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FROM RANDOMIZED CONTROLLED TRIALS TO COMMUNITY-LEVEL CHANGE: WHAT SHOULD BE EXPECTED WHEN TAKING HOME VISITING PROGRAMS TO SCALE?

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ABSTRACT

Though home visiting programs have rapidly expanded across the country as an evidence-based policy choice for supporting families with young children, selecting an evidence-based model is not a guarantee of effectiveness. This paper is the first step in understanding whether these evidence-based programs can produce the change expected of them—what outcomes can be expected if the effects of large-scale implementation efforts mirrored those found in the programs' RCTs? A thorough review of the research related to parenting outcomes for four evidence-based home visiting programs participating in MIECHV was conducted. To provide additional context for the findings from the reviewed studies, the findings, significant and null, from each of the reviewed studies were synthesized and then compared to both the professional recommendations or standards and similar estimates from the population. In general, the research shows that home visiting programs have the greatest, albeit still modest, effect on parents' support for children's learning and in reducing the prevalence of child maltreatment, but that these effects are strongest for the most disadvantaged program participants. The research provides little support for the effect of home visiting programs on early health behaviors including prenatal care, breastfeeding, or well-child visits, or on reducing the use of harsh parenting. Implications for policy and future implementation efforts are discussed.

KEYWORDS:

home visiting, implementation, parenting, early childhood

BACKGROUND

Voluntary home visiting programs support and educate expectant parents and families of young children to improve maternal and child health, support child development, and increase family economic self-sufficiency (Michalopoulos, Duggan, Knox, Filene, Lee, Snell, et al., 2013). Home visiting programs often target at-risk families and children; in fact, many programs only enroll families who are low-income or living in poverty. Home visiting programs are operating in all 50 states and the District of Columbia and reach an estimated 3.5 to 4.3 percent of the 11.5 million children under age six who are living in or near poverty (Gomby, 2005; U.S. Census Bureau, 2012).

Currently, home visiting programs in the U.S. are receiving unprecedented support at both the state and federal levels. According to a recent survey conducted by the Pew Center on the States, in the 2010 fiscal year, states allocated $1.4 billion for home visiting programs (Pew, 2011). That same year, Congress established the Maternal, Infant, and Early Childhood Home Visiting Program (MIECHV), which offered states, jurisdictions, and American Indian tribes $1.5 billion in formula grant funding over five years to support the expansion and development of home visiting programs. Importantly, states were required to spend at least three-quarters of the federal funds on home visiting models that met federal standards of evidence-based effectiveness (DHHS, 2013). Even more recently, in 2013, President Barack Obama highlighted evidence-based home visiting programs as a part of his comprehensive, early learning agenda.

As many policy scholars have noted, that a national initiative has brought the importance of evidence-based practice to the forefront of public policy is a triumph for social science and demonstrates the importance of rigorous program evaluation (Astuto & Allen, 2009). With that triumph, however, comes a responsibility to ensure that the public's expectations for success of these programs are consistent with what researchers understand about the empirical evidence – will the same positive outcomes found in programs' randomized controlled trials emerge when those programs are taken to scale? Concomitant with increased investment is an increased concern for the return on investment – policymakers and the public want to know if the programs being invested in produce the outcomes expected of them (Boller, Daro, Del Grosso, Cole, Cole, Paulsell, et al., 2014).

To that end, the primary aim of this paper is to guide expectations about the extent to which home visiting programs can demonstrate significant and meaningful change when implemented at the community level by reviewing the effects of evidence-based home visiting programs on multiple aspects of early parenting. This review of the evidence base for four of the home visiting programs being implemented across the country with MIECHV funding illustrates the potential best case scenario after implementation—what outcomes are expected if the programs perfectly replicate the RCTs during implementation.

HOME VISITING AS AN EARLY CHILDHOOD INTERVENTION

Home visiting programs are a unique model of early childhood intervention in that they target parenting rather than the child by supporting parents' abilities to promote their children's development. This theory of change—influencing children indirectly through direct intervention with parents—is supported by decades of empirical evidence. Healthy pregnancies and positive parenting in early childhood predict fewer behavioral problems, better academic performance, and

stronger socio-emotional competencies (Gershoff, Aber, Raver, & Lennon, 2007; Mistry, et al., 2010; Yeung et al., 2002). Additionally, by delivering services in the home, home visiting programs can engage families who may be difficult to reach otherwise, and can allow for greater family involvement, personalized service, and individual attention, which may promote families' engagement and retention in the programs (Sweet & Appelbaum, 2004).

DO HOME VISITING PROGRAMS WORK?

Home visiting program models are numerous and the services vary widely according to children's age, the level of family risk, the type and number of services provided, program curriculum, the frequency and duration of the visits, qualifications for home visitors, and overall program goals. Over the last four decades, several home visiting programs have undergone rigorous tests of their effectiveness. Many programs have been evaluated with randomized controlled trials (RCTs), an evaluation method that has been recognized by the National Academies as providing "the highest level of confidence" in program efficacy or failure (Haskins et al., 2009). Reviews and meta-analyses of home visiting evaluations consistently find that the results are mixed, and when positive, tend to be modest at best (Astuto & Allen, 2009; Gomby, 2005; Sweet & Appelbaum, 2004).

The positive effects of home visiting programs that have emerged include improvements in maternal and child health, parenting attitudes and behaviors; better cognitive and social-emotional outcomes for children; and a lower incidence of child abuse and maltreatment (Sweet & Appelbaum, 2004). The average effect sizes for these findings, however, are small (typically ranging between 0.1 and 0.2 of a standard deviation), which raises the question of whether these small effects are substantial enough to make a visible difference in children's lives and whether they warrant the effort, time, and cost required to implement these programs on a large scale (Coalition for Evidence-Based Policy, 2011; Gomby, 2005; Sweet & Appelbaum, 2004). If the effects of home visiting programs on child and family outcomes are small in randomized controlled trials, then it may be considerably difficult for home visiting programs to produce sizeable effects when implemented broadly.

Additionally, there is the important question of external validity – to what extent can the effects, even if small, found in the RCTs be generalized to the larger population? The RCTs conducted on home visiting programs to date vary widely in sample size, the racial and ethnic composition of the sample, geographic location, and in length of follow-up. Some RCTs include samples of several thousand families and others only include a few hundred participants. Some RCTs were conducted on very homogenous samples (e.g., mostly a single race/ethnicity) and others include far more diverse samples. An evidence base gathered from RCTs on small and/or limited samples may not generalize as well to the larger population compared to an evidence base gathered from RCTs conducted with larger and varied samples.

IMPLEMENTATION IS KEY TO PROGRAM SUCCESS

Though home visiting programs have rapidly expanded across the country as an evidence-based policy choice for supporting families with young children, selecting an evidence-based model is not a guarantee of effectiveness. Implementation is a key determinant of whether or not children and families benefit from home visiting programs (Child Trends, 2013; Paulsell, Del Grosso, & Supplee, 2014). Careful monitoring of whether the program implementation adheres to the program's original design and purpose (i.e., model fidelity) is critical to ensuring that the program yields the range of outcomes observed in the randomized controlled trials. Programs that are well-designed, but implemented poorly will not produce their intended effects (Daro, Hart, Boller, & Bradley, 2012; Olds, Sadler, & Kitzman, 2007).

