrition, even with a reanalysis excluding a site that almost exclusively serves this population. The program serves a substantial proportion (21.2%) of women with current or past substance abuse, which is associated with poor pregnancy and child outcomes (Tobon, Habecker & Forray, 2019; Baldaccino, Arbuckle, Petrie, & McCowan, 2014). These are precisely the families the program is designed to support, and identifying program design and implementation strategies to improve retention will increase the likelihood that they will receive the full benefits of the program. In contrast to a study of NFP participants, the current study did not find being Black or unmarried as risk factors (O'Brien et al., 2012). It was notable that neither race, ethnicity, nor lack of English language proficiency was a barrier to retention in our study. The proportions of Black, Hispanic and Spanish-speaking home visitors are fairly matched to the population (Florida Associationn of Healthy Start Coalitions, 2021). Furthermore, despite a substantial proportion of participants with these challenges such as IPV (25%), current/history of child abuse/neglect (30%) depression (25%), and moderate stress (PSS mean 13), they were not more likely to leave this voluntary program.

Unlike previous studies (Bower, Nimer, West & Gross, 2020; Duggan et al., 2018; Maternal and Early Childhood Home Visiting, 2015; O'Brien et al., 2012), the current study did not find program-level factors to be associated with retention or attrition of participants in the program. O'Brien et al. (2012) studied attrition only among NFP participants, examining nurse

home visitor length of employment and whether the nurse left the program before the child's first birthday as program-level characteristics. Staff turnover was a risk factor, and the qualitative component suggested lower attrition for sites where nurses tailored the program's structure to participant needs (O'Brien et al., 2012). It may be that there was little attrition in our study as the program was in its first few years of implementation.

There are several important considerations for conducting or interpreting cross-model comparisons. While MIECHV-funded programs are distributed throughout the state in both urban and rural environments, they comprise a fraction of the populations served in Florida's HFA, NFP and PAT programs. For example, Healthy Families Florida (HFF), Florida's largest voluntary home visiting program is available in all 67 Florida counties from Pensacola to Key West: county-wide in 42 counties and in select high-risk zip codes in 25 counties. During the study period there were two MIECHV HFF sites, and only their retention rates were included in the analysis. At the time of this study, MIECHV funded the majority of NFP programs in the state, and three of 13 PAT programs. Furthermore, while all Florida MIECHV programs work towards shared benchmarks, and serve families in high-risk communities, models may focus on specific populations such as first-time mothers early in pregnancy, parents of infants and toddlers, or parents with substance abuse history. The primary goals of the home visiting models also vary – HFA focuses on reducing child maltreatment, enhancing parent-child interactions, and children's social-emotional well-being (U.S. Department of Health and Human Services, 2018), NFP on improving prenatal and maternal health and birth outcomes, child health and development, and family economic self-sufficiency (U.S. Department of Health and Human Services, 2019), and PAT focuses on school readiness and child development (Duffee et al., 2017). While we found few differences across program models, it was notable that the statewide

1 commitment to 2 visits per month was a protective factor for retention for all. Fewer visits may
2 relate to less engagement and more than 2 monthly visits could be indicative of a crisis.

3 The strength of this study was that we examined individual- and program-level
4 characteristics associated with participant retention in a large program serving a diverse
5 population. Another strength was that we were able to include more than one evidence-based
6 home visiting models. One of the study limitations was that a more detailed description for
7 dismissal reasons like “dropout” was not available that could have been more informative.
8 Another limitation is that there could be bias associated with reporting of reasons for attrition
9 since it was recorded by the home visitor. Our evaluation report based on qualitative analysis of
10 Florida MIECHV staff in 2016 explored these dismissal reasons in depth (Agu et al., 2017).
11 Inclusion of an indicator variable for housing stability would also be useful in future analysis. A
12 weakness of this study is that since it is based on data from a single state it could have limited
13 generalizability. Additionally, self-reported measures including maternal depression, PSS, and
14 IPV could have been underestimated due to social desirability bias. This could have led to
15 nondifferential misclassification that may have underestimated the results. Furthermore, there
16 was a substantial proportion of participants with some missing values who were also more likely
17 to have higher attrition rates. This is to be expected as those who are less engaged, have fewer
18 visits, or leave the program early are likely to miss some data collection. Initial analysis prior to
19 imputation of missing values found depression and stress to be associated with attrition;
20 therefore these factors should be further studied (Online Resource Table 1). There also may be
21 model-specific practices such as higher dosage to address early engagement, retention,
22 expectations for program completion, or thresholds for dismissal from the program. Thus, more

1 information on model- or program-specific policies or practices related to dismissal would
2 strengthen future analysis.

