

Design of the Mother and Infant Home Visiting Program Evaluation Long-Term Follow-Up



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Overview

Introduction

Children develop fastest in their earliest years, and the skills and abilities they develop in those years help lay the foundation for future success. Early negative experiences can contribute to poor social, emotional, cognitive, behavioral, and health outcomes both in early childhood and in later life. One approach that has helped parents and their young children is home visiting, which provides individually tailored support, resources, and information to expectant parents and families with young children. Many early childhood home visiting programs work with low-income families to help ensure the healthy development and well-being of their children.

In 2010, Congress authorized the Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program by enacting section 511 of the Social Security Act, 42 U.S.C. § 711, which also appropriated funding for fiscal years 2010 through 2014. Subsequently enacted laws extended funding for the program through fiscal year 2022. The program is administered by the Health Resources and Services Administration (HRSA) in collaboration with the Administration for Children and Families (ACF) within the U.S. Department of Health and Human Services (HHS). The initiation of the MIECHV Program began a major expansion of evidence-based home visiting programs for families living in at-risk communities. The legislation authorizing MIECHV recognized that there was considerable evidence about the effectiveness of home visiting, but also required an evaluation of MIECHV in its early years, which became the Mother and Infant Home Visiting Program Evaluation (MIHOPE). The overarching goal of MIHOPE is to learn whether families and children benefit from MIECHV-funded early childhood home visiting programs, and if so, how. MIHOPE includes the four evidence-based home visiting models that 10 or more states chose in their fiscal year 2010-2011 plans for MIECHV funding: Early Head Start – Home-based option, Healthy Families America, Nurse-Family Partnership, and Parents as Teachers. From October 2012 to October 2015, a total of 4,229 families entered the study.

Given the positive effects found in previous long-term studies of home visiting and previous findings that the benefits of home visiting outweigh the costs only after children enter elementary school, ACF and HRSA initiated plans to design long-term follow-ups with the families who are participating in MIHOPE. Under contract with ACF, MDRC is conducting this work in partnership with Columbia University and Mathematica Policy Research. ACF and HRSA were interested in ensuring that any additional follow-ups build on information from the earlier waves of data collection to the greatest extent

possible, and that any proposed follow-up points build on one another. This long-term follow-up phase is called MIHOPE-LT. This report presents the proposed design for potential long-term follow-ups with MIHOPE families through the time when their children are in high school. The report also presents the detailed design for the follow-up that is occurring when children are in kindergarten.

Primary Research Questions

The four primary research questions that the long-term follow-ups were designed to address are:

1. What are the long-term effects of being assigned to receive evidence-based home visiting for families who enrolled in MIHOPE?
2. Are the long-term effects of home visiting larger for some families than for others?
3. What are the pathways through which home visiting affects families' longer-term outcomes?
4. How do the monetary benefits of home visiting compare with its costs over the long term?

Purpose

Several previous studies of the four home visiting models included in MIHOPE have provided information on the long-term effects of home visiting programs. MIHOPE-LT can expand this body of evidence. The previous studies had relatively small samples, were model-specific, and did not examine the same outcomes in the same way across models, making it difficult to summarize across studies and models. In contrast, MIHOPE-LT will measure the same outcomes for all four evidence-based models included in MIHOPE. In addition, most of the previous long-term studies were completed many years ago. Home visiting programs have changed over time, both because of statutory requirements for federal funding through the MIECHV Program and because programs and models are continually evolving through quality-improvement efforts. Moreover, the context in which the programs operate, and the program participants, have also changed. As programs evolve and program context changes, additional evaluation can determine whether programs continue to be effective in meeting their goals.

Key Findings and Highlights

MIHOPE estimated the effects of MIECHV-funded early childhood home visiting programs on family and child outcomes around the time children were 15 months of age and found small positive effects for families across several outcome areas. (See Charles Michalopoulos, Kristen Faucetta, Carolyn J. Hill, Ximena A. Portilla, Lori Burrell, Helen Lee, Anne Duggan, and Virginia Knox, *Impacts on Family Outcomes of Evidence-Based Early Childhood Home Visiting: Results from the Mother and Infant Home Visiting Program Evaluation*, OPRE Report 2019-07.) Contact with the MIHOPE families was maintained via short surveys that were completed around the time children were 2.5 and 3.5 years of age.

The MIHOPE-LT study team identified the four primary research questions listed above and proposed a study design that could be used to answer these questions. A follow-up when children are in kindergarten began in January 2019, and the plans for this data collection are discussed in detail in this report. Three other potential follow-up time points based on the participating child's expected progression through school were also identified: third grade, middle school, and high school. Obtaining information about families' well-being over time might be particularly important for answering the question of how the monetary benefits of home visiting compare with its costs, because benefits may continue to accrue as children get older. This report does not present detailed plans for follow-ups past kindergarten. Detailed study designs would need to be developed in the future if follow-up at later time points was to be conducted.

Methods

MIHOPE included 88 local home visiting programs in 12 states. More than 4,200 women who were pregnant or had children younger than six months of age were randomly assigned to a MIECHV-funded home visiting program or to a control group who received information about other appropriate services in the community.

For the kindergarten follow-up, data collection methods are similar to those used for the MIHOPE follow-up that occurred when children were 15 months of age. Specifically, information is being gathered from a structured interview conducted with mothers. The study is also drawing on video-recorded interactions of mothers and children playing with toys; interviewer observations of parental warmth and children's self-regulation; direct assessments of children's language skills, math skills, and executive function; direct assessments of mothers' executive function; state administrative child welfare data; state school records data; federal administrative Medicaid data; federal employment and

earnings data from the National Directory of New Hires; and a survey conducted with children's teachers.

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The MIHOPE-LT design was informed by discussions with representatives from the four evidence-based home visiting models included in MIHOPE (Early Head Start – Home-based option, Healthy Families America, Nurse-Family Partnership, and Parents as Teachers). The team also solicited suggestions from other evidence-based home visiting models; from state grantees of the Maternal, Infant, and Early Childhood Home Visiting program; and from the Home Visiting Coalition.

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The Authors

Executive Summary

Children develop fastest in their earliest years, and the skills and abilities they develop in those years lay the foundation for their future success.¹ Similarly, early negative experiences can contribute to poor social, emotional, cognitive, behavioral, and health outcomes both in early childhood and in later life. Children growing up in poverty tend to be at greater risk of encountering adverse experiences that negatively affect their development. One approach that has helped is home visiting, which provides individually tailored support, resources, and information to expectant parents and families with young children. Many early childhood home visiting programs aim to support the healthy development of infants and toddlers and work with low-income families in particular to help ensure their well-being.

In 2010, Congress authorized the Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program by enacting section 511 of the Social Security Act, 42 U.S.C. § 711, which also appropriated funding for fiscal years 2010 through 2014.² Subsequently enacted laws extended funding for the program through fiscal year 2022.³ The program is administered by the Health Resources and Services Administration (HRSA) in collaboration with the Administration for Children and Families (ACF) within the U.S. Department of Health and Human Services. The initiation of the MIECHV Program began a major expansion of evidence-based home visiting programs for families living in at-risk communities.

The legislation authorizing MIECHV recognized that there was considerable evidence about the effectiveness of home visiting, but also required an evaluation of MIECHV in its early years,⁴ which became the Mother and Infant Home Visiting Program Evaluation (MIHOPE). The overarching goal of MIHOPE is to learn whether families and children benefit from MIECHV-funded early childhood home visiting programs, and if so, how.⁵

¹National Research Council and Institute of Medicine (2000).

²Social Security Act of 1935. SEC. 511 [42 U.S.C. 711] (j) (1) (2010).

³Funds for subsequent fiscal years were appropriated by section 209 of the Protecting Access to Medicare Act of 2014, Pub. L. 113-93 (fiscal year 2015); section 218 of the Medicare Access and Children's Health Insurance Program Reauthorization Act of 2015, Pub. L. 114-10 (fiscal years 2016-2017); and section 50601 of the Bipartisan Budget Act of 2018, Pub. L. 115-123 (fiscal years 2018-2022).

⁴Social Security Act of 1935. SEC. 511 [42 U.S.C. 711] (g) (2) (2010).

⁵MIHOPE is studying those programs as they operated from 2012 through 2017.

Given the positive effects found in previous long-term studies of home visiting, as well as previous findings that the benefits of home visiting outweigh the costs only after children enter elementary school,⁶ ACF and HRSA initiated plans to design long-term follow-ups with the families who are participating in MIHOPE. Under contract with ACF, MDRC is conducting this work in partnership with Columbia University and Mathematics Policy Research. This long-term follow-up phase is called MIHOPE-LT, and the study design is the subject of this report.

The purpose of this design phase was to determine the most fruitful times to collect data to answer questions of interest in the context of a study that follows families over time. A study that follows families over time provides an opportunity to examine child and family outcomes at individual time points as children get older, and to learn about the trajectories of child and family outcomes. ACF and HRSA were interested in ensuring that any additional follow-ups build on information from the earlier waves of data collection to the greatest extent possible, and that any proposed follow-up points build on one another.⁷

MIHOPE-LT: Context and Goals

Several previous studies of the four home visiting models included in MIHOPE have provided information on the long-term effects of home visiting programs.⁸ MIHOPE-LT can expand this body of evidence. The previous studies had relatively small samples (most included fewer than 1,000 families), were model-specific, and did not examine the same outcomes in the same way across models, making it difficult to summarize across studies and models. In contrast, MIHOPE-LT will measure the same outcomes for the four evidence-based models included in MIHOPE: Early Head Start – Home-based option, Healthy Families America, Nurse-Family Partnership, and Parents as Teachers. In addition, most of the previous long-term studies were completed many years ago.⁹ Home visiting programs have changed over time, both because of statutory requirements for federal funding through the MIECHV Program, and because programs and models are continually evolving through quality improvement efforts. Moreover, the context in which the programs operate, and the program participants, have also changed.

⁶See Michalopoulos, Faucetta, Warren, and Mitchell (2017).

⁷MIHOPE had already collected data from families when children were 15 months of age, 2.5 years of age, and 3.5 years of age.

⁸See Michalopoulos, Faucetta, Warren, and Mitchell (2017).

⁹Most of the studies began enrolling families before 1995, and most follow-ups occurred before 2005.

As programs evolve and program context changes, additional evaluation can determine whether programs continue to be effective in meeting their goals.

The primary goal of MIHOPE-LT is to measure the long-term effects of home visiting programs on family outcomes. To that end, the study team aimed to propose a study design that will try to answer these primary research questions:

1. What are the long-term effects of being assigned to receive evidence-based home visiting for families who enrolled in MIHOPE?
2. Are the long-term effects of home visiting larger for some families than for others?
3. What are the pathways through which home visiting affects families' longer-term outcomes?
4. How do the monetary benefits of home visiting compare with its costs over the long term?

The next section describes the original MIHOPE design in order to familiarize readers with the foundation for MIHOPE-LT.

Background: The MIHOPE Design

MIHOPE is a randomized controlled trial. That is, to provide reliable estimates of home visiting programs' effects, women who enrolled in the study were randomly assigned to a MIECHV-funded local home visiting program, or to a control group who received information about other appropriate services in the community.

MIHOPE included 88 local home visiting programs in 12 states: California, Georgia, Illinois, Iowa, Kansas, Michigan, Nevada, New Jersey, Pennsylvania, South Carolina, Washington, and Wisconsin. States were selected based on a number of criteria, including whether they planned to implement more than one of the four evidence-based models that MIHOPE included and to support five eligible local programs or more, whether they contributed geographic diversity to the sample, and whether they contributed some local programs operating in nonmetropolitan areas to the final sample.

The 88 local programs that participated in MIHOPE consisted of 19 Early Head Start programs, 26 Healthy Families America programs, 22 Nurse-Family Partnership programs, and 21 Parents as Teachers programs. As was true for states, local programs also had to meet several criteria to be included in MIHOPE, such as having been in operation for at least two years when they entered the study and being able to recruit enough families to fill the program slots and allow for a randomly chosen control group.

Characteristics of MIHOPE Families

A total of 4,229 families entered the study from October 2012 to October 2015. In order to be eligible for MIHOPE, women had to be at least 15 years of age, be either pregnant or have a child younger than 6 months of age when they enrolled in the study, be able to speak English or Spanish well enough to provide consent and complete a survey when they entered the study, and not be receiving home visiting services from a participating local program already. They also had to be interested in receiving home visiting services and had to meet the local program's eligibility criteria.

Women participating in MIHOPE tended to be young, economically disadvantaged, and racially and ethnically diverse, and they exhibited a variety of risks at study entry that could affect their children's development. Almost two-thirds of the women were younger than 25 years of age, and 35 percent were younger than 21 years of age. Forty-two percent of the women in the sample did not have high school diplomas; as might be expected, older women in the sample were more likely to have completed high school. Nearly 75 percent of women in the sample were receiving benefits from the Special Supplemental Nutrition Program for Women, Infants, and Children, and more than half were enrolled in the Supplemental Nutrition Assistance Program. More than half of the women reported that their households had experienced food insecurity in the past year (meaning there were times when they worried about food or ran out of it), nearly one-third reported substance use before pregnancy, over two-fifths reported symptoms of either depression or anxiety, and about one-fifth reported experiencing or perpetrating physical acts of intimate partner violence.

Early Effects on MIHOPE Families

The first follow-up phase of MIHOPE included an impact analysis to estimate the effects of MIECHV-funded home visiting programs in a broad range of outcome areas mentioned in the authorizing legislation and for different subgroups of families, using data that were gathered when children were about 15 months of age.¹⁰ Effects were estimated in the following outcome areas: (1) prenatal, maternal, and newborn health; (2) child health and development, including child maltreatment; (3) parenting skills; (4) crime or domestic violence; (5) family economic self-sufficiency; and (6) referrals and service coordination.¹¹

¹⁰Michalopoulos et al. (2019) describes the results of the impact analysis and analysis of impact variation from the first phase of MIHOPE.

¹¹SEC. 511 [42 U.S.C. 711] (d) (2) (B). The legislation also indicated that programs should improve school readiness and academic achievement, but children in MIHOPE were too young to provide information about that area at the follow-up that occurred when they were 15 months of age.

The impact analysis when children were 15 months of age found that there were positive effects of home visiting for families in MIHOPE, and that most estimated effects were similar to but somewhat smaller than those found in past studies of individual home visiting models. However, it is important to note that MIHOPE differs from those studies in many respects. For example, most of those studies were conducted in a single local area rather than including locations across the country, and some were conducted many years ago, when similar services were less likely to be available to control group families. Estimated effects are statistically significant for 4 of the 12 confirmatory outcomes: the quality of the home environment, the frequency of psychological aggression toward the child, the number of Medicaid-paid child emergency department visits, and child behavior problems.¹² Overall, for 9 of the 12 confirmatory outcomes, program group families fared better than control group families on average, which is unlikely to have occurred for the study sample if the home visiting programs made no true difference in family outcomes. In addition, results for clusters of exploratory outcomes suggest that home visiting may improve maternal health and might reduce household aggression.¹³

Checking in with Families When Children Are Preschool Age

In addition to following up with the MIHOPE families when the study child was 15 months of age, follow-up occurred at two later points in time: (1) when the child was 2.5 years of age, and (2) when the child was 3.5 years of age. The phase of MIHOPE that includes these two later points is called MIHOPE Check-in. Data collection for this phase began in September 2015 and concluded in June 2019.

MIHOPE Check-in included brief surveys to gather information from parents about child and family well-being. Information about these outcomes allows the study team to estimate ongoing effects of home visiting as children grow older. Updated contact information was also obtained at each point during the MIHOPE Check-in phase in preparation for the MIHOPE long-term follow-up. Because the MIHOPE Check-in data

¹²To focus the analysis on areas where home visiting programs were likely to have their greatest short-term effects, the study team chose 12 outcomes based on the evidence of effects from the four evidence-based models included in MIHOPE that existed before the analysis began, the policy relevance of those outcomes, and the quality of the tools available to measure the outcomes. Following the terminology used in a report written for the Institute of Education Sciences, the 12 outcomes are considered “confirmatory.” See Schochet (2008).

¹³Exploratory outcomes capture other aspects of the areas the legislation intended home visiting to improve. These outcomes were considered exploratory because past home visiting studies had not found effects on them or they had not been examined in previous studies. They were still thought to be areas where MIECHV-funded programs might improve family outcomes.

Household aggression includes experiences of intimate partner violence and child maltreatment.

were still being collected when the long-term follow-up study was designed, they did not contribute to the MIHOPE-LT design.

MIHOPE-LT Kindergarten Follow-Up

The next follow-up with MIHOPE families is occurring when children are in kindergarten. Children of MIHOPE families are attending kindergarten in four cohorts, from the 2018-2019 school year to the 2021-2022 school year.

Measuring children’s cognitive, behavioral, self-regulatory, and social-emotional skills before formal schooling begins or at the outset of formal schooling will provide important data on intermediate effects of home visiting. In addition, a wealth of literature demonstrates that children’s math, language, and social-emotional skills at the time of the transition to formal schooling are predictive of academic and behavioral outcomes over the longer term,¹⁴ and a follow-up during the kindergarten year will allow the study team to measure these key mediators. Consistent with this research evidence, the legislation that authorized MIECHV indicated that home visiting programs are expected to improve school readiness.¹⁵

The study team identified eight areas of adult and child functioning and behavior where effects of home visiting services are most likely to be observed when children are kindergarten age:

- Family economic self-sufficiency
- Maternal positive adjustment¹⁶
- Maternal behavioral health¹⁷
- Family environment and relationship between parents
- Parent-child relationship and interactions
- Parental support for child’s cognitive development

¹⁴Duncan et al. (2007); Eisenberg, Valiente, and Eggum (2010); Portilla et al. (2014).

¹⁵SEC. 511 [42 U.S.C. 711] (c) (1) indicates that grants are to be made to enable eligible entities to deliver home visiting services in order to promote improvement in several outcome areas that include school readiness. SEC. 511 [42 U.S.C. 711] (d) (1) (A) includes school readiness in the list of benchmark areas that eligible entities are expected to improve.

¹⁶The term “maternal positive adjustment” is used here to refer to aspects of maternal functioning such as parenting stress, mastery, self-regulation, and household chaos.

¹⁷This area includes maternal mental health and maternal substance use and alcohol use.

- Child social, emotional, and cognitive functioning and school readiness
- Receipt of and connection to services

Two additional areas (social support; school and neighborhood context) are being measured at the kindergarten follow-up primarily because they can provide important context and information about characteristics that may moderate the long-term impacts of home visiting. Table ES.1 shows all the areas that will be examined at the kindergarten follow-up.