Home visiting program standards and content are often modified during implementation to fit local participants' needs, organizational capacity, and the community context (Daro et al., 2012). Whether these model modifications strengthen the program's effects or reduce the likelihood of achieving the impact found in the RCTs is uncertain and may depend on numerous factors. Prior research does show, however, that when home visiting programs adhere to a method of service delivery that has been documented to be effective and when those programs target the most high-risk families (e.g., those at risk for low birthweight, child abuse and neglect, poor nutrition, and other problems), home visiting programs can return up to $5.70 per taxpayer dollar invested (Karoly, Kilburn, & Cannon, 2005; Pew, 2011).

TAKING HOME VISITING PROGRAMS TO SCALE

In 2010, the Maternal, Infant, and Early Childhood Home Visiting Program (MIECHV) provided states, jurisdictions, and American Indian tribes with $1.5 billion in federal formula funding to support improvements in health and development outcomes for at-risk children through evidence-based home visiting programs. As a result of the MIECHV requirement that 75 percent of grantees' funds be directed toward *evidence-based* home visiting programs, the federal government contracted with Mathematica Policy Research, Inc. to conduct a systematic review of home visiting research to determine which home visiting program models met the U.S. Department of Health and Human Services' (HHS) criteria for "evidence-based." This review—the Home Visiting Evidence of Effectiveness (HomVEE) project—identified 14 models of home visiting programs as "evidence-based" (Avellar, Paulsell, Sama-Miller, & Del Grosso, 2013). The identified models demonstrated at least two favorable impacts in either randomized controlled trials or quasi-experimental designs rated to be of either high or moderate quality across measures of child and maternal health, school readiness, reductions in child maltreatment, positive parenting practices, family economic self-sufficiency, and referrals to other services.

Being "evidence-based" does not, however, ensure that these programs can be effectively translated into community practice or that they will be effective at producing the amount of change expected of them (Olds et al., 2007). Although each of the 14 identified program models received the same HomVEE "evidence-based" determination, the "evidence" in the "evidence-based" determination varies—the number of favorable impacts and the range of impacts across outcome domains both vary widely across program models (Avellar et al., 2013). For example, HomVEE identified 27 favorable impacts on primary outcome measures—those in which data were collected through direct observation or assessment, administrative records, or self-reported using a

standardized instrument—for the Nurse Family Partnership (NFP) program and 14 for Healthy Families America (HFA), but only four for the Home-based Instruction for Parents of Preschool Youngsters (HIPPY). Similarly, NFP shows at least one favorable impact in six of the seven primary outcome measures that have been evaluated in NFP, whereas Early Head Start-Home Based (EHS-HB) has only been evaluated on three primary outcome measures and showed a favorable impact in two.

Although the focus of this paper is to review the RCTs to identify the best potential outcomes home visiting programs can be expected to produce if replicated after large-scale implementation, there are several reasons to suggest that the outcomes found in the RCTs may not be replicated in implementation efforts. For example, the populations served differ from the characteristics of the populations in the programs' RCTs, implementation with complete fidelity to the model is extremely difficult, there is little guidance on how to replicate the model at sufficient scale to create change visible at the national level (Astuto & Allen, 2009), and family attrition and staff turnover—two issues endemic to community-level implementation—mean that families often do not receive the full dosage of the program, or in the least, the amount of dosage participants in the RCTs experienced. Moreover, the federal MIECHV requirements for the state home visiting programs vary from the RCTs in terms of such things as the outcomes measured, the timeline for program development, the incentives to participate, and the oversight of the programs. Though there are various reasons why the external validity of the RCTs may be limited, the RCTs provide a good starting point in understanding the impact home visiting programs can have when taken to scale.

CURRENT STUDY

This paper is the first step in understanding whether these evidence-based programs can produce the change expected of them—in other words, what do the RCTs tell us about the possible impact of home visiting programs? Parenting outcomes were chosen specifically to reflect the theory of change for home visiting programs, and because the most methodologically rigorous studies show that programs may be more likely to produce benefits in outcomes related to parenting rather than outcomes related to children (Gomby, 2005). In addition, growing evidence suggests that early intervention programs, and home visiting programs in particular, can effectively promote children's development through intermediary improvements in early parenting behaviors (Vogel et al., 2013; Sweet & Appelbaum, 2004).

A thorough review of the research related to parenting outcomes for four evidence-based home visiting programs participating in MIECHV was conducted. To provide additional context for the findings from the reviewed studies, the findings, significant and null, from each of the reviewed studies were synthesized and then compared to both the professional recommendations or standards and similar estimates from the population. Together, the review of the research and the comparisons with population estimates help establish realistic expectations for the amount of change in parenting outcomes that home visiting programs can produce if the outcomes mirrored those found in the RCTs.

METHOD

To conduct our review and analysis of the evidence-base for a sample of home visiting programs participating in MIECHV, we consulted the HomVEE project to identify the relevant research and the Design Options for Home Visiting Evaluation (DOHVE) project to identify the parenting outcomes prioritized by MIECHV. Additional detail about the data sources and how the sample of home visiting programs was selected are presented below.

DATA

The ability to draw relevant conclusions about what can be expected from home visiting programs depends on being able to examine the same evidence base that was evaluated by the federal government. Thus, the primary source of research for the present review is the database of literature identified in the HomVEE project. Every year, the HomVEE project includes a broad search for research on home visiting programs that serve pregnant women or families with young children (ACF, 2014). In addition to a thorough search of databases including Academic Search Premier, Child Care & Early Education Research Connections, EconLit, ERIC, Medline, PsychINFO, and Scopus, HomVEE issues a call at the beginning of each calendar year for studies to approximately 40 listservs for dissemination. The research identified is then screened for relevance. To be included in the HomVEE project, studies must meet the following criteria:

1. Home visiting is the primary service delivery strategy and the study examined a named home visiting program model.
2. The study relied on a randomized controlled trial, quasi-experimental design, or was an implementation study.
3. The program included the eligible target population (pregnant women or families with children from birth to age 5).
4. The study examined an outcome in at least one of eight eligible outcome domains (maternal health; child health; child development and school readiness; reductions in child maltreatment; reductions in juvenile delinquency, family violence, and crime; positive parenting practices; family self-sufficiency; and linkages and referrals).
5. The study was published in English and was published after 1979.

Supplemental searches for relevant research relied on the websites for each of the program models and the Administration for Children and Families (ACF) website.

SAMPLE

A thorough review of the evidence for each of the 14 home visiting models that were identified by HomVEE as "evidence-based" would be beyond the scope of the present paper. Instead, this paper focuses on a sample of four widely-used home visiting program models that met the DHHS "evidence-based" criteria: Early Head Start-Home Based (EHS-HB), Healthy Families America (HFA), Nurse-Family Partnership (NFP), and Parents as Teachers (PAT). These programs were selected because they are the four home visiting programs included in the Mother and Infant Home Visiting Program Evaluation (MIHOPE)—the legislatively mandated, large-scale evaluation of

the effectiveness of home visiting programs funded by MIECHV. A comparison of the four evidence-based programs selected for the present review is presented in Table 1.

Table 1. Evidence-based Home Visiting Program Models Included in Review

Program	States Served	Ages Served	Eligibility
Early Head Start-Home Based (EHS-HB)	50	Birth to three years	Family income at or below federal poverty level
Healthy Families America (HFA)	40	Birth to five years	Target population (e.g., low-income, first time mothers) is defined by individual HFA site. All families must be screened for the risk for child maltreatment or other adverse childhood experiences. Enrollment must occur during pregnancy or at birth.
Nurse Family Partnership (NFP)	43	Prenatal to two years	Mothers must be low-income (specific low-income eligibility varies) and pregnant with first child. Enrollment and first visit must occur prior to 28th week of pregnancy.
Parents as Teachers (PAT)	50	Prenatal to kindergarten entry	Eligibility criteria for the target population are defined by each site but may include income-based criteria, children with special needs, teen parents, etc.