3 In addition, availability of data about characteristics of home visitors (such as
4 race/ethnicity concordance, training, or qualifications) and home visitor-participant relationship
5 would have added to information about program-level determinants of participant attrition
6 (Bower, Nimer, West & Gross, 2020). This is important because two primary stakeholders of a
7 home visiting program are the participants themselves and the home visitor; therefore, in
8 addition to participant characteristics that influence program attrition it is imperative to identify
9 characteristics of home visitors that may a role in participant dropouts. We note that while the
10 methods used in this study are informative to the program, the study only tells us who dropped
11 out but not why. A qualitative follow-up with home visitors and with former participants
12 (alumni) who had completed the program or left the program early identified several reasons for
13 attrition, including: life challenges (especially housing insecurity/instability and return to work),
14 social issues (substance use, mental health challenges, or IPV) , home visitor turnover, mismatch
15 between participant needs/expectations and services provided as common causes for attrition
16 (Agu, et al., 2017; Oredein, et al., 2018). Factors important for retention cited by staff and former
17 participants were strong home visitor-participant relationship, tailoring content to participants'
18 needs/interests, and flexible scheduling to accommodate return to work. This program will
19 benefit from more data collected in relation to program factors (policies and practices around
20 dismissal, re-enrollment, referrals, and transitions) as well as staff-participant relationships.
21 Finally, Florida MIECHV should continue to anticipate and address challenges to retention
22 related to housing and accommodating work schedules/demands.

23 To increase participant retention in the Florida MIECHV program, specific strategies

1 may be needed for engaging and retaining younger women, addressing the unique needs of
2 women with a history of substance abuse, and increasing the number of home visits received
3 throughout the program (Barton et al., 2020; Paulsell et al., 2014). Home visiting programs
4 should also continue to support family stability through interagency referrals and transition
5 support to reduce loss to follow-up (Agu, 2017; Marshall et al., 2018). It is essential to focus on
6 differential predictors of participant attrition such as time of enrollment (during pregnancy and
7 after delivery) and to consider program factors that may play a role in engagement, and therefore
8 retention. In response to this evaluation, the Florida MIECHV initiative continues its
9 commitment to an average of 2 visits per month, with monthly monitoring of enrollment,
10 retention, and frequency of visits. Additionally, the program launched a learning collaborative
11 for improving participant engagement (Florida Maternal Infant & Early Childhood Home Visiting
12 Initiative, 2020) to identify, share, and test strategies for improving engagement and retention.

References

- Agu, N., Birriel, P. C., Balogun, O., Ajisope O., Patil, A., Heeraman, C. & Marshall, J. (2017). *The Florida Maternal, Infant, and Early Childhood Home Visiting Program Evaluation: Staff Perception of Engagement and Retention 2016 Site Visit Report*.
<https://health.usf.edu/-/media/Files/Public-Health/Chiles-Center/MIECHV/Site-Visit-Report-2016-Engagement--Retention-5182017.ashx>
- Azzi-Lessing, L. (2011). Home visitation programs: Critical Issues and Future Directions. *Early Childhood Research Quarterly*, 26(4), 387–398.
<https://doi.org/http://doi.org/10.1016/j.ecresq.2011.03.005>
- Bae, D., Cho, J., Terris, D. D., Glisson, R. E., Brown, A., & Nelson, T. (2019). Multilevel Interaction Effects of Family and Community Factors on Mothers' Engagement in Evidence-Based Home Visiting. *Family & Community Health*, 42(3), 203–212.
<https://doi.org/10.1097/FCH.0000000000000231>
- Baldacchino, A., Arbuckle, K., Petrie, D. J., & McCowan, C. (2014). Neurobehavioral consequences of chronic intrauterine opioid exposure in infants and preschool children: a systematic review and meta-analysis. *BMC Psychiatry*, 14(1), 1-12. doi:10.1186/1471-244X-14-104
- Barton, J., Naemi Jimenez, P., Biggs, J., Garstka, T. A., & Ball, T. C. (2020). Strengthening family retention and relationships in home visiting programs through early screening and assessment practices. *Children and Youth Services Review*, 118, 105495.
<https://doi.org/https://doi.org/10.1016/j.childyouth.2020.105495>
- Bower, K. M., Nimer, M., West, A. L., & Gross, D. (2020). Parent Involvement in Maternal, Infant, and Early Childhood Home Visiting Programs: an Integrative Review. *Prevention*