At the kindergarten follow-up, the study team plans to conduct an impact analysis and mediational analyses. The impact analysis will assess the effectiveness of MIECHV-funded early childhood home visiting programs in improving the outcomes of families and children when the study child is in kindergarten, both overall and across key subgroups of families and programs. Mediational analyses will be conducted to shed light on the pathways through which home visiting has longer-term effects on families. In other words, the study will look at the relationships between earlier outcomes (from the 15-month, 2.5-year, and 3.5-year follow-ups) and outcomes when the child is in kindergarten.

MIHOPE-LT Follow-Up Points After Kindergarten

As indicated above, the study team was contracted to design long-term follow-ups that could build on information from earlier waves of data collection and build on one another. Three other potential follow-up points were also identified through the literature reviews and consultations with experts conducted by the MIHOPE-LT study team: third grade, middle school, and high school. This report briefly describes the rationale for data collection at these three later time points, but does not present detailed plans for follow-ups past kindergarten.

In addition, brief check-ins with families (to obtain updated contact information and maintain engagement with the study) could occur periodically, and administrative data could be obtained throughout the follow-ups and could be collected past the last follow-up with families.

Obtaining information about families' well-being over time might be particularly important for answering the question of how the monetary benefits of home visiting compare with its costs. Because benefits may continue to accrue as children get older,

Table ES.1

MIHOPE-LT Kindergarten Constructs

Outcome Area	Construct
Family economic self-sufficiency	<ul style="list-style-type: none"> • Public assistance receipt • Employment and earnings • Income • Material hardship
Maternal positive adjustment	<ul style="list-style-type: none"> • Mastery • Mobilizing resources • Parenting stress • Parent-child separations
Maternal behavioral health	<ul style="list-style-type: none"> • Depressive symptoms • Drug use
Family environment and relationship between parents	<ul style="list-style-type: none"> • Mother’s relationship status • Mother’s relationship with biological father of child
Parent-child relationship and interactions	<ul style="list-style-type: none"> • Parental warmth • Parent-child interaction • Abuse (physical, sexual)
Parental support for child’s cognitive development	<ul style="list-style-type: none"> • Home literacy environment
Child functioning (school readiness)	<ul style="list-style-type: none"> • Behavior problems • Social-emotional skills • Learning behaviors and approaches to learning
Receipt of and connection to services	<ul style="list-style-type: none"> • Child received any early intervention services • Child care setting before kindergarten • Child has health insurance coverage
Social support	<ul style="list-style-type: none"> • Involvement of the biological father or father figure with the child
School and neighborhood context	<ul style="list-style-type: none"> • School characteristics

obtaining information about family well-being after the children’s kindergarten year might allow the study to measure more of the benefits. It is likely that a benefit-cost analysis could be conducted at the kindergarten follow-up point, but using the kindergarten data might require projecting the value of benefits that accrue later than kindergarten or

measuring only the benefits that accrue through kindergarten. Both are accepted strategies, but either could limit how precisely the study could answer the question of how the monetary benefits of home visiting compare with its costs.

Contributions of MIHOPE-LT

MIHOPE-LT will allow for the examination of long-term effects of MIECHV-funded home visiting programs and can expand the evidence from previous long-term studies of home visiting programs. MIHOPE-LT will also build on the evidence from the first follow-up with MIHOPE families, which occurred when children were about 15 months of age and provided information on the short-term effects of MIECHV-funded home visiting programs. It will also build on the data from the brief MIHOPE Check-in surveys that were collected when children were about 2.5 years of age and 3.5 years of age. Data from these surveys were not yet analyzed at the time MIHOPE-LT was designed. Additional follow-ups can allow the same constructs to be measured at multiple time points so that effects in particular areas can be more fully understood. Additional follow-up also enables the examination of constructs that were not, and in some cases could not be, measured when children were 15 months, 2.5 years, or 3.5 years of age.

MIHOPE-LT can provide information about how small, measurable changes in particular areas of adult and child functioning that were the result of an early childhood intervention affect longer-term well-being. Information about these connections could be used by policymakers and researchers who are interested in the life trajectories of children and families.

Home visiting programs intervene early in the lives of children whose families face a variety of risk factors because these programs aim to improve the long-term well-being of at-risk children. MIHOPE-LT will build evidence about these intended long-term effects and will provide information on whether and how home visiting might have changed the life course of MIHOPE families.

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Chapter 1

Introduction

Children develop fastest in their earliest years, and the skills and abilities they develop in those years lay the foundation for future success.¹ Similarly, early negative experiences can contribute to poor social, emotional, cognitive, behavioral, and health outcomes both in early childhood and in later life. Children growing up in poverty tend to be at greater risk of encountering adverse experiences that negatively affect their development. One approach that has helped is home visiting, which provides individually tailored support, resources, and information to expectant parents and families with young children. Many early childhood home visiting programs aim to support the healthy development of infants and toddlers and work with low-income families in particular to help ensure their well-being.

Home visiting programs in the United States have their origins in the late nineteenth century, when charitable organizations used home visiting to try to reduce poverty by changing the behavior of the urban poor.² Home visiting later expanded to include approaches such as visits by public health nurses to promote infant and child health, Head Start home visiting to promote child development, and home-based family support to promote positive parenting and prevent child maltreatment.³ As currently practiced, home visitors identify family strengths, needs, concerns, and interests and attempt to address those in partnership with families through education and support during home visits or through referrals to and coordination with community services.

In 2010, Congress authorized the Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program by enacting section 511 of the Social Security Act, 42 U.S.C. § 711, which also appropriated funding for fiscal years 2010 through 2014.⁴ Subsequently enacted laws extended funding for the program through fiscal year 2022.⁵ The program is administered by the Health Resources and Services Administration (HRSA) in collaboration with the Administration for Children and Families (ACF) within the U.S.

¹National Research Council and Institute of Medicine (2000).

²Weiss (1993).

³Combs-Orme, Reis, and Ward (1985); Harding et al. (2007); Love et al. (2005).

⁴SEC. 511 [42 U.S.C. 711] (j) (1).

⁵Funds for subsequent fiscal years were appropriated by section 209 of the Protecting Access to Medicare Act of 2014, Pub. L. 113-93 (fiscal year 2015); section 218 of the Medicare Access and Children's Health Insurance Program Reauthorization Act of 2015, Pub. L. 114-10 (fiscal years 2016-2017); and section 50601 of the Bipartisan Budget Act of 2018, Pub. L. 115-123 (fiscal years 2018-2022).

Department of Health and Human Services (HHS).⁶ The initiation of the MIECHV Program began a major expansion of evidence-based home visiting programs for families living in at-risk communities.

The legislation authorizing MIECHV recognized that there was considerable evidence about the effectiveness of home visiting, but also called for research to increase knowledge about the implementation and effectiveness of home visiting.⁷ States that receive MIECHV funding are required to devote the majority of their MIECHV funding to the delivery of services according to the specifications of designated evidence-based models that met HHS's criteria for evidence of effectiveness.⁸ At the same time, states can spend part of their MIECHV funding on promising approaches to home visiting as long as research is conducted on those promising approaches.⁹ The legislation also required an evaluation of MIECHV in its early years,¹⁰ which became the Mother and Infant Home Visiting Program Evaluation (MIHOPE). The overarching goal of MIHOPE is to provide information about whether families and children benefit from MIECHV-funded early childhood home visiting programs, and if so, how. MIHOPE is studying these programs as they operated from 2012 to 2017.

To receive MIECHV funds, awardees were required to create initial plans that indicated the communities where the funds would be used and the home visiting models that would be supported by those funds.¹¹ MIHOPE includes the four evidence-based models that 10 states or more chose in their fiscal year 2010-2011 plans for MIECHV funding. These four models are:

- Early Head Start – Home-based option
- Healthy Families America
- Nurse-Family Partnership
- Parents as Teachers

⁶HRSA distributes funds from the federal MIECHV Program to MIECHV state and territory award-ees. In 2017, HRSA provided awards to 56 states and territories, including 47 state agencies; 3 non-profit organizations serving Florida, North Dakota, and Wyoming; the District of Columbia; and 5 U.S. territories. Awardees distribute funds to local implementing agencies — also commonly referred to as local programs — that work directly with families. Additionally, ACF oversees the tribal MIECHV Program, which as of 2017 funds 29 tribes, consortia of tribes, tribal organizations, and urban Indian organizations across 16 states.

⁷SEC. 511 [42 U.S.C. 711] (h) (3) (A).

⁸SEC. 511 [42 U.S.C. 711] (d) (3) (A) (ii).

⁹SEC. 511 [42 U.S.C. 711] (d) (3) (A) (i) (II).

¹⁰SEC. 511 [42 U.S.C. 711] (g) (2).

¹¹SEC. 511 [42 U.S.C. 711] (e) (1-10).

MIHOPE includes only women who were pregnant or had children younger than 6 months of age when they entered the study (a group who are eligible for most MIECHV-funded local programs) and who were interested in receiving home visiting services. These women were randomly assigned to a MIECHV-funded local home visiting program or to a control group who received information about other appropriate services in the community. MIHOPE estimated the effects of MIECHV-funded early childhood home visiting programs on family and child outcomes around the time children were 15 months of age and found positive effects for families across several outcome areas that were similar to but somewhat smaller than the average found in past studies of individual home visiting models.¹² Contact with the MIHOPE families was maintained via brief surveys that were completed around the time children were 2.5 and 3.5 years of age; this phase of the study is called MIHOPE Check-in.

Given the positive effects found in previous long-term studies of home visiting and previous findings that the benefits of home visiting outweigh the costs only after children enter elementary school,¹³ ACF and HRSA initiated plans to design long-term follow-ups with the families who are participating in MIHOPE. Under contract with ACF, MDRC is conducting this work in partnership with Columbia University and Mathematica Policy Research. This long-term follow-up phase, which focuses on children when they are 5 years of age and older, is called MIHOPE-LT. The study design for MIHOPE-LT is the subject of this report.

The primary goal of MIHOPE-LT is to measure the long-term effects of MIECHV-funded home visiting programs on family outcomes. The study also plans to examine whether the long-term effects of home visiting are larger for some families than for others. In addition, MIHOPE-LT will attempt to determine the pathways through which home visiting has long-term effects on families. Finally, another major goal is to conduct a benefit-cost analysis that compares the costs of home visiting programs with the benefits that the programs generate for participating families, for the government, and for society. The four key research questions associated with these goals are discussed further in Chapter 4.

In the interest of providing background and context for the MIHOPE-LT design described in this report, the following sections review the MIHOPE design as well as the follow-ups and analyses that have already been conducted with the MIHOPE sample.

¹²Michalopoulos et al. (2019).

¹³See Michalopoulos, Faucetta, Warren, and Mitchell (2017).

Overview of the Original MIHOPE Design

MIHOPE included 88 local home visiting programs in 12 states: California, Georgia, Illinois, Iowa, Kansas, Michigan, Nevada, New Jersey, Pennsylvania, South Carolina, Washington, and Wisconsin. States were selected based on a number of criteria, including whether they planned to implement more than one of the four evidence-based models that MIHOPE is studying and support five eligible local programs or more, whether they represented each of four geographic regions in the United States,¹⁴ and whether they allowed the final sample to include some local programs operating in nonmetropolitan areas.

The 88 local programs consisted of 19 Early Head Start programs, 26 Healthy Families America programs, 22 Nurse-Family Partnership programs, and 21 Parents as Teachers programs. As was true for states, local programs had to meet several criteria to be included in MIHOPE, such as operating for at least two years when they entered the study and being able to recruit enough families to fill program slots and allow for a randomly chosen control group.

MIHOPE Sample

A total of 4,229 families entered the study from October 2012 to October 2015.¹⁵ The sample includes 1,458 families enrolled through Healthy Families America programs, 1,235 enrolled through Nurse-Family Partnership, 963 enrolled through Parents as Teachers, and 573 enrolled through Early Head Start — Home-based option.

To provide reliable estimates of home visiting programs' effects, women who enrolled in the study were randomly assigned to a MIECHV-funded local home visiting program or to a control group that received information about other appropriate services in the community. To be eligible for MIHOPE, women had to be at least 15 years of age,¹⁶ be either pregnant or had a child younger than 6 months of age when they enrolled in the study, be able to speak English or Spanish well enough to provide consent

¹⁴The major regions were defined using smaller regions defined by HRSA. The four major regions used in MIHOPE are the Northeast (HRSA regions 1 to 3), South (HRSA regions 4 and 6), Midwest and Plains (HRSA regions 5 and 7), and Mountain and West (HRSA regions 8 to 10).

¹⁵Over the course of MIHOPE, 11 families withdrew from the study, 2 sample members from a small local program were removed from the analysis, and 1 sample member was found to be too old for the study, for a final analytical sample of 4,215 families (2,102 in the program group and 2,113 in the control group).

¹⁶During its initial review of MIHOPE, the MDRC Institutional Review Board suggested an age cutoff because of a concern that women below a certain age would represent a more vulnerable population than older women. The study team chose 15 years of age based on an estimate that it would

and complete a survey when they entered the study, and not be receiving home visiting services from a participating local program already. They also had to be interested in receiving home visiting services and had to meet the relevant local program eligibility criteria.

Women participating in MIHOPE tended to be young, economically disadvantaged, and racially and ethnically diverse, and they exhibited a variety of risk factors at study entry that could affect their children's development.¹⁷ Almost two-thirds of the women were younger than 25 years of age, and 35 percent were younger than 21 years of age. Forty-two percent of the women in the sample did not have high school diplomas; as might be expected, older women in the sample were more likely to have completed high school. Nearly 75 percent of women in the sample were receiving benefits from the Special Supplemental Nutrition Program for Women, Infants, and Children, and more than half were enrolled in the Supplemental Nutrition Assistance Program. More than half of the women reported that their households had experienced food insecurity in the past year,¹⁸ nearly one-third reported substance use before pregnancy, over two-fifths reported symptoms of either depression or anxiety, and about one-fifth of mothers reported experiencing or perpetrating physical acts of intimate partner violence.¹⁹

MIHOPE Analyses Conducted with Data Collected Through the First Follow-Up Phase²⁰

The first phase of MIHOPE included four main analyses:

- **Implementation research.** This analysis had two main goals: (1) to describe the services that families received in home visiting programs;

exclude less than 3 percent of eligible women from the study and because local home visiting programs could have had concerns about randomly assigning women younger than that age. As an additional step to protect the rights of women between ages 15 and 18, who were still potentially more vulnerable than older women, the study also required a legal guardian to consent to each minor's participation in the study.

¹⁷Michalopoulos et al. (2019).

¹⁸Food insecurity was defined as worrying about food or actually running out of food in the year before women enrolled in MIHOPE.

¹⁹As described in Michalopoulos et al. (2019), the MIHOPE sample at study entry was somewhat similar to MIECHV enrollees in terms of race and ethnicity, but was younger than the MIECHV enrollees in fiscal year 2017, which could be because (1) some evidence-based home visiting programs enroll women with children who are older than the children in the MIHOPE sample; (2) some MIECHV caregivers might not be biological mothers, unlike the MIHOPE sample members; and (3) the age of MIECHV enrollees was not measured at the point at which they enrolled in home visiting programs. See Michalopoulos et al. (2019) for more information.

²⁰The first MIHOPE follow-up occurred when children were about 15 months of age.

and (2) to understand how characteristics of families, home visitors, local programs, other home visiting stakeholders (such as the evidence-based models), and communities are associated with differences in the services that families received.²¹

- **Impact analysis.** This analysis was used to estimate the effects of MIECHV-funded home visiting programs on a broad range of outcome areas mentioned in the authorizing legislation and for different subgroups of families using data that were gathered when children were about 15 months of age. Effects were estimated in the following outcome areas: (1) prenatal, maternal, and newborn health; (2) child health and development, including child maltreatment; (3) parenting skills; (4) crime or domestic violence; (5) family economic self-sufficiency; and (6) referrals and service coordination.²²
- **Analysis of impact variation.** Specifically, information from the implementation study and the impact analysis was used to investigate how much effects vary across local home visiting programs, whether any features of local programs are associated with larger or smaller effects on family outcomes, and whether any aspects of the home visiting services that families received are associated with larger or smaller effects on family outcomes.²³
- **Cost analysis.** The purpose of this analysis is to examine how resources are allocated at MIECHV-funded home visiting programs, to estimate the costs of providing home visiting services to families in MIHOPE, and to investigate how the costs vary across families, local programs, and evidence-based models.²⁴

Results from the impact and impact variation analyses are summarized in Chapter 2; detailed information is available in the MIHOPE report that describes effects from

²¹Duggan et al. (2018).

²²Michalopoulos et al. (2019). SEC. 511 [42 U.S.C. 711] (d) (2) (B). The legislation also indicated that the program should improve school readiness and academic achievement, but outcomes in that area were not included at the first MIHOPE follow-up because children in the sample were 15 months of age at that point.

²³Michalopoulos et al. (2019).

²⁴Corso, Ingels, and Walcott (forthcoming).

around the time children were about 15 months of age.²⁵ Findings from the implementation analysis are available in the MIHOPE implementation research report.²⁶ Findings from the cost analysis will be published in a forthcoming report.

Limitations of the Study Design

The use of random assignment and the large number of families and locations included in the study provide a strong framework that MIHOPE can use to investigate the ability of MIECHV-funded home visiting programs to improve family outcomes, but the MIHOPE study design has some important limitations.

- The team sought to include a diverse set of local home visiting programs in the study, but the programs differ in some important respects from the larger set of MIECHV-funded programs. For example, MIHOPE includes a smaller proportion of rural locations than MIECHV as a whole. Thus, the effects presented might differ somewhat from the effects of all MIECHV-funded home visiting programs.
- MIHOPE enrolled local programs and families during the early years of the MIECHV Program. Since the implementation of home visiting has evolved, the current effects of home visiting may differ somewhat from those found for the MIHOPE sample.
- Although the study strove to collect high-quality information about family outcomes, each data source that was used has some limitations. Parent reports may be inaccurate if individuals cannot remember relevant information or are reluctant to report that information, as may be the case with sensitive outcomes. Although administrative data may accurately reflect the information collected by state agencies, they are limited to families who have not moved from the state and are often limited in other respects. For example, Medicaid-reimbursed health care is available only for individuals who receive Medicaid benefits.
- The main results compare outcomes for all families assigned to the program group with all families assigned to the control group. Since about 17 percent of program group families never received home visits, the effects may be larger among families who received services.²⁷ In

²⁵Michalopoulos et al. (2019).

