CONDUCTING A PRE-IMPLEMENTATION ASSESSMENT OF MATERNAL INFANT EARLY CHILDHOOD HOME VISITING SERVICES FOR ORANGE COUNTY, NORTH CAROLINA

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ABSTRACT

Robyn J. Wood: Conducting a Pre-Implementation Assessment of MIECHV Services for Orange County
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The Orange County Health Department, along with community partners, has identified a need for programming to support women during the prenatal and early childhood periods. This project describes the creation of an evidence-based pre-implementation assessment for Maternal Infant Early Childhood Home Visiting (MIECHV) programming in Orange County. This assessment was developed using a literature review, study of census data, and the experiences of program administrators, implementation specialists, and research specialists. Findings were disseminated through in-person presentations to key health department staff and community leaders, as well as by electronic distribution of a technical report and short informational videos.

To my family.

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LIST OF ABBREVIATIONS

AFDC	Aid to Families With Dependent Children
CCNC	Community Care North Carolina
CC4C	Care Coordination for Children
CPS	Child Protective Services
DOI	Diffusion of Innovations
FSA	Family Success Alliance
HCZ	Harlem Children's Zone
HFNY	Healthy Families New York
HomVee	Home Visiting Evidence of Effectiveness
LBW	Low Birth Weight
MIECHV	Maternal Infant Early Childhood Home Visiting
OCHD	Orange County Health Department
WSIPP	Washington State Institute for Public Policy

CHAPTER 1: CONDUCTING A PRE-IMPLEMENTATION ASSESSEMENT OF MIECHV SERVICES FOR ORANGE COUNTY

Using census data, free and reduced lunch metrics and Medicaid data, the Orange County Department of Health has identified six geographically defined zones in Orange County with disproportionately high numbers of children living in poverty (OCHD, 2013). The Orange County Health Department is partnering with community leaders and stakeholders by forming the Family Success Alliance (FSA) to develop a multifaceted anti-poverty program to combat the long term sequelae of childhood poverty based on the successful programs such as the Harlem Children's Zone (HCZ) Program in New York, Promise Neighborhoods, and the East Durham Children's Initiative. These programs are based on the concept of collective impact, the idea that diverse organizations across a community develop common goals, shared measures for success, engage in mutually reinforcing activities, and collaborate and communicate easily and often. A key component in these collective impact programs is the notion of the "pipeline" which provides support for children from birth through college. Currently, at-risk pregnant women, newborns and children in Orange County may be referred for home visiting under the Community Care North Carolina (CCNC) and Care Coordination for Children (CC4C) programs. These case management programs aim to contain costs and make referrals as needed. In order for the Orange County Health Department to establish and fund an effective anti-poverty initiative locally, an evidence-based Maternal, Infant, and Early Childhood home visiting program with demonstrated positive, long-term outcomes

may prove an integral part of the pipeline for Orange County's most vulnerable mothers and their children.

Background and Significance: Risk Factors for Children in Poverty

Children living in poverty are at risk for reduced cognitive, social, emotional and physical health into adulthood. These negative outcomes come at a great cost to both the individual and society. Poor children are at risk for diminished cognitive development (Hair et al., 2015) and depth of poverty is inversely related to IQ scores (Yoshikawa, Aber & Beardslee, 2012). Poverty exposure in early childhood has been shown to have a greater impact on cognitive development than when poverty exposure begins in later childhood or adolescence (Anderson et al., 2014, Costello et al., 2010). Impoverished children are more likely to have poor self-regulatory skills, more impulsive behavior, and decreased coping and resilience compared with children from more affluent homes (Evans & Kim, 2013; Mazza et al, 2017). The behavioral impacts of childhood poverty may continue into adulthood, and are associated with diminished employment status, higher rates of incarceration, and increased addictive and violent behavior (Nikulina, Widom, & Czaja, 2011; Sharkey et al., 2012).

Childhood poverty also puts an individual at risk for diminished physical health throughout life. Impoverished mothers are more likely to suffer pre-term labor and low birth weight babies (Ascher & Edwards, 2013). Impoverished children are at increased risk of childhood obesity, adult obesity, diabetes, heart disease, asthma, and depression (Klebanov, Evans & Brooks, 2014; Spencer, Thanh & Louise, 2013). In addition, impoverished children are at increased risk of being victims of violence across the lifespan (Minh et al., 2013).

The long-term societal cost of childhood poverty is staggering. The economic and educational cost of childhood poverty is estimated at $500 billion annually (Educational Testing Services, 2013). Given the long-term social and economic impact of childhood poverty, The Orange County Health Department has chosen to take aggressive action in creating a multifaceted anti-poverty initiative.

Maternal Infant Early Childhood Home Visiting

The Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program was established in 2010 when the Affordable Care Act was signed into law (USDH, 2014). This program provided $1.5 billion to states over five years for home visiting models that serve at-risk pregnant women and their children from birth to age five (USDH, 2014). The act stipulated that at least 75% of the distributed funds were to be spent on programs that meet vigorous standards for research and are deemed to be evidence-based (USDH, 2014). Over the last seven years, the MIECHV program has grown with bipartisan support. Currently, there is a proposal to increase MIECHV federal funding from $400 million to $800 million per year as part of the DocFix legislation. In the most recent review, the Home Visiting Evidence of Effectiveness (HomVee) analysis has identified nineteen MIECHV program models that meet vigorous standards for evidence.

DNP Project Purpose

The purpose of this project is to provide the Orange County Health Department with an overview of current maternal, infant, early childhood services as well as an evidence-based determination of fit, cost, and potential return on investment for the Nurse Family Partnership and Healthy Families America programs in Orange County. By

considering factors at the local level that may support or hinder successful implementation of these programs, the FSA will be prepared to present the Nurse Family Partnership and Healthy Families America to their community partners for consideration as part of a county wide effort to mitigate the devastating effects of childhood poverty. These two specific programs were chosen for evaluation in collaboration with representatives from the Orange County Department of Health because of their alignment with the mission of the FSA, feasibility of possible implementation in Orange County, and their relative depth and breadth of demonstrated positive impacts. In addition, NFP and HFA are two of only six (out of nineteen) models that have been able to replicate favorable effects in the same domain across two or more samples (USDH, 2016).

Clinical Questions

What are the potential facilitators and challenges to adopting Healthy Families America or the Nurse Family Partnership as an adjunct to current home visiting services in Orange County North Carolina? How do the outcomes of these programs fit with the goals of the Family Success Alliance? What are the key implementation characteristics of these two programs, and how do they align with the geographic, personnel, and demographic factors in Orange County that must be considered prior to program adoption?

The Role of the DNP student in a Pre-Implementation Assessment

This project utilizes implementation science and largely involves a literature and archival review, assessment of outcomes, utilization of technology and understanding of health care and public health delivery systems. It is ideally suited to meet the program requirements of a Doctorate of Nursing Practice (DNP) degree. DNP students are trained

to implement evidence-based practice in a variety of settings. Implementation science refers to the "study of factors that influence the full and effective use of innovations in practice" (NIRN, 2015). The pre-implementation assessment provided to the OCHD is based on the highest quality available evidence. In the *DNP Essentials*, the American Association of Colleges of Nursing states that DNP programs should focus heavily on "practice that is innovative and evidence-based, reflecting the application of research findings" (p.3). Evidence-based practice refers to "the integration of the best research evidence, clinical research and patient values in making decisions about the care of individual patients" (IOM, 2003). The American Association of Colleges of Nursing (AACN) encourages DNP training programs to "consider a broad range of academic-practice partnerships, eg: with school systems, prisons, public health departments…that allow DNP students to engage in the full planning, implementation and evaluation of a project that impacts healthcare outcomes" (p. 10).

In their pivotal publication *The Future of Public Health* the Institute of Medicine (1988) states that public health decisions are often "driven by crises, panic and the concerns of interest groups" (p.4). Instead, public health departments are encouraged to adopt evidence-based approaches in order to meet objectives (Brownson et al., 2010). The implementation of evidence-based public health (EBPH) has been shown to result in improved access to higher quality information about what is effective, increased likelihood of successful program and policy implementation, higher productivity, and increased efficiency in spending (Brownson et al., 2010). Conversely, when public health practitioners fail to implement high quality interventions that yield the greatest return on investment, society pays significant health and monetary costs (Fielding & Briss, 2006).

In keeping with the AACN recommendations for interagency cooperation, this pre-implementation assessment represents a partnership between the DNP student, university faculty, OCHD personnel and the community at large as represented by the Family Success Alliance. By utilizing the expertise of the DNP student to analyze and synthesize the best available evidence, potential program adopters can avoid the pitfalls of being "driven by crises" and instead choose programming with rigorously tested and replicated positive impacts, and which offers the community the greatest likelihood of a positive return on investment.

Conceptual and Theoretical Framework

Though NFP and HFA are each grounded in theory, it is important to note that for the purpose of this project, the theoretical focus is not based on the theories supporting the interventions themselves, but rather on theories that help to explain the ways in which innovations are adopted and rejected, and the manner in which communities and stakeholders are involved in decision making and program planning. Given the focus of this project is on adoption and implementation considerations that will involve multiple community stakeholders, the assessment provided here relies on the tenets of the Diffusion of Innovation theory (Rogers, 2003), as well as the concept of community engagement to frame the discussion of MIECHV services in Orange County.

Diffusion of Innovation (DOI) Theory. The Diffusion of Innovation (DOI) Theory is based on the work of Everett Rogers. In his book, *Diffusion of Innovations* originally published in 1962, and now in it's fifth edition, Rogers incorporated research from other disciplines including anthropology, medicine, sociology, industrial sociology, and rural sociology to develop a theory to explain how individuals or organizations adopt

an innovative idea or product. The key elements in Diffusion of Innovation theory include the innovation itself, adopters, communication channels, time, and social system (Rogers, 2003). The rate at which an innovation spreads is dependent on the specific characteristics of each of these elements (Rogers, 2003). Though it was originally designed to explain the diffusion of agricultural innovations, this theory has been widely adopted across many disciplines and is well known in public health practice. Given that the task of this project is to provide information for the adoption of an evidence-based program in a novel setting, the Diffusion of Innovation Theory provides a useful framework for conceptualizing the necessary steps to facilitate program adoption and implementation.

For the purpose of this project, the innovation is the Nurse Family Partnership or Healthy Families America home visiting program. Rogers defines an innovation as an "idea, practice or object that is perceived as new by an individual or other unit of adoption" (Rogers, 2003). The actual newness of the idea is irrelevant, but if the adopting individual or institution perceives an idea as new it is considered an innovation. Though both NFP and HFA have been in existence for decades, both are innovations in the context of the Orange County Health Department. The DOI describes the attributes of innovations including relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). These attributes provide a practical means to make the case for a given program's adoption.

According to the Diffusion of Innovation theory, the five stages of adoption include knowledge, persuasion, decision, implementation and confirmation (Rogers, 2003). In this case, the FSA and Orange County Health Department are the adopters, and

the innovations are the Healthy Families America or Nurse Family Partnership programs. By partnering with a doctoral student to create this report, a communication channel was established to allow the transfer of information from one unit to the other, specifically from the student to the organization. The pre-implementation assessment provides information to the FSA, Health Department and other interested parties about the relative advantage (in terms of return on investment and outcomes), compatibility (in terms of the goals of the FSA, and fit within the context of the community), complexity (of the interventions themselves, fidelity standards and funding challenges), trialability, and observability (in terms of other agencies' experiences).

Community Engagement

An additional theoretical perspective that must be considered in developing this pre-implementation assessment is that of community engagement. Community engagement is the integration of values, strategies, and actions that support meaningful partnerships (Minkler & Wallerstein, 2003). These partnerships should ideally include mutual respect, shared power, active participation, equity, mutual benefits, and flexibility both in goal setting and choosing methods that fit community needs (Moini & Fackler-Lowrie, 2005; Minkler&Wallerstein, 2011).

Research demonstrates that a population can achieve long term improvements in health when people are involved in their communities, and that community engagement has the potential to decrease health disparities (O'Mara-Eves et al., 2013). The concept of community engagement stresses the importance of involving a community in health-related decision making and increasing community participation in health promotion, protection, and disease prevention efforts (O'Mara-Eves et al., 2013). Community

engagement is at the heart of the work undertaken by the Family Success Alliance. In creating the Family Success Alliance, the Orange County Health Department is demonstrating their commitment to community participation and engagement by using input from community stakeholders to plan programs based on the needs and priorities of Orange County.

After identifying six zones with a high relative percentage of children living in poverty, the FSA targeted neighborhoods and housing complexes with higher poverty levels and conducted a survey that touched on a variety of subjects, including what community and school resources were most useful and what residents felt was lacking in their area, along with demographic and language data. The FSA reached out to each community to identify zone champions. These champions were often affiliated with schools in the respective zones, in roles such as teachers, school social workers or administrators, and were invited to make the case for their zone to be the pilot site for FSA work. Community listening sessions were conducted to discuss potential programming for the zones, as well as establish overall goals for the FSA. Community partners were established. These partners are organizations within Orange County that are working to connect families to existing programs and resources. Zone navigators were hired in each of the pilot zones. Zone navigators are paid positions, wherein the navigators serve as a link between the FSA and families. Navigators attend FSA meetings, and also assist in connecting families to necessary resources. Finally, an advisory council has been established. This is a group of community leaders including members of local governmental agencies, non-profits, elected officials and zone representatives.

Review of Literature: Level of Evidence for Intervention Options

NFP Evidence. The HomVee analysis awarded 19 studies of nurse home visitors a high rating. A brief discussion of those highly rated studies is included below, along with additional cost related research not include in HomVee.