- 1 *Science*, 21, 728-747.
- 2 Brand, T., & Jungmann, T. (2014). Participant characteristics and process variables predict
3 attrition from a home-based early intervention program. *Early Childhood Research*
4 *Quarterly*, 29(2), 155–167. <https://doi.org/http://dx.doi.org/10.1016/j.ecresq.2013.12.001>
- 5 Cohen, S., & Williamson, G. (1988). *Perceived stress in a probability sample of the United*
6 *States. The social psychology of health: Claremont Symposium on applied social*
7 *psychology. Edited by: Spacapan S, Oskamp S. 1988. Newbury Park, CA: Sage.*
- 8 Council on Child and Adolescent Health. (1998). The Role of Home-Visitation Programs in
9 Improving Health Outcomes for Children and Families. *Pediatrics*, 101(3), 486.
10 <https://doi.org/10.1542/peds.101.3.486>
- 11 Cox, J., & Holden, J. (2003). Perinatal mental health: A guide to the Edinburgh Postnatal
12 Depression Scale (EPDS). In *Perinatal mental health: A guide to the Edinburgh Postnatal*
13 *Depression Scale (EPDS)*. Royal College of Psychiatrists.
- 14 Damashek, A., Kothari, C., Berman, A., Chahin, S., Lutzker, J. R., Guastaferrro, K., Whitaker, D.
15 J., Shanley, J., & Self-Brown, S. (2020). Engagement in Home Visiting Services during the
16 Transition from Pregnancy to Postpartum: A Prospective Mixed Methods Pilot Study.
17 *Journal of Child and Family Studies*, 29(1), 11–28. [https://doi.org/10.1007/s10826-019-](https://doi.org/10.1007/s10826-019-01641-z)
18 01641-z
- 19 Dodge, K. A., Goodman, W. B., Murphy, R. A., O'Donnell, K., Sato, J., & Guptill, S. (2014).
20 Implementation and randomized controlled trial evaluation of universal postnatal nurse
21 home visiting. *American Journal of Public Health*, 104 Suppl(Suppl 1), S136-43.
22 <https://doi.org/10.2105/AJPH.2013.301361>
- 23 Duffee, J. H., Mendelsohn, A. L., Kuo, A. A., Legano, L. A., & Earls, M. F. (2017). Early

- 1 Childhood Home Visiting. *Pediatrics*, 140(3). <https://doi.org/10.1542/peds.2017-2150>
- 2 Fifolt, M., Lanzi, R. G., Johns, E., Strichik, T., & Preskitt, J. (2017). Retention and attrition in a
3 home visiting programme: looking back and moving forward. *Early Child Development and*
4 *Care*, 187(11), 1782-1794.
- 5 Finello, K. M., Terteryan, A., & Riewerts, R. J. (2016). Home Visiting Programs: What the
6 Primary Care Clinician Should Know. *Current Problems in Pediatric and Adolescent*
7 *Health Care*, 46(4), 101–125. <https://doi.org/10.1016/j.cppeds.2015.12.011>
- 8 Florida Associationn of Healthy Start Coalitions. (2021). Florida Home Visiting Statewide
9 Needs Assesment Update, 2020. Retrieved April 25, 2021 from
10 [https://www.flmiechv.com/wp-content/uploads/FULLREPORT_Florida-Home-Visiting-](https://www.flmiechv.com/wp-content/uploads/FULLREPORT_Florida-Home-Visiting-Statewide-Needs-Assessment-Update-2020.pdf)
11 [Statewide-Needs-Assessment-Update-2020.pdf](https://www.flmiechv.com/wp-content/uploads/FULLREPORT_Florida-Home-Visiting-Statewide-Needs-Assessment-Update-2020.pdf)
- 12 Florida Maternal Infant & Early Childhood Home Visiting Initiative (MIECHV). (n.d.). *About*
13 *Florida Maternal Infant & Early Childhood Home Visiting Initiative*. Retrieved October 9,
14 2020, from <https://www.flmiechv.com/about/>
- 15 Florida Maternal Infant & Early Childhood Home Visiting Initiative (MIECHV). (2019). *Data*
16 *Collection Manual*. [https://www.flmiechv.com/wp-content/uploads/MIECHV-Data-](https://www.flmiechv.com/wp-content/uploads/MIECHV-Data-Collection-Manual-v7.pdf)
17 [Collection-Manual-v7.pdf](https://www.flmiechv.com/wp-content/uploads/MIECHV-Data-Collection-Manual-v7.pdf)
- 18 Florida Maternal Infant & Early Childhood Home Visiting Initiative (MIECHV). (2020).
19 *Continuous Quality Improvement*. [https://www.flmiechv.com/for-programs/continuous-](https://www.flmiechv.com/for-programs/continuous-quality-improvement/)
20 [quality-improvement/](https://www.flmiechv.com/for-programs/continuous-quality-improvement/)
- 21 Girvin, H., DePanfilis, D., & Daining, C. (2007). Predicting program completion among families
22 enrolled in a child neglect preventive intervention. *Research on Social Work Practice*,
23 17(6), 674–685.