PARENTING OUTCOMES

For each of the selected home visiting program models, this study examined the evidence base specifically for parenting outcomes. The evidence base should be strongest for parenting outcomes relative to child outcomes, where the theory of change is indirect. Six parenting outcomes were highlighted specifically: 1) prenatal care; 2) breastfeeding; 3) well-child visits/immunizations; 4) learning support behaviors; 5) child maltreatment; and 6) harsh discipline. Each outcome was selected for the review because it was included as a construct within one of the six MIECHV legislatively-mandated benchmark areas and thus, considered a federal priority and/or they were included as a relevant outcome domain in the HomVEE project. A description of each parenting outcome, the relevance for children's well-being and public health, as well as various ways in which each outcome is measured in studies of home visiting programs are presented in Table 2.

Table 2. Parenting Outcomes

	Importance	Recommendation	Definition/Measurement
Prenatal Care	Opportunity for physicians to 1) inform expectant mothers of healthy nutritional and psychosocial practices; 2) identify and manage risk factors and health conditions Babies born to mothers without prenatal care are 3 times more likely to be born at low birth weight and 5 times more likely to die (US DHHS, 2013) Among teen mothers, prenatal care services could save between $2,369 and $3,242 per birth (Hueston et al., 2008)	The American Academy of Pediatrics (AAP) recommends that pregnant women receive prenatal care once each month during the first 28 weeks, twice a month between the 28th and 36th week, and weekly thereafter until the birth of the child (AAP, 2012).	Population estimates: The % of mothers who received their first prenatal care visit late (third trimester) or received no prenatal care Home visiting program model RCTs: • The % of participants receiving *any* prenatal care services during pregnancy (EHS-HB & HFA) • The % of participants receiving prenatal care during the first trimester (EHS-HB) • Number of prenatal care visits, knowledge of prenatal care services, childbirth class attendance (NFP)
Breastfeeding	Breastfeeding is associated with reduced odds of infant mortality, bonding between mother and child, and healthy physical and psychosocial development of young children (Britton, Britton, & Gronwaldt, 2006; Chen & Rogan, 2004; Hauck, Thompson, Tanabe, Moon & Vennemann, 2011; Lawrence, 1997) An estimated $3.6 billion would be saved through reductions in the cost of treating childhood illnesses if at least 75 percent of mothers breastfed exclusively in the hospital at birth and 50 percent of mothers breastfed exclusively for 6 months after birth (Weimer, 2001)	The World Health Organization (WHO), AAP, and the Institute of Medicine recommend exclusive breastfeeding (i.e., no other food or drink) for the first six months of life with continued breastfeeding through the first year of a child's life or longer as complementary foods are introduced to achieve optimal growth, development, and health (AAP, 2012; WHO, 2001)	Population estimates and home visiting program model RCTs: The % of infants who were ever breastfed and the % of infants who were exclusively breastfed for 6 months (EHS-HB, HFA, & NFP)

	Importance	Recommendation	Definition/Measurement
Well-Child Visits/ Immunizations	Well-child visits are associated with a range of positive outcomes for young children including increased rates of immunization, reduced rates of emergency or urgent care, and both more frequent and earlier detection of developmental delays (Freed, Clark, Pathman, & Schectman, 1999). Vaccines are among the most cost-effective preventive services. For each birth cohort vaccinated with the routine immunization schedule, society saves 33,000 lives, prevents 14 million cases of disease, reduces direct health care costs by $9.9 billion, and saves $33.4 billion in indirect costs (U.S. Department of Health and Human Services, 2013).	According to the AAP, the first doctor's visit should occur 4 days after bringing the baby home. Afterward, visits should occur at 1, 2, 3, 6, 9, 12, 15, 18, and 24 months, and every year thereafter (AAP, 2014) The CDC recommends that children between 19 and 35 months, children have been immunized with the 4:3:1:3:3:1 Series Coverage (CDC, 2013)	Population estimates: • The % of children under age 6 who have received a well-child visit in the last year • The % of children between ages 19- and 35-months who have received the recommended combined series of immunizations Home visiting program model RCTs: • The total number of well-child visits that children have attended • The % of children who have received any immunizations • The % of children who are up-to-date on their immunizations
Learning Support	Parents play a key role in providing children with a wide range of cognitively stimulating experiences that foster their early academic achievement and ultimately, help children enter school ready to learn and reach their full potential (Crosnoe, 2012; Crosnoe, Leventhal, Wirth, Pierce, & Pianta,, 2010; Duncan, Ludwig, & Magnuson, 2007; Mistry, Benner, Biesanz, Clark, & Howes, 2010).	Parents should read to their children beginning in infancy and continuing until at least entry into Kindergarten (AAP, 2014)	Population estimate: The % of parents who report reading daily to their children Home visiting program model RCTs: • Observed learning support behaviors using the Home Observation for Measurement of the Environment (HOME) Inventory (EHS-HB, HFA, & NFP) • Parents' reports of teaching activities, provision of appropriate play materials, and the frequency of reading to their child

	Importance	Recommendation	Definition/Measurement
Child Maltreatment	Child maltreatment, defined as any type of abuse or neglect of children including physical and sexual abuse and emotional maltreatment, has both immediate and long-term consequences for children's well-being and is toxic for the family environment. Maltreated children are more likely to display depressive symptoms, aggressive behaviors, conduct disorders, and delinquency; they are also less likely to be liked by their peers, develop and maintain friendships, and demonstrate successful school adaptations (Cicchetti & Toth, 1995). According to the Centers for Disease Control and Prevention (CDC), the total lifetime cost of child maltreatment is more than $124 billion each year (Fang, Brown, Florence, Mercy, 2012).	N/A	Population estimates: • The rate (per 1,000) of children who are subject to an investigated report • The rate (per 1,000) of children who are confirmed victims of child maltreatment Home visiting program model RCTs: • The rate of child maltreatment among study participants • The rate of opened cases of child abuse and neglect
Harsh Discipline	Harsh forms of discipline, and spanking in particular, are consistently associated with greater behavioral problems in children, have harmful consequences for children's social-emotional development, and are ineffective at reducing children's misbehavior (Gershoff, 2002, 2013; Gershoff, Lansford, Sexton, Davis-Kean, & Sameroff, 2012)	The AAP has recommended that parents avoid using punitive forms of discipline, including spanking, as a parenting tool (AAP, 1998)	Population estimates of harsh discipline are uncommon, but generally present the percentage of parents who report having ever spanked their child Home visiting program model RCTs: • The % of participants who spanked their child in the last week/last 2 weeks/last month • Parent attitudes and beliefs around using harsh discipline

REVIEW PROCESS

An exhaustive search of the HomVEE website, program model websites, and government agency websites produced a combined total of approximately 60 research studies for review: 11 articles were reviewed for EHS-HB, 18 for HFA, 19 for NFP, and 10 for PAT. For each program model, we identified which, if any, of the parenting outcomes had been examined. Studies that did not include an examination of at least one of the seven parenting outcomes of focus were excluded from our review. The studies included in the present review are presented in Table 3. For each of the included studies, we identified how the outcome(s) was measured, whether there was a significant effect or not, and the size of the effect if evident. We did not assess the quality of the study, because all of these studies have been accepted as meeting the federal standards for "evidence."

