

Effectiveness of Home Visiting in Improving Child Health and Reducing Child Maltreatment

abstract

BACKGROUND AND OBJECTIVE: The Patient Protection and Affordable Care Act established the Maternal, Infant, and Early Childhood Home Visiting Program, which provides \$1.5 billion to states over 5 years for home visiting program models serving at-risk pregnant women and children from birth to age 5. The act stipulates that 75% of the funds must be used for programs with evidence of effectiveness based on rigorous evaluation research. Home Visiting Evidence of Effectiveness reviewed the home visiting research literature and provided an assessment of the evidence of effectiveness for program models that serve families with pregnant women and children from birth to age 5.

METHODS: Home Visiting Evidence of Effectiveness included a systematic search and screening process, a review of the research quality, and an assessment of program effectiveness. Reviewers rated studies' capacity to provide unbiased estimates of program impacts and determined whether a program met the Department of Health and Human Services' criteria for an evidence-based model.

RESULTS: As of July 2012, 32 models were reviewed, of which 12 met the Department of Health and Human Services criteria. Most of these models were shown to have favorable effects on child development. Other common favorable effects included health care usage and reductions in child maltreatment. Less common were favorable effects on birth outcomes.

CONCLUSIONS: Home visiting is a promising way to serve families who may be difficult to engage in supportive services. Existing rigorous research indicates that home visiting has the potential for positive results among high-risk families, particularly on health care usage and child development. *Pediatrics* 2013;132:S90–S99

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KEY WORDS

home visiting, child health, child development, child maltreatment

ABBREVIATIONS

CBFRS—Community-Based Family Resource and Support
DHHS—Department of Health and Human Services
ED—emergency department
EHS—Early Head Start-Home Visiting
EIP—Early Intervention Program for Adolescent Mothers
HFA—Healthy Families America
HIPPPY—Home Instruction for Parents of Preschool Youngsters
HomVEE—Home Visiting Evidence of Effectiveness
MIECHV—Maternal, Infant and Early Childhood Home Visiting
NFP—Nurse-Family Partnership
PAT—Parents as Teachers
PALS—Play and Learning Strategies

The views expressed in this publication are solely the opinions of the authors and do not necessarily reflect the official policies of the U.S. Department of Health and Human Services, the Health Resources and Services Administration, or the Administration for Children and Families nor does mention of the department or agency names imply endorsement by the U.S. Government.

www.pediatrics.org/cgi/doi/10.1542/peds.2013-1021G

doi:10.1542/peds.2013-1021G

Accepted for publication Aug 26, 2013

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PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

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FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: The Home Visiting Evidence of Effectiveness review is funded by contract number HHSP23320095642WC/HHSP23337025T with the Office of Planning, Research and Evaluation, Administration for Children and Families, US Department of Health and Human Services.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

Home visiting has been part of the landscape of the United States since the late 1800s when home visitors were sent to the homes of the poor to act as exemplars on how to live appropriately.¹ Beginning in the 1960s with the War on Poverty, the home visitor became a catalyst for addressing children's health and development through working with parents.¹ In 2009, the field was estimated to include between \$500 million and \$750 million of state investment and served more than half a million children.²

The Patient Protection and Affordable Care Act of 2010 authorized the Maternal, Infant and Early Childhood Home Visiting (MIECHV) program, providing \$1.5 billion dollars over 5 years for evidence-based home visiting. MIECHV is a federal investment in home visiting for communities at-risk to improve a range of outcomes including maternal and child health, child development, child maltreatment, and coordination of home visiting programs with community resources. The MIECHV program stipulates that states and territories must spend $\geq 75\%$ of the funds received on evidence-based home visiting programs. Although overall summaries and meta-analyses suggest impacts on key outcomes for children and families,³⁻⁶ the American Academy of Pediatrics statement on home visiting recognizes that the research remains mixed about the efficacy of home visiting, largely due to the widely varying programs and program goals. Thus, not all home visiting programs may be effective for improving the health and well-being of children and families. To inform MIECHV and the field broadly, the Department of Health and Human Services (DHHS) initiated a systematic review of the evidence of effectiveness of home visiting models, the Home Visiting Evidence of Effectiveness (HomVEE) review, which is the subject of this article.

The HomVEE⁷ review assesses the empirical literature, including published

and unpublished articles; assesses the quality of the impact studies; and summarizes the evidence of effectiveness for each reviewed home visiting model. This article describes the systematic review and some of the results, focusing on child health and development outcomes that are likely of interest to the *Pediatrics* community.