The Nurse Family Partnership has demonstrated positive outcomes in three rigorously designed randomized controlled trials. The Elmira study was set in rural New York, 400 women were enrolled 89% of whom were white. Nurse-visited mothers had higher rates of smoking cessation, improved maternal diet, decrease in pregnancy induced hypertension, more attempts at breastfeeding, improved parent/child interaction, fewer child healthcare encounters for injury or ingestion, fewer subsequent pregnancies and live births for the mother, fewer closely spaced pregnancies, fewer months using food stamps and welfare, and higher rates of living with the father of the child (Olds, Henderson, Chamberlin & Tatelbaum 1986; Olds et al., 1988; Olds et al.,1994; Olds et al.,1998). There were also positive effects on low birth weight and pre-term deliveries in teens and smokers (Olds et al., 1986), and mothers enrolled in NFP had an 82% increase in the number of months worked by the 46th month post delivery (Olds et al., 1988). Many of these findings were sustained in the two years after the program ended, specifically decreased accidents and ingestions, fewer ED visits, improved parental coping per physician records, and homes had fewer hazards (Olds et al., 1994).

In a 15 year follow up study, the index children of mothers enrolled in NFP reported fewer incidents of running away, decreased numbers of arrests, convictions and parole violations, fewer lifetime sex partners, decreased use of tobacco and alcohol and there were decreased parent reports of behavioral problems related to substance abuse

(Olds et al., 1998). Women enrolled in NFP were less likely to be found to be the perpetrators of child abuse as measured by verified CPS reports (Olds et al., 1997), and were less likely to have been arrested in a review of New York State records (Olds et al., 1997). Zielinski, Eckenrode and Olds (2009) also found that at 15 years post-intervention, the group differences in state verified abuse and neglect were greater that at earlier measurements (.29 verified CPS reports in intervention group vs .54 in comparison group, $p < .001$). These differences were the greatest among highest risk families. In addition, they looked at the timing of maltreatment as measured by the first CPS report and found that 68% of the index children in the comparison group made it to age 15 years without a reported incident of abuse compared with 76% of nurse visited children (Zielinski, Eckenrode & Olds, 2009). These findings suggest that early home visiting may have a profound effect in parenting practices later on.

There were also positive impacts in increasing child spacing and fewer lifetime pregnancies for mothers who were enrolled in NFP for their first pregnancy (Olds et al., 1997). In a 19 year follow up (Eckenrode, 2010), daughters of nurse visited mothers were less likely to have entered the criminal justice system, and those born to higher risk (unmarried, low-income) mothers utilized less Medicaid and had fewer children at age 19.

The Memphis study was designed to test NFP in a different setting. While the Elmira study looked at primarily white women in a rural setting, Memphis offered an urban setting and included more racial minorities. This study recruited 1,139 mothers in the prenatal phase and 743 for the post-natal phase. The study subjects were 92% African American. The results of the Memphis trial supported the results reported in the Elmira

cohort, with decreased child maltreatment, greater spacing between births, fewer pregnancies, decreased use of AFDC, and decreased use of food stamps (Kitzman et al., 2000; Kitzman et al., 2010; Holmberg; Olds et al., 2004, Olds et al., 2002). In addition there were decreased incidents of pregnancy-induced hypertension, and fewer pediatric ED visits for injuries and ingestions (Kitzman et al., 1997). In a 12 year follow up, NFP mothers reported less substance use for themselves and their children, academic achievement was improved for children born to mothers with low psychological resources, and there were fewer reports of internalizing mental health problems for children born to mothers with low psychological resources (Kitzman et al, 2010; Olds et al., 2010).

The Denver study (n=735) was designed to determine whether lay professionals trained to deliver NFP methods would achieve the same positive outcomes as nurse home visitors (Olds et al., 2002; Olds et al., 2007). The study subjects were 47% Latina, 35% non-Hispanic white, 15% African American and 3% American Indian or Asian. In that study, there was a group of women randomized to a control, a nurse visited group, and a group visited by trained laypersons. Although nurse visitors' outcomes supported earlier findings, home visiting by the trained laypersons was not found to improve outcomes, except in cases where the mother had low psychological resources (Olds et al., 2002; Olds, Robinson et al., 2004; Olds et al., 2007; Holmberg et al, 2011, Olds et al., 2014). These findings provide the evidence driving the NFP requirement that the program be delivered by registered nurses with at least a bachelor's degree.

The HomVee analysis and found NFP to have significant positive outcomes. NFP had positive primary (Assessment Table 1) and secondary outcomes (Assessment

Appendix B) in seven of eight domains assessed. Healthy Families America (HFA) was the only program found to have statistically significant positive impacts in all eight domains (Assessment Appendix C) when considering both primary and secondary outcome measures (USDH, 2014). Both new randomized controlled trials and longitudinal analyses of earlier NFP cohorts continue to support the positive impact this program has for families even years after program participation (Eckenrode, 2010; Kitzman et al., 2010; Olds et al., 2004; Olds, 2013).

Multiple independent agencies have conducted evaluations and found NFP to be a financially sound investment. The RAND Corporation (Karoly et al., 2005), The Washington State Institute for Public Policy (Aos et al., 2004), and the Brookings Institute (Isaacs, 2008) have endorsed NFP as a cost-effective intervention. The US Department of Health conducted the HomVEE analysis to compare the relative effectiveness and cost effectiveness of home visiting programs and found NFP to be cost effective (USDH, 2014). The Washington State Institute for Public Policy has estimated the cost savings gained from the NFP program to be between $1.61 to $5.80 per dollar spent.

In 2013, Ted Miller of the Pacifica Institute reviewed all of the outcomes demonstrated by NFP in high quality RCTs and compiled a list of expected outcomes (Assessment Table 4). These outcomes were monetized to attempt to predict the cost of administering the program, projected savings to state and federal government by the age of 18 for the target child, and total societal savings (Miller, 2013). The societal savings calculations use a formula, which takes into account some more subjective outcomes such as potential gains in work, salary, and quality of life. Monetizing these types of

intangible outcomes can be controversial as it forces the researcher to assign dollar amounts to somewhat subjective questions. Consider for example, how much "preventing language delay" is worth. Those wishing to focus on only tangible measures can instead use the "total government savings" metrics (Assessment Table 11) as outlined by Miller, wherein he used more conventional methods of monetizing outcomes.

Some key findings in Miller's analysis which represent an immediate return on investment include a 60% decrease in infant mortality, a 31% reduction in second birth 2 years post-partum, an 18% reduction in pre-term births for the index child and a 37.7% decrease in subsequent pre-term births (Miller, 2013). In addition, Miller found a 23% increase in full immunization for children ages 0-2, helping to diminish later barriers to school entry. Longer-term outcomes such as decreased Medicaid costs through age 18, and decreased reliance on TANF and food stamps through 10 years post-partum demonstrate a significant economic benefit for recipients and taxpayers.

HFA Evidence. The HomeVee analysis awarded 13 studies supporting Healthy Families America a "high" rating. A brief overview of those studies' findings is discussed below, along with additional cost related research not included in HomVee.

Hawaii's Healthy Start (HSP) program was an early iteration of the Healthy Families America program. A randomized controlled trial was conducted with 684 families randomized to the intervention (n=395) and a comparison group (n=290). The sample was 34% native Hawaiian or Pacific Islander, 28% Asian or Filipino, 10% Caucasian and 27% of unknown primary ethnicity. The setting was six implementation sites in three agencies in Hawaii. Results of this RCT showed that HSP did not prevent abuse or promote non-violent discipline (Duggan, McFarlane, Fuddy et al., 2004). There

was a modest impact on decreasing neglect (Duggan, McFarlane, Fuddy et al., 2004). HSP did not demonstrate statistically significant program impacts on parental risks (Duggan et al., 2007), and there was no overall effect on maltreatment or measures of potential maltreatment (Duggan et al., 2007). There was not significant increase on at-risk mothers' desire for or utilization of community services (Dugan, Fuddy et al., 2004). There was a decrease in poor maternal mental health measured at one of the three agencies (Duggan, Fuddy et al., 2004). In families that received seventy five percent of more of visits, there was a significant decrease in problematic maternal alcohol consumption and a decrease in repeat incidents of intimate partner violence (Dugan, Fuddy et al., 2004). Study authors suggest that the modest results of this RCT may be attributable to erratic implementation and many participants' failure to receive the full dose of home visiting. In a two year follow up, mothers were less likely to suffer poor mental health one year after the intervention ended, and at two years were found to be more likely to use non-violent discipline techniques (Duggan, McFarlane, Windham et al., 1999).

El-Kamary et al., (2004) sought to determine whether there was a decrease in rapid repeat birth for HSP participants and found there was no program effect. In mothers enrolled in HSP, a rapid repeat birth was associated with increased stress, increased neglect of the index child, and an increase in severe parenting (Kamary et al., 2004). In a long term follow up, mothers who were enrolled in HSP were found to be less likely to perpetrate intimate partner violence over the three years enrolled in the program, but there were no prolonged program effects at seven and nine year follow ups (Bair-Merritt et al., 2010).

In another RCT set in Alaska, 364 families were recruited with 179 randomized into the program and 185 into the comparison group. Participants were 22% Alaskan Native, 55% Caucasian, 8% multiracial and 15% other. Families were enrolled across six Healthy Families Alaska sites, those receiving the intervention were shown to have greater parenting self-efficacy using the TETI self-efficacy scale, were less likely to have a poor home learning environment, and were more likely to use center-based parenting services (Caldera et al., 2007). In addition, enrolled children were more likely to have a normal score on the BSID and CBCL measures of cognitive behavioral development in young children, and more likely to have health care coverage (Caldera et al., 2007).

Another HFA randomized controlled trial was undertaken in California. In a primarily urban area of San Diego, 515 families were initially recruited and ultimately randomized with 241 in the program group and 241 in the comparison group. Participants were 26.8% Spanish speaking Hispanic, 19.3% English speaking Hispanic, 24.2% Caucasian, 19.5% African American and 10.2% Asian or other. Children in the program were more likely to have completed a higher number of well-child visits and were more likely to have a normal score on the BSID and CBCL questionnaires that asses mental, motor and behavioral development in young children (Landsverk et al., 2002). Mothers showed a decrease in mildly abusive behaviors and decreased psychological aggression toward the index child (Landsverk et al., 2002).

In the Healthy Families Arizona RCT, 195 families were randomized to the program (n=98) and the comparison group (n=97). At six months of enrollment, there was an increased use of resources and improved safety practices for the enrolled families (LeCroy & Krysik, 2011). At one year of enrollment, there was an increase in the

attendance of school or vocational training for enrolled mothers, and a higher percentage of enrolled mothers reported never shouting at or slapping their infants' hands (LeCroy & Krysik, 2011).

The Healthy Families New York (HFNY) study is the largest RCT for Healthy Families America to date. This study randomized 1173 women from three sites into a program group (n=579) and a comparison group (n=594). The women were 34% white/non-Latina, 45% African American/non-Latina, and 18% were Latina. For some parts of the evaluation, women were separated into subgroups. The Recurrence Reduction Opportunity (RRO) subgroup was comprised of mothers with a previous confirmed report of neglect or abuse. The High Prevention Opportunity (HPO) subgroup was comprised of first time mothers enrolled prenatally.

For the sample as a whole, women enrolled in HFNY were approximately one fourth as likely to commit acts of serious physical abuse as those in the comparison group (DuMont, Mitchell-Herzfield, Greene et al., 2008). For the HPO subgroup, there was a decrease in harsh parenting, lowered frequency of minor physical aggression and decreased psychological aggression perpetrated by the mothers at year one (DuMont, Mitchell-Herzfeld, Greene et al., 2008). At the one year interviews, women in the RRO subgroup were less likely to have a CPS report for abuse or neglect (41.5% vs 60.4%; $p<.10$). This is a significant finding, because for the sample as a whole, women enrolled in HFNY were more likely to have a CPS report for abuse or neglect, which may be attributable to surveillance bias. Logistic regression analyses were used to try to determine the relationship between the HFNY program and confirmed CPS reports in the RRO group. It was determined that the subsequent number of children and especially a

rapid repeat birth decreased the program effectiveness by up to 35% (DuMont, Mitchell-Herzfield, Greene et al., 2008). Further investigation revealed that intensive family planning during the prenatal period was the most significant correlate (r= -.15) with confirmed CPS reports (DuMont, Mitchell-Herzfield, Greene et al., 2008). It is unclear, however why this effect was more profound for the RRO subgroup, nor is the rapid repeat birth rate reported across groups.

In a seven-year follow up, more HFNY children were enrolled in gifted education and special education (Dumont, Mitchell-Herzfield, Ehrhard-Dietzel et al., 2010) compared with controls. Seven years post intervention, mothers in the HPO subgroup were using non-violent discipline more frequently than comparison the group, were less likely to self-report committing serious physical abuse, and were less likely to have a CPS report for abuse or neglect (Dumont, Mitchell-Herzfield, Ehrhard-Dietzel et al., 2010).

In 2009, Lee et al. examined the effects of HFA on low birth weight (LBW) and found that the risk of LBW was reduced for women enrolled in HFNY when contrasted with the comparison group. The effect was particularly profound in black women; there was a small but statistically significant effect in Latinas and no effect on LBW for Caucasian women. It is unclear why there is a difference across ethnicities, and it is further unclear what aspects of HFNY caused the decrease in LBW. Though there is data to suggest that home visitors helped to connect women enrolled in HFNY to community services, there is not comparable data about services utilized in the comparison group. Enrolled women were more likely to have a primary care provider, and more likely to

have attended a greater number of prenatal visits (Lee et al., 2009), though neither of these outcomes can be demonstrated as the cause of decreasing the incidence of LBW.

Like NFP, the WSIPP has evaluated the costs and benefits for HFA periodically since 2003. For the first time in 2016, WSIPP found HFA to have a positive return on investment projecting a $1.21 return for every dollar spent and a 51% chance that the program will yield a positive return. The 2012 evaluation found HFA to have a negative return, costing just over $2.00 per dollar spent. Notably, the 2016 findings for both NFP and HFA were based on the same 2012 data as previous reports, with only methodology changing for monetizing various outcomes. As the WSIPP numbers and methodology are somewhat fluid, it can be helpful to look at other economic evaluations.