Table 3. Evaluation Studies Included in Review

	EHS-HB	**HFA**	**NFP**	**PAT**
Prenatal Care	Kisker & Kuhns, 2004	Daro & Harding, 1999	Kitzman et al., 1997; Olds et al., 1986	
Breastfeeding	Kisker & Kuhns, 2004	Mitchell-Herzfeld et al., 2005	Kitzman et al., 1997	
Well-child Visits/ Immunizations	Chazen-Cohen et al., 2013; Love et al., 2001; Love et al., 2002	Caldera et al., 2007; Duggan et al., 1999; Landsverk et al., 2002; Mitchell-Herzfeld et al., 2005	Kitzman et al., 1997	Campbell & Silva, 1997; Wagner et al., 1996; Wagner et al., 1999; Wagner & Clayton, 1999; Wagner & Spiker, 2001; Wagner et al., 2001
Learning Support	Chazen-Cohen et al., 2013; Jones Harden et al., 2012; Love et al., 2001; Love et al., 2002	Caldera et al., 2007; Duggan et al., 1999; Duggan et al., 2007; Landsverk et al., 2002; LeCroy & Krysik (2011)	Kitzman et al., 1997; Olds et al., 1986; Olds et al., 1994; Olds et al., 2002; Olds et al., 2004	Campbell & Silva, 1997; Wagner et al., 1996; Wagner et al., 1999; Wager & Spiker, 2001; Wagner et al., 2002; Zigler et al., 2008
Child Maltreatment	Green et al., 2014	Chambliss, 1998; Duggan et al., 2004; Duggan et al., 2007; DuMont et al., 2008; DuMont et al., 2010; Landsverk et al., 2002; LeCroy & Krysik (2011)	Kitzman et al., 1997; Eckenrode et al., 2000 Olds et al., 1986; Olds et al., 1994; Olds et al., 1997; Zielinski et al., 2009	Drazen & Haust, 1993; Wagner & Clayton, 1999
Harsh Discipline	Chazen-Cohen et al., 2013;	Caldera et al., 2007; Duggan et al., 2004; Duggan et al., 2007;	Kitzman et al., 1997; Olds et al., 1986;	Wagner et al., 1999; Wagner & Spiker, 2001

	Jones Harden et al., 2012; Love et al., 2001; Love et al., 2002; Roggman & Cook, 2010	DuMont et al., 2008; DuMont et al., 2010; Landsverk et al., 2002; LeCroy & Krysik (2011); Mitchell-Herzfeld et al., 2005	Olds et al., 1986

To provide additional context for the findings from the reviewed studies, for each parenting outcome (where appropriate and possible) we identified: 1) the professional recommendation or standard (e.g., according to the Ameican Academy of Pediatrics, how many well-child visits are recommended); and 2) the most recent population-level (both overall and low-income) estimate. Estimates for the overall and low-income population (when available) were gathered from the US Census Bureau and other national surveys including the National Survey of Children's Health (NSCH). When low-income population estimates were unavailable, data from the Fragile Families and Child Well-Being Study (FF) were analyzed to provide low-income estimates. The FF follows a cohort of almost 5,000 children born in large U.S. cities between 1998 and 2000—approximately three-fourths of whom were born to unmarried parents (McLanahan, Garfinkel, Reichman, Teitler, Carlson, Norland Audigier, 2003). Data were weighted to make the mother sample representative of all non-marital births in the seventy-seven US cities with populations over 200,000 in 1999, thus the data provide nationally-representative estimates. At baseline (birth), nearly three-fourths (73%) of mothers reported household incomes that were below 200 percent of the federal poverty line.

The findings, significant and null, from each of the reviewed studies were synthesized and then compared to both the professional recommendations or standards and the population estimates. These comparisons provided an important context to interpret the program effects.

RESULTS

The results of our review are presented for each parenting outcome below. In general, the research shows that home visiting programs have the greatest, albeit still modest, effect on parents' support for children's learning and in reducing the prevalence of child maltreatment, but that these effects are strongest for the most disadvantaged program participants. The research provides little support for the effect of home visiting programs on early health behaviors including prenatal care, breastfeeding, or well-child visits, or on reducing the use of harsh parenting.

Early Health Behaviors

Whether home visiting programs are associated with improvements in parents' early health behaviors was examined in these areas: mothers' use of prenatal care, breastfeeding, and children's well-child visits. In the reviewed literature, the four home visiting programs vary substantially in whether an impact has ever been measured for the outcome, how each outcome is measured, and whether a significant impact emerged. The variation in how each health outcome is measured and

in impact across the four home visiting programs is displayed in Table 4 and described in greater detail below.

Table 4. Variation across Home Visiting Programs in Early Health Outcomes

Outcome	Program Model	Measure	Comparison	Program
Prenatal Care	EHS	Percentage receiving prenatal care services during their pregnancy	N/A	95%
	EHS	Percentage receiving prenatal care during the first trimester	N/A	82%
	NFP	**Attending childbirth classes during pregnancy**	**54%**	**70%**
	NFP	**Knowledge on the number of prenatal care services**	**4.9**	**5.5**
	NFP	Number of prenatal visits	10.5	10.5
	HFA	Received prenatal care	N/A	94%
	HFA	Received prenatal care	N/A	75%
Breastfeeding	EHS	Ever-breastfed rate	N/A	59%
	NFP	**Attempted breastfeeding at six-months**	**16%**	**26%**
	HFA	Ever-breastfed rate	45%	46%
	HFA	Length of breastfeeding (months)	1.04	1.01
Well-child Visits and Immunizations	EHS	Receiving any immunizations at age two	98.2%	98.2%
	EHS	Receiving any immunizations at age three	98.5%	99.2%
	NFP	Number of well-child visits	4.8	4.6
	NFP	Percentage of children who had current immunizations	68%	70%
	PAT	Percentage of children who had current immunizations	65%	56%
	PAT	**Fully-immunized for his/her age (three-year follow-up)**	**8%**	**40%**
	HFA	Adequate well-child visits at age two	8%	4%
	HFA	Number of well-child visits at age one	4.54	4.61
	HFA	Up-to-date immunizations at age one	82%	82%
	HFA	Up-to-date immunizations at age two (Hawaii trial)	87%	85%
	HFA	Up-to-date immunizations at age two (Alaska trial)	27%	27%
	HFA	Number of well child visits at age three	1.9	2.4
	HFA	Up-to-date immunizations at age three	82.4%	84%

Note. Findings in bold represent a statistically significant ($p<.05$) difference between the program and comparison groups.

Prenatal care. Across the four home visiting programs, the evidence linking home visiting programs to prenatal care is thin. The strongest, albeit still modest, evidence for a link comes from an evaluation of the NFP program, which show impacts on attendance at child birth classes and knowledge of how to access prenatal care, but does not show an impact on actual prenatal care visits. More limited, but still promising, evidence comes from studies of EHS-HB and HFA. No evaluation of the PAT program has examined prenatal care.

In a randomized control trial of NFP, approximately 400 mostly white teenage and low-income women living in Elmira, NY—a small, semirural county in the Appalachian region of New York State—were randomly assigned to either the NFP program or to a comparison group (Olds, Henderson, Tatelbaum, & Chamberlin, 1986). Women in the treatment group were visited by nurse home-visitors, received free transportation, and were encouraged to keep prenatal care appointments, enroll in child birth education classes, and seek other community services when needed; whereas women in the control group received no services but were provided free transportation for regular prenatal and well-child care at local clinics and physician's offices. By the end of the pregnancy, a significantly ($p<.05$) higher proportion of nurse-visited women reported attending childbirth classes than did women in the comparison group (Table 4). On average, nurse-visited women also reported knowing how to access a significantly ($p<.05$) higher number of prenatal care services, including nutritional supplementation vouchers, calls to physician or clinic, childbirth education, and antepartum visits compared to women in the comparison group (Table 4). There was, however, no significant difference in the number of actual prenatal visits between nurse-visited women and women in the comparison group.