WHAT IS HOME VISITING?

Home visiting is a service delivery mechanism that has been used across many disciplines, for prevention or intervention, to reach individuals from pregnancy through old age.^{8,9} These programs typically use a trained worker, professional or paraprofessional, to provide services and information or guidance in a way that overcomes many of the traditional barriers to service delivery. For example, many high-risk families have limited transportation options. Home visitation reaches families in their homes, eliminating this barrier.

The focus of the current article is on programs that provide home visiting as a service delivery strategy to reach pregnant women and families with children birth through school-entry. Some home visiting programs are universal, reaching all new parents, whereas many target families at high risk for poor health, development, and economic outcomes.¹⁰ A scan of the literature reveals clinical trials of home visiting models focused on: birth outcomes,^{11,12} immunization rates,¹³ emergency department visits,¹³ prenatal care,¹⁴ breastfeeding,¹⁵ accidental injury,^{12,16} child maltreatment,¹⁷ children's dietary practices,¹⁸ and lead levels.¹⁹

Although models differ, most home visiting models have a structured protocol, materials, and goals and use a combination of direct information sharing or service provision and case management with referral to community resources.²⁰ Most address child health and development by targeting

parenting; for example, encouraging sensitive caregiving, increasing parent knowledge on development, or recognizing child illnesses.

The focus on children's health for home visiting models often begins during a mother's pregnancy. Models aim to improve birth outcomes by linking mothers to prenatal health care and providing them with information about fetal development. After the birth of the child, programs focus on children's access to well-child care and immunizations and appropriate care for illnesses and injuries. Some programs also provide information to parents about ways to support physical health, such as through nutritious meals and physical activity.

To support children's development, models engage parents in activities designed to improve child functioning, educate parents about child development and strategies to enhance school readiness (such as literacy activities), and promote positive parent-child interactions. Some also link families to early childhood care and education.

Although many recognize that home visiting is not a cure-all,^{21,22} the available empirical evidence suggests promise from the use of home visitation to reach families in need and affect positive change for parents and children. This evidence has spurred interest and investment in home visiting, including linkages with other services and agencies. The American Academy of Pediatrics statement on home visiting, for example, calls for pediatricians to actively partner with home visiting programs.²¹

THE HOME VISITING EVIDENCE OF EFFECTIVENESS REVIEW

HomVEE was designed to identify all of the relevant research on selected program models and evaluate the strength of that research for detecting program impacts. HomVEE included a systematic

search and screening process, a review of the research quality, and an assessment of program effectiveness. The HomVEE team also reviewed and summarized implementation information for each program model. All results, as well as details of the study review process, are available online (<http://homvee.acf.hhs.gov>).

To fully understand program effects, the HomVEE team conducted a comprehensive search of the literature. Appendix A includes details of the searching, screening, and prioritization process. The team identified published and unpublished research through database searches, a call for studies, Web searches, and reference lists from recently published reviews. Studies were screened for eligibility, using such criteria as whether home visiting was the primary service delivery strategy, and targeted at least 1 of 8 eligible outcome domains, including child and maternal health, child development and school readiness, positive parenting practices, and reductions in child maltreatment.

As of July 2012, the literature search yielded ~14 071 unduplicated citations, including 477 articles submitted through the HomVEE calls for studies and 254 Web search hits (Fig 1). Without the capacity to review such a large quantity of citations, HomVEE ranked the program models on the strength of the evidence base and those with higher rankings were selected for review. As of July 2012, HomVEE had reviewed 32 program models, including 207 impact studies and 198 implementation studies about the 32 models.

Trained reviewers assessed the research on selected models and rated studies based on their capacity to provide unbiased estimates of program impacts. The review included 2 types of designs: (1) randomized controlled trials and (2) quasi-experimental designs