There are notably fewer large-scale economic evaluations of the Healthy Families America program compared with NFP. A contributing factor to this relative shortage of evaluations may be that there are fewer longitudinal studies for HFA demonstrating long-term program effects that may be monetized. The HFNY seven year follow up discussed above (Dumont et al., 2010) examined the costs and savings associated with HFNY and found that overall, enrolling a woman in HFNY resulted in a net savings of $628 in government costs. This is only a 15% recovery of the cost to provide HFNY services. Women in the RRO subgroup demonstrated a recovery of 316% of the initial cost of providing HFNY services. In dollars, this is a net savings to the government of $12,395 per family or a $3.16 return for every dollar invested by the time the target child reached 7 years of age. Women enrolled in HFNY's HPO subgroup generated a net government savings of $1020 per family by the target child's seventh birthday, which is a 25% recovery of the cost of the program.

An additional factor limiting availability of large scale economic evaluations may be that HFA allows implementation sites to tailor the program to meet identified needs in a given community, resulting in less stringent fidelity standards. It is difficult, then, to generalize possible outcomes or savings for any given HFA site to other HFA implementation sites. This of course does not mean that HFA does not produce monetizable benefits for taxpayers or participants, rather that more data needs to be collected going forward in order to do so.

CHAPTER 2: METHODOLOGY

Phase I: Establishing the Need for MIECHV Programming and Searching for Evidence

Design. The design of this assessment was developed with input from representatives of the OCHD and the Family Success Alliance. A preliminary meeting with the Director of Nursing took place to discuss the possibility of a pre-implementation assessment for evidence based Maternal, Infant, and Early Childhood Home Visiting services in Orange County. A subsequent meeting took place with the initial leadership of the FSA, which was attended by the DNP student, the program director, project coordinator, community outreach specialist and informatics manager. This meeting determined which programs should be reviewed and what information might be helpful in considering implementation of each of these programs. Informational videos were created with input from FSA director and key community stakeholders.

Archival Review. In order to establish the need for MIECHV services, Orange County census data was reviewed to determine birth data related to marital status, parity, and age of the mother at birth. The most recent Orange County Community Health Assessment (2015) was studied, as were periodical publications related to health and income disparities in Orange County. WIC and TANF enrollment were also reviewed, as well as the reports of abuse or neglect and the ultimate findings of those reports. An exhaustive literature review was conducted using the Google Scholar, CINHAL and PubMed search engines using the terms ‘Healthy Families America’ and ‘Nurse Family

Partnership.' The United States Department of Health Home Visiting Evidence of Effectiveness (HomVee) analysis was extensively considered in the selection of programs for discussion. In addition, the implementation manuals for each program selected were downloaded and studied to inform this report.

Key Informant Experiences. In addition to reviewing implementation manuals and other publications surrounding the NFP and HFA programs, key informants were sought out with program administrators for every implementation site of each program in North Carolina to provide information on their implementation successes and challenges. Contact was initiated via email as well as telephone. Questions related to staffing, challenges, implementation support, data collection and client demographics were asked and answered as time allowed (Assessment Appendix F). Additional key informants were comprised of regional implementation specialists for NFP, research coordinators for HFA and NFP, and the public policy/legislative coordinator for NFP. These interviews were used to identify themes around implementation, as well as to inform the legislative and funding aspects of the technical report.

Community Engagement. The Family Success Alliance is developing programming to support vulnerable communities using the tenets of community engagement. Listening sessions, brainstorming, administering surveys, and periodic open meetings are some examples of ways in which the FSA is gathering information on the needs and opinions of the community. By attending these events, the author gathered useful background information and honed a finer understanding of the goals and processes of the FSA. In addition to discussions with NFP and HFA program administrators and implementation specialist as described in the Key Informant

Experiences above, the DNP student attended a number of meetings and community events (Table 1) to become familiar with the work of the Family Success Alliance as well as other related programming currently available to pregnant and parenting women and their children in Orange County.

Table 1 – Student Community Experiences

ACTIVITY	Hours
Assisting to administer zone survey	5
Zone meetings/listening sessions	6
OCHD meeting with original FSA team	2
County Commissioner Meeting to determine pilot zones	2.5
Meeting with current post-partum home visiting nurse	2
Board of Health Meeting	2
Meeting with Orange County Home Visiting Services coordinator (phone)	2.25
Meeting with Orange County Health Department Data Specialist	1
Meeting with Early Head Start program manager	1.5
Meeting Adolescent Parenting Program manager	1
Meeting Orange/Chatham Early Childhood Mental Health Task Force	2
FSA meeting to define “school readiness”	2.5

Phase II: Development of the Pre-Implementation Assessment

Step 1: Development of the Technical Report. The components of the pre-implementation assessment (Appendix 1) were informed by discussions with OCDH staff, FSA personnel and UNC faculty advisors. A broad overview of the elements of the final product is presented below.

Introduction. This section describes the disproportionate number of children in Orange County who are living in poverty, as well as the genesis of the Family Success Alliance as a means to mitigate some of the negative impacts of poverty on children. There is a brief introduction to the CC4C and CCNC case management programs that are largely aimed at cost containment. This section was primarily designed to familiarize the reader with the magnitude of poverty in Orange County.

Project Purpose. This section outlines the process by which the HFA and NFP programs were chosen for evaluation and describes the parameters to be discussed. The reader is made aware that there will be a focus on fit, cost, and return on investment as well as a discussion of local factors that may assist or hinder implementation of each program.

Maternal Infant Early Childhood Home Visiting. An overview of MIECHV programming and associated federal funding is provided. The HomVee analysis, which is conducted annually by the federal government, is introduced. In order to establish the stringent evidentiary standards imposed by the HomVee analysis, the HomVee review process is outlined, with appendices (Assessment Appendices A & B) giving further detail. Because of the overwhelming amount of research of varying quality dedicated to

these programs, using the outcomes deemed evidence-based in the HomVee analysis allowed for an unbiased comparison and discussion of proven impacts.

Programs Under Consideration for Adoption. The NFP and HFA programs are introduced. A broad overview of each program including their goals and target populations are presented.

Demographics and Current Programming. An overview of census, Medicaid, WIC and child protective services data are presented in this section, making the case for the need for additional supportive programming.

This section also provides a brief overview of current services available to at-risk women and children in Orange County. Descriptions of case management/cost containment programs such the Pregnancy Medical Home (PMH), Obstetrical Case Management, and Care Coordination for Children are provided. In addition, specialized programming such as the Adolescent Parenting Program, Kidscope Outreach Services, and the Orange County Head Start/Early Head Start program are discussed. The general goals and populations served are highlighted for these programs in order to illustrate that additional MIECHV services may be a useful adjunct to current offerings in Orange County.

Comparison of Outcomes. This segment of the report highlights some of the difficulties in comparing HFA and NFP. Because these programs serve demographically different populations, comparison of outcomes is made complicated. Healthy Families America is offered to women regardless of parity, and often recruits women with a prior report of abuse or neglect. Nurse Family Partnership is offered only to first time mothers

prior to the 28th week of gestation. NFP is a program largely based on prevention, where HFA originated primarily issues of abuse and neglect.

In the *A Note About First Time Mothers* subheading, an overview of the evidence supporting or refuting first time mothers as the ideal candidates for MIECHV interventions is reviewed. Galano and Huntington's (2012) finding that the differences between outcomes for primiparous and multiparous women enrolled in HFA were less than the differences between intervention and control groups is discussed. Galano and Huntington further assert that once risk factors are corrected for, primiparous and multiparous women reap similar benefits from home visiting.

Several tables in this section of the analysis are devoted to comparing outcomes for these programs as demonstrated by the HomVee study. Assessment Table 2 reviews the number of studies that were eligible for review for each program, Assessment Table 3 showed the number of positive impacts in primary and secondary outcome measures for each program, and Assessment Table 4 outlined the expected outcomes for NFP as described by Miller (2013). The table based on the principles of Miller (2013) is a powerful tool that succinctly synthesizes NFP outcome data into concrete projections that implementing agencies may use to predict long and short-term impacts. Unfortunately, there is no analogous data for Miller's projections for HFA, likely due to a lack of necessary longitudinal data.

Considerations for Implementation. The goal of this section is to provide the reader with an overview of what NFP and HFA would require in terms of staffing, funding, training, technology and data management. This section of the pre-implementation assessment is largely comprised of tables excerpted from the HomVee

analysis, which have been modified to show a side-by-side comparison of HFA and NFP. Prerequisites for implementation, training considerations, and fidelity standards are presented in table form. Some key distinctions between the programs include a looser inclusion criteria for HFA, allowing enrollment pre or post-natally, and the ability of program administrators to target different populations and vary the goals of HFA at different implementation sites.

Additional tables for cost estimates per family per year for each program, and a three-year "year over year" projection of costs is provided. Notably, though NFP requires home visitors to be a nurse with a minimum of a bachelor's degree, the cost differences between the two programs are minimal. Finally, there is a discussion of return on investment for each program. The Washington State Institute for Public Policy (WSIPP) conducts periodic reviews for MIECHV programs to determine return on investment (ROI) and in their 2016 review found the Nurse Family Partnership and Healthy Families America to have a return of $1.61 and $1.21 respectively. The reader is informed that this is the first time WSIPP has found HFA to have a positive ROI, though NFP has always shown a positive return. In addition, other agencies such as the Coalition for Evidence Based Policy and the RAND institute have deemed NFP a cost-effective intervention. This section also outlines the findings of the HFNY study (Dumont et al., 2010), which found HFA to be cost effective only for women enrolled pre-natally and those with a prior report of abuse or neglect.

Funding. This section outlines some of the common federal, state and local funding sources cited by NFP and HFA implementation sites in North Carolina. There is a great deal of overlap in funding for these two programs.

Implementation Lessons from the Field. This section is devoted to discussing the information gathered by speaking directly with HFA and NFP program administrators. During these discussions, a question guide was used to ensure uniformity across conversations. Meetings took place both in-person and over the phone. Several themes unique to each program emerged which were highlighted in the technical report.

Theme One NFP. Program administrators for NFP repeatedly cited the ease of data collection as a strength of NFP. The Evidence to Outcomes (ETO) system was described as user friendly and as an asset to the program.

Theme Two NFP. The "strength based approach" used at all levels of management for NFP was cited as creating a very positive work environment, while challenging staff to strive always for improvement.

Theme Three NFP. Managers who were part of the launch aspect of bringing NFP into a community expressed enthusiastically that there was tremendous support at the national and local levels from the National Service Office at every step in the process. From building the community advisory board to creating a referral base, administrators felt that NFP was a "well oiled machine" as far as implementation set up and follow through.

Theme Four HFA. Program administrators for HFA were largely in agreement that they liked being able to tailor the intervention to their community, though several admitted this very likely hindered outcomes research and possibly dilutes the intervention itself.

Theme Five HFA. HFA program personnel stated that they felt that their outcomes were not necessarily being 'captured' by current research. One stated, "We know we are

doing a lot of good, and we just can't prove it." HFA currently does not collect outcomes data at every implementation site. In addition, because the intervention can be tailored at individual sites, replication across sites is made difficult. A telephone interview with the HFA national research coordinator elaborated on this theme. This person has been somewhat recently hired, and is tasked with attempting to capture the impacts of HFA. She introduced the idea that because HFA targets women with prior CPS referrals, there is a significant sample bias. In addition, because the intervention is designed to identify and refer caregivers who are abusive, there is an additional surveillance bias. Effectively, she asserts that abusive tendencies are being identified and documented more frequently in HFA program participants precisely because they are looking for it, not because it is more prevalent. She further asserts that the difference between primary outcomes (what can be found in official documentation such as ED visits, CPS referrals) and secondary outcomes (parent self-reports of abusive behaviors) can be very informative when evaluating program effects.

Similar Challenges. Program administrators for both programs cite similar challenges related to insecure funding, staff burnout, logistical challenges associated with scheduling in-home visiting, and providing services to women with undiagnosed or untreated mental illness.

Step 2: Development of Brief Informational Videos. Two brief videos were created (Appendix 2) and posted to a public YouTube channel to ease distribution. These videos are from five to six minutes in length and are designed in a format that is easily shared via electronic mail or social media. The content of these videos were designed with input from FSA representatives. One is a broad overview of the FSA, its goals and

MIECHV programming along with a brief introduction to the NFP and HFA programs. The other assumes viewers' knowledge of the FSA and its mission and goes deeper into a comparison of the HFA and NFP programs.

Phase III: Dissemination

In order to share the findings of the pre-implementation assessment, a technical report document was assembled. This document was distributed at a "lunch and learn" conference at the Orange County Health Department and a corresponding Power Point presentation was delivered to key stakeholders in the Health Department, FSA and community. Attendees included the FSA program director, the OCHD Director of Nursing, one of the FSA Zone Navigators, the Director of Kidscope, a clinical social worker with KidScope (a local provider of social-emotional health services for children), the OCHD Director of Home Visiting, the OCHD director of Health Behavior Interventions, the OCHD Interim Health Director, an outcomes specialist from UNC's Frank Porter Graham Institute, and the director for Early Head Start. In the parlance of DOI theory, the attendees were largely opinion leaders, or those who are influential in spreading positive or negative information about a particular innovation (Rogers, 2003).

Given the prevalence of electronic communication, digital copies of the pre-implementation assessment and PowerPoint presentation were also made available. In addition, brief videos describing MIECHV programming, funding opportunities, and NFP and HFA outcomes were developed and distributed at this presentation. These videos are easily shared via email or social media platforms and were created to ease dissemination to key stakeholders.