- 1 Goyal, N. K., Hall, E. S., Jones, D. E., Meinzen-Derr, J. K., Short, J. A., Ammerman, R. T., &
2 Van Ginkel, J. B. (2014). Association of maternal and community factors with enrollment
3 in home visiting among at-risk, first-time mothers. *American Journal of Public Health, 104*
4 *Suppl*(Suppl 1), S144-51. <https://doi.org/10.2105/AJPH.2013.301488>
- 5 Health Resources and Services Administration (HRSA). (2021). Maternal, Infant, and Early
6 Childhood Home Visiting Program Supplemental Information Request (SIR) for the
7 Submission of the Statewide Needs Assessment Update, OMB No: 0906-0038 Retrieved
8 April 23, 2021 from
9 [https://mchb.hrsa.gov/sites/default/files/mchb/MaternalChildHealthInitiatives/HomeVisiting](https://mchb.hrsa.gov/sites/default/files/mchb/MaternalChildHealthInitiatives/HomeVisiting/miechv-needs-assessment-update-sir.pdf)
10 [/miechv-needs-assessment-update-sir.pdf](https://mchb.hrsa.gov/sites/default/files/mchb/MaternalChildHealthInitiatives/HomeVisiting/miechv-needs-assessment-update-sir.pdf)
- 11 Holland, M. L., Christensen, J. J., Shone, L. P., Kearney, M. H., & Kitzman, H. J. (2014).
12 Women's reasons for attrition from a nurse home visiting program. *Journal of Obstetric,*
13 *Gynecologic & Neonatal Nursing, 43*(1), 61-70.
- 14 Ingoldsby, E. M. (2010). Review of Interventions to Improve Family Engagement and Retention
15 in Parent and Child Mental Health Programs. *J Child Fam Stud, 19*(5), 629–645.
16 <https://doi.org/10.1007/s10826-009-9350-2>
- 17 Ireys, H. T., DeVet, K. A., & Chernoff, R. (2001). Who joins a preventive intervention? How
18 risk status predicts enrollment. *Journal of Community Psychology, 29*(4), 417–427.
19 <https://doi.org/10.1002/jcop.1026>
- 20 Korfmacher, J., Green, B., Staerkel, F., Peterson, C., Cook, G., Roggman, L., Faldowski, R. A.,
21 & Schiffman, R. (2008). Parent involvement in early childhood home visiting. *Child &*
22 *Youth Care Forum, 37*(4), 171–196.
- 23 Latimore, A. D., Burrell, L., Crowne, S., Ojo, K., Cluxton-Keller, F., Gustin, S., Kruse, L.,