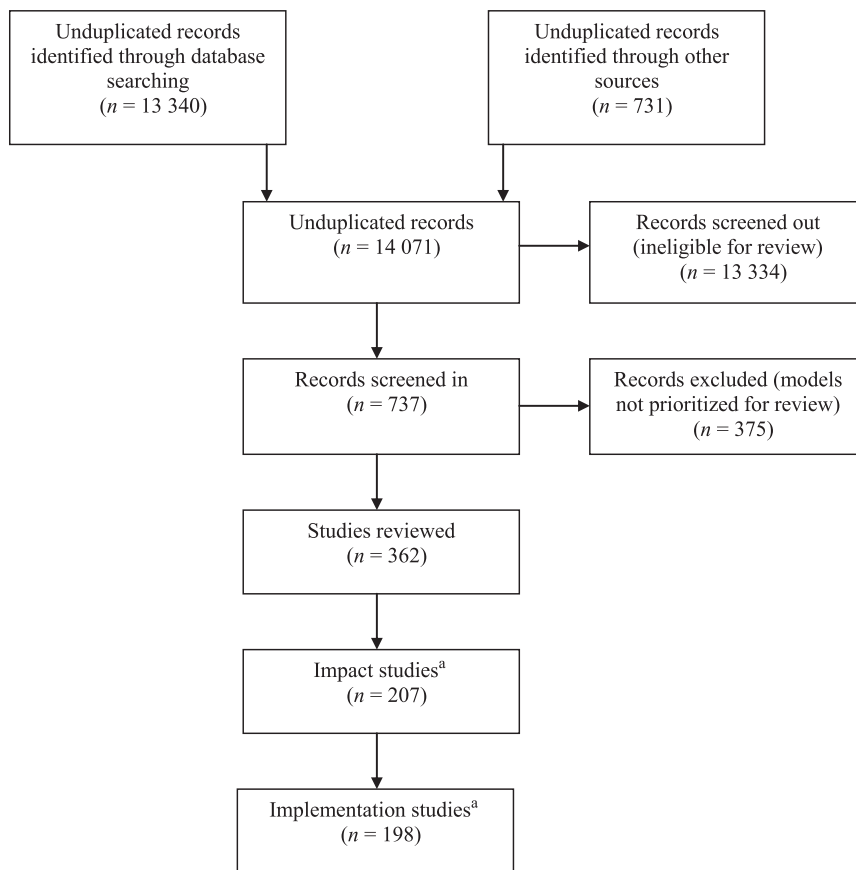


FIGURE 1 Preferred Reporting Items for Systematic Review and Meta-analyses flow diagram. ^aSome studies were reviewed for information on both impacts and implementation.

(including matched comparison studies, single case designs, and regression discontinuity designs). The crux of the study ratings is an assessment of the internal validity of the study, that is, the study's potential for establishing that the observed outcomes were caused by the program, rather than other factors. Additional details are available on the HomVEE Web site. The study ratings are 1 element in the criteria established by DHHS for evidence-based program models, which require program models to be supported by studies with strong internal validity showing favorable impacts (Appendix B).

Of the 32 models reviewed, 12 met the DHHS criteria for an evidence-based early childhood home visiting model: (1) Child FIRST, (2) Early HeadStart-Home Visiting (EHS), (3) Early Intervention

Program for Adolescent Mothers (EIP), (4) Early Start (New Zealand), (5) Family Check-Up, (6) Healthy Families America (HFA), (7) Healthy Steps, (8) Home Instruction for Parents of Preschool Youngsters (HIPPPY), (9) Nurse-Family Partnership (NFP), (10) Oklahoma's Community-Based Family Resource and Support (CBFRS) Program, (11) Parents as Teachers (PAT), and (12) Play and Learning Strategies (PALS) for Infants.

In the discussion of program efficacy, we focus on the DHHS evidence-based programs that included statistically significant findings—either favorable or unfavorable/ambiguous—on child health and development or child maltreatment (Table 1). Programs that did not meet the DHHS criteria are not discussed.

SUMMARY OF EFFICACY

Child Health and Development

Health Care Coverage and Use

Of the 12 models, 5 showed favorable effects on measures of health care coverage or use. EIP showed favorable impacts on 8 outcomes, including fewer days and episodes of hospitalization, relative to those in the comparison group, covering a range of 6 weeks to 2 years postpartum.^{13,23,24} EIP also showed a favorable effect on the percentage of children who were adequately immunized by 1 year, but the difference was no longer statistically significant by 2 years.^{13,24} Early Start demonstrated favorable effects on 3 outcomes, including percentage who received well-child visits and dental service.^{25–27} HFA had favorable results for 4 health care outcomes, such as the number of well-child visits and whether the child had health insurance.^{28–31} HFA had an unfavorable effect on the number of pediatric emergency department (ED) visits.³² The research showed that Healthy Steps had a beneficial effect on 2 outcomes: 1-month well-child visits and diphtheria toxoid, tetanus toxoid, and pertussis vaccinations.³³ Finally, NFP had favorable results on 3 outcomes measuring the number of ED visits at different follow-ups but an

unfavorable/ambiguous effect on number of days hospitalized between 25 and 50 months.^{34,35} The research on 2 programs (Oklahoma's CBFRS and PAT) showed no effects on measures of health care use or coverage.^{36–40} The research on 5 programs (Child FIRST, EHS, Family Check-Up, HIPPY, and PALS for Infants) did not report health care coverage or usage outcomes.