CHAPTER 3: DISCUSSION

Feedback

After presenting the technical report at the OCHD lunch and learn and a brief discussion at the Orange Chatham Early Childhood Mental Health Task Force, several attendees asked questions related to equity. Stakeholders are concerned about equity and want to choose a program that has been tested and proven effective across ethnicities. In addition, they want to ensure that programs are delivered by home visitors and program administrators that are culturally competent. Specifically, there was interest in both whether NFP and HFA were tested in non-white populations, as well as whether there was any "equity training" for home visitors to address issues of cultural competence.

To address these concerns, the DNP student provided FSA leadership with the review of literature above. Notably, though both programs were testing using demographically diverse samples, only the Nurse Family Partnership was tested in three randomized controlled trials comparing different ethnicities head to head. After initial testing in Elmira with a largely Caucasian population, the Memphis study sample for NFP was 92% African American and the Denver study sample was 47% Latina. Given that outcomes were consistent across populations, the Family Success Alliance can be assured that NFP is an intervention that is sensitive to meeting the needs of racial minority groups. Further, the national offices for each program were contacted to ask regarding equity training. Though neither program offers specific equity training per se, there is content within training modules for both HFA and NFP about not making

assumptions based on ethnicity, asking respectful questions and treating each client as an individual.

Discussion of Key Clinical Questions

> *What are the potential facilitators and challenges to adopting Healthy Families America or the Nurse Family Partnership as an adjunct to current home visiting services in Orange County North Carolina?*

The Family Success Alliance has identified a gap in prenatal to pre-school services in Orange County. This creates an opportunity for the adoption of an evidence-based home MIECHV program. The strength of the evidence for NFP in particular, its demonstrated positive impacts, return on investment and long-term program effects are powerful measures that can be used to persuade stakeholders to adopt. Though interest in MIECHV programming in general and NFP in particular is quite high at this time, barriers remain. In the setting of a public health department, and the FSA, the strong emphasis on community engagement can be a challenge. If the health department is the adopter, but is allowing the "community" to decide what programming to choose, there can be conflict. Laypersons and stakeholders alike may not understand the importance of adopting an evidence-based program. It is crucial that not only community leaders, but also other leaders with extensive knowledge of the importance of strong evidence-based practice be at the table to hear and determine which programs meet the needs of the community.

Additional barriers include uncertainty regarding MIECHV legislation and funding, as well as confusion surrounding whether a chosen program would be adopted simply by the FSA to be implemented in zones (which would be unlikely to be cost effective) or by the OCHD and open to all eligible families.

How do the outcomes of these programs fit with the goals of the Family Success Alliance?

The outcomes of both of these programs align with the goals of the FSA. Using primary outcome measures, both programs improve school readiness, child health, and positive parenting practices, and decrease child maltreatment. NFP also improves child health, and has significantly more positive impacts in the HomVee analysis across outcome domains.

What are the key implementation characteristics of these two programs, and how do they align with the geographic, personnel, and demographic factors that must be considered prior to program adoption?

Though NFP requires that home visitors be nurses with a bachelor's degree, Orange County should easily be able to recruit for these positions. Given the proximity to schools of nursing, there should be an adequate applicant pool to choose from. Geography was cited as a challenge for all key informants involved in home visiting. The six zones identified by the FSA as having a disproportionate number of children living in poverty are fairly spread out and will create a logistical challenge for program administrators.

Stakeholders are concerned about equity and want to choose a program that has demonstrated positive impacts across demographics. NFP has been tested in rigorous RCTs across rural and urban populations with significant numbers of Caucasian, Latina, and African American women and results have remained largely consistent. While HFA has been tested among women of varying ethnicities, these studies largely do not compare effects across groups and there is often too small a sample size for each group to power a comparison study adequately.

The requirement that NFP be administered only to first time mothers necessarily

limits the number of families that can be served with this program. Though HFA allows the program to be offered to all at-risk women, it is notable that program effects are most powerful and return on investment is greatest among first time mothers enrolled prenatally and those with a previous CPS referral (DuMont, Mitchell-Herzfield, Greene et al., 2008).

Lessons Learned

Community Engagement is a key element of the work of the Family Success Alliance. In partnering with the FSA, the DNP student was able to participate firsthand in multiple stages of the planning and development of programming. Perhaps the most meaningful lesson learned is related to these events. While the concept of community engagement is a very appealing one, it became clear that this type of engagement is only as diverse and as meaningful as those participants who are "at the table." Translating the theory of community engagement into practice is fraught with challenges, including but not limited to determining how to reach and engage the people most in need of services, determining who best represents those people, and ultimately giving the community evidence-based options in a format and forum that is meaningful to them.

Conclusion

Each of these MIECHV programs has the potential to positively impact the most vulnerable families in Orange County. A thorough review of the HomVee analysis and currently available data on cost and return on investment demonstrate that the Nurse Family Partnership has a greater depth of positive impacts and is more likely to offer a financial return on investment. Because of the limitation that NFP is only open to first time mothers who are enrolled prior to the 28th week of pregnancy, there will be families

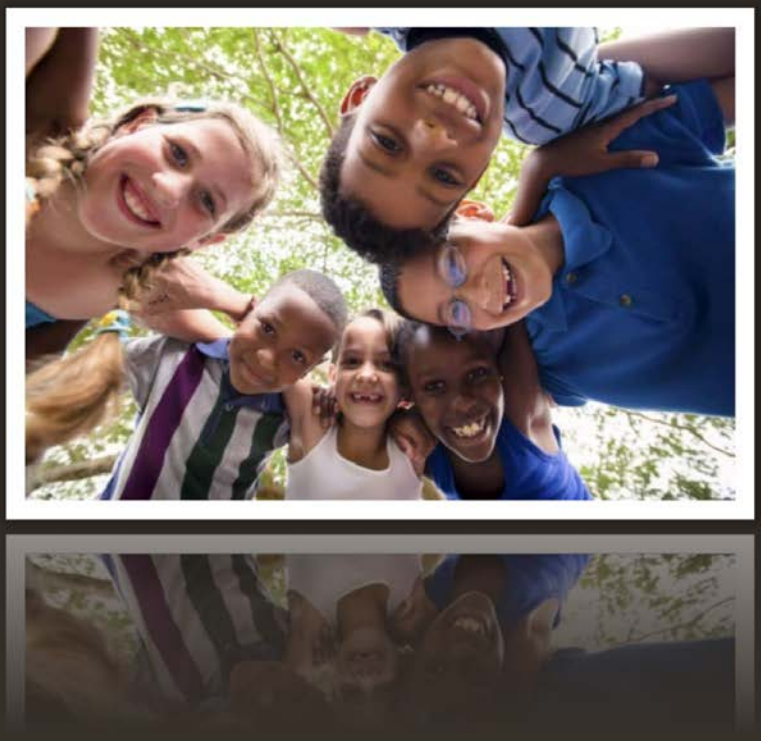
that NFP unfortunately cannot serve. The decision to implement NFP must be considered in the long term, with the understanding that at some point, all moms are first time moms. By identifying and supporting at-risk first time mothers, the FSA has an opportunity to positively impact that mother child dyad as well as future children born to that mother.

In presenting the findings of this assessment to the OCHD, there was clear enthusiasm for NFP. Though some attendees expressed an interest in HFA and specifically its ability to serve women regardless of parity and the flexibility in implementation, the majority seemed to gravitate toward the strength of evidence in support of NFP. Following the PowerPoint presentation, there was an in-depth discussion of the desire to serve all families. While HFA does allow for recruitment of women regardless of parity, it is crucial to note that the HFNY and other studies demonstrate that this program typically only offers a return on investment for those women who enroll prenatally and those with a previous CPS referral.

Going forward, the OCHD will further disseminate these findings to the community and seek input into choosing a program that meets both long and short-term goals of the FSA.

APPENDIX 1: PRE-IMPLEMENTATION ASSESSMENT

A Pre-Implementation Assessment of MIECHV Services for Orange County



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Introduction

The 2015 Orange County Community Health Assessment identified the social determinants of health with a focus on access and poverty as one of three priority areas to be addressed. Using census data, free and reduced lunch metrics and Medicaid data, the Orange County Department of Health has identified six geographically-defined zones with disproportionately high numbers of children living in poverty (OCHD, 2013). The Orange County Health Department (OCHD) has partnered with community leaders and stakeholders to form the Family Success Alliance (FSA).

The FSA seeks to develop a multifaceted anti-poverty program to combat the long term sequelae of childhood poverty based on the successful programs such as the Harlem Children's Zone (HCZ) Program in New York, Promise Neighborhoods, and the East Durham Children's Initiative. These programs are based on the concept of collective impact, the idea that diverse organizations across a community develop common goals, shared measures for success, engage in mutually reinforcing activities, and collaborate and communicate easily and often. A key component in these collective impact programs is the notion of the "pipeline" which provides support for children from birth through college. Currently, at-risk pregnant women, newborns and children in Orange County may be referred for home visiting under the Community Care North Carolina (CCNC) and Care Coordination for Children (CC4C) programs. These case management programs aim to contain costs and make referrals as needed (CCNC, 2015a). In order for the OCHD to establish and fund an effective anti-poverty initiative locally, an evidence-based Maternal, Infant, and Early Childhood home visiting program with demonstrated positive, long-term outcomes may prove an integral part of the pipeline for Orange County's most vulnerable mothers and their children.

Project Purpose

The purpose of this project is to provide the Orange County Health Department with an overview of current maternal, infant, early childhood services as well as a determination of fit, cost, and potential return on investment for the Nurse Family Partnership and Healthy Families America programs in Orange County. By considering factors at the local level that may support or hinder successful implementation of these programs, OCHD will be prepared to present the Nurse Family Partnership and Healthy Families America to their community partners for consideration as part of a county wide effort to mitigate the devastating effects of childhood poverty. These two specific programs were chosen for evaluation in collaboration with representatives from the Orange County Department of Health because of their potential to mitigate some of the negative impacts of childhood poverty, the feasibility of possible implementation in Orange County, and their relative depth and breadth of demonstrated positive impacts. In addition, NFP and HFA are two of only six (out of nineteen) models that have been able to replicate favorable effects in the same domain across two or more samples (USDH, 2014).

Maternal Infant Early Childhood Home Visiting

When the Patient Protection and Affordable Care Act was signed into law in 2010, the Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program was established (USDH, 2014). This program provided $1.5 billion to states over five years for home visiting models serving pregnant women determined to be at-risk, and their children from birth to age five (USDH, 2014). The act stipulated that at least 75% of the distributed funds were to be spent on programs that meet vigorous standards for research and are deemed to be evidence-based (USDH, 2014). This program has enjoyed strong bipartisan support, and has expanded significantly. The Federal Home Visiting Program received a $372.4 million appropriation for fiscal year 2017. The 2016 Home Visiting Evidence of Effectiveness analysis identified nineteen MIECHV program models that meet vigorous standards for evidence. Programs deemed evidence-based in the HomVee analysis are eligible for the majority of earmarked federal funds, which creates an opportunity for local health departments to transform current delivery of care. The remaining 25% of funds were set aside to support the development of new and promising programs that would later be subject to evaluation.

For the purpose of this report, maternal, infant, early childhood home visiting (MIECHV) services refers to home visiting for pregnant women and children from birth through age 5 years. These programs are designed to support pregnant women and families and help at-risk parents of children from the prenatal period through kindergarten entry to raise physically, socially and emotionally healthy children who enter school ready to learn. All MIECHV supported programs supported by the Health Resources and Services Administration (HRSA) are managed at the local level and voluntary for participants.

Home Visiting Evidence of Effectiveness

Home visiting evidence of effectiveness (HomVEE) was launched in 2009 to create a comprehensive review of the literature pertaining to home visiting services that serve pregnant women and children up to the age of 5 years (USDHHS, 2014). This review is updated annually, and is conducted by the Mathmatica Policy Research Institute in partnership with the United States Department of Health and Human services division of Health Resources and Services Administration with additional representatives from the Office of Planning Research and Evaluation, The Children's Bureau, The Centers for Disease Control and Prevention, and the Office of the Assistant Secretary for Planning and Evaluation, The Children's Bureau, The Centers for Disease Control and Prevention, and the Office of the Assistant Secretary for Planning and Evaluation (USDHHS, 2014). In order to be considered for review in the HomVEE analysis, a given home visiting program must be evidence based with at least one high quality or moderate quality impact study with statistically significant impacts on at least two outcome domains, or a minimum of two high or moderate quality impact studies of the program model with statistically significant impacts in the same domain with non-overlapping study samples (USDHHS, 2014).

The HomVEE review process (Appendix A) requires that trained reviewers evaluate randomized controlled trials (RCTs) and quasi-experimental designed (QED) studies for each model under review. In an effort to ensure accuracy and minimize bias, two reviewers are assigned to evaluate every study. Each study is given a high, medium or low rating to predict how well the study design could provide unbiased estimates of model impacts. The HomVEE executive summary provides a detailed discussion and table (Appendix B) to describe the rating process. High ratings are given to studies with random assignment of subjects, low attrition and no reassignment after initial randomization, as well as single case and regression discontinuity designs that meet the What Works Clearinghouse (WWC) design standards (What Works Clearinghouse, 2010). The moderate rating is assigned to studies found to have a design flaw which precludes them from meeting the criteria for a high rating. Studies that do not meet criteria for high or moderate quality are given a low rating.

There are eight outcome domains considered in the HomVEE analysis (Table 3), which include child development and school readiness, child health, family economic self-sufficiency, linkages and referrals, maternal health, positive parenting practices, reductions in child maltreatment, and reductions in juvenile delinquency, family violence and crime (USDHHS, 2014). In the 2016 Executive Summary, nineteen MIECHV programs were deemed by the HomVEE analysis to be evidence-based cost effective interventions. Of these nineteen evidence based interventions, NFP and HFA have been chosen for further analysis of adoption and implementation-related factors because of their increased depth and breadth of positive impacts (Table 3) as well as the alignment of potential positive impacts with the goals of the Family Success Alliance.