²⁶Duggan et al. (2018).

²⁷See Duggan et al. (2018) for detailed results concerning the amounts of home visiting services received by families who enrolled in MIHOPE.

addition, some control group members received home visits or other services to promote positive parenting, and the effects observed in the study might have been larger if the control group did not have access to such services.

The Evidence-Based Home Visiting Models Studied in MIHOPE

In general, home visiting consists of three types of activities:

- **Assessing family needs.** To identify family strengths, needs, concerns, and interests, home visitors gather information from families through formal screening and assessment and through informal means that include reading cues provided by family members.
- **Educating and supporting parents.** Having identified family needs, home visitors devote most of their time to providing education and support to families. For example, home visitors educate parents on topics such as children’s developmental stages. Home visitors can also provide support during crises such as threats of being evicted or incidents of family violence. In addition, home visitors work with families to strengthen their support networks. Home visitors use methods such as positive reinforcement, direct suggestions and encouragement, and motivational interviewing to support healthy behavior and positive parenting.²⁸
- **Referral and coordination.** If home visitors think families will benefit from receiving more specialized services in the community, they can provide referrals to those services. In MIHOPE, referrals were most commonly made to address breastfeeding and nutrition, economic self-sufficiency, and public assistance or health insurance.²⁹ This aspect of home visiting highlights the place of home visiting as one component in a comprehensive system of care for early childhood.

²⁸Rubak, Sandbæk, Lauritzen, and Christensen (2005). Motivational interviewing emerged from the experiences of clinicians treating individuals with alcohol dependency, and is defined as “a directive, client-centered counseling style for eliciting behavior change by helping clients to explore and resolve ambivalence.” See Miller and Rose (2009). It is viewed as a particularly important technique when working with clients who are resistant to changing their behaviors, and when standard cognitive behavioral approaches and social learning approaches (that is, positive or constructive reinforcement) are not working. See Iannos and Antcliff (2013).

²⁹Duggan et al. (2018).

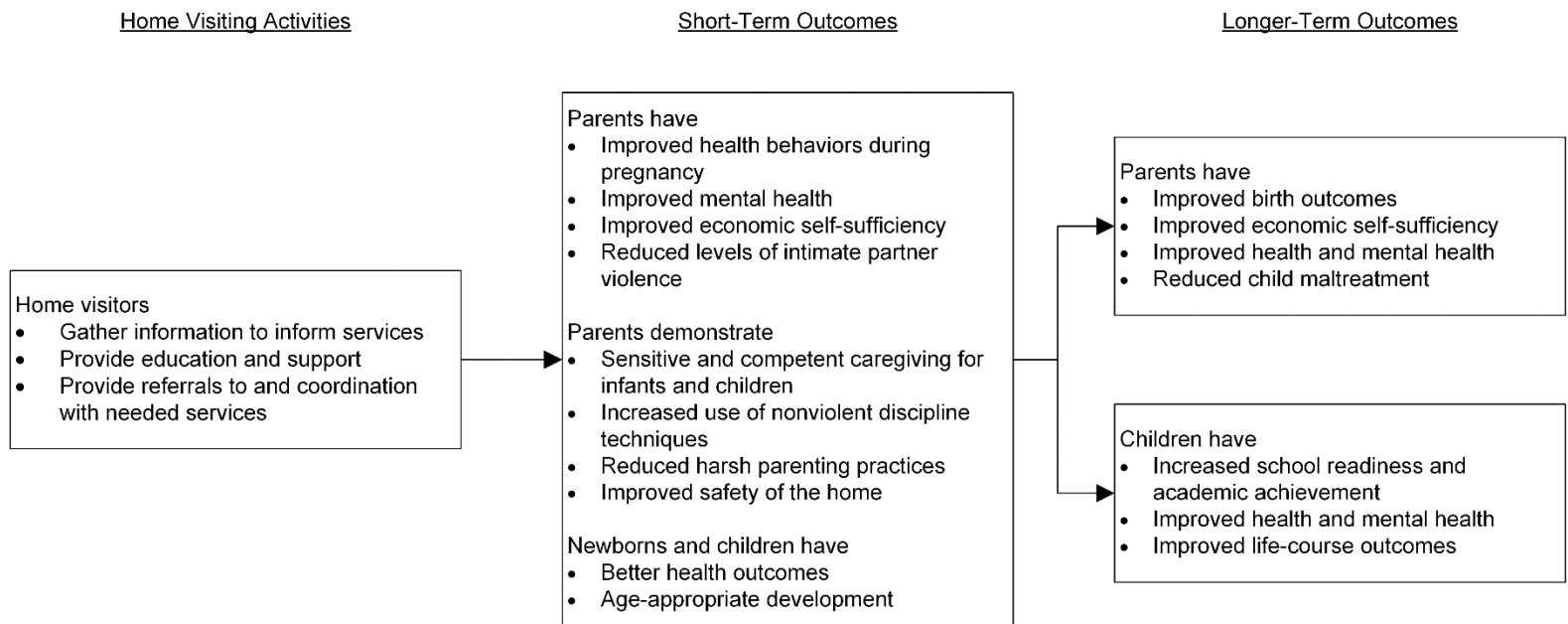
These activities are undertaken to improve outcomes for families in the short term. Figure 1.1 shows this intention, as well as how those short-term improvements might lead to longer-term benefits for parents and children.

Although all four evidence-based models use these activities and share the overall goal of improving outcomes for at-risk families and their young children, they differ in several important ways. Table 1.1 summarizes some important features of the four evidence-based models as they existed when MIHOPE began.

- **Evidence-based model goals.** While all four models tried to improve child health and development in the broad sense, their specific emphases differed. For example, Healthy Families America emphasized preventing child maltreatment; Nurse-Family Partnership strongly emphasized improving maternal and child health; and Early Head Start – Home-based option and Parents as Teachers focused on increasing positive parenting or school readiness.
- **Intended recipients.** Most of these models served families they identified as being at risk of poor child outcomes, based on one family characteristic or more. Although the indicators used to identify families at risk differed among the models, most models worked with low-income families. Nurse-Family Partnership specifically focused on women early in their first pregnancies, while Healthy Families America focused on families who faced a variety of risk factors for child maltreatment or other negative childhood experiences. Parents as Teachers has historically served a broad array of families with children in its target age range. All models could enroll women who met the MIHOPE eligibility criteria, although Early Head Start and Parents as Teachers also accepted families whose youngest children were up to 3 years of age and through kindergarten entry, respectively.
- **Other model features.** The models also varied somewhat in their program intensity and duration; in the timing, intensity, and content of required training; in requirements for group and individual supervision; in their standards for home visitor qualifications; and in the degree of flexibility they allow local programs.

Figure 1.1

Home Visiting Activities and Outcomes



SOURCES: Early Head Start Parent, Family, and Community Engagement Framework (<https://eclkc.ohs.acf.hhs.gov/sites/default/files/pdf/pfcea-framework.pdf>); Healthy Families America logic model; Nurse-Family Partnership logic model; and Parents as Teachers logic model (<https://parentsasteachers.org/logic-model/>). The Healthy Families America and Nurse-Family Partnership logic models were obtained from communication with the model developers.

Table 1.1

Selected Planned Services of the Evidence-Based Home Visiting Models in MIHOPE: Goals, Recipients, and Enrollment

Component	Early Head Start – Home-Based Option	Healthy Families America	Nurse-Family Partnership	Parents as Teachers
Evidence-based model goals ^a	Enhance the development of very young children	Build and sustain community partnerships to systemically engage overburdened parents in home visiting services prenatally or at birth	Improve prenatal health and birth outcomes	Provide parents with child development knowledge and parenting support
	Promote healthy family functioning		Improve child health and development	Provide early detection of developmental delays and health issues
	Promote school readiness	Cultivate and strengthen nurturing parent-child relationships	Improve families’ economic self-sufficiency and maternal life course development	Prevent child maltreatment
		Promote healthy childhood growth and development		Increase school readiness
		Enhance family functioning by reducing risk and building protective factors		
	Prevent child maltreatment and adverse experiences			

(continued)

Table 1.1 (continued)

Component	Early Head Start – Home-Based Option	Healthy Families America	Nurse-Family Partnership	Parents as Teachers
Intended recipients	Low-income pregnant women and families with children from birth to 3 years of age, families at or below the federal poverty level, and children with disabilities who are eligible for Part C services under the Individuals with Disabilities Education Act in their states	Parents facing challenges such as single parenthood, low incomes, childhood histories of abuse or adverse experiences, current or past behavioral health issues, or domestic violence Local programs select the specific characteristics of the target populations they plan to serve	First-time, low-income, pregnant mothers and their children	No eligibility requirements for participants Local programs select the specific characteristics of their target populations, such as children with special needs, families at risk for child abuse, low-income families, teen parents, first-time parents, immigrant families, families with little literacy, or parents with mental health or substance use issues
Intended timing of enrollment	Pregnancy through age 3	Pregnancy or within the first 3 months after a child's birth	Before the end of the 28th week of pregnancy ^b	Pregnancy or soon after birth, though can continue until age 5

SOURCES: Evidence-based model websites (Early Head Start: <https://eclkc.ohs.acf.hhs.gov/programs/article/early-head-start-programs>; Healthy Families America: www.healthyfamiliesamerica.org; Nurse-Family Partnership: www.nursefamilypartnership.org; Parents as Teachers: parentsasteachers.org), the U.S. Department of Health and Human Services Home Visiting Evidence of Effectiveness (HomVEE) website (homvee.acf.hhs.gov/programs.aspx), and interviews the study team conducted with the MIHOPE evidence-based model developers.

NOTES: ^aGoals are as stated by each evidence-based model.

^bLocal programs are recommended to begin conducting visits as early as possible in the pregnancy.

Checking in with Families When Children Are Preschool Age

As noted earlier, in addition to following up with the MIHOPE families when the study child (who is also referred to as “the child” or “the MIHOPE child” in the remainder of the report) was 15 months of age, follow-up data collection has also been conducted (1) when the child is 2.5 years of age, and (2) when the child is 3.5 years of age. The phase of MIHOPE that includes these two later follow-up points is called MIHOPE Check-in, and data collection for this phase began in September 2015 and concluded in June 2019.³⁰

MIHOPE Check-in included brief surveys to gather information from parents on the topics shown in Table 1.2. Information about these outcomes will allow the study to estimate ongoing effects of home visiting as children grow older. Updated contact information was also obtained at each point in preparation for the MIHOPE long-term follow-up. Because the data were still being collected when the long-term follow-up study was being designed, they did not contribute to the MIHOPE-LT design.

Context and Motivation for MIHOPE-LT

As Chapter 3 discusses, several previous studies have provided information on the long-term effects of home visiting programs. MIHOPE-LT can expand this body of evidence. The previous studies had relatively small samples (most included fewer than 1,000 families), were model-specific, and did not all examine the same outcomes in the same way across models, making it difficult to summarize across studies and models. In contrast, MIHOPE-LT will measure the same outcomes for all four evidence-based models. In addition, most of the previous long-term studies were completed many years ago.³¹ Home visiting programs have changed over time, both because of statutory requirements to meet the federal benchmarks tied to MIECHV funding and because programs

³⁰Data collection for the survey when children are about 2.5 years of age began in September 2015 and concluded in June 2018. Data collection for the survey when children are about 3.5 years of age began in June 2017 and concluded in June 2019.

³¹Most of the studies began enrolling families before 1995, and most follow-ups occurred before 2005.

Table 1.2
MIHOPE Check-in Constructs at 2.5 and 3.5 Years

Survey	Outcome Area and Construct
2.5- and 3.5-year survey	<p><u>Maternal health</u> Self-reported health status Subsequent pregnancies and births Depressive symptoms</p> <p><u>Family economic self-sufficiency</u> Child care Education or training Employment Public assistance receipt^a</p> <p><u>Parenting</u> Discipline Home literacy environment Cognitive stimulation</p> <p><u>Child health</u> Health status Well-child visits Has primary care provider Emergency department visits Has health insurance coverage</p> <p><u>Participation in home visiting or parenting program</u></p>
3.5-year survey only	<p><u>Child development</u> Early language and literacy skills Early math skills Fine motor skills Executive function</p>

NOTE: ^aThe benefits that were measured were those from the Supplemental Nutrition Assistance Program; disability insurance; Temporary Assistance for Needy Families; and Special Supplemental Nutrition Program for Women, Infants, and Children.

continually evolve.³² Moreover, the context in which the programs operate, and the program participants, have also changed. As programs evolve and program context changes, additional evaluation can determine whether programs continue to be effective in meeting their goals.

³²SEC. 511 [42 U.S.C. 711] (d) (1) (A) (i-vi) shows the federal benchmark areas under the MIECHV Program.

Contents of This Report

The subsequent chapters in this report provide the following information:

Chapter 2, Early Findings from MIHOPE on Effects for Families, presents results from the first follow-up with MIHOPE families, which occurred around the time children were 15 months of age.

Chapter 3, Long-Term Effects of Home Visiting: Evidence from Previous Studies, summarizes evidence from existing long-term studies of the four MIHOPE home visiting models, on the effects of home visiting and benefit-cost analyses.

Chapter 4, Overview of Plans for MIHOPE Long-Term Follow-Up, presents the research questions that MIHOPE-LT is designed to answer, the proposed timing of potential follow-up points, the sampling the study may use, and the data sources and outcome areas that may be examined.

Chapter 5, The MIHOPE-LT Kindergarten Follow-Up, describes the first MIHOPE-LT data collection effort, which began in January 2019 and is occurring approximately five years after women enrolled in MIHOPE, when their children are kindergarten age.³³ This chapter describes plans for the kindergarten data collection effort, focusing on the constructs to be examined.

Chapter 6, Conclusion, highlights the contributions that MIHOPE-LT is expected to make to the research evidence on home visiting and discusses challenges the study could face in collecting data over many years as well as ways these challenges can be addressed.

³³MIHOPE children were either infants (under 6 months of age) or in utero when their mothers entered the study.

Chapter 2

Early Findings from MIHOPE on Effects for Families

This chapter describes results from the MIHOPE follow-up that occurred around the time children were 15 months of age. Results are presented that address two broad questions:

1. What are the effects of home visiting programs across the range of outcomes specified in the authorizing legislation?
2. Are the effects of home visiting larger among some types of families than for others?

Data Sources

Around the time the MIHOPE child was 15 months of age, the study team collected information about family and child outcomes from several data sources, including:

- A one-hour telephone interview with the child's mother,¹ during which she was asked about outcomes in all the domains mentioned in the authorizing legislation other than school readiness and academic achievement
- A video recording of an interaction between the child and mother using the "Three Bags" and "Clean-Up" tasks, during which the child and mother played with toys contained in three bags and placed the toys back in the bags
- The Preschool Language Scales, Fifth Edition, Auditory Comprehension scale, to assess the child's ability to be attentive and respond to stimuli in the environment and to comprehend basic vocabulary or gestures
- A measurement of the child's weight and height, to provide information about whether the child's growth was within a normal range or the child

¹In 64 cases where the mother was not available to answer the survey (in most cases because she no longer had custody of the child), data collection was conducted with the child's primary caregiver.

exhibited early signs of being underweight or at risk of becoming overweight; and a measurement of the mother's weight to assess the effects of home visiting on maternal weight and obesity

- The Infant-Toddler Home Observation for Measurement of the Environment, to measure the quality and amount of stimulation the child could receive in the home using observations from study team data collectors in the family's home and parent responses to the 15-month survey
- Administrative data (data collected while administering a public program) in three areas: (1) health care use (for which data came from Medicaid and the Children's Health Insurance Program), (2) child maltreatment (for which data came from state administrative child welfare records), and (3) employment and earnings (for which data came from the federal National Directory of New Hires)

Outcomes

Following best practices in a random assignment study, MIHOPE estimated the effects of evidence-based early childhood home visiting programs by comparing outcomes for all families assigned to the program group with all families assigned to the control group. Results included most outcome areas that the legislation that authorized the Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program indicated the program should affect, including (1) prenatal, maternal, and newborn health; (2) child health and development, including child maltreatment; (3) parenting skills; (4) crime or domestic violence; (5) family economic self-sufficiency; and (6) referrals and service coordination.² To focus the analysis on areas where home visiting programs were likely to have their greatest short-term effects, the study team chose 12 outcomes based on the evidence of effects from the four evidence-based models included in MIHOPE (Early Head Start – Home-based option, Healthy Families America, Nurse-Family Partnership, and Parents as Teachers) that existed before the analysis began. The team also considered the policy relevance of those outcomes and the quality of the tools available to measure the

²SEC. 511 [42 U.S.C. 711] (d) (2) (B). The legislation also indicated that the program should improve school readiness and academic achievement, but children in MIHOPE were too young to provide information about that area at the follow-up that occurred when they were 15 months of age.

outcomes. Following the terminology used in a report written for the Institute of Education Sciences, the 12 outcomes, which are listed in Table 2.1, are considered “confirmatory.”³

MIHOPE also estimated effects for several dozen “exploratory outcomes” that capture other aspects of the areas the legislation intended home visiting to improve. These outcomes were considered exploratory because past home visiting studies had not found effects on them or they had not been examined in previous studies. They were still thought to be areas where MIECHV-funded programs might improve family outcomes. These outcomes are listed in Table 2.2.

Table 2.1
MIHOPE Confirmatory Outcomes at 15 Months of Age

Outcome Area	Outcome
Maternal health	New pregnancy after study entry
Family economic self-sufficiency	Receiving education or training
Parenting	Quality of the home environment Parental supportiveness
Child maltreatment	Frequency of minor physical assault during the past year Frequency of psychological aggression during the past year
Child health	Health insurance coverage for the child Number of Medicaid-paid well-child visits Number of Medicaid-paid emergency department visits Any Medicaid-paid health care encounter for injury or ingestion
Child development	Behavior problems Receptive language skills

Differences between the program and control group outcomes were also estimated for seven subgroups that were created based on the following demographic characteristics and psychosocial risk factors, which were measured when women enrolled in the study:

- Gestational age (number of weeks pregnant at enrollment) or whether the woman had already given birth

³Schochet (2008).