Birth Outcomes

Two programs showed favorable results on birth outcomes. HFA had a favorable effect on low birth weight.⁴¹ The standard implementation of NFP with nurse home visitors did not demonstrate any effects on birth weight or preterm births.^{35,42–47} However, when paraprofessional home visitors were used, a favorable effect on low birth weight was shown.⁴⁶ EIP demonstrated no effects on birth weight or the percentage of infants born premature.²³ The remaining 9 programs, most of which were offered postnatally and thus would not be expected to affect birth outcomes, did not report any results in this area.

Health Behaviors and Other Outcomes

One program, NFP, showed favorable results on the percentage of mothers who attempted breastfeeding⁴²; 2 others (Early Start and Healthy Steps) showed

no effects,^{25,26,48} and the remaining programs did not report any findings on this outcome. A few other health outcomes were reported in the literature. NFP showed a favorable effect on the number of child behavioral/parental coping problems in the physician's record³⁵ but an unfavorable/ambiguous effect on the child's resistance to eating.⁴⁹ HFA did not show any effects on health outcomes such as whether the child was anxious or withdrawn,⁵⁰ and EHS did not show an effect on 2 outcomes: child's health status and percentage of parents reporting children with fair or poor health.^{51,52} Outcomes on health behaviors or other health outcomes were not reported in the research on the remaining programs.

Child Development

Five programs demonstrated favorable effects on ≥ 1 measure of cognitive development: (1) Child FIRST on 2 measures of language development⁵³, (2) EHS on 2 measures of a mental development index and approaches to learning^{54,55}; (3) HFA on mental and cognitive development^{28,30}; (4) HIPPY showed 1 favorable effect on vocabulary⁵⁶; and (5) NFP had a favorable effect on language.¹² Three programs (Early Start, PALS for Infants, and PAT) showed no favorable effects on measures of cognitive development,^{25,26,37–40,57–60} and no results were reported for EIP, Family Check-Up, Healthy Steps, and Oklahoma's CBFRS.

Nine programs demonstrated favorable effects on ≥ 1 measure of social development or behavioral problems: (1) Child FIRST on 3 measures of externalizing problems⁵³; (2) EHS on 2 measures of attachment security and social problems^{54,55}; (3) Early Start on 2 measures of behavioral problems^{25,26}; (4) Family Check-Up on 3 measures of behavioral problems⁶¹; (5) HFA on 4 measures, such as internalizing and

TABLE 1 Favorable Program Effects

Program Model	Any Favorable Outcomes				
	Health Care	Birth Outcomes	Other Health Outcomes	Child Development	Reductions in Child Maltreatment
Child FIRST				✓	✓
EHS				✓	✓
EIP	✓				
Early Start	✓			✓	✓
Family Check-Up				✓	
HFA	✓	✓		✓	✓
Healthy Steps	✓				
HIPPY				✓	
NFP	✓	✓	✓	✓	✓
Oklahoma's CBFRS ^a					
PAT				✓	
PALS for Infants				✓	

^a Studies of Oklahoma's CBFRS showed favorable effects in other areas, such as maternal health, but not those highlighted in this article.

externalizing behaviors^{28,30}; (6) HIPPY on classroom adaptation and academic self-image^{62,63}; (7) NFP had 1 favorable effect on infant vulnerability¹²; (8) PAT had 1 favorable effect on mastery motivation⁵⁷ and an unfavorable/ambiguous effect on a self-help development scale at age 2, which was favorable by age 3^{38,39}; and (9) PALS for Infants had a favorable effect on negative affect.⁵⁸ Healthy Steps had no effects on two measures of attachment and behavioral problems.^{64,65} No results for social development or behavioral problems were reported for the remaining 2 programs: EIP and Oklahoma's CBFRS.

In addition to these overall effects, NFP had benefits for a subgroup of mothers with low psychological resources and their children. For children in this group, the program demonstrated favorable outcomes for 18 measures of cognitive and social emotional development.