Programs Under Consideration for Adoption

The Nurse Family Partnership

The NFP is a home visiting program designed for low-income first time mothers and their children from birth through two years of age. Women must enroll prior to the 28th week of gestation. NFP is designed to improve prenatal health and outcomes, improve child health and development, and improve families' economic self-sufficiency. NFP is modeled on human attachment, human ecology and attachment theories (NFP, 2016). NFP home visitors are bachelor's prepared registered nurses who receive training in the critical elements of NFP as well as motivational interviewing techniques to build on the interests and desires of the mother to attain NFP goals (NFP, 2016).

Healthy Families America

HFA is a home visiting program for families considered to be at risk for negative outcomes including child maltreatment. HFA is a voluntary program designed for families that have a history of trauma, alcohol or substance abuse, intimate partner violence or poor mental health (HFA, 2016). HFA services are initiated prenatally or shortly after birth, and may continue up to the age of three or five years of age. HFA goals include reducing child

maltreatment, increasing utilization of prenatal care, improving parent-child interactions, and promoting readiness for school. In addition to home visiting services provided by lay-professionals known as Family Support Workers (FSWs), HFA implementation sites are individually permitted develop activities to meet the needs of their communities such as parent support groups or father involvement programs.

Table 1. NFP and HFA at a Glance (Excerpted from HomVee *Implementation*)

	NFP	HFA
Theoretical Framework	Human attachment, human ecology, and self-efficacy models	Attachment theory, bio-ecological systems theory, trauma informed care
Target Population	First time, low income mothers and their children. Women must be enrolled no later than the 28th week of pregnancy, and service continues until the child is 2 years of age	Parents facing challenges such as single parenthood, low socio-economic status, history of abuse or childhood trauma, current or previous issues with substance abuse, mental health challenges or domestic violence. HFA prefers that women enroll during prenatal period, but may enroll until the index child is three months of age. Length of service varies across sites, with some terminating when the child is 3 years of age, and others continuing to the 5th birthday. Individual sites select target population to serve.
Goals	Improve prenatal health and outcomes, improve child health and development, improve families' economic self-sufficiency and/or maternal life course	Reduce child maltreatment, improve parent-child interactions and children's emotional well-being, increase school readiness, promote child physical health and development, promote positive parenting, promote family self-sufficiency, increase access to community services, decrease child injuries and utilization of emergency departments.
Program Model	Weekly home visits for the first month after enrollment, then every other week until birth. After birth, weekly home visits for six weeks then every other week until the child reaches 20 months of age. The last 4 visits are monthly and cease at 2 years of age.	One home visit per week for first 6 months of enrollment. Visit frequency then varies based on need, and continues through age 3 or five (dependent on site funding).

Demographics and Current Programming

Orange County Demographics

In Orange County in 2012, 43.1% of all births were to women on Medicaid, 32.0% of all births were to women who were eligible for WIC. These numbers have steadily risen from 2008 in which 35.3 % of all Orange County births were to Medicaid recipients, and 28.2% were WIC eligible (NCS Center for Health Statistics, 2016). In 2015, 374 births were to women on Medicaid, 263 of which were to women receiving WIC benefits, translating to a roughly 70.32% overlap (Medicaid Data, USDA Food and Nutrition Data, 2016). Between 2010 and 2014 12.4% of live births in Orange County took place with an interval from the last delivery to conception of six months or less. This is a key indicator of the need for family planning services. From July of 2014 to June 2015, Orange County DHHS investigated 1,115 cases of suspected abuse or neglect, with 5 confirmed cases of abuse and neglect, 8 findings of abuse, 49 findings of neglect, and 252 findings that the child or family demonstrated a need for services (OCDHHS, 2016). In 2014, the birth rate per 1,000 teen girls aged 15-19 in Orange County was 4.4.

Though many of these statistics compare favorably with other counties in North Carolina, these data demonstrate that there are many women who meet criteria for eligibility for either NFP or HFA home visiting services. In addition, Orange County has the highest Gini score (51.7 in 2014) in the state of North Carolina (Opengov, 2016). The Gini is a metric to describe disparity, with a higher number indicating a greater disparity. In effect, this means that though we are among the wealthiest of counties in the state, the wealth is concentrated among relatively few people while many people have very little.

Current Programming

Community Care of North Carolina (CCNC)

CCNC is a managed primary care program that serves the majority of Medicaid recipients in North Carolina. The aim of CCNC is to improve the quality of health care for Medicaid beneficiaries in North Carolina, while containing costs (CCNC, 2015a). The program aid category in which a person receives Medicaid determines whether participation in CCNC is mandated or optional (CCNC, 2015a). Under CCNC, beneficiaries are assigned a medical home, which serves to coordinate the patient's health care services. Primary care services are coordinated through the medical home, and specialty care access requires referral by primary providers.

The Pregnancy Medical Home (PMH)

The pregnancy medical home is the division of CCNC which strives to improve the quality of maternity care, improve infant and maternal outcomes, and reducing healthcare costs (CCNC, 2015b). This initiative monitors outcomes, such as the rates of low birth weight, prematurity, and caesarian delivery. Participating providers are given financial incentives through Medicaid to complete risk screening and post partum visits., Other aspects of the PMH include collaboration with a pregnancy care manager, data and analytics from CC4C's informatics center, and clinical guidance materials and resources (CCNC, 2015b).

Obstetrical Care Management

Pregnant women on Medicaid in Orange County are enrolled in obstetrical care management. Those identified as high risk may be referred for home visiting through the CCNC program (CCNC, 2015a). This obstetrical home visiting is referred to as Care Coordination for Obstetrics (CCOB). Home visitors may be nurses or social workers, and support pregnant women by acting as a link between obstetrical providers, and coordinating pharmacy, nutritional, housing and counseling services as needed. After giving birth, all Medicaid eligible women in Orange County are entitled to a newborn/post partum home visit. This post-partum visit is provided by a registered nurse. The nurse home visitor assesses mother and baby and refers those with an identified need to CC4C for ongoing case management as described below.

Care Coordination for Children (CC4C)

Care coordination for children is the division of CCNC that provides care management for families with young children from birth through age 5 years who are considered at risk and qualify for services (CCNC, 2015c). Risk factors that warrant referral include but are not limited to special health care needs, infants who require a stay in neonatal intensive care (NICU), and toxic stress (CCNC, 2015c). Care coordinators are nurses or social workers who assist families through home visits and telephone calls. These coordinators identify programs, resources and services to meet the families' unique needs. Care coordinators also receive training to complete developmental assessments and serve as the link between the family and the child's doctor. This program is free for eligible families.

Adolescent Parenting Program

The adolescent parenting program (APP) is administered by the Orange County Department of Social Services. This free program is open to any pregnant or parenting teen aged 19 or younger who is actively pursuing a high school diploma or GED. Notably, this program accepts both men and women. Social workers meet with participants on a monthly basis, and use a curriculum based on the Parents as Teachers (PAT) program. Stated goals of this program include delaying subsequent pregnancy, completion of high school or GED, improving parenting practices, preparing for success in college or employment,

assisting with health care access for parent and child, and providing teaching about child development.

KidSCope Outreach Services

KidSCope is a division of the Chapel Hill Training-Outreach Project Inc., whose stated mission is "to develop and demonstrate programs and strategies that will enhance the lives of children and families." KidSCope's target population includes all children in Orange and Chatham Counties, particularly those at risk for developmental challenges or family challenges. Programming includes care consultation, outreach services, the Assuring Better Health and Development (ABCD) program, Incredible Years Parenting Education, Chatham Parenting NOW!, and Early Childhood Education consultation.

Incredible Years Parent Education: 15 week parent training program for children aged 3-6 years. Parents learn to promote school readiness, foster children's confidence, and address children's behavioral problems.

Orange County Head Start/Early Head Start

Currently, there are two head start programs serving Orange County. The Chapel Hill-Carrboro Head Start program of the Chapel Hill Carrboro City School System and the Orange County Head Start and Early Head Start program of the Chapel Hill Training and Outreach Project Inc. All Head Start families receive individualized services based on needs. Those who qualify for center-based services receive subsidized high quality childcare or preschool education. Families who qualify for the home-based option may attend parent-child playgroups and weekly home visits focused on parent education and child development. Early Head Start is among the programs found to be evidence-based by the HomVee analysis. Specifically, it shows favorable effects for primary outcome measures of child development and school readiness and positive parenting practices. There was insufficient evidence of positive impact on primary outcome measures of child health, family economic self-sufficiency, linkages and referrals, maternal health or reductions in child maltreatment.

Comparison of Outcomes

Apples to Apples

This report aims to provide key stakeholders with insight into the level of evidence, fit with community needs and implementation considerations for the Nurse Family Partnership and Healthy Families America programs home visiting programs for Orange County. NFP and HFA were chosen in partnership with representatives of OCHD because they have been deemed evidence-based by the HomVee analysis, and because of the depth and breadth of their positive impacts on at-risk families. By utilizing the rigorous HomVee analysis as a basis for comparing outcomes, we are able to make as close to an "apples to apples" comparison as is possible for two programs with somewhat different goals and

which serve slightly disparate populations. What these programs share is the mission to serve families at risk for toxic stress, and minimize adverse childhood experiences (ACEs).

In attempting to compare these programs, it is important to take note of some key differences. The Nurse Family Partnership serves only first time mothers who are enrolled before the 28th week of gestation who are considered "at-risk." The Nurse Family Partnership was designed as a randomized controlled trial and launched in three demonstration sites in 1977, 1988 and 1994. In 1996 the first replication sites were launched, and the program is now in 42 states with some international sites as well. The reader will note that there is a wealth of longitudinal data available in support of NFP as a result of both the length of time it has been in existence and their extensive data collection and research protocols. In 2003, NFP established a National Service Office (NSO) to provide ongoing support to implementing agencies as well as assist in facilitating quality replication at new sites. Healthy Families America was launched in 1992 by Prevent Childhood Abuse America. This program has likewise grown from 25 sites to 624 implementation sites in 34 states. HFA is designed to serve any family considered to be at risk regardless of parity. Unlike NFP, which began with RCTs, HFA created a program and outcome data has been collected post hoc. Some implementation sites have undertaken RCTs to evaluate HFA, notably the New York Study, which will be discussed in detail later in this report. In addition, where NFP has been collecting outcomes data from virtually all implementation sites on the individual participant and aggregate levels, HFA is only now launching an outcomes collection system. Like NFP, HFA has a national office to support implementation sites, and they have recently created a "Director of Research" position to facilitate in the creation and dissemination of evidence in support of their program.

A Note About First Time Mothers

It is a long held tenet of MIECHV programming that first time mothers are ideal candidates for intervention. David Olds, the founder of NFP so strongly believed this group to be ideal for intervention that he has in fact never empirically tested his intervention head to head between primiparous and multiparous women. There is little data actually comparing these two groups. The HomVee analysis does not analyze outcomes according to parity. A six-year evaluation of the Hampton Healthy Start program in Virginia (Galano & Huntington, 1999) found that any differences between primiparous and multiparous mothers were less than the differences between intervention and control groups. A later study of HFA by Galano and Huntington (2012) used multiple regression analysis to look at the relationships between client demographics (including parity), program participation and program outcome. This study found that multiparous mothers enrolled in HFA participated similarly and had comparable outcomes to primiparous mothers, after controlling for individual risk factors. Galano & Huntington (2012) further concluded that for the three outcome measures studied, there was no significant relationship with parity.

A Brief Overview of Outcomes

The table below outlines the number of studies reviewed by HomVee for each program, as well as the study design ratings.

Table 2. Number of HomVee Eligible Studies

	Healthy Families America	Nurse Family Partnership
Number of Studies	190	179
Studies Eligible for HomVee Review	57	41
Studies Rated High	12	23
Studies Rated Moderate	8	5
Studies Rated Low	32	10

The table below highlights the evidence-based favorable primary and secondary outcome measures of both NFP and HFA by the HomVee review of literature and analysis.

Table 3. Outcome Domains for HomVee

	Primary Outcomes for NFP	Primary Outcomes for HFA	Secondary Outcomes for NFP	Secondary Outcomes for HFA
Child Development and School Readiness	6	9	1	2
Child Health	5	0	5	5
Family Economic Self-Sufficiency	4	0	17	3
Linkages and Referrals	0	1	0	1
Maternal Health	8	0	18	2
Positive Parenting Practices	5	3	1	5
Reductions in Child Maltreatment	7	1	0	14
Reductions in Juvenile Delinquency, Family Violence and Crime	0	0	9	1

In addition to the impacts highlighted above, the Nurse Family Partnership has research devoted to mothers who are not only deemed to be at risk from an economic or educational standpoint but who also suffer from "low psychological resources." HomVee considered these studies separately and evaluated outcomes separately. Within the low psychological resources subgroup, HomVee found 22 favorable impacts on primary outcome measures for the "Child development and school readiness" outcome domain.

In 2013, Ted Miller of the Pacifica Institute reviewed all of the outcomes demonstrated by NFP in high quality RCTs and compiled a list of expected outcomes (Table 4). Unfortunately there is not a similar compilation that projects outcomes for HFA at this time.