Table 2.2

MIHOPE Exploratory Outcomes at 15 Months of Age

Outcome Area	Outcome
Maternal health	<ul style="list-style-type: none"> • Health insurance coverage for the mother • Current smoking • Substance use during the past three months • Depressive symptoms • Health status self-rated as “poor” or “fair” • Received any behavioral health services
Family economic self-sufficiency	<ul style="list-style-type: none"> • Received any public assistance during the past month <ul style="list-style-type: none"> ○ Supplemental Nutrition Assistance Program ○ Disability insurance ○ Temporary Assistance for Needy Families ○ Women, Infants, and Children • Food insecurity • Employed five quarters after birth • Earnings five quarters after birth • Use of nonparental child care • Received any transportation services
Intimate partner violence	<ul style="list-style-type: none"> • Maternal perpetration of physical violence • Maternal experience with physical or sexual violence • Experience with battering • Received any domestic violence services • Received any services from a domestic violence shelter
Parenting	<ul style="list-style-type: none"> • Quality of the home environment <ul style="list-style-type: none"> ○ Parental warmth ○ Parental support for learning and literacy ○ Parental verbal skills ○ Parental lack of hostility ○ Home interior • Parental supportiveness <ul style="list-style-type: none"> ○ Sensitivity ○ Positive regard ○ Stimulation of cognitive development • Parental unsupportiveness <ul style="list-style-type: none"> ○ Intrusiveness ○ Negative regard ○ Detachment • Parental discipline <ul style="list-style-type: none"> ○ Discipline strategies during parent-directed task <ul style="list-style-type: none"> ▪ Gentle guidance ▪ Control ○ Nonviolent discipline during the past year • Parenting stress <ul style="list-style-type: none"> ○ Parenting distress ○ Parent-child dysfunctional interaction • Awareness of health and safety hazards

(continued)

Table 2.2 (continued)

Outcome Area	Outcome
Child maltreatment	<ul style="list-style-type: none">• Severe or very severe physical abuse during the past year• Any substantiated maltreatment report• Any maltreatment report• Loss of custody
Child health	<ul style="list-style-type: none">• Primary care provider for the child• Number of Medicaid-paid immunizations• Any nonbirth hospitalizations• Weight for length<ul style="list-style-type: none">○ Underweight○ Normal weight○ At risk of overweight• Duration of breastfeeding
Child development	<ul style="list-style-type: none">• Social-emotional competence• Behavior during semistructured play<ul style="list-style-type: none">○ Engagement of the parent○ Negativity toward the parent○ Sustained attention to objects• Behavior during a parent-directed task<ul style="list-style-type: none">○ Compliance○ Distress• Received any early intervention services

- Parity (whether the woman had children before she entered the study, not counting her pregnancy or her newborn)
- The mother's race and ethnicity
- The presence of intimate partner violence
- The mother's level of emotional functioning in three areas: the presence of depression, relationship anxiety, and relationship avoidance at the time she entered the study⁴
- The mother's psychological resources⁵

⁴“Relationship anxiety” refers to an individual's excessive need for reassurance, fear of rejection, and a desire to merge with relationship partners. “Relationship avoidance” reflects the extent to which an individual avoids intimacy and is distrusting of others. See McFarlane et al. (2010); Mikulincer and Shaver (2007).

⁵The concept of “psychological resources” is taken from the Nurse-Family Partnership Memphis pilot test, which hypothesized that effects on maternal caregiving and childhood injuries would be greater among mothers with few psychological resources. See Kitzman et al. (1997). In MIHOPE, it is based on a composite of (1) mental health, (2) mastery (the extent to which a person thinks life chances are under her control), and (3) verbal abstract reasoning.

- Demographic characteristics of mothers that put them or their children at higher risk of poor outcomes⁶

Impact Findings When Children Are 15 Months of Age

Figure 2.1 displays estimated effects on the 15-month confirmatory outcomes. (See Box 2.1 for an explanation of how to interpret estimated effects.) Effects on confirmatory and exploratory outcomes and across subgroups are summarized below.

- **There are positive effects for families in MIHOPE. Most estimated effects are similar to but somewhat smaller than the average found in past studies of individual home visiting models.**

Estimated effects are statistically significant for 4 of the 12 confirmatory outcomes:⁷ the quality of the home environment, the frequency of psychological aggression toward the child, the number of Medicaid-paid child emergency department visits, and child behavior problems. Overall, for 9 of the 12 confirmatory outcomes, program group families fared better than control group families on average,⁸ which is unlikely to have occurred for the study sample if the home visiting programs made no true difference in

⁶Risk factors included the following: mothers' receipt of public assistance or enrollment in Medicaid; mother was 20 years of age or younger; child's biological father did not live in the home; and mother was not enrolled in school (if younger than 19 years of age) or had not received a high school degree (if at least 19 years of age).

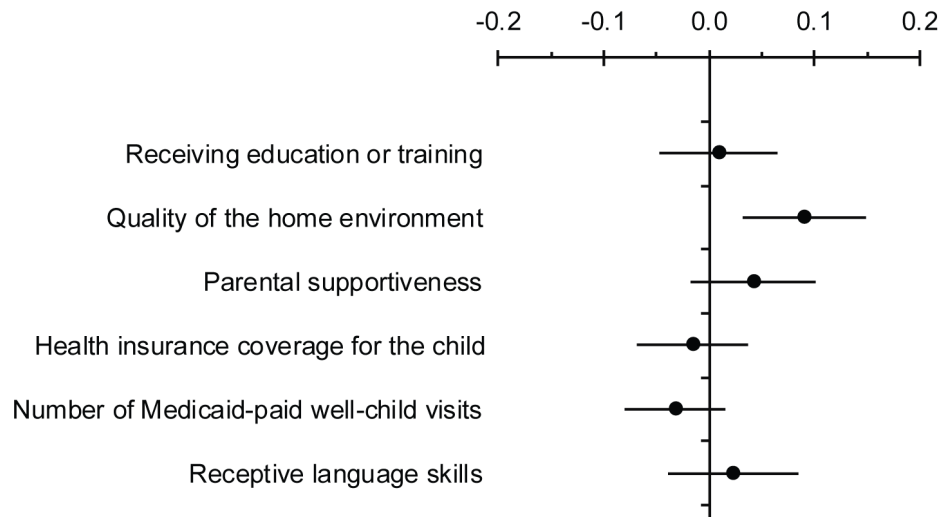
⁷The p-value indicates the likelihood of estimating an effect of this magnitude or larger in absolute value if the intervention had zero effect (that is, if the estimated effect had occurred by chance). In Michalopoulos et al. (2019), estimates are considered statistically significant if there is less than a 10 percent likelihood that the effect is due to chance based on a two-tailed t-test (which assumes effects have the possibility of appearing in a positive or negative direction); that is, if the p-value is less than 0.1.

⁸This tally includes five outcomes where program group families had better outcomes on average than control group families but where the difference between them is not statistically significant.

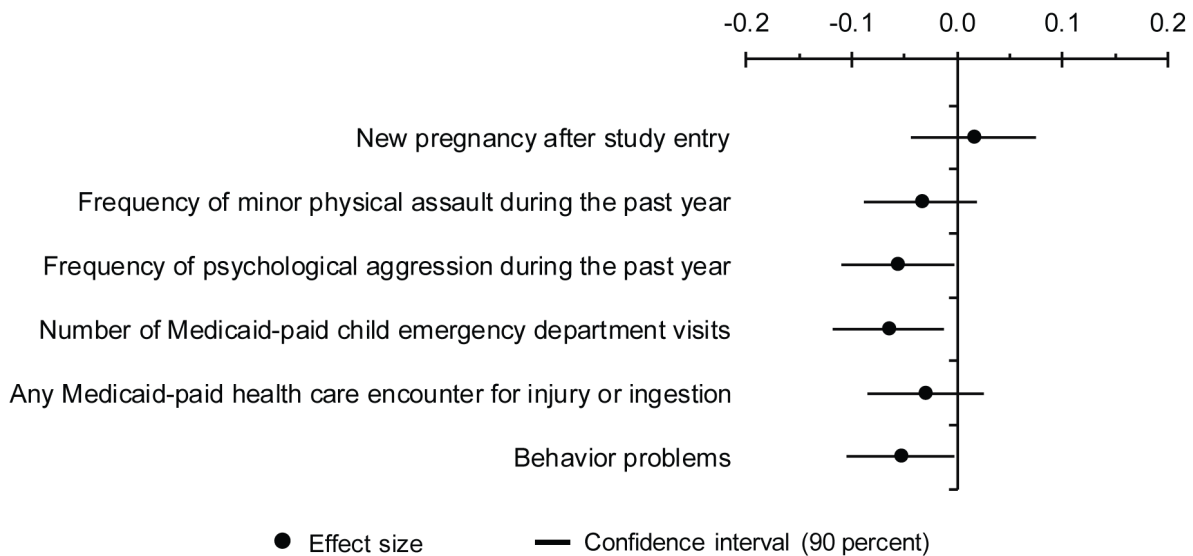
Figure 2.1

Estimated Effects on Confirmatory Outcomes at 15 Months of Age

Outcomes where positive effects mean improvements for families



Outcomes where negative effects mean improvements for families



SOURCES: Calculations based on the MIHOPE 15-month follow-up survey, the in-home assessment, the mother-child video-recorded interaction, and Medicaid enrollment and claims data.

NOTES: Effects are considered statistically significant if the 90 percent confidence interval does not intersect with 0. A statistical test of the number of outcomes for which estimated effects would be improvements for families resulted in a p-value of 0.096 for having 9 or more such findings out of 12.

Box 2.1

How to Interpret Estimated Effects

The effects of home visiting are estimated by comparing the outcomes of the program and control groups, adjusted for background characteristics of the sample members. Figure 2.1 shows the estimated effects for the study's confirmatory outcomes as circles. For example, there is a small, negative estimated effect on whether a child had health insurance coverage at 15 months but a small, positive estimated effect on whether a mother was receiving education or training at 15 months.

All results are presented as effect sizes, which is a way of standardizing outcomes so they are on the same scale. The interpretation of an effect size will vary with the outcome and the context, so it is difficult to characterize the magnitude of effect sizes in general. A standard IQ test has a standard deviation of 10, for example, so an effect size of 0.10 would represent a one-point positive change in IQ. For an outcome expressed as a percentage, such as the percentage of mothers with a subsequent pregnancy, an effect size of 0.10 would represent a change of about 3 percentage points to 5 percentage points in the outcome.

The lines surrounding the estimated effect in Figure 2.1 represent the 90 percent confidence interval, an estimate of the variability (or statistical imprecision) of the effects. A narrower confidence interval suggests a more precise estimate than a wider confidence interval; a wider interval indicates greater variability and thus greater uncertainty. Confidence intervals that do not contain zero (that is, that are fully to the right or the left of the zero line in the figure) indicate that the effect is different from zero to a statistically significant degree, using 10 percent as the benchmark for statistical significance. That is, there is less than a 10 percent chance of finding an estimated effect this big if the true effect of the program were zero. The figure shows that the effect is different from zero to a statistically significant degree for four outcomes: quality of the home environment, frequency of psychological aggression toward the child during the past year, number of Medicaid-paid child emergency department visits, and child behavior problems.

family outcomes.⁹ However, no outcome or outcome area stands out as having consistently large effects.¹⁰ In addition, the effects are generally smaller than those found in past studies, although MIHOPE differs from those studies in many respects. For example, most of those studies were conducted in a single local area rather than including sites across the country, and some were conducted many years ago, when similar services were less likely to be available to control group families. In addition, previous studies each examined only one evidence-based model, and might have chosen outcomes where those models were expected to make the largest differences.

- **There are some statistically significant differences in effects on the confirmatory outcomes among the evidence-based models that are generally consistent with the models' focuses.**

For example, Parents as Teachers produced the largest increase in parental supportiveness, and Nurse-Family Partnership produced the largest reduction in emergency department visits for children. The differences are somewhat sensitive to the statistical method used to examine them but these two patterns were found across different estimation methods.

- **Most estimated effects are not statistically significant.**

Although the results suggest that families are benefiting from MIECHV-funded home visiting services, only about one-third of the confirmatory outcomes and one-third of the exploratory outcomes showed effects that were statistically significant. In addition, only one of the 67 estimated effect sizes is greater than 0.20, a level sometimes used as a threshold for considering an effect to be small.¹¹

- **Results for several exploratory outcomes suggest home visiting may improve maternal health.**

⁹A statistical test of the number of outcomes for which estimated effects would be positive resulted in a p-value of 0.096 for having 9 positive findings or more out of 12, meaning there is less than a 10 percent probability that this pattern of results would have resulted if home visiting had no effect on any of the 12 outcomes. A statistical test that accounts for the magnitude of the estimated effects has a p-value of 0.025, meaning there is a 2.5 percent probability that this pattern of results would have been found if home visiting had no effects on the 12 outcomes.

¹⁰In addition, after adjusting for the number of confirmatory outcomes, none of the 12 estimated effects is statistically significant. Although the evidence as a whole points to positive effects for families, this finding reduces the study team's confidence that any individual outcome was improved by the home visiting services that were studied.

¹¹Cohen (1988).

MIHOPE found statistically significant improvements in women’s general health, increases in health insurance coverage, and reductions in depressive symptoms (although program group mothers were also more likely to say they had used drugs or alcohol in the recent past). Results for exploratory outcomes are not shown in Figure 2.1.¹² Improving maternal mental health could be especially important since it could result in improvements in many other areas, such as child development and economic self-sufficiency.

- **Home visiting might reduce household aggression.**

The results also suggest that home visiting services reduce household aggression, which could have wide-ranging, long-term implications. For example, there are statistically significant effects on the frequency of psychological aggression toward children (a confirmatory outcome) as well as mothers’ experience with intimate partner violence and mothers’ use of domestic violence services (exploratory outcomes). This effect is consistent with other significant effects — for example, those on exploratory outcomes such as parental depression (discussed above), parental stress, and parental discipline using gentle guidance. Reduced household aggression and improved parenting behaviors could also help explain observed reductions in child behavior problems (a confirmatory outcome). Because adverse childhood experiences such as child abuse and intimate partner violence have been shown to be associated with negative long-term outcomes, reducing household aggression could benefit children as they grow older.¹³

- **Differences in estimated effects for the 12 confirmatory outcomes across subgroups of families are generally small and not statistically significant.**

Of the 84 comparisons of effects that were made to examine effects for subgroups of families, only 8 differences were statistically significant at the 10 percent level. This pattern would be expected to occur by chance even if there were no real differences in effects across subgroups. Moreover, after applying an adjustment for conducting multiple tests, the only statistically significant difference in estimated effects is by race and ethnicity for a single outcome: the number of Medicaid-paid well-child visits.¹⁴

¹²See Michalopoulos et al. (2019).

¹³Felitti et al. (1998).

¹⁴Specifically, the children of non-Hispanic white mothers in the program group had significantly fewer well-child visits than children of non-Hispanic white mothers in the control group. The estimated effects for the other subgroups were positive but small (children of mothers in the program group had more Medicaid-paid well-child visits than children of mothers in the control group).

Summary

MIHOPE estimated the effects of MIECHV-funded early childhood home visiting programs on family and child outcomes around the time children were 15 months of age and found effects for families across several outcome areas that were generally similar to but somewhat smaller than the average found in past studies of the individual home visiting models.¹⁵ Subsequent chapters describe the design for long-term follow-up with MIHOPE families.

¹⁵Michalopoulos et al. (2019).

Chapter 3

Long-Term Effects of Home Visiting: Evidence from Previous Studies

This chapter provides an overview of both the evidence on the effects of home visiting and the evidence generated by benefit-cost analyses from these earlier studies to situate MIHOPE-LT within this existing body of research.¹

Evidence of Effectiveness

Evidence on the effects of home visiting from previous studies of the models included in MIHOPE (Early Head Start – Home-based option, Healthy Families America, Nurse-Family Partnership, and Parents as Teachers) informed the MIHOPE-LT design by providing information about previous results that could potentially be replicated and gaps in current knowledge that needed to be filled.² Because MIHOPE-LT is following up with families around the time the children are 5 years of age — that is, around the time they start kindergarten — this section of the chapter covers follow-ups in previous studies that occurred when children were 5 to 21 years of age.³

As indicated in Table 3.1, all the current available evidence comes from seven model-specific studies. All but one of the studies was a randomized controlled trial.⁴ The current evidence for children over 11 years of age comes only from studies of Nurse-Family Partnership.

Table 3.2 presents the evidence from these studies. In each study, families were enrolled when children were infants or their mothers were pregnant, so the table shows study results as the children age.

¹See, also, Michalopoulos, Faucetta, Warren, and Mitchell (2017).

²With one exception, the studies mentioned in this report are those that are listed on the Home Visiting Evidence of Effectiveness (HomVEE) website (<http://homevee.acf.hhs.gov>) as being of either high quality or moderate quality. The fifth-grade follow-up of the national Early Head Start evaluation is not listed on the HomVEE site. In addition, the four models' developers confirmed that there were no other published studies with long-term impact findings. Finally, existing studies of Parents as Teachers with children older than 5 years of age are not considered to be of high or moderate quality by the HomVEE review and are not included in this report.

³Drazen and Haust (1993) had a prekindergarten follow-up that included some children who were 4 years of age and some children who were 5 years of age, so it is included here. However, any studies that looked only at children 4 years of age and younger were excluded.

⁴The one exception is the Parents as Teachers study.

Table 3.1
Seven Studies with Follow-Ups at Ages 5 to 21 Years
That Informed the MIHOPE-LT Design

Home Visiting Model	Study Locale	Baseline Sample Size (Number of Families)	Follow-Up Points
Early Head Start – Home-based option	Nationwide	1,385 ^a	Kindergarten Fifth grade
Healthy Families America	Erie, Rensselaer, and Ulster counties, New York	1,173	First grade
	Oahu, Hawaii	684 ^b	Averaged outcomes over 7-9 years old
Nurse-Family Partnership	Elmira, New York	400	15 years old 19 years old
	Denver, Colorado	735	6 years old 9 years old
	Memphis, Tennessee	1,139	6 years old 9 years old 12 years old 20-21 years old
Parents as Teachers	Binghamton, New York	40	4-5 years old ^c

SOURCES: Bair-Merritt et al. (2010); Chazan-Cohen, Raikes, and Vogel (2013); Drazen and Haust (1993); DuMont et al. (2010); Eckenrode et al. (2001); Eckenrode et al. (2010); Hanks et al. (2011); Holmberg, Luckey, and Olds (2011); Jones Harden, Chazan-Cohen, Raikes, and Vogel (2012); Kirkland and Mitchell-Herzfeld (2012); Kitzman et al. (2010); Olds et al. (1997); Olds et al. (1998); Olds et al. (2007); Olds et al. (2010); Olds, Holmberg et al. (2014); Olds, Kitzman et al. (2004); Olds, Kitzman et al. (2014); Sidora-Arcoleo et al. (2010); Vogel et al. (2010); and Zielinski, Eckenrode, and Olds (2009).