Findings from evaluations of EHS-HB and HFA are promising, but do not provide enough information to draw valid conclusions about impacts. The national Early Head Start Research and Evaluation Project (EHSREP) included approximately 3,000 families with a pregnant woman or infant under age 1, who were randomly assigned to either an EHS program (home-based, center-based, or mixed) or a comparison group that did not receive EHS services, but could participate in existing community programs. In a report from the EHSREP, almost all (99%) EHS mothers received prenatal care services at some point during their pregnancy. Additionally, most mothers (82%) started prenatal care during their first trimester (Kisker & Kuhns, 2004). Unfortunately, this report is the only report from the larger EHS evaluation to provide information on mothers' use of prenatal care, but did not examine the comparison condition, which prevents drawing valid conclusions about the impact of the EHS-HB program on mother's health behaviors during pregnancy. Pretest and posttest evaluations of the HFA program in Oregon and Tennessee showed that mothers in HFA programs were more likely to receive prenatal care for their subsequent pregnancies than they were for their first (Daro & Harding, 1999). The findings on prenatal care from evaluations of both the EHS-HB and HFA programs are encouraging, but stronger evidence from more rigorously designed studies is still needed.

Analyses of data from the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS) show that in 2010, 6 percent of mothers reported they did not receive any prenatal care or did not receive prenatal care until the third trimester of their pregnancy (U.S. Department of Health and Human Services, 2013). Data from NCHS also show that the percentage of births to mothers receiving little or no prenatal care varies by mothers' socioeconomic status.[1]

[1] Because income status is not asked in the Long Form Birth Certificate, the estimate of prenatal service use by income status is difficult to obtain. Maternal education is used alternatively here to indicate the differences in use of prenatal services by socioeconomic status.

In 2010, 12 percent of mothers with less than a high school diploma received late or no prenatal care compared to 3 percent of mothers with a bachelor's degree. Similar estimates emerge from the Fragile Families data—almost all (97%) of mothers reported at least one prenatal visit and among those reporting a prenatal visit, just over 2 percent reported the first visit being in the third trimester. The findings from the NFP program are not directly comparable to the data from the NCHS because of measurement differences, but the findings from the EHS-HB and HFA evaluations show that both programs are associated with rates of prenatal care similar to population averages, but rates higher than those reported among low-income mothers.

Breastfeeding. The evidence for an impact of home visiting programs on breastfeeding is driven almost entirely by the modest findings from an evaluation of NFP (Table 4). A study of HFA showed no significant impact on breastfeeding and the evidence from EHS-HB does not lend itself to causal conclusions. Breastfeeding has not been examined as an outcome in evaluations of the PAT program.

In a randomized controlled trial of the NFP program, a total of 1,138 primarily African-American, first-time pregnant women with at least two socio-demographic risks (unmarried, less than a high school education, or unemployed) living in Memphis, TN were randomly assigned to either the comparison group that was only provided with free transportation for prenatal care appointments, developmental screenings, and referral services for the child or to the NFP group, which was provided with additional nurse-visiting services (Kitzman et al., 1997). At six months postpartum, nurse-visited mothers were significantly ($p<.01$) more likely to have attempted breastfeeding at some point (26%) compared to mothers in the comparison group (16%), but no differences emerged in the duration of breastfeeding.

Evidence from the Early Head Start Research and Evaluation Project (EHSREP) shows that nearly 60 percent of mothers in EHS programs breastfed their children (Kisker & Kuhns, 2004), but again, the absence of any information about mothers' rates of breastfeeding in the comparison groups limits any ability to make causal conclusions. No significant impact on either the percentage of mothers ever breastfeeding or the length of breastfeeding emerged in evaluations of the HFA program (Table 4; Mitchell-Herzfeld, Izzo, Greene, Lee, & Lowenfels, 2005).

According to recent estimates from the 2011-2012 National Survey of Children's Health (NSCH), 21 percent of children were never breastfed, 62 percent were breastfed, but not exclusively for the first six months, and 16 percent were exclusively breastfed for the first six months (NSCH, 2011/12). In contrast, children from poor families are more likely to have never been breastfed. Among children born to families with incomes below the federal poverty level, 32 percent were never breastfed, 55 percent were breastfed, but not exclusively for the first six months, and 12 percent were exclusively breastfed for the first six months (NSCH, 2011/12). The NSCH rates of breastfeeding are comparable to authors' calculations of the Fragile Families data—approximately 50 percent of mothers reported ever breastfeeding their child. Although the proportion of mothers in EHS programs who breastfed their children was comparable to national averages among low-income families in 2011, the proportion of NFP mothers who reported ever breastfeeding was far below national averages. This may reflect NFP mothers in the Memphis trial being of higher risk (these mothers had to have at least two socio-demographic risks in addition to being a first-time pregnant woman) than mothers participating in the EHSREP.

Well-Child Visits and Immunizations. For the most part, home visiting programs have largely been shown to be ineffective at increasing rates of well-child visits and immunizations (Table 4). In the EHSREP, a higher percentage of children in the EHS treatment group had received any immunizations at age 2 and at age 3, but when the analysis was restricted only to families in

the home-based model of EHS, there was no impact of EHS participation on children having received any immunizations (Chazen-Cohen et al., 2013). Rates were extremely high among both treatment and comparison groups at age 2 (98%) and age 3 (99%). Similarly, across evaluations of the NFP program, no statistically significant differences have been documented for the number of well-child visits or the percentage of children who had current immunizations during the first two years of children's lives between families who had received nurse-visits and those who were provided only with the transportation to services and developmental screenings in the comparison group (Kitzman et al., 1997).

Mixed findings emerge from evaluations of HFA and PAT. There is little empirical support for the effectiveness of HFA on well-child visits or children's immunization within the first two years (Caldera, Burrell, Rodriguez, Crowne, Rohde, & Duggan, 2007; Duggan, et al., 1999; Mitchell-Herzfeld, et al., 2005). However, at age three, HFA participants reported significantly more well-child visits than participants in the comparison group (Table 4; Landsverk, et al., 2002).

Two PAT evaluations included more than 1000 families residing in California—one examined the effect of PAT as a stand-alone intervention and in combination with case management services for teen parents and the other examined the effect of PAT in a largely Latino sample of families (Wagner & Clayton, 1999). In both evaluations, there were no significant differences in the percentage of children who had current immunizations between families who had been randomly assigned to PAT and families in the comparison group. In contrast, a smaller evaluation of PAT found that children in families randomly assigned to the PAT program were more likely to be up to date on their immunizations compared to children in the comparison group (Wagner, Lida, Spiker, Hermandez, & Song, 2001). In this study, 206 women (primarily White and low-income) were recruited and randomly assigned to the PAT program or to a comparison group who received only the services already available in their community. Three years after enrolling in the PAT program, 40 percent of children in the PAT home visiting program were up-to-date on their immunizations compared to only 8 percent of the comparison group children (Table 4). This was a marked difference from the year one and year two follow-ups, in which no significant difference in being fully-immunized for their age emerged between program and comparison children.