Reductions in Child Maltreatment

Six programs had studies that assessed reductions in child maltreatment, measured in different ways, including substantiated information from administrative records, encounters with health providers for injuries or poisonings, and self-reported parenting behaviors. There is some concern that relying on substantiated reports alone may be misleading because families in home visiting programs are under greater surveillance, which may increase the incidence of reporting apart from increases in behaviors.

Five programs showed favorable effects in some aspect of child maltreatment reduction: (1) Child FIRST showed a favorable effect on family involvement with child protective services⁵³; (2) Early Start on 2 measures, including the percentage who went to the hospital for accident, injury, or accidental poisoning, and parents' report of severe or very severe physical assault^{25,26};

(3) EHS had a favorable effect on physical punishment at 36 months⁶⁶; (4) HFA showed 14 favorable impacts on measures of parenting behaviors, such as corporal punishment, self-reported serious physical abuse, and aggression,^{30,50,67–69} and 1 measure of the biological mother as a confirmed subject of sexual abuse report by the child's seventh birthday⁵⁰; and (5) NFP had favorable effects on 7 measures, including health care encounters for injuries or ingestions and substantiated abuse or neglect 15 years after program enrollment.^{34,35,42,70,71} One program, Healthy Steps, showed no effect on 1 measure in this domain.⁶⁵

LESSONS LEARNED

Several Evidence-Based Programs Improved Families' Health Care Usage

Of the 12 models that meet the DHHS criteria for an evidence-based model, 5 showed favorable effects on health care usage. Findings included improvements in favorable outcomes, such as immunizations and well-child visits, and fewer unfavorable outcomes, such as ED visits and hospitalizations. Improving families' use of preventive care may reduce the likelihood of subsequent serious illnesses. In addition, linking families to health care practitioners provides families another resource, which may provide support, information, or access to other services. These benefits may be particularly important for vulnerable, isolated, or high-needs families, who are often the target of home visiting programs.

Most Evidence-Based Programs Had Favorable Effects on Direct Measures of Child Well-Being

Almost all of the programs showed favorable effects on measures of children's social emotional development or behavioral problems.

Five of these programs also showed ≥ 1 favorable effect on cognitive development. Five of the evidence-based programs showed improvements in reductions in child maltreatment, measured in different ways, including substantiated reports and parents' self-report of behaviors.

Most Programs Have More Outcomes on Which There Is No Discernible Effect Than Outcomes With Favorable Effects

This summary focused largely on statistically significant findings, either favorable or unfavorable, but in most cases, a greater number of findings were not statistically significant. As the number of outcomes increases, so does the likelihood of finding a statistically significant finding by chance, a "false-positive", unless corrections are made. Most research did not make any corrections, which suggests some caution is warranted in interpreting a single or few favorable outcomes.

IMPLICATIONS FOR POLICY AND PRACTICE

This article highlights the potential benefits that evidence-based home visiting may bring to a coordinated effort to improve child health and well-being. Specifically:

- Home visiting shows promise as a way to work with families who may be difficult to engage in supportive services. The rigorous research to date has indicated that home visiting has the potential to yield positive results for these high-risk families.
- Home visiting shows positive outcomes in child health, but partnerships with health providers such as pediatricians could strengthen home visiting as a mechanism to attain these outcomes.

- The American Academy of Pediatrics encourages pediatricians, as experts in child development and health, to partner with home visiting

programs to support quality services. If the home visiting programs and pediatric community can work collaboratively to address

the outcomes desired, our communities, families, and society have the opportunity for improved public health for all.

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APPENDIX A SEARCH STRATEGIES, SCREENING, AND PRIORITIZATION

Literature Search

Each year, the HomVEE team conducts a broad search for literature on home visiting program models serving pregnant women or families with children from birth to age 5. HomVEE's literature search includes 2 main activities:

1. Database Searches. The HomVEE team searched on relevant key words in a range of research databases. The databases searched are Academic Search Premier, Campbell Collaboration, CINAHL with Full Text, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, Cochrane Methodology Register, Database of Abstracts of Reviews of Effects, Dissertation Abstracts, EconLit, Education Research Complete, ERIC, MedLine, New York Academy of Medicine's Grey Literature Report, PsycINFO, Social Sciences Citation Index, Social Work Abstracts, SociINDEX with Full Text, and Sociological Abstracts.

2. Call for Studies. At the beginning of each calendar year, HomVEE issues a call for studies and sends it to ~40 relevant listservs for dissemination.