NOTES: With one exception, the studies mentioned in this table are those that are listed on the Home Visiting Evidence of Effectiveness (HomVEE) website (<http://homevee.acf.hhs.gov>) as being either high quality or moderate quality. The fifth-grade follow-up of the national Early Head Start (EHS) evaluation is not listed on the HomVEE site. In addition, the four models' developers confirmed that there were no other published studies with long-term impact findings. Finally, existing studies of Parents as Teachers with children older than 5 years of age are not considered to be of high or moderate quality by the HomVEE review and are not included in this report.

^aThis is the sample size for participants who were only enrolled in home-based EHS programs. The national EHS evaluation sample size is larger as it also includes participants enrolled in center-based and mixed-approach programs.

^bSeven hundred and thirty families gave initial consent to participate in the study, but only 684 were interviewed at baseline. Forty-one of these families were assigned to a smaller "testing control group," which is why some studies cite a sample size of 643.

^cA study (Drazen and Haust, 1993) with a prekindergarten follow-up included some children who were 4 years of age and some children who were 5 years of age, so it is included here. However, any studies that looked at only children age 4 years and younger were excluded.

Table 3.2

Evidence from Previous Home Visiting Studies (Follow-Ups at Ages 5 to 21)

Outcome Area	Age Group								
	5 Years and Kindergarten	6 Years	7 Years	7-9 Years	9 Years	5 th Grade	12 Years	15 Years	19-21 Years
Child Development and School Performance	PPPPPPPPP	NNNNNN	HHHHHHH		NNNNNN	EEEEEE	NNNNNN	N	N
	PPPPPPPPP	NNNNNN	HHHHHHH		NNNNNN	EEEEEE	NNNNNN		
	EEEEEEEEEE	NNNNN	HHHHHHH		NNNNNN	EEEEEE	NNN		
	EEEE		HHHHHHH		NNNNNN	EEEEEE			
Family Economic Self-Sufficiency	P	NNNNN			NNNNNN	EEEEEEE	NNNNNN	N NNNN	NNNN
	EEE	NNNNN NNNN			NNNNNNN NNNNNN		NNNNNNN NNNNNNN		
Juvenile Delinquency, Family Violence, and Crime	E	N		HHHHHH HHH	NNN	EE	NNN	NNNN NNN NNNNNNN NNNNNNN	NNNNNN NNNNNNN NN
Maternal Health	EE	NNNNN NNNNN			NNNNN NNNNN	EEE	NNNNN NN	NNNN	NNN
Child Maltreatment	PPP		HHHHHHHH				N	NNNN	
	E		HHHHHHHH HHHHHHHH					NNN	
Child Health		NN	HHH		NNN	EEEE	NNN	NNNNN NNN	NNNNNNN NNN
Parenting	EEEEEEE		HHH			EEEE EEEE EEE			

SOURCES: The U.S. Department of Health and Human Services Home Visiting Evidence of Effectiveness (HomeVEE) website (homvee.acf.hhs.gov) and sources in Table 3.1.

NOTES: E = Early Head Start H = Healthy Families America N = Nurse-Family Partnership P = Parents as Teachers

Bold = Outcome examined, significant. **NO BOLD** = Outcome examined, not significant. **Red** indicates the result was negatively significant.

Of the 405 total outcomes examined in previous studies, 68 estimates (17 percent of examinations) are statistically significant and positive,⁵ which is more than would be expected if home visiting had no effect on these outcomes. Across this large set of findings, about 5 percent would be statistically significant at the 5 percent significance level even if home visiting had no benefits for families as children age.⁶

The likelihood that estimates are statistically significant varies across domains, but more than 5 percent of the estimates are statistically significant in a favorable direction in all of them. Family economic self-sufficiency (25 percent), parenting (25 percent), and maternal health (21 percent) have the highest rates of statistically significant positive results. Child development and school performance (14 percent), child health (12 percent), child maltreatment (14 percent), and juvenile delinquency, family violence, and crime (13 percent) are at the lower end of the range.

Following is a summary of the overall evidence from each outcome area shown in Table 3.2 (in descending order from most to least examined):

- **Child development and school performance** (144 examinations; 14 percent statistically significant): Positive effects have been concentrated in follow-ups at younger ages, for which 80 examinations have been made and 19 statistically significant estimates found; after age 7, there have been 64 examinations in this domain and only one statistically significant estimate.
- **Family economic self-sufficiency** (73 examinations; 25 percent statistically significant): The positive effects have been found in increased parental employment, reduced receipt of benefits, and increased family stability through age 12.
- **Juvenile delinquency, family violence, and crime (maternal)** (56 examinations; 13 percent statistically significant overall)
 - **Juvenile delinquency** (32 examinations; 22 percent statistically significant): The few positive effects are seen on arrests and convictions at ages 15 and 19 (in the Nurse-Family Partnership Elmira

⁵In this case, estimates are considered statistically significant if there is less than a 5 percent likelihood that the effect is due to chance based on a two-tailed t-test (that is, assuming effects have the possibility of appearing in a positive or negative direction).

⁶Although statistical significance is not a perfect indicator of the size of the impacts, estimated impacts that are not statistically significant in individual studies are generally quite small.

follow-ups), which suggests that these outcomes should be examined in middle or late adolescence.

- **Family violence** (16 examinations; 0 percent statistically significant): Most examinations come from the Healthy Families America Hawaii follow-up (at ages 7 to 9 years).
- **Crime (maternal)** (8 examinations; 0 percent statistically significant): The crime outcomes that were examined for mothers were jail, arrests, and convictions (at the Nurse-Family Partnership follow-ups at ages 9, 12, and 15 years).
- **Maternal health** (39 examinations; 21 percent statistically significant): The evidence suggests positive effects are more likely to be found on the mother's subsequent births and pregnancies before the child for whom the mother entered home visiting is 9 years of age. Effects have also been found on mothers' sense of mastery.⁷
- **Child maltreatment** (36 examinations; 14 percent statistically significant): The majority of examinations of child maltreatment come from the 7-year Healthy Families America follow-up and the 15-year Nurse-Family Partnership follow-up. Effects have been seen on parents' reports of minor physical aggression and reports of child abuse and neglect substantiated by child protective services agencies.
- **Child health** (33 examinations; 12 percent statistically significant and positive): Examinations of child health are concentrated in the areas of adolescent substance use and reproductive behaviors. Significant effects on substance use occur at the 12-year Nurse-Family Partnership follow-up but not at later follow-ups, and no significant effects on reproductive behaviors have been observed.
- **Parenting** (24 examinations; 25 percent statistically significant): Parenting outcomes have been examined at only three follow-up points, and the majority of examinations occurred at the two Early Head Start follow-up points. The significant results are concentrated at the Early Head Start kindergarten follow-up; no impacts were observed on any of the parenting outcomes that were examined at the fifth grade follow-up.

⁷Mastery measures the extent to which a person thinks life chances are under her control.

Discussion about how the evidence from previous studies informs data collection plans for the MIHOPE-LT kindergarten follow-up is included in Chapter 5.

Benefit-Cost Evidence

In addition to examining the effectiveness of home visiting, previous studies have examined whether the monetary benefits to families, the government, and society outweigh the costs of providing home visiting services.⁸ In these analyses, benefits are often based on outcomes such as earnings and receipt of public assistance benefits that are already expressed in monetary terms. In addition, they can be based on outcomes where there is useful information that links the outcome to monetary benefits, such as educational attainment (which can contribute to increased earnings and reduced use of public assistance programs) and child maltreatment (which may reduce costs to the child welfare system). Since it can be difficult to link outcomes such as improved parenting practices to monetary benefits, the benefits of home visiting that are estimated in these analyses might understate their full value to individuals, the government, or society.⁹

Table 3.3 summarizes results from benefit-cost analyses of the evidence-based models and includes results from several studies.¹⁰

- **Healthy Families America:** Two studies, one of 2,727 families in Oregon with one follow-up that occurred when children were 2 years of age, and a second of 1,173 families in New York with follow-ups that occurred until children were 7 years of age; plus a Washington State Institute for Public Policy (WSIPP) analysis that made several assumptions to project from specific follow-up periods to the parent's and child's lifetimes.
- **Nurse-Family Partnership:** Three studies, in Denver (735 families), Elmira (400 families), and Memphis (1,139 families), with multiple follow-up points, and one WSIPP lifetime projection analysis.

⁸Results in this section are based on Michalopoulos, Faucetta, Warren, and Mitchell (2017). However, the Washington State Institute for Public Policy (WSIPP) benefit-cost ratios reported in that study are higher than those in this report because WSIPP periodically changes its estimates based on updated benefit-cost methods and literature reviews. This report uses the WSIPP results available in 2018.

⁹Because different studies may not have included the same outcomes in estimating the benefits of home visiting, there may be differences in benefit-cost results across studies.

¹⁰A benefit-cost analysis has not been published for Early Head Start.

Table 3.3

Directly Measured and Lifetime Projections of Returns on Investment in Home Visiting, by Evidence-Based Model

Model and Study	Follow-Up Period	Benefit-Cost Ratio ^a	Stakeholder Perspective ^b	Main Source of Benefits (In Descending Order) ^c
<u>Healthy Families America</u>				
Oregon: Green et al. (2016)	2 years	-0.17	Society	Not applicable
New York: DuMont et al. (2010)	7 years	0.15	Government	Medicaid delivery and hospitalizations, public assistance
Oregon: Green et al. (2016)	Lifetime projection	-4.20	Society	Not applicable
WSIPP (2018a)	Lifetime projection	0.98	Society	Maternal earnings associated with employment, K-12 special education
<u>Nurse-Family Partnership</u>				
Elmira: Olds et al. (1993)	4 years	0.55	Government	Not available
Denver: Glazner et al. (2004)	4 years	0.29	Government	Tax revenue, subsidized child care, Medicaid, food stamps
Memphis: Glazner et al. (2004)	4.5 years	0.26	Government	Food stamps, foster care, AFDC
Denver: Miller et al. (2011)	9 years	3.05	Society	Maternal earnings and employer-paid supplements, maternal depression
Memphis: Olds et al. (2010)	12 years	1.07	Government	Food stamps, Medicaid, AFDC/TANF
Elmira: Glazner et al. (2004)	15 years	3.93	Government	Food stamps, AFDC, tax revenue, Medicaid
WSIPP (2018b)	Lifetime projection	1.63	Society	Child earnings due to reduced child maltreatment, infant mortality
<u>Parents as Teachers</u>				
WSIPP (2018c)	Lifetime projection	0.24	Society	Child earnings due to reduced child maltreatment

(continued)

Table 3.3 (continued)

SOURCE: Summaries and calculations based on results from the four evidence-based models included in MIHOPE.

NOTES: WSIPP = Washington State Institute for Public Policy; AFDC = Aid to Families with Dependent Children; TANF = Temporary Assistance for Needy Families.

This table includes results from benefit-cost analyses of the four evidence-based home visiting models included in MIHOPE. It includes original benefit-cost evaluations by model developers and independent evaluators and secondary evaluations by WSIPP. It does not include subgroup findings or analyses that include studies of models implemented outside the United States.

The WSIPP results have been updated from those included in Michalopoulos, Faucetta, Warren, and Mitchell (2017) due to WSIPP's use of updated benefit-cost methods.

^aThe benefit-cost ratios presented were calculated by the original study authors or WSIPP, with the exceptions of Healthy Families Oregon, the Nurse-Family Partnership Elmira 4-year study, and the Nurse-Family Partnership Memphis 12-year study. In these cases MDRC calculated the ratios based on authors' benefits and costs to avoid presenting results in different annual dollar amounts.

^b"Government" means the benefit-cost calculations considered only government expenditures and revenues. "Society" indicates a wider perspective, including outcomes such as those related to the earning of high school diplomas or equivalents.

^cDefined as the largest benefits that, taken together, comprise at least 75 percent of total benefits. Some of the information came from authors of the cited studies while other benefits were calculated by the authors of Michalopoulos, Faucetta, Warren, and Mitchell (2017).

- **Parents as Teachers:** One WSIPP analysis.

In Table 3.3, the main result is the benefit-cost ratio shown in the third column. This ratio is calculated by dividing the estimated monetary benefits by their costs. Ratios greater than 1.0 indicate that benefits exceed costs, and ratios less than 1.0 indicate that costs exceed benefits. Since this number is a ratio, it also indicates the degree to which benefits are greater or less than costs. For example, the benefit-cost ratio for the Healthy Families America study in New York, which is shown in the second row, is 0.15, indicating that benefits were only 15 percent as large as costs with a seven-year follow-up period. By comparison, the Denver study of Nurse-Family Partnership at 9 years has a benefit-cost ratio of 3.05, indicating that benefits were more than three times as great as costs. The second-to-last column shows whether the benefits are for government agencies (for example, reduced government costs) or society as a whole. Where the benefit-cost ratio is positive, the final column shows the main outcomes that contributed to estimated benefits.

Overall, these analyses have found:

- **The benefits of home visiting generally exceed its costs over periods of 9 years or more.**

Home visiting programs incur costs right away, but participating parents and children can see improved outcomes over their lifetimes. Table 3.3 shows findings from Nurse-Family Partnership and Healthy Families America studies from several defined follow-up periods. All three Nurse-Family Partnership studies found that the benefits of home visiting were less than costs when children were 4 years of age but exceeded costs when children were 9 years of age or older. For Healthy Families America, the benefits with a 7-year follow-up are greater than with a 2-year follow-up (0.15 versus -0.17), although neither Healthy Families America estimate indicates that the monetary benefits exceeded the cost of providing services.¹¹

- **Benefits to the government generally stem from increased parental earnings.**

Society benefits from improved parent and child well-being. For the longer-term follow-ups of Nurse-Family Partnership, for example, increased maternal earnings resulted in increased tax revenue and reduced spending on public assistance programs such as Medicaid, Temporary Assistance for Needy Families, and the Supplemental Nutrition Assistance Program. From society's perspective, the 9-year follow-up in the Nurse-Family Partnership study in Denver found that benefits also came from reduced maternal depression, which can result in improvements in many aspects of parent and child well-being.¹² The WSIPP lifetime projections for Nurse-Family Partnership and Parents as Teachers indicate that society also benefited from reduced child maltreatment, which was projected to increase future earnings when these children become adults.

- **Projecting benefits over an individual's lifetime introduces considerable uncertainty into these findings, especially with shorter follow-up periods.**

The lifetime projections are consequently quite variable, ranging from -4.20 when Healthy Families America results in Oregon were projected from a 2-year follow-up, to 0.24 for Parents as Teachers, to 1.63 for Nurse-Family Partnership when projecting from the longer follow-up periods available in those studies. Moreover, these pro-

¹¹There are no Parents as Teachers studies that measured benefits using defined follow-up periods.

¹²Knitzer, Theberge, and Johnson (2008).

jected results can change. In an earlier MIHOPE-LT publication discussing these benefit-cost results, an earlier set of results from WSIPP indicated benefits exceeded costs over a lifetime for all three evidence-based models (Healthy Families America, Nurse-Family Partnership, and Parents as Teachers).¹³

Summary

Previous studies of the four MIHOPE evidence-based home visiting models have provided some information on the effectiveness of home visiting programs when children are in kindergarten and beyond. MIHOPE-LT can expand this body of evidence, as described in subsequent chapters.

¹³The WSIPP benefit-cost ratios reported in Michalopoulos, Faucetta, Warren, and Mitchell (2017) are higher than those in this report. The benefit-cost ratios in the earlier MIHOPE-LT publication are 1.25, 1.88, and 3.44 for Healthy Families America, Nurse-Family Partnership, and Parents as Teachers, respectively. These results are different because as mentioned above, WSIPP periodically changes its estimates based on updated benefit-cost methods and literature reviews.

Chapter 4

Overview of Plans for MIHOPE Long-Term Follow-Up

This chapter provides an overview of the plans for MIHOPE-LT. It presents the research questions that the study is designed to answer, the proposed timing of potential follow-up points, the sampling the study may use, and the data sources and outcome areas that may be examined.

Research Questions

The primary goal of MIHOPE-LT is to measure the long-term effects on family outcomes of having access to MIECHV-funded evidence-based home visiting through programs that participated in MIHOPE. The study also plans to determine whether effects differ for different subgroups of families and examine the pathways through which home visiting has long-term effects. In addition, a benefit-cost analysis is proposed. Discussion of the four primary research questions that MIHOPE-LT was designed to try to answer follows.

1. What are the long-term effects of being assigned to receive evidence-based home visiting for families who enrolled in MIHOPE?

MIHOPE-LT can contribute to the body of evidence on home visiting because of its large sample and because data will be collected the same way across the four evidence-based models (Early Head Start – Home-based option, Healthy Families America, Nurse-Family Partnership, and Parents as Teachers). In addition, programs have evolved since the earlier studies were conducted, in part because of the statutory requirements of the MIECHV Program and in part due to ongoing quality improvement efforts by programs and models. The context in which programs operate and the participants in those programs have changed. Finally, the prior evidence of effectiveness is limited for any particular outcome, and MIHOPE-LT provides an opportunity to gain important knowledge about these outcomes.

2. Are the long-term effects of home visiting larger for some families than for others?

Learning about effects for particular groups of families — that is, for subgroups by different types of family characteristics — could allow for better targeting of home visiting services. Although, as described in Chapter 2, analyses in MIHOPE using data collected when children were about 15 months of age suggest that the effects of home visiting do not vary much with family characteristics, MIHOPE-LT can continue to look

for subgroup differences. A review of the literature that informed the MIHOPE 15-month analysis found that the same subgroups have not been examined consistently in previous studies of home visiting, so continuing to provide this information for the four evidence-based models could be informative. However, MIHOPE-LT may examine additional subgroups that were not analyzed when children were 15 months of age. For example, information about mothers' adverse experiences as children will be collected at the kindergarten follow-up and could be used to form additional subgroups.

3. What are the pathways through which home visiting affects families' longer-term outcomes?

The longitudinal nature of MIHOPE-LT and its use of randomization provide a unique opportunity to investigate the pathways through which home visiting benefits families.