- Hellman, D., Scott, L., Riordan, A., & Duggan, A. (2017). Exploring Multilevel Factors for Family Engagement in Home Visiting Across Two National Models. *Prev Sci*, 18(5), 577–589. <https://doi.org/10.1007/s11121-017-0767-3>
- Lee, E. H. (2012). Review of the psychometric evidence of the perceived stress scale. *Asian nursing research*, 6(4), 121-127.
- Marshall, J., Birriel, P. C., Baker, E., Olson, L., Agu, N., & Estefan, L. F. (2018). Widening the scope of social support: the Florida maternal, infant, and early childhood home visiting program. *Infant Mental Health Journal*, 39(5), 595-607.
- Maternal and Early Childhood Home Visiting, I. (2015). *MIECHV Issue Brief on Family Enrollment and Engagement*. Retrieved April 23, 2021 from <https://doi.org/https://mchb.hrsa.gov/sites/default/files/mchb/MaternalChildHealthInitiatives/HomeVisiting/tafiles/enrollmentandengagement.pdf>
- McKelvey, L. M., Burrow, N. A., Balamurugan, A., Whiteside-Mansell, L., & Plummer, P. (2012). Effects of Home Visiting on Adolescent Mothers' Parenting Attitudes. *American Journal of Public Health*, 102(10), 1860–1862. <https://doi.org/10.2105/AJPH.2012.300934>
- McFarlane, E., Burrell, L., Duggan, A., & Tandon, D. (2017). Outcomes of a randomized trial of a cognitive behavioral enhancement to address maternal distress in home visited mothers. *Maternal and Child Health Journal*, 21(3), 475-484.
- McKelvey, L. M., & Fitzgerald, S. (2020). Family functioning and involvement in home visiting: Examining program characteristics as moderators to support retention in services. *Infant Mental Health Journal*, 41(2), 220-231.
- McKelvey, L. M., Fitzgerald, S., Conners Edge, N. A., & Whiteside-Mansell, L. (2018). Keeping Our Eyes on the Prize: Focusing on Parenting Supports Depressed Parents' Involvement in

- Home Visiting Services. *Maternal and Child Health Journal*, 22(Suppl 1), 33–42.
<https://doi.org/10.1007/s10995-018-2533-y>
- Michalopoulos, C., Faucetta, K., Hill, C. J., Portilla, X. A., Burrell, L., Lee, H., Duggan, A., & Knox, V.. (2019). Impacts on Family Outcomes of Evidence-Based Early Childhood Home Visiting: Results from the Mother and Infant Home Visiting Program Evaluation. OPRE Report 2019-07. Washington, DC: Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services. Retrieved April 3, 2021 from https://www.mdrc.org/sites/default/files/MIHOPE_Impact_Report-Final2.0.pdf
- O’Brien, R. A., Moritz, P., Luckey, D. W., McClatchey, M. W., Ingoldsby, E. M., & Olds, D. L. (2012). Mixed methods analysis of participant attrition in the nurse-family partnership. *Prev Sci*, 13(3), 219–228. <https://doi.org/10.1007/s11121-012-0287-0>
- Oredein, I., Carpenter, S., Delva, J., Fross, M., Bello, T., & Marshall, J. (2018). Learning from alumni: Engagement and retention in Florida MIECHV programs. Available at <https://usf.app.box.com/s/mzec232kvlgy7in99l015pcpbbzgaz8k>
- Paulsell, D., Del Grosso, P., & Supplee, L. (2014). Supporting replication and scale-up of evidence-based home visiting programs: assessing the implementation knowledge base. *American Journal of Public Health*, 104(9), 1624–1632.
<https://doi.org/10.2105/AJPH.2014.301962>
- Seed, M., Juarez, M., & Alnatour, R. (2009). Improving recruitment and retention rates in preventive longitudinal research with adolescent mothers. *Journal of Child and Adolescent Psychiatric Nursing*, 22(3), 150-153.
- Tobon, A. L., Habecker, E., & Forray, A. (2019). Opioid use in pregnancy. *Current Psychiatry*