Population estimates of rates of well-child visits and immunizations vary according to family socio-economic status (SES), though rates still remain relatively high across SES. According to Child Trends analyses of 2012 National Health Interview Survey data, among children under the age of six, those whose primary caregiver had less than a high school education were less likely to have had a well-child visit in the past year (80%) compared to children whose primary caregiver had a bachelor's degree or higher (93%; Child Trends, 2014). The authors' analyses of Fragile Families data show that at age one, less than 1 percent of mothers reported never having taken their child for a well-child visit and more than three-quarters reported four or more visits. National estimates from the Centers for Disease Control and Prevention, National Immunization Program, suggest that 77 percent of children under the age of three are current with their immunizations, compared to 69 percent of children living in families below the poverty line (Child Trends, 2014). The lack of effect of home visiting programs on well-child visits and immunizations may be driven by the fact that in the programs' RCTs, rates of well-child visits and immunizations tend to be relatively high in both the comparison and treatment groups. That is, there may be less room for home visiting programs to make a difference, if rates are already high.

Early Parenting Behaviors

The impact of evidence-based home visiting programs on parents' early parenting behaviors was examined in the following areas: parents' support of their children's learning, rates of child maltreatment, and parents' use of harsh discipline. The variation in how each parenting behavior is measured and in impact across the four home visiting programs is displayed in Tables 5, 6, and 7 and is described in greater detail below.

Learning Support. Many home visiting programs aim to educate parents about the importance of supporting children's early learning through frequent reading and a stimulating home environment and provide parents with the tools to support their children's early learning (Astuto & Allen, 2009). In general, evaluations of home visiting programs show fairly positive impacts on parents' support for children's learning, though the evidence is strongest for the most disadvantaged program participants (Table 5).

Table 5. Variation across Home Visiting Programs in Learning Support Behaviors

Outcome	Program Model	Measure	Comparison	Program
Learning Support	**EHS**	**The HOME Inventory (Kindergarten)**	**35.2**	**33.7**
	EHS	**Teaching activities (Kindergarten)**	**10.8**	**11.3**
	EHS	**Reading daily (Kindergarten)**	**27.3%**	**35.1%**
	EHS	**The HOME Inventory: Language & Literacy (age two)**	**10.1**	**10.3**
	EHS	The HOME Inventory: Language & Literacy (age three)	10.7	10.9
	EHS	**The HOME Inventory: Lanugage & Literacy (age five)**	**10.6**	**11.2**
	NFP	**The HOME Inventory (age two)**	**30.9**	**32.3**
	NFP	**The HOME Inventory Provisions of Appropriate Play Materials subscale (among the most disadvantaged at 10 months)**	**5.94**	**7.35**
	PAT	**Reading aloud to child to child (4-point scale) at 1-year assessment (among the very low income group)**	**2.5**	**3.0**
	PAT	**Tells stories, says nursery rhymes, sings with child (4-point scale) at 2-year assessment (among the very low income group)**	**2.9**	**3.4**
	HFA	The HOME Inventory (age one)	35.2	35.2
	HFA	The HOME Inventory (age two)	34.1	34.6
	HFA	Self-reported estimate of the time spent reading to the child on a weekly basis	2.72	2.46
	HFA	The Nursing Child Assessment Satellite Teaching (NCAST) scale	11.9	11.8

Note. Findings in bold represent a statistically significant ($p<.05$) difference between the program and comparison groups.

In the EHSREP, families who were randomly assigned to EHS were significantly (p<.05) more supportive of their children's language and literacy learning at age two and age five (but not at age three) compared to parents in the comparison group, who did not participate in EHS (Chazan-Cohen et al., 2013). Similarly, in analyses restricted to data from EHS home visiting programs participating in EHSREP (n=1,385 families), a significantly (p<.05) higher percentage of parents participating in EHS home-based programs provided home environments more supportive of language and literacy, read daily to their children, and engaged in more teaching activities upon school entry (two years after the program ended) compared to parents in the comparison group (Jones Harden, Chazan-Cohen, Raikes, & Vogel, 2012).

Evidence from two NFP RCTs also shows positive impacts on children's learning environments at home (Table 5). In the Memphis evaluation of NFP using a sample of African-American mothers (Kitzman et al., 1997), at age two, nurse-visited mothers had significantly (p<.01) higher scores on the HOME Inventory compared to mothers in the comparison group who did not receive nurse home visits. In the Elmira evaluation of NFP (Olds et al. 1986), there were no overall differences between the treatment and comparison group, but among the most disadvantaged (i.e., poor and unmarried teen families), parents in the treatment group were observed to provide significantly more appropriate play materials using the HOME inventory for their children than comparison group parents at both 10 months and 22 months. In the follow-up to the Elmira study (Olds, Henderson, Kitzman, 1994), no overall treatment differences on the HOME Inventory emerged at either 34- or 46-months, but the nurse-visited poor, unmarried teens scored significantly higher on the provision of toys, games, and reading materials at 34 months and stimulation of language skills at 34 months and 46 months compared with poor, unmarried teens in the comparison group.

Positive effects on learning support have been documented in studies of the PAT program, but only for the most disadvantaged urban families (Table 5). In the large, multi-site evaluation of PAT, small effects on reading and telling stories, nursery rhymes, and singing songs were found among very low-income families (Wagner, Spiker, & Linn, 2002). At the one-year assessment, parents in the PAT program read to their children significantly (p<.05) more often than did parents in the comparison group and at the two-year assessment told stories, nursery rhymes, and sang songs with their children significantly (p<.05) more often than the comparison group. In another study of PAT, which included more than 5,000 children randomly selected from public elementary schools in Missouri (Zigler, Pfannenstiel, & Seitz, 2008), participation in the PAT program was associated with a stronger and more supportive home literacy environment (β = .10, p<.01). More supportive home environments, in turn, were linked with children's school readiness (β = .13, p<.01).

In contrast to the studies of EHS, NFP, and PAT, there is no support for an impact of HFA on parent's support of their children's learning. This may reflect the primary goal of HFA, which is to prevent child abuse and maltreatment through parental education and support rather than to promote children's school readiness. Studies of HFA have examined the impact on parents' provision of an adequate learning environment, mothers' reading practices, and fostering cognitive growth (Caldera et al., 2007; Duggan et al., 1999; Lecory & Krysik, 2011), but no significant differences between HFA participants and the comparison group have emerged.

Among a variety of strategies for supporting children's learning, reading to children remains one of the easiest, yet most important, ways of promoting early literacy skills and is the most common measure of parents' learning support in national surveys. According to data from the 2011/2012 National Survey of Children's Health (NSCH), however, less than half (48%) of

children are read to everyday and 7 percent of children are not read to at all (NSCH, 2012). The frequency of daily reading is even lower among low-income families. Approximately 34 percent of children in families with incomes below the federal poverty level are read to daily and nearly 12 percent of poor children are not read to at all (NSCH, 2012). Authors' analyses of Fragile Families data show that when children were age one, just 5 percent of mothers reported not reading to their children at all, while 25 percent of them reported reading 1-3 days per week, and nearly 40 percent reported reading 4-7 days per week. The varied ways of assessing parents' learning support makes it difficult to compare the findings from program evaluations to national estimates. Based on findings from the EHSREP, which reports the percentage of comparison and program participants that read daily to their children, participation in EHS-HB was associated with rates of daily reading (35.1%) comparable to national averages for low-income families (34%-40%).

Child Maltreatment. The results from several evaluations and randomized control trials show that home visiting programs may be an effective approach to reducing the prevalence of child maltreatment, but generally only for the most disadvantaged or at-risk families (Table 6). Studies of HFA, NFP, and PAT show no overall impact of program participation on reductions in child maltreatment, but do find effects for certain subgroups of their sample. Mixed evidence emerges from the single EHS study that has looked at child maltreatment.