Table 4. Expected NFP Outcomes

Smoking During Pregnancy	24% reduction in tobacco smoked
Complications in Pregnancy	27% decrease in pregnancy induced hypertension
Preterm First Births	18 % reduction in births below 37 weeks gestation
Infant Deaths	60% reduction in infant deaths
Closely Spaced Second Births	31% reduction in second birth 2 years post-partum
Subsequent Pre-Term Births	37.7% fewer preterm births in subsequent preterm births
Breastfeeding	12% increase in mothers who attempt to breastfeed
Childhood Injuries	38% reduction in injuries treated in emergency department ages 0-2
Child Maltreatment	31% reduction child maltreatment through age 15
Language Development	39% reduction in language delay, 0.14 fewer remedial services by age 6
Youth Criminal Offenses	46% reduction in crimes and arrests, ages 11-17
Youth Substance Abuse	53% reduction in alcohol, tobacco and marijuana use, ages 12-15
Immunization	23% increase in full immunization, ages 0-2
TANF Payments	7% reduction through year 9 post-partum, no reduction

	thereafter
Food Stamp Payments	9% reduction through year 10 post partum
Person-Months of Medicaid Coverage	7% reduction through at least year 15 post-partum
Costs if on Medicaid	8% reduction through age 18
Subsidized Child Care	Caseload reduced by 3.6 per 1,000 families served

*Ted Miller, Ph.D., Pacific Institute for Research and Evaluation, Nurse-Family Partnership Home Visitation: Costs, Outcome and Return on Investment, April 30, 2013 and associated Return on Investment Calculator, 5/5/14.

Considerations for Implementation (Excerpted from HomVee *Implementation)*

The HomVee website is an invaluable resource in comparing various MIECHV programs. There are a number of helpful charts presented therein that provide a concise "snapshot" of what these programs look like, requirements for implementation, cost per family, and fidelity standards. The series of charts below were created using HomVee data to attempt a side by side comparison.

Table 5. Implementation Prerequisites

Prerequisites	NFP	HFA
Type of Implementing Agency	National Service Office does not specify a specific type of implementing agency. NSO does require that interested agencies have a demonstrated ability to serve low-income families, and submit a plan that outlines the agencies preparation to launch NFP.	National office does not specify type of agency. May be implemented publically or privately or may be a stand-alone entity.
Staffing	Requires 4 staffing components: Nurse home visitors Nurse supervisors An administrative assistant for data entry Other administrative staff to ensure fidelity.	4 key staff positions: Family support workers who conduct home visits Parent survey staff who conduct family and child assessments Supervisors who provide administrative, clinical and reflective

	Nurse home visitors maximum caseload is 25 families	supervision and Program managers to oversee operations, funding, quality assurance and evaluation. Maximum case load is 15 families if all require weekly visits, 25 for less frequent visits
Staff Education and Experience	Home visitors and supervisors must be RNs with a minimum of a baccalaureate degree in nursing. NSO prefers that supervisors have at least a master's degree in nursing. Required annual seminars for NFP staff for continuing education regarding the model.	Direct service workers (family support workers and parent survey staff) must have at least a high school diploma.
Supervision	Full time nursing supervisor may not supervise more than 8 home visitors. Focus is on reflective supervision.	1 supervisor for maximum of 6 FSWs, preferred ratio 1:5
Technology/ Data Management	Requires use of Efforts to Outcomes (ETO) web based data system	Individual sites report aggregate data in HFA's web-based tracking system.

Table 6. Training Considerations

Training	NFP	HFA
Certification Requirements	Agencies considered to be implementation sites after contract accepted by NFP NSO. Implementing agency must demonstrate need, funding plan, community support, referral plan, ability to recruit and retain qualified nursing staff	Requires a commitment to 12 critical elements. Sites must complete an application an HFA application for affiliation. By third year of affiliation, sites must complete an accreditation process composed of three steps: Self-assessment Peer review by at least two HFA certified reviewers Accreditation decision made by HFA

		panel
Staff Training	4-5 day mandatory pre-service core training by nationally certified HFA trainers, ongoing non-mandatory in-service training consisting of distance learning and webinars available.	NSO requires that home visitors complete 3-core education sessions over 9 months (combination face to face and distance modules). Supervisors complete additional 4 sessions. In-service training is ongoing, with web-based modules for both supervisors and home visitors. Supervisors must attend annual training in Denver, Colorado designed to reinforce current best practices.

Table 7. Tools for Implementation

Tools	NFP	HFA
Operations Manuals	Online and print manuals, handbooks, home visit guidelines available to participating agencies	Healthy Families America Site Development Guide
Assessment Tools	Assessment tools are part of the provided home visit guidelines and the ETO	Requires use of an assessment tool to ascertain risk of child abuse and neglect. Most sites use Kempe Family Stress Checklist, though permission may be granted for other validated assessments
Curriculum	Requires home visitors to follow visit-by-visit guidelines, but encourages home visitors to adapt guidelines to the needs of clients.	Does not require a specific curriculum. Allows individual sites to tailor curriculum to community needs as long as it is based in evidence and focused on meeting HFA overall goals.
Languages	All materials are available in English and Spanish. In areas with high concentrations of immigrants, the use of interpreters is permitted.	Sites may select a curriculum available in languages spoken by target population.

Fidelity Measurement	NSO monitors data entered into ETO and ensure individual sites are meeting fidelity benchmarks. Data are reported to agencies and provide ongoing data driven assessment and implementation guidance. Nurse consultants and regional coordinators provide ongoing assessment and support for implementing agencies.	Aggregate data entered into database

Table 8. Fidelity Standards

Fidelity Standards	NFP	HFA
	NFP NSO requires implementing agencies to adhere to 18 fidelity standards, including: 1. Clients participate voluntarily in NFP. 2. Clients are first-time mothers. 3. Clients meet low-income criteria at intake. 4. Clients are enrolled in NFP early in the pregnancy and receive the first home visit by no later than the end of the 28th week of pregnancy. 5. Clients are visited one to one (one nurse home visitor to one first-time mother and her family). 6. Clients are visited in their homes. 7. Clients are visited throughout their pregnancy and the first two years of their children's lives in accordance with NFP guidelines.	***Service Initiation*** 1. Initiate services prenatally or at birth. 2. Use a standardized assessment tool to systematically identify families who are most in need of services. This tool should assess the presence of various factors associated with increased risk for child maltreatment or other poor childhood outcomes. 3. Offer services voluntarily and use positive outreach efforts to build family trust. ***Service Content*** 1. Offer services intensively (for example, at least once a week) with well-defined criteria for increasing or decreasing

8. Nurse home visitors and nurse supervisors are registered professional nurses with a minimum of a B.S. in nursing.
9. Nurse home visitors and nurse supervisors complete core educational sessions required by NFP NSO and deliver NFP with fidelity to the model.
10. Nurse home visitors use professional knowledge, judgment, and skill and apply the NFP visit guidelines, individualizing them to the strengths and challenges of each family and apportioning time across defined program domains.
11. Nurse home visitors apply the theoretical framework that underpins the program, emphasizing self-efficacy, human ecology, and attachment theories in their work with clients.
12. A full-time nurse home visitor carries a caseload of no more than 25 clients.
13. A full-time nurse supervisor provides supervision to no more than eight individual nurse home visitors.
14. Nurse supervisors provide nurse home visitors clinical supervision with reflection, demonstrate integration of the theories, and facilitate professional development essential to the nurse home visitor role through frequency of service and service over the long term (for example, three to five years).
2. Make services culturally competent such that the staff understands, acknowledges, and respects cultural differences among participants; staff and materials used should reflect the cultural, linguistic, geographic, racial, and ethnic diversity of the populations served.
3. Focus services on supporting the parent as well as supporting parent-child interaction and child development.
4. At a minimum, link all families to a medical provider to ensure optimal health and development. Link families to additional services, as needed.
5. Limit staff caseloads to ensure that home visitors have an adequate amount of time to spend with each family to meet their unique and varying needs and to plan for future activities.

Administration (Personnel, Staffing, Training, Supervision, Governance and Administration)

1. Select service providers because of their personal characteristics, their willingness to work in or their experience

specific supervisory activities, including one-to-one clinical supervision, case conferences, team meetings, and field supervision.

15. Nurse home visitors and nurse supervisors collect data specified by NFP NSO and use NFP reports to guide their practice, assess and guide program implementation, inform clinical supervision, enhance program quality, and demonstrate program fidelity.

16. NFP implementing agencies are located in and operated by organizations known in the community for being successful providers of prevention services to low-income families.

17. NFP implementing agencies convene a long-term Community Advisory Board that meets at least quarterly to promote a community support system to the program and to promote program quality and sustainability.

18. Adequate support and structure are in place to support nurse home visitors and nurse supervisors to implement the program and to ensure that data are accurately entered in the ETO data collection system in a timely manner.

working with culturally diverse communities, and their skills to do the job.

2. Train service providers about their role so they understand the essential components of family assessment and home visitation.

3. Give service providers a framework, based on education or experience, for handling the variety of situations they may encounter when working with at-risk families. All service providers should receive basic training in areas such as cultural competency, substance abuse, reporting child abuse, domestic violence, drug-exposed infants, and services in their community.

4. Give service providers ongoing, effective supervision so that they are able to develop realistic and effective plans to empower families to meet their objectives; to understand why a family may not be making progress and how to work with the family more effectively; and to express their concerns and frustrations so that they can see that they are making a difference and avoid stress-related burnout.

Cost Versus Benefit, Return on Investment Discussion

Table 9. Costs

Costs	NFP	HFA
Start Up	Initial education fees: $4,452 per nurse home visitor and $5,165 per supervisor. $9,981 Program support fees (first year) $14,163 Nurse consultation fees (in the first year.	$500 application fee, plus an annual start up fee of $4000 per year until the site obtains accreditation.
Variable	The national service office estimates that the average NFP per family cost is $4,100 (in 2011 dollars). This estimate includes materials, salaries and training for nursing staff and access to data management and reporting systems.	According to HFA National Office, the annual average cost of HFA per year ranges from $3,577 to $4,473 in 2014 dollars. This estimate includes personnel costs, training and fidelity costs, data system and evaluation tools.
Annual Fixed	$8,093 Nurse consultation $6,842 Program support fees (first year)	

Table 10. Three Year Cost Estimate

HFA	Year 1	Year 2	Year 3
Application Fee	$500.00	00.00	00.00
Start Up Fee	$4,000.00	$4,000.00	$4,000.00
Average Cost Per Year (50)	$223,650.00	$223,650.00	$223,650.00
	$228,150.00	**$227,650.00**	**$227,650.00**

NFP	Year 1	Year 2	Year 3
Home Visiting Nurse Education (2)	$8,904.00	00.00	00.00
Nurse Consultant Fees	$14,163.00	$8,093.00	$8,093.00
ETO Setup Fee	$3,275.00	$623.00	$623.00
Cost Per Family (50)	$205,000.00	$205,000.00	$205,000.00
	$231,342.00	**$213,716.00**	**$213,716.00**

The cost tables above are excerpted from the HomVee executive summary. Year 1, 2 and 3 costs are estimates based on the data provided in the HomVee analysis. Annual costs are likely overestimated for NFP above as the per-family cost includes education costs, which were also broken out separately. This was done to attempt to differentiate between start up and ongoing costs. Fifty families served are used for estimation, as the NFP National Service Office states that in most markets, cost-effectiveness is reached at a threshold of fifty families.

In addition to summarizing HomVee cost estimates, a literature review was conducted for both NFP and HFA to evaluate available evidence related to cost, return on investment and cost benefit analysis for each program. Utilizing the PubMed and Google Scholar search engines, search terms included the name of each program, as well as the words cost, cost benefit, return on investment, ROI, and cost effectiveness. The results of these literature reviews are discussed below.

NFP

In 2003, the State of Washington hire the Washington State Institute for Public Policy (WSIPP) to evaluate early childhood programming and determine which evidence based interventions would generate the greatest return on investment. At that time, WSIPP found that NFP demonstrated a benefit of $2.88 per dollar spent, and that total benefits minus costs for this program were equal to $17,180 per child (Aos et. al, 2007). The WSIPP updates these analyses periodically, and has always found NFP to have a positive return on investment. Over the years, this return has been found to be as high as $5.00 per dollar spent, with significant variation year to year. The most recent WSIPP assessment which was released in 2016 using a literature review updated in 2012 found a return of $1.61 per dollar spent, with a 58% chance that the program will produce benefits greater than it's cost. It is important to note that WSIPP expressly states that many positive outcomes of the programs evaluated are not able to be monetized, so the dollar amounts of benefits may be underestimated.

In 2003, the PNC Financial Services Group launched PNC Grow Up Great, a ten-year grant program aimed at improving school readiness for children from birth to age 5. As part of this initiative, PNC asked the RAND corporation to evaluate evidence based approaches aimed at this target population, and determine cost effectiveness for these

programs. RAND found NFP to be a cost effective intervention. The 2003 RAND report emphasizes earlier findings that demonstrated that the effective targeting of services generates increased economic benefits. An earlier RAND benefit-cost analysis of the NFP program conducted by Karoly et al. (1998) estimated results separately for both a higher-risk sample of mothers and children served as well as a lower-risk sample. Using the same categories for both the high and lower risk sub-samples, researchers were able to compare the benefit-cost results. The high-risk sample yielded benefits nearly 18 times greater than the lower risk sample ($34,148 versus $1,880 respectively), with benefit-cost ratios of 5.70 and 1.26 for the higher-risk and lower-risk samples. These differences demonstrate a greater program effect on the higher risk population compared with the lower risk population.

The Coalition for Evidence Based Policy has named the Nurse Family Partnership a "Top Tier" program as part of the "Social Programs that Work" initiative. In order to gain the top tier designation, an intervention must demonstrate sizable, sustained benefits to participants and/or society in well designed and implemented randomized controlled studies. Notably, NFP is the only prenatal/early childhood program to earn this designation. Through literature review and analysis of available evidence, the coalition states NFP's proven benefits to society include a 20-50% reduction in child abuse, neglect and/or injuries, a 10-20% reduction in subsequent births during the teens and early twenties, and improvement in cognitive and/or educational outcomes for children born to mothers with lower levels of mental health, confidence, or intelligence. Each of these societal benefits can be monetized, resulting in savings to taxpayers. The net cost to taxpayers according to the Coalition averaged $13,600 per woman served to deliver all program services. This cost was offset in two of three of NFPs initial trials by decreased welfare spending in the Elmira and Memphis trials, though the Denver trial did not result in decreased welfare spending to the same degree.