- 1 *Reports*, 21(12), 1-10. doi:10.1007/S11920-019-1110-4
- 2 U.S. Department of Health and Human Services. (2018). *Home Visiting Evidence of*
- 3 *Effectiveness: Healthy Families America (HFA)*. [https://homvee.acf.hhs.gov/review-](https://homvee.acf.hhs.gov/review-process/HHS-Criteria-for-Evidence-Based-Models)
- 4 [process/HHS Criteria for Evidence-Based Models](https://homvee.acf.hhs.gov/review-process/HHS-Criteria-for-Evidence-Based-Models)
- 5 U.S. Department of Health and Human Services. (2019). *Home Visiting Evidence of Effectiveness:*
- 6 *Nurse-Family Partnership (NFP)*. [https://homvee.acf.hhs.gov/effectiveness/Nurse-Family](https://homvee.acf.hhs.gov/effectiveness/Nurse-Family-Partnership-%28NFP%29%20In-Brief)
- 7 [Partnership %28NFP%29®/In Brief](https://homvee.acf.hhs.gov/effectiveness/Nurse-Family-Partnership-%28NFP%29%20In-Brief)
- 8 Van den Berg, G. J., & Drepper, B. (2016). Inference for shared-frailty survival models with left-
- 9 truncated data. *Econometric Reviews*, 35(6), 1075–1098.

Table 1***Selected Participant Characteristics by Home Visiting Model: Maternal, Infant, and Early Childhood******Home Visiting Program, 2013-2016***

	HFA (n=339)	NFP (n =589)	PAT (n=879)	Total (N=1,807)
	N (%) ^a	N (%) ^a	N (%) ^a	N (%) ^a
Enrolled during Pregnancy				
No	202 (59.6)	8 (1.4)	788 (89.7)	998 (55.2)
Yes	137 (40.4)	581 (98.6)	91 (10.3)	809 (44.8)
Age (years)				
<20	64 (18.9)	214 (36.3)	92 (10.4)	370 (20.5)
20-24	141 (41.6)	201 (34.1)	200 (22.8)	542 (30.0)
25-29	66 (19.5)	100 (17.0)	283 (32.2)	449 (24.8)
30-34	37 (10.9)	45 (7.6)	203 (23.1)	285 (15.8)
35 +	31 (9.1)	29 (4.9)	101 (11.5)	161 (8.9)
Maternal Race/Ethnicity				
White Non-Hispanic	74 (21.9)	41 (7.1)	385 (44.5)	500 (28.0)
Black Non-Hispanic	184 (54.4)	349 (60.1)	215 (24.9)	748 (41.9)
Hispanic	75 (22.2)	172 (29.6)	240 (27.8)	487 (27.3)
Other	5 (1.5)	19 (3.3)	25 (2.9)	49 (2.8)
Maternal Education				
Less than high school	108 (31.9)	156 (40.8)	336 (38.5)	600 (37.7)
≥ high school	230 (68.1)	226 (59.2)	537 (61.5)	993 (62.3)
Maternal Employment				
Unemployed	273 (80.5)	371 (63.0)	701 (79.7)	1,345 (74.4)
Part-time	2 (0.6)	218 (37.0)	15 (1.7)	235 (13.0)
Full-time	64 (18.9)	0 (0.0)	163 (18.5)	227 (12.6)
Maternal Marital Status				
Single/separated/widowed	288 (85.0)	488 (84.3)	652 (74.7)	1,428 (79.7)
Married/co-habitation	51 (15.0)	91 (15.7)	221 (25.3)	363 (20.3)
Household Poverty (Below 100% FPL)				
No	76 (22.4)	197 (33.4)	237 (27.0)	510 (28.2)
Yes	263 (77.6)	392 (66.6)	642 (73.0)	1,297 (71.8)
Primary Language Spoken at Home				
English	276 (81.4)	460 (78.1)	685 (77.9)	1,421 (78.6)
Spanish	45 (13.3)	85 (14.4)	167 (19.0)	297 (16.4)
Other	18 (5.3)	44 (7.5)	27 (3.1)	89 (4.9)
Insurance				
Uninsured	43 (12.7)	49 (8.3)	188 (21.4)	280 (15.5)
Public	262 (77.3)	493 (83.7)	603 (68.6)	1,358 (75.1)
Private	32 (9.4)	45 (7.6)	83 (9.4)	160 (8.9)
Other	2 (0.6)	2 (0.3)	5 (0.6)	9 (0.5)
Current/Past Maternal Substance Abuse				
No	277 (82.9)	574 (97.5)	569 (64.7)	1,420 (78.8)
Yes	57 (17.1)	15 (2.5)	310 (35.3)	382 (21.2)
Maternal Depression ^b				