In addition to these 2 activities, in the first year of the review, HomVEE also included the following:

3. Review of Existing Literature Reviews and Meta-Analyses. In the first year, the HomVEE team checked initial search results against the bibliographies of recent literature reviews and meta-analyses of home visiting and added relevant missing citations to the search results. This check was conducted to ensure our search terms identified relevant studies; once the validity of the search terms was

Key words included terms related to the service delivery approach, target population, and outcome domains of interest. The initial search was limited to studies published since 1989; a more focused search on prioritized program models included studies published since 1979. This search is updated annually to identify new literature.

Search Step	Search Terms
S1. Activity	(Home AND visit*) or "family development" or (case AND manage*)
S2. Target group	Prenatal or perinatal or pregn* or "early childhood" or preschool or "pre-school" or infan* or newborn* or toddler* or parent* or "low-income" or "low income" or poor or poverty or "young child*"
S3. Outcomes	(child* and (abuse or neglect or maltreatment or health or injury or violence or attachment or immuniz* or "emergency department")) or "infant mortality" or ((juvenile or adolescent) AND delinquen*) or (child and (cognit* or language or "social-emotional" or "socioemotional" or "socio-emotional" or physical or health) and development)) or "school readiness" or "school achievement" or "child development" or "developmental delay" or (child AND behavior*) or (child AND disab*) ((Preterm or "pre-term" or premature) AND birth) or "low birth weight" or ((parent* or family or matern* or mother* or father* or patern*) and (employment or career or stress or depress* or efficacy or "mental health" or health)) or ((subsequent or teen) AND (birth or pregnan*)) or "home environment" or (parent* AND (skill* or abilit*)) or (reduc* AND (crime or "domestic violence" or "family violence" or "intimate partner violence" or ((community AND coordinat*) or referral*) or "self sufficiency" or "self-sufficiency" or (smoking or tobacco) or ("armed forces" or military)
S4. Document type	(Study or evaluat* or research) and (effective* or efficacy* or impact* or outcome* or implement* or cost or replic*)
S7. Combine terms	S1 AND S2 AND S3 AND S4

confirmed we did not repeat the process in subsequent years.

4. Web site Searches. The HomVEE team used a custom Google search engine to search >50 relevant government, university, research, and nonprofit Web sites for unpublished reports and papers. Results of this search, however, largely overlapped with the results of the first 2 activities, and this activity was dropped in subsequent years.

Screening

After studies have been identified, the team screens out studies for the following reasons:

- Home visiting was not the primary service delivery strategy.
- The study did not use an eligible design (randomized controlled trial,

quasi-experimental design, or implementation study).

- The program did not include an eligible target population (pregnant women and families with children from birth to age 5 served in a developed world context).
- The study did not examine any outcomes in the 8 eligible outcome domains (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).
- The study did not examine a named home visiting program model.
- The study was not published in English.

- The study was published before 1989 for the initial search or 1979 for the focused search on prioritized program models.

Prioritizing Home Visiting Program Models for the Review

To prioritize home visiting models for inclusion in the review, the HomVEE team created a point system for ranking models. Points are assigned to models based on

- the number and design of impact studies (3 points for each randomized controlled trial and 2 points for each quasi-experimental design) and
- sample sizes of impact studies (1 point for each study with a sample size of ≥ 50).

During the prioritization process, the HomVEE team also tries to determine whether the program appears to be currently operational and identify the availability of implementation information

on the model. This information, which may be gleaned from Web sites, DHHS partners, or other sources, helps inform the decision of which models to review in each cycle, especially when deciding among several models with a similar point value. To ensure we included the most prevalent models in the initial review conducted in 2009, we compared the prioritized list of models to an objective data source on prevalence of implementation.⁷² Each year, HomVEE releases new review information on up to 10 additional models and updates the results for up to 5 previously reviewed models.

APPENDIX B DHHS CRITERIA FOR EVIDENCE-BASED PROGRAM MODELS

To meet the DHHS criteria for an “evidence-based early childhood home visiting service delivery model,” program models must meet ≥ 1 of the following criteria:

- At least 1 high- or moderate-quality impact study of the model finds favorable, statistically significant impacts in ≥ 2 of the 8 outcome domains
- At least 2 high- or moderate-quality impact studies of the model using nonoverlapping analytic study samples with ≥ 1 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 ≥ 2 studies using nonoverlapping 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 ≥ 1 favorable, statistically significant impacts must be sustained for ≥ 1 year after program enrollment, and ≥ 1 favorable, statistically significant impact must be reported in a peer-reviewed journal.

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