In 2013, Ted Miller of the Pacifica Institute reviewed all of the outcomes demonstrated by NFP in high quality RCTs and compiled a list of expected outcomes (Table 4). These outcomes were then monetized to attempt to predict the cost of administering the program, savings to state and federal government by the age of 18 for the index child, and total societal savings (Miller, 2013). The societal savings calculations use a formula which includes less tangible outcomes such as potential gains in work, wages, and quality of life. Traditionally, monetizing intangibles can be a controversial practice as it forces the researcher to assign dollar amounts to somewhat subjective questions. Consider for example, how much "preventing language delay" is worth. Those wishing to focus on only tangible measures of saving can look at "total government savings" (Table 11) as outlined by Miller, wherein he used more conventional methods of monetizing outcomes.

Some key findings in Miller's analysis which represent an immediate return on investment include a 60% decreased in infant mortality, a 31% reduction in second birth 2 years post-partum, an 18% reduction in pre-term births for the index child and a 37.7%

decrease in subsequent pre-term births (Miller, 2013). In addition, Miller found a 23% increase in full immunization for children ages 0-2, helping to diminish later barriers to school entry. Longer term outcomes such as decreased Medicaid costs through age 18, and decreased reliance on TANF and food stamps through 10 years post-partum demonstrate a significant economic benefit for recipients and taxpayers.

Table 11. Miller's Projected ROI for NFP

NFP cost per family served	$8,580
Savings to State Government at age 18	$8,044
Savings to Federal Government at age 18	$10,260
Total Govt. Savings at age 18	$18,304
Total Societal Savings	$52,209

*Ted Miller, Ph.D., Pacific Institute for Research and Evaluation, Nurse-Family Partnership Home Visitation: Costs, Outcome and Return on Investment, April 30, 2013 and associated Return on Investment Calculator, 5/5/14.

HFA

Like NFP, the WSIPP has evaluated the costs and benefits for HFA periodically since 2003. For the first time in 2016, WSIPP found HFA to have a positive return on investment projecting a $1.21 return for every dollar spent and a 51% chance that the program will yield a positive return. The 2012 evaluation found HFA to have a negative return, costing just over $2.00 per dollar spent. Notably, the 2016 findings for both NFP and HFA were based on the same 2012 data as previous reports, with only methodology changing for monetizing various outcomes. As the WSIPP numbers and methodology are somewhat fluid, it can be helpful to look at other economic evaluations. There are notably fewer large-scale economic evaluations of the Healthy Families America program compared with NFP. In evaluating analyses like those done by RAND, and the Coalition for Evidence Based policy described above, one contributing factor to this relative shortage of evaluations may be attributed to fewer longitudinal studies for HFA demonstrating long term program effects that may be monetized. Another important factor may be that HFA allows implementation sites to tailor the program to meet identified needs in a given community, resulting in less stringent fidelity standards. It is difficult, then, to attempt to generalize possible outcomes or savings for any given HFA site to other HFA implementation sites. This of course does not mean that HFA does not produce monetizable benefits for taxpayers or participants, rather that more data needs to be collected going forward in order to do so.

In the year 2000, the State of New York set out to address the lack of longitudinal evidence in support of HFA. The New York State Office of Children and Family Services (OCFS) Bureau of Evaluation and Research, in partnership with the Center for Human

Services Research at the University at Albany, initiated an RCT at three sites with the already existing Healthy Families New York (HFNY) home visiting program. Eligible families at each site were randomly assigned to either an intervention group that was offered HFNY services or to a control group that was provided informational materials and referral to services other than home visiting where appropriate. Baseline interviews were conducted with 1173 of the eligible women (intervention, n=579; control, n=594), with follow-up interviews at years 1 and 2. In the third year, a reduced sample was assessed (n=522) due to attrition.

In 2006, additional funding was obtained and a seven-year follow up to the initial study was conducted. This follow up specifically sought to determine to what extent HFNY sites adhered to the HFA model, whether home visiting prevented or reduced child maltreatment, whether the HFA home visiting model decreased the precursors to delinquency, and whether the long term benefits of HFA outweigh the cost of the program.

This study divided participants into subcategories. The High Prevention Opportunity (HPO) subgroup is defined as young, first time mothers who were randomly assigned prior to week 30 of pregnancy, and the Recurrence Reduction Opportunity (RRO) subgroup, defined as those who were already involved in a confirmed child protective services report. Together, the HPO and RRO groups made up approximately one fourth of the total sample, with 15% of the total sample in the HPO subgroup and 9% in the RRO subgroup.

Fidelity

The HFNY study provides in depth insight as to the degree to which implementation sites meet the standards of the HFA intervention. While the success of any program likely depends largely on the degree to which it meets fidelity requirements, for this cost related discussion, a few factors are notable. At HFNY sites, women who were assigned to Level 1, the highest level of need, only took part in 29% of the program models required weekly visits, falling short of the goal of 75% of visits completed as identified by the HFA national office standard. Significantly, the study also finds a high level of attrition. The average length of enrollment in HFNY was 20.68 months. Only 52% of participants remained enrolled at one year and 33% remained enrolled at the two year mark. With only 22% at three years and 4% at five years, very few families sustained enrollment for the length of the program. Only approximately 16% of families who enrolled in HFNY actually graduated from the program. While the authors of the HFNY assessment point out that these numbers are reflective of many other HFA sites, a high attrition rate would certainly have a negative effect on any cost benefit analysis or longitudinal study of program impacts.

Preventing and Reducing Maltreatment

The cumulative number of confirmed CPS reports for the entire sample did not demonstrate a statistically significant program effect. The study authors point out that this data may be skewed by increased detection and reporting among those enrolled in HFA. Further analysis showed that 42.9% of HFNY mothers who self- reported serious abuse and neglect had a CPS report compared with 22.2% of mothers who self- reported serious

abuse and neglect in the control (p<.05). These findings show that mothers assigned to HFNY were more likely to be detected for child maltreatment than mothers assigned to the control group, which may be attributed to a phenomenon known as surveillance bias. HFNY mothers less frequently reported use of serious physical abuse (.03 versus .15, p<.01) than mothers in the control group, and report using of non-violent discipline strategies more often (49.27 versus 45.27, p <.05). Children also reported less minor physical aggression from mothers enrolled in HFNY (70.8% versus 77.2%, p<.05)

In contrast, within the RRO subgroup there were lower rates of confirmed CPS reports for each type of abuse or neglect assessed (41.5% versus 60.4%, p<.10). For the HPO subgroup, a decrease in the cumulative number of CPS reports was not noted, though mothers in the HPO subgroup were less likely to engage in psychological aggression (79.7% versus 91.2%, p<.10) and were less likely to use minor physical aggression in parenting (3.7 versus 5.5, p<.10) than those in the control group.

Precursors to Delinquency

More children enrolled in HFNY were reported to participate in gifted programs as compared to children in the control group (AOR: 2.80, p<.01). Fewer children in the HFNY group were receiving special education services (AOR: .70, p<.10) or self-reported skipping school (AOR: .35, p<.01) compared with controls. Significant differences were not detected between the groups for the sample as a whole or within the HPO subgroup for problem behaviors, socio-emotional difficulties, and self- regulation. Children within the HPO subgroup were less likely to score below average on the PPVT-IV (AOR: .43, p<.05); less likely to be held back a grade (AOR: .45, p<.10), and more likely to be in gifted programming (5.8% versus 0%, p<.10).

Low Birth Weight

Lee et al. (2009) looked into the reduction of low birth weight through home visitation and found that mothers enrolled in HFNY prior to the 31st gestational week were roughly half as likely to deliver a low birth weight baby compared with the control group. The rates of LBW in this study (N=506) showed 9.1% of mothers in the control group, 7.1% of women on Medicaid, and 5.1% of mothers enrolled in HFNY prior to week 31 of gestation delivered LBW infants. This finding was particularly profound among African American women: Only 3.1% of African American women enrolled in the study had low birth weight (LBW) babies compared with 10.2% of African American women in the control group. The study authors attributed these program effects to a number of variables, stating that women in the HFNY program benefitted from referrals to health care providers, increased access resources such as food stamps, WIC, nutritional counseling, housing assistance and other social services. In their research brief, Dumont and Kirkland (2007) posit that by preventing LBW births, HFA generates both an immediate and sustained financial return on investment. This savings is attributed to the tremendous medical costs associated with the care of pre-term and LBW babies immediately after birth, and increased medical expenses from health problems, developmental delay and increased risk of maltreatment associated with LBW.

Cost

Overall, a woman enrolling in HFNY was found to net a savings of $628 in government costs. This demonstrates a recovery of 15% of the overall cost to provide HFNY services. For women in the RRO subgroup, investment in HFNY produced a net savings in government costs of $12,395 per family and a return of $3.16 for every dollar invested by the time the target child was 7 years old. This is a 316% recovery of the initial $3,920 HFNY cost invested. HFNY women in the HPO subgroup generated a savings of $1020 per family in the net cost to government, recovering 25% of the initial investment in the program by the target child's 7th birthday.

These HFNY findings highlight several important themes. These data support the idea that carefully targeting the HFA program to those most at risk will increase cost effectiveness. Unfortunately, the HFNY findings suggest that despite demonstrable positive impacts for program recipients, HFNY did not demonstrate a reliable financial return on investment for the taxpayer, except in the case of mothers who have a confirmed prior CPS report, or those women who are enrolled prior to the 31st week of gestation.

Funding

Funding for each of these programs is most often comprised of a variety of federal, state and private monies. There is a great deal of overlap in funding sources for all MIECHV programming. Some of the commonly cited funding sources for HFA and NFP in North Carolina are highlighted below.

NFP Funding Opportunities

NFP is frequently funded by an array of federal, state and local public funding sources, including Medicaid, Title V Maternal and Child Health Services Block Grants, Temporary Assistance for Needy Families (TANF), Child Care Development Block Grant, Healthy Start, Early Head Start, child welfare and foster care prevention funds, juvenile justice, tobacco settlement funds and state and local revenue based funds. The NFP implementation manual provides a more comprehensive list of funding sources utilized across the country (Appendix E). Highlighted below are commonly sited funding sources for implementing agencies in North Carolina.

MIECHV Federal Grant

The Federal Home Visiting Program was established by Congress in 2010. In March 2014, funding was extended through March 2015, building on the initial $1.5 billion investment. In April 2015 Congress passed the Medicare Access and CHIP Reauthorization Act of 2015, which includes a 2-year extension of the Home Visiting Program through FY 2017 at current funding levels. This legislation enjoyed widespread bipartisan support. Though the future of MIECHV federal funding is somewhat uncertain and dependent on political outcomes, there is strong reason to believe this funding will be perpetuated. The DocFix bill currently before congress would increase MIECHV spending

from 400 to 800 million annually. In addition, there is a budget line item before the North Carolina legislature to increase NFP funding from $1.3 million to $6.3 million annually.

The Kate B Reynolds Charitable Trust

This trust was established with the legacy of the late Kate Gertrude Bitting Reynolds. The mission of the trust is to improve the quality of life and the quality of health for the financially needy of North Carolina. The Kate B Reynolds trust targets three key areas: impact, innovation and influence and leverage. Though many grants offered through this trust are limited to counties with a "Tier 1" designation, there are opportunities to meet with trust representatives to discuss specific proposals.

The Duke Endowment

Established in 1924, the Duke Endowment works to strengthen communities in North and South Carolina by supporting programming aimed at nurturing children, as well as promoting health, education, and spiritual enrichment. Duke Endowment funding for MIECHV services would fall specifically under the "prevention and early intervention for at-risk children" subdivision that allows for child care and health care related grant funding.

Blue Cross Blue Shield North Carolina Foundation (BCBSNCF)

The Blue Cross Blue Shield North Carolina Foundation's stated mission is to "Improve the health of North Carolinians." To that end, BCBSNCF has developed an outcome driven grantmaking approach, with three primary focus areas. These focus areas include the Health of Vulnerable Populations, Healthy Active Communities, and Community Impact through Non-Profit Excellence.

Other Resources:
The NC Partnership for Children
Prevent Child Abuse North Carolina

HFA Funding

HFA implementation sites report a mix of federal, state and local funding sources. Title IVB Family Preservation and Temporary Assistance for Needy Families make up 70% of federal dollars being used to support Healthy Families America programming. State funding for HFA comes from a wide variety of sources, including tobacco monies, the Department of Human Services, Department of Education and public health dollars.

Smart Start Grants

Smart Start is a North Carolina Initiative to ensure that each child meets his or her full potential. Smart Start strives to improve children's early care and education programs so that they are safe, healthy and provide opportunities for children to learn skills they need for success in school. Programs funded by Smart Start also provide parents with tools that support them in raising healthy, happy, successful children or ensure that children have access to preventive health care services.

Implementation Lessons from the Field

A 15-question survey (appendix F) was administered largely by phone interview to program supervisors or administrators regarding the practical challenges for implementing either NFP or HFA at their sites. Seven NFP supervisors, and four HFA supervisors were given this survey. Data from these interviews have informed other portions of this report, such as common local funding sources, and discussion of fit. Several themes emerged during these interviews, which are highlighted below.

HFA

Challenges

HFA program administrators frequently mentioned staff burnout and insecure funding as challenge areas in sustaining programming at their sites. A logistical concern contributing to burnout is the difficulty in scheduling home visits to meet families' needs. Many families require evening visits and there is often a mismatch between staff and family scheduling needs. The high needs nature of many of the families served further contributes to burnout, and administrators discussed the solitary nature of home visiting and the need for team building and staff support activities to foster a sense of team unity.

As with many grant funded programs, the insecure nature and need to reapply for funding were often cited as stressors for program administrators. Those with the most diverse funding sources were seemingly more optimistic about securing ongoing funding.