No	243 (75.9)	394 (89.8)	590 (77.7)	1,227 (80.8)
Yes	77 (24.1)	45 (10.2)	169 (22.3)	291 (19.2)
Current/History of Childhood Abuse/Neglect				
No	239 (70.5)	549 (93.2)	556 (63.3)	1,344 (74.4)
Yes	100 (29.5)	40 (6.8)	323 (36.7)	463 (25.6)
Intimate Partner Violence (Screened Positive)				
No	167 (74.9)	540 (93.6)	637 (88.6)	1,344 (88.5)
Yes	56 (25.1)	37 (6.4)	82 (11.4)	175 (11.5)
Average Home Visits/month				
0-1.0	27 (8.0)	133 (22.6)	262 (29.8)	422 (23.4)
>1.0 – 1.5	36 (10.6)	217 (36.8)	234 (26.6)	487 (26.9)
>1.5 – 2.0	82 (24.2)	157 (26.7)	216 (24.6)	455 (25.2)
> 2.0	194 (57.2)	82 (13.9)	167 (19.0)	443 (24.5)
Perceived Parental Stress (mean [standard deviation]) ^c	13.1 (8.3)	10.6 (7.2)	12.9 (7.4)	12.2 (7.6)

Note: Abbreviations: FPL =Federal Poverty Level, HFA = Healthy Families America, NFP = Nurse Family Partnership, PAT = Parents as Teachers

^aFrequencies may not add to the total due to missing data and percentage may not add to 100% due to rounding. Column percentages displayed.

^bResults of the Edinburgh Postnatal Depression Scale, score ≥ 10 was defined as being positive (Yes) for depression.

^cMeasured by the 10-item version of the Perceived Stress Scale (range 0-40, score ≥ 16 considered high).

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21

Table 2.***Multilevel Survival Analysis of Participant and Program - Level Characteristics******Predicting Participant Attrition in the Maternal, Infant, and Early Childhood Home******Visiting Program, 2013-2016 (N=1,807)***

Characteristic	Hazard Ratio (95%CI)
Participant-Level	
Enrolled during Pregnancy	
No	1.00
Yes	0.82 (0.66, 1.01)
Age (years)	
<20	1.00
20-24	0.89 (0.74, 1.08)
25-29	0.73 (0.58, 0.90)
30-34	0.65 (0.50, 0.83)
35 +	0.66 (0.49, 0.89)
Maternal Race/Ethnicity	
White Non-Hispanic	1.00
Black Non-Hispanic	0.99 (0.83, 1.19)
Hispanic	0.93 (0.72, 1.19)
Other	1.17 (0.79, 1.73)
Maternal Education	
Less than high school	1.00
≥ high school	0.94 (0.80, 1.09)
Maternal Employment	
Unemployed	1.00
Part-time	0.89 (0.70, 1.13)
Full-time	0.95 (0.78, 1.16)
Maternal Marital Status	
Single/separated/widowed	1.00
Married/co-habitation	0.98 (0.81, 1.18)
Household Poverty (Below 100% FPL)	
No	1.00
Yes	1.15 (0.99, 1.34)
Primary Language Spoken at Home	
English	1.00
Spanish	0.78 (0.58, 1.05)
Other	0.98 (0.70, 1.38)
Insurance	
Uninsured	1.00
Public	0.89 (0.71, 1.12)
Private	0.87 (0.63, 1.19)
Other	2.27 (0.98, 5.29)
Current/Past Maternal Substance Abuse	
No	1.00
Yes	1.48 (1.18, 1.84)
Maternal Depression ^a	

No	1.00
Yes	1.04 (0.85, 1.27)
Current/History of Childhood Abuse/Neglect	
No	1.00
Yes	0.95 (0.80, 1.12)
Intimate Partner Violence (Screened Positive)	
No	1.00
Yes	0.84 (0.66, 1.06)
Average Home Visits/month	
0-1.0	1.00
>1.0 – 1.5	0.49 (0.42, 0.58)
>1.5 – 2.0	0.28 (0.23, 0.35)
> 2.0	0.41 (0.33, 0.52)
Perceived Parental Stress ^b	1.002 (0.991, 1.013)
Program-Level	
Median Staff Employment (days)	0.999 (0.998, 1.001)
Age of the Program (days)	1.000 (0.998, 1.002)