Providing credible information on pathways may still be difficult because home visiting is intended to affect a wide range of outcomes, which are likely to interact in complicated ways over time. For example, maternal mental health could affect child well-being as well as other maternal behaviors (parenting, child maltreatment, intimate partner violence, education, employment, and earnings), all of which then also have the potential to affect child well-being. The same is true for many aspects of adult well-being. Improvements in one aspect of adult well-being can lead to improvements in other aspects of adult well-being or can lead to improvements in child well-being. Child well-being then has the potential to continue to affect adult well-being. Home visiting could also have a direct effect on child well-being through, for example, early detection of developmental delays.

Although the statistical models that are used to analyze pathways might be complicated, they could further an understanding of how home visiting may affect policy-relevant outcomes. For example, at the kindergarten follow-up, the study could examine the pathways through which home visiting may affect school readiness by determining how positive impacts on families at the 15-month follow-up are related to school readiness as measured at the kindergarten follow-up.

4. How do the monetary benefits of home visiting compare with its costs over the long term?

Longer-term follow-up with the MIHOPE families could also allow the study to measure impacts that could be linked to long-term economic savings to the government

or economic benefits to families and society.¹ Previous benefit-cost analyses of the models that participated in MIHOPE have found that costs exceed benefits with less than nine years of follow-up data, but results from the Nurse-Family Partnership indicate that benefits exceed costs with longer follow-up.² Thus, benefit-cost analyses in MIHOPE could be conducted at future points in time to reveal how the difference between benefits and costs changes as children get older.

As in prior benefit-cost analyses of home visiting, the benefit-cost analysis could use three types of outcomes:

- Outcomes readily expressed in monetary terms, such as earnings, public assistance (Temporary Assistance for Needy Families, Supplemental Nutrition Assistance Program, and Medicaid), and health care use (for example, hospitalization and emergency department care)
- Outcomes that have been assigned a monetary value, such as maternal depression (which can influence health care costs, employment, and public assistance), and child maltreatment (which can have costs to the child welfare system)
- Outcomes that can be used to estimate future benefits, such as child maltreatment and special education to project improvements in children's future earnings as adults and maternal alcohol use, and maternal graduation from high school to project improvements in maternal earnings

Timing of Potential Follow-Up Points

To determine the optimal timing of follow-up data collection to answer the key research questions and minimize the burden on families, the study team reviewed other long-term follow-up studies of home visiting programs, examined the existing literature on child and family outcomes of interest, and consulted with experts in home visiting research, early childhood and family intervention research, economics, and benefit-cost analysis.

¹Cost data were collected during the implementation phase of MIHOPE, and the costs of delivering home visiting services in the year after families began receiving services are discussed in Corso, Ingels, and Walcott (forthcoming).

²Not counting the lifetime projections conducted by the Washington State Institute for Public Policy, benefit-cost analyses have not been conducted for the other three evidence-based models with follow-ups that occurred when children were older than 7 years of age.

As a result of this work, four potential follow-up points were identified that are based on the MIHOPE child's expected progression through school: kindergarten, third grade, middle school, and high school. The rationale for each of these time points is described below.

In addition, brief check-ins with families (to obtain updated contact information and maintain engagement with the study) could occur periodically, and administrative data could be obtained throughout the follow-ups and could be collected past the last follow-up with families.

Kindergarten³

Measuring children's cognitive, behavioral, self-regulatory, and social-emotional skills before formal schooling begins or at the outset of formal schooling will provide important data on the intermediate effects of home visiting. In addition, a wealth of literature demonstrates that children's math, language, and social-emotional skills at the transition to formal schooling are predictive of academic and behavioral outcomes in the longer term,⁴ and a follow-up in the children's kindergarten year will allow the study team to measure these key mediators. Consistent with this evidence from the literature, the legislation that authorized MIECHV indicated that MIECHV-funded home visiting programs are expected to improve school readiness.⁵

Third Grade

Children's behaviors and self-regulation in third grade are important predictors of future outcomes, such as academic achievement and aggressive behavior.⁶ In addition, third grade generally presents the first opportunity to obtain school records that include reading and math state test scores, which are key predictors of future school success, as research has found empirical evidence for the association between reading skills at third grade and high school graduation rates.⁷ However, the previous studies of home

³The kindergarten follow-up data collection began in January 2019 and will continue through 2022 with families whose children are 5 years of age by the state cut-off date for entry into kindergarten each year.

⁴Duncan et al. (2007); Eisenberg, Valiente, and Eggum (2010); Portilla et al. (2014).

⁵SEC. 511 [42 U.S.C. 711] (c) (1) indicates that grants are to be made to enable eligible entities to deliver home visiting services in order to promote improvement in several outcome areas that include school readiness. SEC. 511 [42 U.S.C. 711] (d) (1) (A) includes school readiness in the list of benchmark areas that eligible entities are expected to improve.

⁶Kokko et al. (2006); Ladd and Dinella (2009); Miles and Stipek (2006); Valiente, Lemery-Chalfant, Swanson, and Reiser (2008).

⁷Hernandez (2011).

visiting discussed in Chapter 3 have not found any effects on school performance after the age of 7 years.

Obtaining information at or following third grade might be particularly important for answering the question of how the monetary benefits of home visiting compare with its costs. Because benefits may continue to accrue as children get older, obtaining information about family well-being after the children's kindergarten year might allow the study to measure more of the benefits. As discussed in Chapter 3, benefits can be measured more precisely over longer follow-up periods, and studies of the Nurse-Family Partnership have found that the benefits of home visiting services exceed their costs only when examined when children are nine years of age or older. Thus, a third-grade follow-up could provide information on whether that finding still holds with a larger sample and for additional models. Children's test scores would be key measures for the benefit-cost analysis. Measures of family economic self-sufficiency, family violence, child maltreatment, child health, and maternal health would also contribute to this analysis.

Middle School

The transition to adolescence is considered an especially stressful time, characterized by challenging biological, cognitive, and psychosocial changes.⁸ It is also a time when some children start engaging in risky health-related behaviors such as sexual activity, smoking, and drug use, and when early indicators of future juvenile justice involvement may emerge.

In terms of prior evidence of effectiveness of home visiting, Nurse-Family Partnership's Memphis study is the only one for which there is evidence when children are 12 years of age, with statistically significant impacts related to child development, child and maternal health, and economic self-sufficiency.

High School

Similar rationales point to the value of a follow-up when children are in high school. From the perspective of child development and academic achievement, the transition to high school is another critical period,⁹ which might suggest conducting a follow-up when the participating children are age 15. In addition to taking more advanced course work, children in high school must navigate a new and potentially larger social

⁸Arnett (1999); Hall (1904); Schwartz, Cappella, and Seidman (2015).

⁹Alspaugh (1998); Graber and Brooks-Gunn (1996); Smith (2006).

environment, a complex set of school structures, and a context that is likely less emotionally supportive than the settings they experienced in prior schooling.¹⁰ High school is also a time when teens might become pregnant or become parents, and involvement with the juvenile justice system may increase.¹¹

Additionally, following up in high school could allow for the replication of evidence of reductions in child maltreatment and juvenile delinquency at age 15 in the Nurse-Family Partnership study in Elmira¹² — the only follow-up with children this age in the seven studies included in Chapter 3. Finally, measuring outcomes for children at this point could provide evidence for the benefit-cost analysis on several outcomes that may result in reduced government spending and benefits to society (such as improved academic achievement for children, improved child health and mental health, and reductions in involvement with the criminal justice system).

Sampling

In making decisions about how to collect data about families, the study team has considered the possibility of collecting some types of data for a subset of families (rather than collecting all data about all families) at each follow-up point.¹³ The primary reason to do this is to use resources where they would create the most value for the study.

Using resources where they would create the most value is particularly important for MIHOPE-LT because the sample is so widely dispersed geographically (families enrolled in MIHOPE at 87 locations in 12 states) and because the children in the sample range in age (with, for example, children in the MIHOPE sample entering kindergarten over the course of four years).¹⁴

As a result of these sample characteristics, the team has weighed the cost of collecting various types of data against the value those data are likely to provide to the study. Weighing the costs of data collection with the value they provide suggests using more resource-intensive methods with a subset of families. For example, assessments of children conducted in families' homes could be done with a subset of families that is

¹⁰Dupéré et al. (2015); Yeager et al. (2016).

¹¹National Institute of Justice (2014).

¹²Olds et al. (1997); Zielinski, Eckenrode, and Olds (2009).

¹³This section describes sampling strategies that have been considered by the team. The sampling strategies used in the kindergarten follow-up are described in Chapter 5.

¹⁴An eighty-eighth site participated in the study but did not enroll any families. Both the length of the study's enrollment period and the range of child and gestational ages at enrollment contribute to this four-year period.

still large enough to estimate the effects of the programs overall but not to investigate subgroup differences. In contrast, when costs do not vary much with the number of families for whom data are collected (such as with an administrative data source like the National Directory of New Hires), the study could collect data for all families.

Subsampling may take several forms:

- The study could focus on obtaining school records only in states with centralized data systems.
- For data collection that requires going to a family's home (as would be done with direct assessments of children or observed mother-child interactions), the study could focus on locations with enough families to be able to efficiently use field staff.

The subsampling described above would not be random since it would favor locations where data collection is less expensive compared with locations where costs would be greater. However, it would not affect the random assignment design of the study since families were randomly assigned to program and control groups within each local home visiting program. In addition, the study team is considering reducing the overall burden of data collection by randomly choosing which families will be asked to provide which type of information. The basic idea behind this strategy — which is sometimes referred to as “planned missingness” — is that collecting some information from a subset of the sample allows the study to collect a wider set of information than it could otherwise, while state-of-the-art methods for working with missing data minimize the extent to which the precision of the impact estimates is affected.¹⁵

One example of planned missingness is the multiform design, in which multiple forms of a survey are each conducted with a randomly chosen subset of families.¹⁶ In MIHOPE, the multiform design could be applied by asking each family a subset of questions from a scale. For example, considering a scale with nine items, one-third of sample members could be asked to answer items one, two, four, and seven; one-third could be asked to answer items one, two, five, and eight; and one-third could be asked to answer items one, two, three, six, and nine. Asking a subset of questions on the scale would still

¹⁵With planned missingness, statistical methods can be used as a way to fill in the missing information. To the extent that other information such as baseline data or other outcome data can help predict the outcome, these statistical methods can reduce the loss of statistical power that results when the outcome data for only part of the sample are collected. Strong predictors would result in little loss of power while very weak predictors would produce mostly random information on missing outcomes, and in that case planned missingness would result in a substantial reduction in statistical precision. See Lang and Little (2016).

¹⁶Graham, Taylor, Olchowski, and Cumsille (2006).

provide an unbiased estimate of the underlying construct but leave more room on the survey to measure other constructs.

Data Sources

Home visiting has the potential to affect a wide range of outcomes. In determining the scope of the MIHOPE-LT data collection efforts, the team considered a wide range of data sources. These include data sources that require direct contact with families, such as structured interviews with mothers,¹⁷ direct assessments of children and mothers, in-home observations, video-recorded mother-child interactions, qualitative interviews, biospecimens (such as hair or saliva specimens), and, in potential later follow-up waves, structured interviews with children. Teacher surveys, which would require direct contact with individuals who were not previously part of the study, were also considered, as were a variety of administrative data sources: Medicaid records, state child welfare records, data from the National Directory of New Hires (to measure employment and earnings), juvenile justice records, school records, tax records, mortality records, and the American Community Survey.

The sources of data to be collected at the MIHOPE-LT kindergarten follow-up are shown in Chapter 5. If follow-ups are conducted at later time points, the data sources will be chosen after key outcomes are finalized and resources are allocated.

As indicated earlier, administrative data could be collected throughout children's childhood and adolescence and past high school. Once the MIHOPE children who are the focus of this study are 18 years of age, consent could be obtained from them for collecting administrative data during their adulthood.

Summary

Chapter 4 provides an overview of the design for long-term follow-up with MIHOPE families. The chapter describes the four research questions MIHOPE-LT is designed to answer and the rationale for following up with families when children are in kindergarten, as well as at three later potential time points. The next chapter describes the design for the kindergarten follow-up point in detail. Sampling considerations are also discussed.

¹⁷In cases where the mother is not available (for example, because she no longer has custody of the child), data collection would be conducted with the child's primary caregiver, such as the child's father. This approach was also used at the MIHOPE follow-up that occurred when children were 15 months of age.

Chapter 5

The MIHOPE-LT Kindergarten Follow-Up

This chapter covers the data collection plans for the kindergarten follow-up point. It begins by describing the considerations that informed the constructs included in the kindergarten data collection effort and then describes what will be examined in each outcome area. It then details the data sources that will be used to obtain findings about these constructs. The chapter concludes with a discussion of the sample distribution across multiple cohorts, the sampling plan, the specific timing of the data collection effort within the kindergarten year, and the analyses that the study team plans to conduct with the kindergarten data.

Choosing Constructs to Measure in Kindergarten

Home visiting has the potential to affect a wide range of outcomes. The study team generated a lengthy list of potential constructs by reviewing previous studies of home visiting, compiling the logic models for the four MIHOPE evidence-based models (Early Head Start – Home-based option, Healthy Families America, Nurse-Family Partnership, and Parents as Teachers), discussing long-term effects with the model developers and other key stakeholders, and reviewing the broader literature in each domain of interest. It was not possible to examine all the constructs at the kindergarten follow-up,¹ so the study team considered prior evidence of effects, potential use in a benefit-cost analysis, adverse childhood experiences (ACEs), and mediators and moderators, as explained below, when deciding which constructs to examine.²

Previous Evidence of Effects

As noted earlier, one of the goals for MIHOPE-LT is to learn about the long-term effects of being given access to evidence-based home visiting. Consequently, prior evidence of effectiveness was considered when choosing among constructs, and the focus in reviewing the evidence from previous studies was on examinations that occurred around kindergarten age, because findings from the same time period in children's lives were considered the most relevant for the MIHOPE kindergarten design. The results

¹Constructs that were considered but are not included are discussed in Appendix D.

²Policy relevance was considered but was not used to narrow the kindergarten outcomes list because all the outcomes considered are policy-relevant. The ACEs criterion enables the study to capture many outcomes that are most consequential for children's well-being, and the benefit-cost lens enables the study to capture effects on government assistance programs.

from the MIHOPE 15-month impact analysis were also considered, but because the 15-month findings were not available until after many decisions about the kindergarten design had been made and were similar to effects in previous studies, and because it is difficult to anticipate how effects at 15 months may affect families when children are in kindergarten, the evidence from previous studies was given more weight.³

Potential Use in Benefit-Cost Analysis

Because conducting a benefit-cost analysis is one of the priorities of MIHOPE-LT, the study team also considered the potential for a construct to be linked to long-term economic benefits. In prior benefit-cost analyses, home visiting may not have had a statistically significant impact on constructs that have been used either to directly measure benefits or to model future benefits. Because a benefit-cost analysis can use constructs that may not have statistically significant impacts, the study team included a construct's potential use in benefit-cost analyses as a separate criterion.

Adverse Childhood Experiences

Given research that shows that the risk for a host of poor health and well-being outcomes increases as the number of adverse childhood experiences (ACEs) increases, a construct's ability to contribute to an ACE index was also considered.⁴ The range of constructs considered to be ACEs has evolved since the original ACE study, but they often include topics such as abuse (emotional, physical, sexual), having a mother who has been treated violently, substance use in the household, mental illness in the household, parental separation or divorce, incarceration of a household member, emotional neglect, and physical neglect. By including measures of children's ACEs at the kindergarten follow-up, the study team will be able to measure whether home visiting affects these predictors of subsequent negative outcomes (outcomes that could emerge as the MIHOPE children become adults).⁵

³Similarly, because it is difficult to anticipate how effects in earlier waves of prior studies affected families when children were in kindergarten, findings from follow-ups that occurred at younger ages in prior studies were not considered.

⁴Felitti et al. (1998).

⁵Separately, the study team is also obtaining information about mothers' ACEs at the kindergarten follow-up, to learn about their childhood experiences.

Mediators and Moderators

As indicated in Chapter 4, a goal of MIHOPE-LT is to investigate the pathways through which home visiting has long-term effects on families. To examine these pathways, the study team needs to measure mediators — mechanisms that can explain the relationship between home visiting and long-term effects. Because home visiting is an intervention that attempts to influence a wide range of behaviors, and it is likely that outcomes will be influenced through multiple mediators, all the constructs considered for the kindergarten follow-up have the potential to be mediators of the longer-term effects of home visiting. However, to ensure that important mediators of policy-relevant outcomes in third grade, middle school, and high school are being measured at kindergarten, a few constructs were included at the kindergarten follow-up, primarily because of their value as mediators of the effects of home visiting at later follow-up points. In addition, a few constructs that have the potential to moderate — or explain the strength of the relationship between home visiting and long-term effects — were included at the kindergarten follow-up.

Kindergarten Constructs

As previously indicated, home visiting programs attempt to support families in a variety of ways, tailoring services to meet families' needs. Although individual services may vary, the study team identified eight areas of adult and child functioning and behavior where effects of home visiting services are most likely to be observed when children are kindergarten age:⁶

⁶These eight areas cover aspects of the outcome areas specified in the MIECHV legislation, even though they do not align exactly with those areas. The study team modified the outcome areas for the kindergarten follow-up so that the areas would reflect the more narrow focus of the constructs of interest at the kindergarten follow-up. (For example, “maternal behavioral health” is used at kindergarten, rather than the broader “prenatal, maternal, and newborn health.”) A list of the kindergarten outcome areas follows, with the legislative outcome areas with which they are most closely aligned shown in parentheses: family economic self-sufficiency (family economic self-sufficiency); maternal positive adjustment (prenatal, maternal, and newborn health; parenting skills); maternal behavioral health (prenatal, maternal, and newborn health); family environment and relationship between parents (family economic self-sufficiency; crime and domestic violence); parent-child relationship and interactions (parenting skills; child health and development); parental support for cognitive development (parenting skills); child functioning (child health and development; school readiness); and receipt of and connection to services (child health and development; school readiness).

- Family economic self-sufficiency
- Maternal positive adjustment⁷
- Maternal behavioral health⁸
- Family environment and relationship between parents
- Parent-child relationship and interactions⁹
- Parental support for child’s cognitive development
- Child functioning (school readiness)
- Receipt of and connection to services

Constructs in two additional areas are also being measured at the kindergarten follow-up:

- Social support
- School and neighborhood context

These last two areas were included primarily because they can provide important context and information about characteristics that may moderate the long-term impacts of home visiting.