Table 6. Variation across Home Visiting Programs in Child Maltreatment Outcomes

Outcome	Program Model	Measure	Comparison	Program
Child Maltreatment	**EHS**	**Likelihood of an encounter with child welfare**	***OR* = 0.64**	
	EHS	**Number of encounters with child welfare between ages 5 and 9**	***B* = -2.50**	
	EHS	**Substantiated report of physical or sexual abuse**	***B* = -1.24**	
	NFP	Substantiated abuse or neglect (2-year follow-up)	10%	5%
	NFP	**Rates of child abuse and neglect among the most disadvantaged group at age 2**	**.19**	**.04**
	NFP	**Substantiated reports of child abuse and neglect (incidence; 15-year follow-up)**	**.54**	**.29**
	PAT	**Opened cases of child abuse and neglect**	**2.4**	**0**
	HFA	Extreme physical abuse at 3-year follow-up (CTS-PC)	2%	4%
	HFA	Minor physical assault at 3-year follow-up (CTS-PC)	86%	86%
	HFA	Neglect at 3-year follow-up (CTS-PC)	27%	22%
	HFA	**Percent with a confirmed abuse or neglect (HPO subgroup) by age 7**	**19.3%**	**9.9%**
	HFA	**Rate of confirmed CPS report for any abuse or neglect (RRO subgroup) by age 7**	**60.4%**	**41.5%**
	HFA	**Number of total confirmed reports for mothers as confirmed subject (RRO subgroup) by age 7**	**1.6**	**0.8**

Note. Findings in bold represent a statistically significant ($p<.05$) difference between the program and comparison groups.

Most studies evaluating the impact of the HFA program suggest that there is no overall impact on child maltreatment (e.g., Chambliss, 1998; Duggan et al., 2004, 2007; Landsverk et al., 2002), but among the most vulnerable children and families, there is evidence that the HFA program reduces the frequency of child maltreatment (see Table 6; DuMont et al., 2010). In a randomized control trial of Healthy Families New York, no differences were found for cumulative rates or number of confirmed CPS reports for physical abuse or neglect between random assignment and age seven for the overall sample of nearly 1,200 families. In contrast, among a subgroup of young, first-time mothers who enrolled during pregnancy (N = 179), participation in HFA was associated with significantly lower cumulative rates of confirmed CPS reports from age five to seven compared to the comparison group ($p<.05$). Similarly, among a subgroup of mothers who had at least one

confirmed child protective services report prior to random assignment (N = 104), participation in HFA was associated with a significantly smaller number of total confirmed reports for mothers as the confirmed subject ($p<.05$), and lower rates of confirmed CPS reports for any type of abuse or neglect ($p<.10$).

In the Elmira randomized control study of the NFP program (Olds, Henderson, Chamberlin, & Tatelbaum 1986), there was no overall impact of NFP on child maltreatment, but positive effects emerged among the most disadvantaged subgroup in the sample (i.e., poor and unmarried teen mothers; Table 6). Poor, unmarried teen mothers who were visited by nurses demonstrated lower rates of child abuse and neglect than the most disadvantaged families in the comparison group during the first two years ($p<.07$; Olds et al., 1986). However, these differences disappeared two years after the program ended (Olds et al., 1994), but were again present at the 15-year follow-up ($p<.01$; Olds et al., 1997).

No available evidence links participation in PAT as a stand-alone intervention with reductions in child abuse, but findings from a California evaluation of PAT shows that participating in PAT in conjunction with a case management intervention is associated with a reduction in child abuse (Wagner & Clayton, 1999). In a study involving more than 700 teen families (though, it should be noted data were only collected on approximately half of these teenagers due to high levels of attrition), there were fewer opened cases of child abuse and neglect among three-year-old children in families participating in a PAT program that was provided in conjunction with a case management intervention compared to families in a comparison group ($p<.05$; Wagner & Clayton, 1999).

A recent study, the Early Head Start Child Welfare Study (EHSCWS) is the first to assess the impact of EHS on child maltreatment (Green et al., 2014). Child welfare administrative data were obtained for a subset of participants (N = 1,247) in the national EHSREP (7 or the 17 original EHSREP project sites). Compared to children in the comparison group, children in EHS (either center-based or home-based) had significantly fewer child welfare encounters between ages five and nine ($p<.01$), had fewer subsequent encounters ($p<.05$; Table 6), were less likely to have a substantiated report of physical or sexual abuse ($p<.01$), but were more likely to have a substantiated report of neglect ($p<.05$).

In 2012, just slightly more than nine in every 1,000 children were confirmed by Child Protective Services (CPS) to have been victims of maltreatment (U.S. Department of Health and Human Services, 2013). National estimates also indicate that very young children are the most vulnerable to maltreatment—in 2012, more than a quarter (26.8%) of victims were younger than age three and nearly 20 percent (19.9%) of victims were between ages three and five.

In addition to age, family income is also a risk factor for maltreatment. Specifically, data from the Fourth National Incidence Survey (NIS-4) show that in 2005 and 2006, approximately 22.5 children per 1,000 children in families of low socio-economic status (i.e., household incomes below $15,000 a year, parents' highest education level was less than high school, or any household member participated in a poverty-related program) experienced maltreatment (Sedlak, Mettenburg, Basena, Petta, McPherson, Greene, & Li, 2010).

Though it is difficult to compare the effects of home visiting programs on child maltreatment to national estimates of child maltreatment, the potential for home visiting programs to produce visible reductions in maltreatment is encouraging. The national estimates show that child maltreatment rates are highest among the youngest, most vulnerable populations, which are the same populations targeted by home visiting programs and the ones in which the strongest effects have been found.

Harsh Discipline. In contrast to the support for reductions in child maltreatment, there is little support for a link between home visiting programs and a reduction in the frequency with which parents use spanking as a disciplinary technique (Table 7). The research linking participation in EHS and HFA with discipline practices is mixed and there is little evidence to support an effect of NFP on discipline nor is there a research base for the link between PAT and harsh discipline.

Table 7. Variation across Home Visiting Programs in Harsh Discipline Outcomes

Outcome	Program Model	Measure	Comparison	Program
Harsh Discipline	EHS	Percent spanked in the last week at age two	52.3%	48.6%
	EHS	Percent spanked in the last week at age three	49.6%	44.1%
	EHS	Percent spanked in the last week at age five	36.4%	33.6%
	EHS	**Frequency of spanking in the last week at age three**	**N/A**	**N/A**
	NFP	Frequency of spanking or hitting in the last two weeks at six-month follow-up (Elmira)	1.09	1.71
	NFP	**The Adult-Adolescent Parenting Inventory (AAPI) total score (Memphis)**	**100.5**	**98.7**
	HFA	The Straus's Parent–Child Conflict Tactics Scale (CTS-PC): Attitudes toward Corporal Punishment	2.15	2.25
	HFA	AAPI: Parental Belief in Corporal Punishment	66%	71%
	HFA	**CTS-PC: Never slapped their children's hand**	**39%**	**57%**
	HFA	**CTS-PC: Frequency of minor physical aggression**	**3.46**	**2.40**
	HFA	**CTS-PC: Frequency of harsh parenting in the past week**	**1.81**	**1.21**

Note. Findings in bold represent a statistically significant ($p<.05$) difference between the program and comparison groups.

The Early Head Start Research and Evaluation study (EHSREP) showed no impact of participating in the home-based only program on parents' use of spanking at ages two, three, or five, but there was a positive effect for families participating in the program that combined center-based care with home visiting at ages two and three (Table 7; Chazen-Cohen et al., 2013). In a smaller study of EHS, in which 161 low-income families were randomly assigned to EHS or a comparison condition, there were no effects on the frequency of weekly spanking at two years of age, but there were effects at age three, whereby parents in EHS spanked their children significantly fewer times per week than did parents in the comparison group ($p<.05$; Roggman & Cook, 2010). The number of times parents spanked their children was not reported for the comparison or program groups—only that the difference was significant was reported.