Another challenge for HFA administrators was related to outcomes data collection. Two interview subjects discussed the current state of research regarding HFA outcomes and essentially stated that they know they are having a number of positive societal and financial impacts but that it has historically been difficult to prove. Though home visitors and administrators are convinced of the successes of many of their families, some of that data has not always been captured. Going forward, the HFA national office is encouraging the standardization of data management systems across implementation sites. In addition, HFA now employs a national director for research. This office is currently held by Katherine Harding, who states that the national office for HFA has made data collection and outcomes research a priority.

A final challenge noted is that HFA does not have a "State System" in North Carolina. Though there is a regional implementation specialist, the HFA website asserts that State Systems are helpful in providing HFA training for staff at all sites, facilitating implementation of programs that meet the critical elements, assisting established sites in preparing for HFA accreditation, increasing public awareness and advocacy for HFA, identifying potential funding streams for HFA, and evaluating services and outcomes.

Strengths

Nearly all HFA program administrators felt that the flexibility of this program is an asset. This was an interesting finding, as the variability among home visitors' educational preparation and the tailoring of the program to individual communities, while convenient,

very likely contributes to the difficulty in capturing outcomes. In general administrators acknowledge this possibility, but express appreciation for the ability to serve the greatest number of participants. The diversity of needs of families served was further praised as a helpful tool in preventing staff burnout. In addition to flexibility, the HFA administrators unanimously stated that they felt there was adequate support from the HFA national office when questions or concerns arise.

NFP

Challenges

Challenges highlighted by multiple NFP administrators included staff burnout, turnover and difficulty in filling positions. Maintaining a home visiting staff of baccalaureate prepared nurses seemed to be a bigger struggle for more rural settings. Three NFP administrators highlighted the difficulty of caring for very high needs families, particularly those wherein the mother suffers poor mental health, either diagnosed and undertreated or undiagnosed. Finally, an additional theme of insecure funding arose. Administrators commented on the uncertainty associated with grant-funded programming. Many expressed that they were unable to pay competitive salaries for nursing and other staff due to budgetary constraints, and further expressed that in some cases, they only had secured funding for a fixed period of time (2-5 years). Though there was generally a feeling of optimism that grant funding would continue beyond the allotted time, the uncertainty was cited as a stressor.

Strengths

Three site administrators for NFP commented on the ease of data collection. NFP data is entered by home visitors as well as support staff into the Evidence to Outcomes (ETO) database. Using this data, regional and national supervisors are able to generate monthly progress reports for individual implementation sites, helping to direct goals and areas for improvement as well as recognize progress. This data is used by the national office in ongoing efforts to measure outcomes and enhance program design.

An additional cited strength was the network of support for NFP nurses and administrators. Regional supervisors, other NFP administrators in the state and the Community Advisory Board were discussed as sources of encouragement, advice and assistance with funding and political activities. Site administrators praised the “strength based approach” utilized by NFP leadership, as well as the quality of continuing education for home visitors and administrators. Those administrators who were part of the start-up process of bringing NFP to their communities expressed enthusiastically that there was tremendous support at the national and local level at every step in the process.

Summation

Both NFP and HFA offer a wide range of positive impacts for families at risk for adverse events related to poverty and toxic stress. Both programs demonstrate increased school readiness, though NFP excels in most other domains including maternal health,

child health, positive parenting practices and reductions in child maltreatment. NFP has been shown to be a valuable resource in assisting mothers with low psychological resources, an often underserved and difficult to serve population. NFP offers nearly four decades of RCTs demonstrating that they provide an evidence based and cost effective intervention. While the cost of these two programs are fairly similar, it is worth noting that NFP has been found by multiple agencies and across many repeated evaluations to offer a positive return on investment. Two important limiting factors for NFP include the need to employ registered nurses with a minimum of a bachelor's degree in nursing as home visitors, and the NFP requirement that the intervention be offered only to first time mothers.

HFA likewise has been found to be an evidence-based MIECHV program, though their data collection has not been as extensive to date. This may in part explain their inability to demonstrate the breadth of impacts that have been shown by NFP. In addition, unlike the stringent fidelity standards outlined for NFP, HFA has more flexibility in allowing implementing agencies to adapt the program, which likely dilutes outcomes. An important consideration regarding HFA, however, is that it would allow the implementing agency to serve multiparous mothers and could be offered to those already in crisis (those with a previous CPS referral, for example). In order to maximize return on investment for HFA, the preponderance of available data suggest that implementing agencies should prioritize the enrollment of women prior to the 31st week of gestation as well as those with a previous referral for child abuse or neglect. Either program has the potential to assist families living in poverty to develop positive parenting practices, and raise children who are ready for kindergarten.

Appendix A

Review Process

DHHS Criteria for Evidence-Based Program Models

To meet DHHS' criteria for an "evidence-based early childhood home visiting service delivery model," program models must meet at least one of the following criteria:

- At least one high- or moderate-quality impact study of the model finds favorable, statistically significant impacts in two or more of the eight outcome domains
- At least two high- or moderate-quality impact studies of the model using non-overlapping analytic study samples with one or more favorable, statistically significant impacts in the same domain

In both cases, the impacts must either (1) be found in the full sample or (2) if found for subgroups but not for the full sample, be replicated in the same domain in two or more studies using non-overlapping analytic study samples. Additionally, following the legislation, if the program model meets the above criteria based on findings from randomized controlled trial(s) only, then one or more favorable, statistically significant impacts must be sustained for at least one year after program enrollment, and one or more favorable, statistically significant impacts must be reported in a peer-reviewed journal.[1]

For results from single-case designs to be considered towards the DHHS criteria, additional requirements must be met:

- At least five studies examining the intervention meet the WWC's pilot single-case design standards without reservations or standards with reservations (equivalent to a "high" or "moderate" rating in HomVEE, respectively).
- The single-case designs are conducted by at least three research teams with no overlapping authorship at three institutions.
- The combined number of cases is at least 20.

[1] Section 511 (d)(3)(A)(i)(I)

Appendix B

HomVEE Study Rating	Randomized Controlled Trials	Quasi-Experimental Designs		
		Matched Comparison Group	Single Case Design[b]	Regression Discontinuity[b]
High	• Random assignment • Meets WWC standards for acceptable rates of overall and differential attrition[a] • No reassignment; analysis must be based on original assignment to study arms • No confounding factors; must have at least 2 participants in each study arm and no systematic differences in data collection methods • Controls for selected measures if groups are different at baseline	Not applicable	• Timing of intervention is systematically manipulated • Outcomes meet WWC standards for interassessor agreement • At least three attempts to demonstrate an effect • At least five data points in relevant phases	•Integrity of forcing variable is maintained •Meets WWC standards for low overall and differential attrition •The relationship between the outcome and the forcing variable is continuous •Meets WWC standards for functional form and bandwidth

Moderate	• Reassignment OR unacceptable rates of overall or differential attrition[a] • Baseline equivalence established on selected measures • No confounding factors; must have at least 2 participants in each study arm and no systematic differences in data collection methods	• Baseline equivalence established on selected measures and controls for baseline measures of outcomes, if applicable • No confounding factors; must have at least 2 participants in each study arm and no systematic differences in data collection methods	• Timing of intervention is systematically manipulated • Outcomes meet WWC standards for interassessor agreement • At least three attempts to demonstrate an effect • At least three data points in relevant phases	• Integrity of forcing variable is maintained • Meets WWC standards for low attrition • Meets WWC standards for functional form and bandwidth
Low	Studies that do not meet the requirements for a high or moderate rating.			

Appendix C

NFP HomVee Findings

Outcomes	Primary Outcome Measures	Secondary Outcome Measures
Child Development and School Readiness	Favorable: 5 No effect: 54 Unfavorable or Ambiguous: 0	Favorable: 1 No effect: 17 Unfavorable or Ambiguous: 1
Child Health	Favorable: 4 No effect: 25 Unfavorable or Ambiguous: 1	Favorable: 2 No effect: 31 Unfavorable or Ambiguous: 1
Family Economic Self-Sufficiency	Favorable: 4 No effect: 16 Unfavorable or Ambiguous: 1	Favorable: 16 No effect: 78 Unfavorable or Ambiguous: 1
Linkages and Referrals	Favorable: 0 No effect: 0 Unfavorable or Ambiguous: 0	Favorable: 0 No effect: 0 Unfavorable or Ambiguous: 1
Maternal Health	Favorable: 3 No effect: 17 Unfavorable or Ambiguous: 0	Favorable: 19 No effect: 61 Unfavorable or Ambiguous: 0
Positive Parenting Practices	Favorable: 4 No effect: 18 Unfavorable or Ambiguous: 0	Favorable: 2 No effect: 7 Unfavorable or Ambiguous: 0
Reductions in Child Maltreatment	Favorable: 7 No effect: 18 Unfavorable or Ambiguous: 0	Favorable: 0 No effect: 1 Unfavorable or Ambiguous: 0
Reductions in Juvenile Delinquency, Family Violence, and Crime	Favorable: 0 No effect: 5 Unfavorable or Ambiguous: 0	Favorable: 12 No effect: 76 Unfavorable or Ambiguous: 1

Appendix D

HFA HomVee Findings

Outcomes	Primary Outcome Measures	Secondary Outcome Measures
Child Development and School Readiness	Favorable: 9 No effect: 34 Unfavorable or Ambiguous: 0	Favorable: 2 No effect: 3 Unfavorable or Ambiguous: 0
Child Health	Favorable: 0 No effect: 9 Unfavorable or Ambiguous: 0	Favorable: 4 No effect: 31 Unfavorable or Ambiguous: 1
Family Economic Self-Sufficiency	Favorable: 0 No effect: 0 Unfavorable or Ambiguous: 0	Favorable: 3 No effect: 37 Unfavorable or Ambiguous: 2
Linkages and Referrals	Favorable: 1 No effect: 16 Unfavorable or Ambiguous: 1	Favorable: 0 No effect: 0 Unfavorable or Ambiguous: 0
Maternal Health	Favorable: 0 No effect: 7 Unfavorable or Ambiguous: 0	Favorable: 3 No effect: 62 Unfavorable or Ambiguous: 0
Positive Parenting Practices	Favorable: 2 No effect: 48 Unfavorable or Ambiguous: 0	Favorable: 4 No effect: 35 Unfavorable or Ambiguous: 0
Reductions in Child Maltreatment	Favorable: 1	Favorable: 14

	No effect: 33 Unfavorable or Ambiguous: 0	No effect: 109 Unfavorable or Ambiguous: 0
Reductions in Juvenile Delinquency, Family Violence, and Crime	Favorable: 0 No effect: 2 Unfavorable or Ambiguous: 0	Favorable: 1 No effect: 27 Unfavorable or Ambiguous: 0

Appendix E

Funding for Nurse-Family Partnership Implementation

Nurse-Family Partnership
Helping First-Time Parents Succeed

Funding for Nurse-Family Partnership must meet three broad requirements:

1) Funding must be appropriate to the model. That is, none of the requirements associated with receipt of funds should conflict or interfere with the nurses' ability to achieve fidelity to the model.
2) Funding must be adequate to fully support the budget.
3) Funding must be sustainable or replaceable, with an adequate plan and commitment indicated to assure that funding will remain adequate and secure over time.

Each of the funding sources listed below has been used successfully to support Nurse-Family Partnership. Certain funding streams are restricted to particular populations, or to particular developmental phases or purposes (e.g., pregnancy but not infancy; training, but not program operations). Some funding sources require competitive grant applications or are not available in all states. Some require matching funds. In some instances, several of these funding streams are utilized at the same time.

For additional information about which program implementing agencies use each funding source, and in what ways, please contact your Regional Program Developer in the Nurse-Family Partnership National Service Office.

- Medicaid (FFP 75%)
- Medicaid (TCM)
- Medicaid Community Health Administrative Match
- Tobacco settlement funding
- Maternal and Child Health (Title V) block grant funds
- Temporary Assistance for Needy Families (TANF)
- County health department funding
- County general funds
- School readiness program funding (state or county)
- Tax from gambling revenues directed toward selected social programs
- Early education block grant
- Private foundation funding for training and other start-up costs (generally not salaries or ongoing operating support)
- Safe Schools, Healthy Students grants
- City tax levy funds
- Funding for programs to reduce risks for childhood handicapping conditions
- Delinquency and Violence Prevention funding (state program focused on evidence-based programs)
- County children and youth needs-based budgeting process
- Healthy Start
- Federally Qualified Health Center funding
- Children with Special Health Care Needs funding
- SAMHSA grant
- Local child abuse and neglect or prevention funding
- March of Dimes, United Way or other non-profit child services council
- BlueCross BlueShield
- Affordable Care Act - Maternal, Infant, and Early Childhood Home Visiting Program

Appendix F Survey

MIECHV PROGRAM ADMINISTRATOR INTERVIEW QUESTIONS

Program Type_____

Site_____

Interview Date _____

Position _____

1. How long has program been administered at this site?
2. Who is your target population? How are they determined/referred?
3. Please describe your setting (urban/rural), approximate patient demographics, and number of families served?
4. Are you currently serving any families in a language other than English? Are you using interpreters, or are home visitors bilingual?
5. Do you have a waiting list? If so, what other resources are available for families you are unable to serve in your county?
6. How many staff?
7. What is the approximate staff turnover at this site?
8. What is the educational preparation required of staff at this site?
9. What is the greatest challenge regarding staffing for this site?
10. How are outcomes data collected?
11. What are the greatest challenges to sustaining this program at your site?
12. How is this program funded?
13. Are there specific data or metrics you use to justify funding at this site?
14. Do you feel you have sufficient support from the state/regional/national office when faced with challenges?
15. Any other helpful suggestions or thoughts for those considering implementation of this program in their county?

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APPENDIX 2: VIDEO LINKS

MIECHV Introduction: https://www.youtube.com/watch?v=P9JpLv6fLls

HFA/NFP Overview: https://www.youtube.com/watch?v=vjJtzFrY4hU

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