Information on the measurement of all the kindergarten constructs, including discussion of scales and assessments, is included in Appendix A.

Table 5.1 shows all the constructs that will be examined at the kindergarten follow-up and their data sources.¹⁰

⁷The term “maternal positive adjustment” is used here to refer to aspects of maternal functioning such as parenting stress, mastery, self-regulation, and household chaos.

⁸This area includes maternal mental health and maternal substance use and alcohol use.

⁹Severely negative parenting behavior (including child maltreatment) is discussed in this area.

¹⁰All these constructs are being measured, but decisions about outcomes that will be analyzed have not yet been made. The team intends to produce an analysis plan that will include this information and will consider effects found in prior MIHOPE waves when making decisions about outcomes.

Table 5.1

Constructs Measured at the MIHOPE-LT Kindergarten Follow-Up

Outcome Area and Construct	Data Source
<u>Family economic self-sufficiency</u>	
Public assistance receipt ^a	Structured interview, CMS MAX files ^b
Employment and earnings	Structured interview, NDNH
Income	Structured interview
Material hardship	Structured interview
Food insecurity	Structured interview
Housing status and mobility	Structured interview
Highest level of education	Structured interview
Subsequent pregnancies and births	Structured interview
<u>Maternal positive adjustment</u>	
Mastery	Structured interview
Mobilizing resources	Structured interview
Parenting stress	Structured interview
Parent-child separations	Structured interview, state child welfare records
Household chaos	Structured interview
Self-regulation (working memory)	Direct mother assessment
Child school attendance and tardiness	Teacher survey, school records
<u>Maternal behavioral health</u>	
Depressive symptoms	Structured interview
Drug use	Structured interview
Alcohol use	Structured interview
<u>Family environment and relationship between parents</u>	
Mother's relationship status	Structured interview
Mother's relationship with biological father of child	Structured interview
Family conflict	Structured interview
Physical violence: perpetration	Structured interview
Physical violence: victimization	Structured interview
Experience with battering	Structured interview
<u>Parent-child relationship and interactions</u>	
Parental warmth	Structured interview, observer ratings
Parent-child interaction ^c	Video-recorded mother-child interaction
Abuse (physical, sexual)	Structured interview, state child welfare records ^d
Psychological aggression	Structured interview, state child welfare records
Neglect	State child welfare records
<u>Parental support for child's cognitive development</u>	
Home literacy environment	Structured interview
Cognitive stimulation	Structured interview, video-recorded mother-child interaction

(continued)

Table 5.1 (continued)

Outcome Area and Construct	Data Source
<u>Child functioning (school readiness)</u>	
Behavior problems	Structured interview, teacher survey
Social-emotional skills	Structured interview, teacher survey
Learning behaviors and approaches to learning	Teacher survey
Disciplinary incidents	Teacher survey, school records
Executive function	Direct child assessment, observer ratings
Math skills	Direct child assessment
Language skills	Direct child assessment
<u>Receipt of and connection to services</u>	
Child received any early intervention services	Structured interview
Child care setting before kindergarten	Structured interview
Child has health insurance coverage	Structured interview, CMS MAX files
Child emergency department visits	Structured interview, CMS MAX files
Child hospitalizations	Structured interview, CMS MAX files
Child receiving any special education services/has an IEP	Teacher survey, school records
<u>Social support</u>	
Involvement of the biological father or father figure with the child	Structured interview
Social support	Structured interview
<u>School and neighborhood context</u>	
School characteristics	Common Core of Data or Office of Civil Rights data
Neighborhood disadvantage	American Community Survey

NOTES: CMS MAX files = Centers for Medicare & Medicaid Services Medicaid Analytic eXtract files; NDNH = National Directory of New Hires; IEP = individualized education program.

Information about how each construct is measured in MIHOPE-LT is available in Appendix A and B.

^aThe benefits that will be measured are those from the Supplemental Nutrition Assistance Program; disability insurance; Temporary Assistance for Needy Families; Special Supplemental Nutrition Program for Women, Infants, and Children; and Medicaid.

^bMedicaid receipt is being measured using the CMS MAX files. Receipt of other types of public assistance is only being measured on the structured interview.

^cIncludes measures of parental sensitivity, parental intrusiveness, parental negative regard, parental positive regard, parental detachment, child engagement of parent, child's quality of play, and child negativity toward parent.

^dInformation on sexual abuse will not be collected from the structured interview.

The sections that follow describe the constructs that will be measured in each outcome area and the rationale for their inclusion. The tables display information about three of the reasons that constructs are being measured at the kindergarten follow-up:

(1) prior evidence of effects,¹¹ (2) potential use in the benefit-cost analysis,¹² and (3) measures of ACEs. Constructs' value as mediators or moderators of the effects of home visiting are discussed in the text.

Family Economic Self-Sufficiency

Home visiting programs aim to increase families' economic security by connecting them to services or benefits when needed, by helping them reduce their dependence on public benefits, by connecting them to employment opportunities, or by supporting mothers in their education and training endeavors — all with the goal of eventually improving employment opportunities and income. The type of support that home visitors provide depends on families' individual needs, and it is possible that effects on constructs such as maternal educational attainment will take some time to emerge because completion of a degree or program could take years. Several constructs in the area of family economic self-sufficiency will be measured. As shown in Table 5.2, many of the constructs in this area could contribute to the benefit-cost analysis, in part because they are naturally expressed in monetary terms or can be easily translated into monetary terms.¹³ For example, there is literature on the adverse consequences of short intervals between births, including worsened economic and employment outcomes.¹⁴ Measures of material hardship — including the ability to pay rent or pay for utilities, pay for health care, or afford sufficient food (“food insecurity”) — are indicators of a family's degree of economic security and of a family's connection to services and benefits that are direct targets of home visiting programs. The positive effects on food insecurity at the MIHOPE follow-up that occurred when children were about 15 months of age suggest that effects on this or other measures of material hardship may be found at the kindergarten follow-up.¹⁵

¹¹Evidence from previous studies of the four MIHOPE evidence-based models from follow-ups with families who had children between 5 and 6 years of age is included in the table. The number of statistically significant effects and the total number of examinations are shown.

¹²A final determination about the constructs that will be included in the benefit-cost analysis will be made before the analysis is conducted.

¹³Increased birth spacing will be examined, and, for children who were born after the child associated with the MIHOPE study, information on birth weight and gestational age at birth and whether they were admitted to the neonatal intensive care unit will be collected, given that these measures have implications for the benefit-cost analysis.

¹⁴Conde-Agudelo, Rosas-Bermúdez, and Kafury-Goeta (2007); Khoshnood et al. (1998); Polit and Khan (1986).

¹⁵Food insecurity was the only measure of material hardship included at the MIHOPE 15-month follow-up.

Table 5.2
Family Economic Self-Sufficiency Constructs

Construct	Evidence of Effects ^a	Potential Use in the Benefit-Cost Analysis	Measure of ACEs
Public assistance receipt ^b	2 of 4	Yes	No
Employment and earnings	0 of 3	Yes	No
Income	1 of 1	Yes	No
Material hardship	Not examined	No	No
Food insecurity	Not examined	No	No
Housing status and mobility	0 of 1	No	No
Highest level of education	0 of 1	Yes	No
Subsequent pregnancies and births	3 of 7	Yes	No

SOURCES: Evidence of effects based on results from Chazan-Cohen, Raikes, and Vogel (2013); Drazen and Haust (1993); Jones Harden, Chazan-Cohen, Raikes, and Vogel (2012); and Olds, Kitzman et al. (2004).

NOTES: ACE = Adverse childhood experience.

Information about how each construct is measured in MIHOPE-LT is available in Appendix A and B. More information on the outcomes counted under "evidence of effects" is available in Appendix E.

^aDefined as the number of favorable, statistically significant examinations out of the total number of examinations for each construct. Statistically significant results are those with a p-value of less than 0.05.

^bThe benefits that will be measured are those from the Supplemental Nutrition Assistance Program; disability insurance; Temporary Assistance for Needy Families; Special Supplemental Nutrition Program for Women, Infants, and Children; and Medicaid.

Maternal Positive Adjustment

Home visiting programs aim to improve maternal functioning by increasing mothers' sense of mastery,¹⁶ their ability to self-regulate,¹⁷ and their ability to use resources in their community.¹⁸ (See Table 5.3.) These programs also try to reduce parents' levels of stress by providing them with support and by helping them to learn and improve their parenting skills and knowledge about age-appropriate norms and expectations for their children. Improvements in maternal functioning may also lead to more ordered households and more on-time attendance at school for children. Though maternal positive adjustment encompasses areas that are direct targets of home visiting, many of these constructs have not often been examined in previous studies of home visiting and were not examined at the MIHOPE follow-up that occurred when children were 15 months of

¹⁶Mastery measures the extent to which a person thinks life chances are under her control.

¹⁷Self-regulation is defined as emotion and cognitive control capacities. See Blair and Diamond (2008); Blair and Raver (2015).

¹⁸This ability includes feeling empowered to gain access to resources and being aware of their availability.

Table 5.3
Maternal Positive Adjustment Constructs

Construct	Evidence of Effects ^a	Potential Use in the Benefit-Cost Analysis	Measure of ACEs
Mastery	0 of 1	No	No
Mobilizing resources	Not examined	No	No
Parenting stress	Not examined	No	No
Parent-child separations	Not examined	Yes	Yes
Household chaos	Not examined	No	No
Self-regulation (working memory)	Not examined	No	No
Child school attendance and tardiness	1 of 1	No	No

SOURCES: Evidence of effects based on results from Drazen and Haust (1993) and Olds, Kitzman et al. (2004).

NOTES: ACE = Adverse childhood experience.

Information about how each construct is measured in MIHOPE-LT is available in Appendix A and B. More information on the outcomes counted under "evidence of effects" is available in Appendix E.

^aDefined as the number of favorable, statistically significant examinations out of the total number of examinations for each construct. Statistically significant results are those with a p-value of less than 0.05.

age. MIHOPE-LT will fill this gap, as these constructs have important implications as mediators of child outcomes. For example, parenting stress is a risk factor for child maltreatment,¹⁹ and the degree of household order is associated with kindergarteners' early reading skills,²⁰ general cognitive functioning,²¹ early executive functioning skills,²² and the social-emotional development of preschool and school-age children and young adolescents.²³

In addition, participation in home visiting programs could affect mothers' ability to retain custody of their children by reducing mothers' criminal behavior or improving their ability to care for their children in a way that is not neglectful or abusive. Two of these measures of maternal positive adjustment — the mother's incarceration or the child's placement in foster care — have been included in the kindergarten follow-up and can provide relevant information for the benefit-cost analysis.

¹⁹Rodriguez and Richardson (2007); Taylor, Guterman, Lee, and Rathouz (2009).

²⁰Johnson, Martin, Brooks-Gunn, and Petrill (2008).

²¹Hart, Petrill, Deater-Deckard, and Thompson (2007).

²²Vernon-Feagans, Willoughby, and Garrett-Peters (2016).

²³See Coldwell, Pike, and Dunn (2006) for findings on preschool- and school-age children; see Dumas et al. (2005) for findings on young adolescents.

Maternal Behavioral Health

Home visiting programs try to support mothers who may have behavioral health difficulties by screening and referring them to other services as needed. At the time of the kindergarten follow-up, impacts can potentially be observed on both maternal depressive symptoms and maternal substance use (including drugs and alcohol), as early impacts seen at the follow-up that occurred when children were 15 months of age could continue to be manifested at this point. Constructs in this area are also ACEs and can be used in the benefit-cost analysis. (See Table 5.4.)

Table 5.4

Maternal Behavioral Health Constructs

Construct	Evidence of Effects ^a	Potential Use in the Benefit-Cost Analysis	Measure of ACEs
Depressive symptoms	0 of 2 ^b	Yes	Yes
Drug use	0 of 3 ^c	Yes	Yes
Alcohol use	0 of 3 ^c	Yes	Yes

SOURCES: Evidence of effects based on results from Chazan-Cohen, Raikes, and Vogel (2013) and Olds, Kitzman et al. (2004).

NOTES: ACE = Adverse childhood experience.

Information about how each construct is measured in MIHOPE-LT is available in Appendix A and B. More information on the outcomes counted under "evidence of effects" is available in Appendix E.

^aDefined as the number of favorable, statistically significant examinations out of the total number of examinations for each construct. Statistically significant results are those with a p-value of less than 0.05.

^bThe previous outcome "mental health" is also included in this count.

^cTwo previous studies examined effects on a combination of drug and alcohol use, so these outcomes are counted in the evidence of effects for both constructs.

Family Environment and Relationship Between Parents

Home visitors may work with mothers to support and encourage healthy relationships with the biological father of their child or with their current partner. (See Table 5.5.) Effects of home visiting may therefore be seen on measures of family stability. (Lack of family stability is also an ACE and was identified as a key moderator of the effects of home visiting.)²⁴ Home visitors can also work on reducing conflict and violence between partners if this stressor is present in families' lives. Measurement of the physical acts of

²⁴Parental separation or divorce is often included in measures of ACEs.

Table 5.5
Family Environment and Relationship Between Parents Constructs

Construct	Evidence of Effects ^a	Potential Use in the Benefit-Cost Analysis	Measure of ACEs
Mother's relationship status	0 of 2	No	Yes
Mother's relationship with biological father of child	0 of 1	No	Yes
Family conflict	Not examined	No	No
Physical violence: perpetration	Not examined	No	Yes
Physical violence: victimization	0 of 2 ^b	No	Yes
Experience with battering	Not examined	No	No

SOURCES: Evidence of effects based on results from Chazan-Cohen, Raikes, and Vogel (2013) and Olds, Kitzman et al. (2004).

NOTES: ACE = Adverse childhood experience.

Information about how each construct is measured in MIHOPE-LT is available in Appendix A and B. More information on the outcomes counted under "evidence of effects" is available in Appendix E.

^aDefined as the number of favorable, statistically significant examinations out of the total number of examinations for each construct. Statistically significant results are those with a p-value of less than 0.05.

^bPrevious outcomes included under this construct are whether the child witnessed any violence and whether the mother was involved in any domestic violence.

violence (which are ACEs) will be complemented by measurement of battering and family conflict.²⁵ (Family conflict was identified as a key mediator of the effects of home visiting on child maltreatment.)

Parent-Child Relationship and Interactions

Constructs related to the parent-child relationship and parent-child interactions have rarely been examined in previous home visiting studies that occurred at age 5 or later, though these parent behaviors are direct targets of home visiting. The MIHOPE-LT kindergarten follow-up is trying to fill this gap by examining whether there are effects of home visiting on parenting several years after program enrollment and whether these effects mediate the longer-term effects of home visiting. Both positive and negative parent-child interactions can be measured; the constructs that measure maltreatment of children will be used in the benefit-cost analysis and are also ACEs. (See Table 5.6.)

²⁵Battering is a "syndrome of control and increasing entrapment that accompanies the use of physical force in intimate relationships" (Smith, Earp, and DeVellis, 1995; Stark and Flitcraft, 1991), measured here using items from the Women's Experience with Battering scale (Smith, Earp, and DeVellis, 1995). Family conflict is the amount of openly expressed anger and lack of cohesion among family members, measured here using items from the Family Environment Scale (Moos and Moos, 2009).

Table 5.6
Parent-Child Relationship and Interactions Constructs

Construct	Evidence of Effects ^a	Potential Use in the Benefit-Cost Analysis	Measure of ACEs
Parental warmth	Not examined	No	No
Parent-child interaction ^b	0 of 4	No	No
Abuse (physical, sexual)	0 of 3 ^c	Yes	Yes
Psychological aggression	Not examined	Yes	Yes
Neglect	0 of 3 ^c	Yes	Yes

SOURCES: Evidence of effects based on results from Chazan-Cohen, Raikes, and Vogel (2013); Drazen and Haust (1993); and Jones Harden, Chazan-Cohen, Raikes, and Vogel (2012).

NOTES: ACE = Adverse childhood experience.

Information about how each construct is measured in MIHOPE-LT is available in Appendix A and B. More information on the outcomes counted under "evidence of effects" is available in Appendix E.

^aDefined as the number of favorable, statistically significant examinations out of the total number of examinations for each construct. Statistically significant results are those with a p-value of less than 0.05.

^bIncludes measures of parental sensitivity, parental intrusiveness, parental negative regard, parental positive regard, parental detachment, child engagement of parent, child's quality of play, and child negativity toward parent.

^cOne previous study examined three effects on a combination of abuse and neglect, so these outcomes are counted in the evidence of effects for both constructs.

Parental Support for Child's Cognitive Development

All four evidence-based models in MIHOPE have the goal of supporting parents' knowledge about early childhood development and developmentally appropriate parenting practices. The MIHOPE-LT kindergarten follow-up will examine whether home visiting improves parenting practices supportive of early learning, including environmental factors that are most influential for literacy growth and engaging in activities that have been shown to have positive effects on children's later cognitive development and academic achievement.²⁶ (See Table 5.7.)

Child Functioning (School Readiness)

By supporting mothers' well-being and positive parenting practices, home visiting might improve child outcomes as well, and improved child functioning might persist as

²⁶For findings on children's cognitive development, see Fiorini and Keane (2014) and Kalil and Mayer (2016). For findings on academic achievement as children age, see Bodovski and Farkas (2008).

Table 5.7
Parental Support for Cognitive Development Constructs

Construct	Evidence of Effects ^a	Potential Use in the Benefit-Cost Analysis	Measure of ACEs
Home literacy environment	3 of 3	No	No
Cognitive stimulation	1 or 1	No	No

SOURCE: Evidence of effects based on results from Chazan-Cohen, Raikes, and Vogel (2013).

NOTES: ACE = Adverse childhood experience.

Information about how each construct is measured in MIHOPE-LT is available in Appendix A and B. More information on the outcomes counted under "evidence of effects" is available in Appendix E.

^aDefined as the number of favorable, statistically significant examinations out of the total number of examinations for each construct. Statistically significant results are those with a p-value of less than 0.05.

children make the transition into kindergarten. MIHOPE-LT is measuring children's school readiness at kindergarten in a variety of domains such as behavior (problem behaviors and social-emotional skills), language and literacy skills, math skills, executive functioning skills, and approaches to learning. (See Table 5.8.) School-readiness domains were selected largely based on evidence from past long-term home visiting studies at the kindergarten time point, as well as hypotheses generated from current developmental literature.²⁷ All the constructs in this area are potential mediators of later academic achievement.²⁸

Receipt of and Connection to Services

Three of the constructs in this area will be used to inform the benefit-cost analysis, but they also have the potential to function as mediators of longer-term outcomes. Home visiting programs can directly connect families to services; they also have the potential to affect a mother's ability to connect her child to services that could mediate later development, such as special education, attendance at a formal child care setting before entering kindergarten, and health insurance coverage. (See Table 5.9.)