The effects of HFA on harsh parenting are not consistent. There were no treatment-induced changes in parents' attitudes toward corporal punishment (Duggan et al., 2007), or use of corporal

punishment (LeCroy & Krysik, 2011). However, parents participating in HFA were less likely to slap their children's hand ($p<.05$; LeCroy & Krysik, 2011), demonstrate minor physical aggression ($p<.05$; DuMont et al., 2008), or utilize harsh parenting in the past week ($p<.05$; DuMont, et al., 2008). These findings may suffer from positive-attribution bias—mothers reported how often they engaged in each of these behaviors using a non-standardized measured called the Conflict Tactics Scale-Parent Child (CTS-PC); it is possible mothers may underreport their use of these discipline tactics.

In the Elmira NFP evaluation (a mostly White sample), mothers who were either visited by nurses during pregnancy only (N= 151) or during both pregnancy and infancy (N = 159) were no less likely to have spanked or hit their children in the last two weeks than were non-nurse visited mothers at a 6-month follow-up (Olds, Henderson, Chamberlin, & Tatelbaum, 1986). However, in the Memphis NFP evaluation (a mostly African-American and poor sample), nurse-visited women exhibited fewer child rearing beliefs associated with child abuse and neglect (e.g. lack of empathy, belief in physical punishment, unrealistic expectations for infant) than women in the comparison group two years postpartum ($p<.01$; Kitzman et al., 1997).

Data from a nationally representative telephone survey of 2,068 parents of young children (19-35 months), more than 64 percent of parents reported having spanked their child at least once (Regalado, Sareen, Inkelas, Wissow, & Halfon, 2004). Further, 22 percent of parents from low-income families (household income < $ 17,500) reported frequently (often or sometimes) using spanking as discipline practice compared with only 11 percent of parents from higher income homes (household income >$60,000; Regalado et al., 2004). Similar estimates of spanking among low-income families emerge from analyses of data from the Fragile Families Study—more than 23 percent of mothers reported spanking their children (at the age one follow-up) in the past month. These population estimates of spanking among low-income families fall far below the rates of spanking reported among participants in home visiting programs, which range between approximately 30 and 50 percent.

CONCLUSION

The purpose of this review was to carefully examine the research that contributed to the "evidence-based" designation for four home visiting programs participating in the Maternal, Infant, and Early Childhood Home Visiting program (MIECHV). The lofty expectations for success associated with being "evidence-based" require a deeper dive into the evidence to fully understand what can be expected from home visiting programs if the effects produced by large-scale implementation mirrored those found in the program models' RCTs. Though there are several reasons to suggest that the outcomes found in the RCTs may not be replicated in implementation efforts including population and geographic differences, implementation challenges, family attrition and staff turnover, and measurement issues, it is important to first examine the potentially best case scenario—what effects can be expected if the RCTs were replicated perfectly. This is especially timely given the large policy decisions being made based on the evidence base gathered from the models' RCTs.

Together, the 14 home visiting program models designated as "evidence-based" in the HomVEE review are associated with positive impacts in a range of outcomes including maternal, infant, and child health, school readiness, positive parenting, and reductions in the incidence of child abuse and neglect for children and families from pregnancy through school entry. It is

unlikely that a family would enroll in more than one or two different home visiting program models between pregnancy and preschool, making it important to understand the potential any single home visiting program has for success.

There is little research on the impacts of home visiting programs at scale and virtually no evidence on how to achieve quality on-the-ground implementation. Without that guidance, researchers must rely on the findings from the programs' randomized controlled trials. Though, RCTs are arguably one of the most rigorous forms of evaluation and the results of those trials generally provide a high level of confidence in program efficacy or failure, the external validity of RCTs can be limited.

Home visiting programs show some positive, but modest effects in RCTs, but whether or not those same results can be expected when the programs are taken to scale is unclear. The findings from the present review provide good reason to be cautious about the external validity of the evidence base for home visiting programs. The evidence base is drawn from RCTs conducted on small samples, in which many findings only emerge for an even smaller subgroup of the sample. The RCTs for NFP, HFA, and PAT were all conducted in samples drawn from a specific geographic context that is sometimes confounded with a sample of a particular race or ethnic background or socio-economic make-up. RCTs for the same program model do not produce identical findings across geographic context and when those contexts are confounded with a particular race/ethnicity or socio-economic status, it is impossible to parse apart an explanation for the differences.

Even still, the findings from the present review provide a basis to be optimistic about the improvement home visiting programs can have in some areas of child and family well-being. The findings also highlight, however, that the limited external validity of the most promising findings may mean that an impact on child and family well-being can only be expected for the most at-risk families. Additionally, there are other areas of child and family well-being where the evidence is not very strong, suggesting that expectations for success in these areas may need to be tempered.

The evidence supporting a link between participation in a home visiting program and parenting behaviors is the most consistent across programs for parents' support for their child's learning and for reductions in child abuse, but the effect is almost entirely limited to subgroups of the study sample who were most often the most disadvantaged or high-risk participants. Overall program effects for learning support emerged for EHS-HB, but program effects for NFP and PAT were almost entirely limited to the poorest and youngest participants. The findings for child maltreatment are similar—program effects for NFP and HFA were limited to the poorest and youngest participants and those who had a prior report of child maltreatment and the PAT finding was limited to teenagers who received PAT in conjunction with case management services.

In contrast, there is little evidence to support any association between participation in a home visiting program and prenatal care, breastfeeding, well-child visits, or reductions in the use of harsh parenting. In the case of prenatal care and well-child visits, improvement depends on external factors including access to a physician or other medical provider, transportation, and health insurance. The lack of effect could reflect the limited ability of home visiting programs, as a stand-alone program, to influence processes outside of the home. The amount of the program families received (i.e., dosage) and the length of time they remained in the program varied widely in the RCTs, which could also explain why the programs do not have stronger effects on certain outcomes. It is also the case that for some outcomes, namely children's immunizations, the rates are high among both program and comparison groups meaning the programs do not have a lot of room to show improvement.

That home visiting programs would have the strongest influence on the most vulnerable population is unsurprising. Other forms of early intervention including center-based early education and care also show the strongest effect on the subgroups at the highest risk (Brooks-Gunn, 2003). In a 2004 meta-analysis of the effects of home visiting programs to date, the authors examined program factors that may be associated with variation in outcomes across programs (Sweet & Appelbaurm, 2004). They concluded that program features, including staff type, were virtually unrelated to effect sizes, but that studies targeting one or more populations yielded higher effect sizes for children's cognitive development and child abuse than did studies in which families were universally enrolled.

What, then, can be realistically expected from home visiting programs? Based on the evidence from the programs' RCTs, if home visiting programs target the most at-risk families (i.e., young and poor parents, parents with a history of child maltreatment), the research suggests that these programs can positively influence parents' support of their children's learning and reduce rates of child maltreatment. Because the most at-risk families may also be the most difficult to reach in center-based settings, home visiting programs are at an advantage in that the very same high-risk families they need to target are the same families they may be better suited to reach.

To be the most effective, home visiting programs should be provided in conjunction with other services and support. The findings from this review indicate that these programs have the greatest potential to influence the processes that happen within the home environment, but are considerably more limited in their ability to influence outcomes that rely on resources and factors external to the home. Delivering home visiting programs within an organized system of early childhood services and support would likely allow home visiting programs to be more effective and allow families to be better served by them.

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