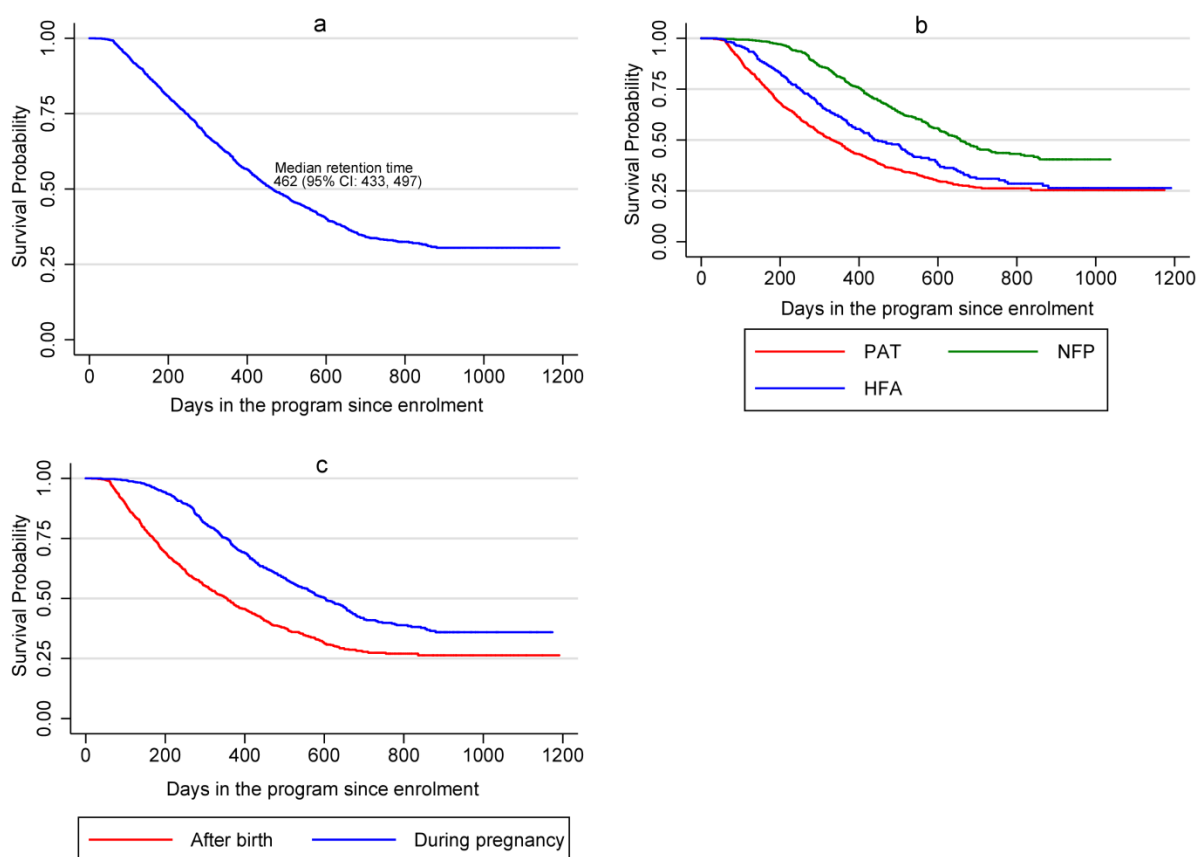
1 Abbreviations: CI = Confidence Interval; FPL =Federal Poverty Level

2 ^aAssessed by the Edinburgh Postnatal Depression Scale, score ≥ 10 was defined as being positive (Yes) for
3 depression.

4 ^bMeasured by the 10 - item version of the Perceived Stress Scale

Figure 1.

Survival Curve of Participant Retention in the Florida Maternal, Infant, and Early Childhood Home Visiting Program, 2013-2016: (a) Overall, (b) Stratified by time of enrollment, and (c) Stratified by home visiting model.



Notes: Median retention time (days): During pregnancy: 603 (95%CI: 557, 651); After birth: 351 (95%CI: 315, 378); PAT: 331 (95%CI: 300, 364); HFA: 435 (95%CI: 381, 517); NFP: 656 (95%CI: 605, 706)

Abbreviations: PAT = Parents as Teachers; HFA= Healthy Families America; NFP = Nurse-Family Partnership