Social Support

Home visiting has the potential to affect perceived social support (such as the mother's perception of social support networks and connections to communities and

²⁷Other domains, such as motor skills, had less support for their inclusion.

²⁸Duncan et al. (2007); Eisenberg, Valiente, and Eggum (2010); Portilla et al. (2014).

Table 5.8
Child Functioning (School Readiness) Constructs

Construct	Evidence of Effects ^a	Potential Use in the Benefit-Cost Analysis	Measure of ACEs
Behavior problems	2 of 11	No	No
Social-emotional skills	0 of 3	No	No
Learning behaviors and approaches to learning	1 of 2	No	No
Disciplinary incidents	Not examined	No	No
Executive function	2 of 5	No	No
Math skills	0 of 4	No	No
Language skills	4 of 11	No	No

SOURCES: Evidence of effects based on results from Chazan-Cohen, Raikes, and Vogel (2013); Drazen and Haust (1993); Jones Harden, Chazan-Cohen, Raikes, and Vogel (2012); Olds, Kitzman et al. (2004); Olds, Holmberg et al. (2014); and Sidora-Arcoleo et al. (2010).

NOTES: ACE = Adverse childhood experience.

Information about how each construct is measured in MIHOPE-LT is available in Appendix A and B. More information on the outcomes counted under "evidence of effects" is available in Appendix E.

^aDefined as the number of favorable, statistically significant examinations out of the total number of examinations for each construct. Statistically significant results are those with a p-value of less than 0.05.

Table 5.9
Receipt of and Connection to Services Constructs

Construct	Evidence of Effects ^a	Potential Use in the Benefit-Cost Analysis	Measure of ACEs
Child received any early intervention services	0 of 1 ^b	No	No
Child care setting before kindergarten	1 of 3 ^b	No	No
Child has health insurance coverage	Not examined	No	No
Child emergency department visits	Not examined	Yes	No
Child hospitalizations	Not examined	Yes	No
Child receiving any special education services/has an IEP	0 of 4	Yes	No

SOURCES: Evidence of effects based on results from Chazan-Cohen, Raikes, and Vogel (2012); Drazen and Haust (1993); Jones Harden, Chazan-Cohen, Raikes, and Vogel (2012); and Olds, Kitzman et al. (2004). Four-year follow-ups are also included for the early intervention and child care setting constructs (Olds, Robinson et al., 2004) because they are comparable to the time period that MIHOPE-LT will examine for these constructs.

NOTES: ACE = Adverse childhood experience. IEP = individualized education program.

Information about how each construct is measured in MIHOPE-LT is available in Appendix A and B. More information on the outcomes counted under "evidence of effects" is available in Appendix E.

^aDefined as the number of favorable, statistically significant examinations out of the total number of examinations for each construct. Statistically significant results are those with a p-value of less than 0.05.

^bA previous study examined effects on a combination of early intervention services and child care setting, so these outcomes are counted in the evidence of effects for both constructs. Counts from studies that looked at these constructs are not included in Table 3.2 because they are not about children who are 5 years of age or older.

community agencies) and the involvement of the biological father or father figure with the MIHOPE child. However, these constructs are primarily being examined because they will provide important context about family functioning and they have the potential to moderate the effects of home visiting. (See Table 5.10.)

Table 5.10
Social Support Constructs

Construct	Evidence of Effects ^a	Potential Use in the Benefit-Cost Analysis	Measure of ACEs
Involvement of the biological father or father figure with the child	Not examined	No	No
Social support	Not examined	No	No

NOTES: ACE = Adverse childhood experience.

Information about how each construct is measured in MIHOPE-LT is available in Appendix A and B. More information on the outcomes counted under "evidence of effects" is available in Appendix E.

^aDefined as the number of favorable, statistically significant examinations out of the total number of examinations for each construct. Statistically significant results are those with a p-value of less than 0.05.

School and Neighborhood Context

Home visiting is not expected to affect constructs related to school and neighborhood characteristics (shown in Table 5.11), but these constructs will provide important contextual information. For example, some of the data that are available in school records, such as number of disciplinary incidents, are affected by district and school policies and should therefore be examined in the context of information about children's schools and school districts.²⁹ Information on the socioeconomic characteristics of families' neighborhoods can be gathered from data sources such as the American Community Survey.³⁰

²⁹This information can be obtained from the Common Core of Data (<https://nces.ed.gov/ccd/aboutccd.asp>) or the Office of Civil Rights (<https://ocrdata.ed.gov>).

³⁰For example, the American Community Survey can be used to create a measure of socioeconomic disadvantage using the following four variables: percentage over age 25 without a high school degree, percentage unemployed, percentage of families living in poverty, and percentage receiving public assistance (Turney and Harknett, 2010). See <https://www.census.gov/programs-surveys/acs> for more information on the American Community Survey.

Table 5.11
School and Neighborhood Context Constructs

Construct	Evidence of Effects ^a	Potential Use in the Benefit-Cost Analysis	Measure of ACEs
School characteristics	Not examined	No	No
Neighborhood disadvantage	0 of 2	No	No

SOURCE: Evidence of effects based on results from Hanks et al. (2011).

NOTES: ACE = Adverse childhood experience.

Information about how each construct is measured in MIHOPE-LT is available in Appendix A and B. More information on the outcomes counted under "evidence of effects" is available in Appendix E.

^aDefined as the number of favorable, statistically significant examinations out of the total number of examinations for each construct. Statistically significant results are those with a p-value of less than 0.05.

Data Sources

The data sources for the kindergarten follow-up are:

- a structured interview with the child’s mother to measure a broad set of constructs that are mostly not available from other data sources³¹
- direct assessments of children’s language skills, math skills, and executive function by trained interviewers
- interviewer observations of parental warmth and children’s self-regulation (for example, attention and impulse control)
- video-recorded mother-child interaction
- a direct assessment of mothers’ working memory by trained interviewers
- a teacher survey
- federal administrative data on Medicaid³²

³¹In cases where the biological mother no longer has custody of the child, data collection will be conducted with the child’s primary caregiver, such as the child’s father. This approach was also used at the MIHOPE follow-up when children were 15 months of age.

³²The study team is planning to obtain Medicaid and Children’s Health Insurance Program (CHIP) data from the Centers for Medicare and Medicaid Services (CMS) Medicaid Analytic eXtract (MAX)

- federal administrative data on employment covered by the unemployment insurance system (National Directory of New Hires)
- state child welfare records
- school records

Tables in Appendix B show the constructs that will be obtained from each data source, and Appendix C contains more information about each of the administrative data sources.

Kindergarten Cohorts

As indicated in Chapter 4, MIHOPE includes children who enter kindergarten over the course of four years because of the length of the study's enrollment period and the range of child and gestational ages at enrollment. Approximately 600 children entered kindergarten in fall 2018 (cohort 1), about 2,100 children in fall 2019 (cohort 2), and about 1,200 children in fall 2020 (cohort 3), and about 150 children will enter kindergarten in fall 2021 (cohort 4).

Sampling

Beginning with the first kindergarten cohort, a multiform design will be used to increase the amount of information that the structured interview can capture. No additional sampling is planned for the first cohort, but other forms of planned missingness may be used in subsequent cohorts.

Timing

A fall data collection period was chosen because it is a priority to measure the MIHOPE sample's readiness for kindergarten and to measure program effects before the transition to kindergarten has occurred.

Due to logistical issues, data collection began with the approximately 600 families who are in the first of four cohorts of families in January 2019. Data is planned to begin in the fall for subsequent cohorts. Though the timing of the data collection periods

files. In December 2019, these data changed to the CMS MAX files and Transformed Medicaid Statistical Information System Analytic file (TAF) data but are referred to as the CMS MAX files throughout this report.

will not line up exactly across cohorts, the same constructs will be measured across all cohorts.³³

Administrative data from the full kindergarten school year will be obtained.

Planned Analyses

Following the kindergarten data collection, the study team plans to conduct an impact analysis and mediational analyses (that is, analyses of the pathways through which an intervention produces effects).³⁴ Some principles for conducting the analyses are described below, but as in earlier waves of the study, the team intends to produce an analysis plan.³⁵

Impact Analysis

The impact analysis will assess the effectiveness of early childhood home visiting programs in improving the outcomes of families and children when children are in kindergarten, both overall and across key subgroups of families and programs. Random assignment was used in MIHOPE to create program and control groups that were expected to be similar in all respects when they entered the study. As is standard in random assignment studies, the primary analytical strategy in MIHOPE-LT will be to compare the outcomes of the entire program group with those of the entire control group (an “intent-to-treat” analysis).³⁶ Doing so preserves the integrity of the random assignment

³³Although the timing of data collection will vary across cohorts, the inclusion of program and control group members in each cohort preserves the integrity of the random assignment design and will allow for reliable estimates of effects. In addition, for assessments of children’s development that have been normed by child age, measures will automatically take into account the child’s age.

³⁴As mentioned previously, it is likely that a benefit-cost analysis could be conducted at the kindergarten follow-up point; however, the measurement of benefits would be less comprehensive than it would be if the analysis were conducted later in the children’s lives, because there would be less time for benefits to accrue. A benefit-cost analysis conducted at the kindergarten follow-up point might require projecting the value of benefits that accrue later than kindergarten or measuring only the benefits that accrue through kindergarten, either of which would limit how precisely the study could answer the question of how the monetary benefits of home visiting compare with its costs.

³⁵In earlier waves of the study, the team has posted plans at clinicaltrials.gov.

³⁶See, for example, Chapter 2 of Orr (1999). As noted in previous MIHOPE reports, about 17 percent of families in the program group never received home visiting services from one of the local home visiting programs that participated in the study. Although those families presumably did not benefit from being given access to evidence-based home visiting, they are included in the main analysis because program group families who received at least one home visit would not be comparable at baseline with the entire control group. Removing program group families who did not receive home visiting from the analysis would therefore eliminate the comparability of the two groups at study entry,

design and means that any differences that emerge after random assignment can be reliably attributed to the program group's access to evidence-based home visiting.³⁷

To address the question of whether home visiting programs have larger effects for some groups of families, effects can also be compared across key subgroups of families.³⁸ For example, in estimating the effects for mothers who were pregnant and the effects for those whose children were infants when they entered the study, the impact analysis would investigate whether estimated effects were larger for one group than for the other. If there are no statistically significant differences in the estimated impacts across subgroups and there are statistically significant effects estimated for all families, the presumption would be that home visiting is effective for all subgroups. This approach is proposed because estimated effects for subgroups are less precise than estimated effects for the full sample (because subgroup sample sizes are smaller than the full sample), meaning that it is likely that estimated effects for some subgroups would not be statistically significant even if the program were modestly effective for that subgroup.

Mediational Analyses

At the kindergarten follow-up, mediational analyses can be conducted to shed light on the pathways through which home visiting has longer-term effects on families. A model, or description of a hypothetical pathway, could be estimated for each kindergarten outcome of interest.³⁹ To identify models and their components, outcomes that

and the study would lose the benefit of having randomly assigned families to the program and control groups. There are methods for adjusting the estimated effects to account for the fact that some program group families did not receive home visiting, but those methods would not change the statistical significance of the estimated effects. In particular, estimated effects that are not statistically significant when measured across all families will not be statistically significant when adjusted for the 17 percent of program group families who received no home visiting.

³⁷Information on sample members' baseline characteristics would be used in the analysis to increase the precision of estimated impacts.

The team could also analyze the extent to which dosage (the number of home visits in which sample members participated) affects estimated impacts of home visiting at the kindergarten follow-up point. A similar analysis when children were 15 months of age did not find a systematic relationship between dosage and estimated effects. See Michalopoulos et al. (2019).

³⁸This approach is consistent with the MIHOPE analysis that was conducted when children were 15 months of age and follows the recommendations of Bloom and Michalopoulos (2013).

³⁹Separate models could be estimated for each outcome of interest. For example, one model could examine the pathways through which home visiting has effects on school readiness at kindergarten, whereas another could examine the pathways through which home visiting has effects on family economic self-sufficiency at kindergarten.

had evidence of effects at the MIHOPE 15-month follow-up could be chosen as mediators. Theory and prior research could guide the thinking about how these 15-month effects might influence longer-term outcomes.

Summary

Chapter 5 describes the kindergarten data collection with MIHOPE families that began in January 2019. The chapter includes discussion of the constructs being examined at this follow-up point and the rationale for their inclusion. Tentative plans for impact and mediational analyses that could be conducted with the kindergarten data are also described.

Chapter 6

Conclusion

This report provides information about the research questions that could be answered with long-term follow-up of the Mother and Infant Home Visiting Program Evaluation, a national evaluation of home visiting programs funded through the Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program in its early years. In addition, it details the design of the MIHOPE-LT kindergarten follow-up. MIHOPE includes four evidence-based home visiting models — Early Head Start – Home-based option, Healthy Families America, Nurse-Family Partnership, and Parents as Teachers — that aim to improve outcomes for families and their young children who are at risk of a variety of poor life and developmental outcomes. More than 4,000 women enrolled in MIHOPE when they were pregnant or had infants younger than 6 months of age. They were randomly assigned to a program group whose members were eligible to receive home visiting services through a local MIECHV-funded program affiliated with one of these four models or to a control group whose members could receive information about other services available in their community but were not eligible for the program group services.

The first MIHOPE follow-up (before MIHOPE-LT began) occurred when children were about 15 months of age. As summarized in Chapter 2, the impact analysis that was conducted at that point found evidence that these home visiting programs improved family outcomes across several outcome areas, and that most estimated effects were similar to but somewhat smaller than the average found in past studies of individual home visiting models. In addition to the generally positive effects on the main outcomes, several exploratory analyses highlighted the need for further investigation. For example, several results pointed to improved health for mothers in the study, including improvements in their general health, increased health insurance coverage, and reduced depression severity (although program group mothers were more likely to say they abused drugs or alcohol in the recent past). Another area with possible wide-ranging implications were several results that point to reduced household aggression.

Following data collection when children in the study were 15 months of age, enrolled families were asked to participate in brief surveys when children were about 2.5 and 3.5 years of age. These surveys gathered some information on family and child well-being and obtained updated contact information; data collection concluded in June 2019.

Data collection for the kindergarten follow-up began in January 2019. Additional follow-up waves could be conducted when children are in third grade, in middle school,

and in high school. In addition or alternatively, administrative data collection could be ongoing, which would allow for continuing assessment of family and child functioning.

Contributions of MIHOPE-LT

MIHOPE-LT will allow for the examination of long-term effects of MIECHV-funded early childhood home visiting programs and can expand the evidence from previous long-term studies of home visiting programs. As Chapter 3 describes, previous studies of the four MIHOPE home visiting models had relatively small samples (most included fewer than 1,000 families), were model-specific, and did not all examine the same outcomes in the same way across models, making it difficult to summarize across studies and models. In contrast, MIHOPE-LT will measure the same outcomes for all four participating evidence-based models. These previous studies also included limited follow-ups through adolescence; the current evidence for children over 11 years of age comes only from studies of Nurse-Family Partnership. In addition, most of the previous long-term studies were completed many years ago.¹ Home visiting programs have changed over time, both because of statutory requirements tied to MIECHV funding and because of programs' and models' continuous quality improvement efforts.² Moreover, the context in which the programs operate and the program participants themselves have also changed.

MIHOPE-LT will also build on the evidence from the follow-up with MIHOPE families that occurred when children were about 15 months of age and that provided information on the short-term effects of MIECHV-funded home visiting programs. Additional follow-up waves will allow the same constructs to be measured at multiple time points to examine whether effects grow, diminish, or remain stable. Additional follow-up will also enable the study to examine constructs that were not, and in some cases could not be, measured when children were 15 months of age. For example, at the kindergarten follow-up, maternal depression and maternal employment and earnings will continue to be measured, but some aspects of maternal positive adjustment, such as the ability to mobilize resources, will be measured for the first time. And of course, as children age, new constructs can be added that are appropriate for measuring the development of children as they get older (such as delinquent behavior).

¹Most of the studies began enrolling families before 1995, and most follow-ups occurred before 2005.

²See Duggan et al. (2018) for more information about how the priorities of home visiting programs may have changed in response to the federal benchmarks tied to MIECHV funding.

Finally, analyses that will answer key research questions can benefit from additional waves of follow-up. A benefit-cost analysis weighs the costs of operating a program with the subsequent monetary benefits to the government, to society, and to families that might result from participating in the program, so allowing more time for benefits to accrue will provide more precise estimates of these benefits.³

Early analyses of the pathways through which home visiting might affect families can be conducted using only the data from the follow-up that occurred when MIHOPE children were 15 months of age. Analyses that include multiple waves of data could further understanding of these pathways by allowing constructs to be measured at multiple time points and by allowing the examination of outcomes that could not be measured at earlier waves (such as school performance and risk-seeking behavior in adolescence).

MIHOPE-LT can provide information about how small, measurable changes in particular areas of adult and child functioning due to a specific intervention affect longer-term well-being. Information about these connections could be used by policymakers and researchers who are interested in the life trajectories of children and families.

Challenges Anticipated

As with any longitudinal data collection effort, this study will face challenges in keeping sample members engaged in the research and responsive to requests for information.

At the kindergarten follow-up, the study will not only need to engage families. Because teachers are being asked to share their perspectives on children's functioning and behavior in the classroom, the study will also need to gain their cooperation, as teachers have no previous connection to the study and may therefore be less inclined to respond.

In an earlier phase of MIHOPE, the study team gathered information on methods that other longitudinal studies have used to maintain contact with low-income families. The goal was to determine what features and techniques led to the fairly high response rates that these studies achieved and what lessons they could offer for future research.

The strategies identified through that work have been used in planning the MIHOPE-LT kindergarten data collection effort. For example, the team will continue to

³Though benefits can be projected using data from shorter follow-up periods, there is considerable uncertainty in these projections. Therefore, longer follow-up periods will provide more accurate information about the ratio of benefits to costs for MIECHV-funded home visiting.

maintain contact with families between major data collection points and will use multiple modes of communication, including letters, packages, emails, and phone calls to reach sample members. In terms of study branding, the team will continue to make use of the MIHOPE logo and will emphasize the value of each sample member's contributions to the study. Though the kindergarten structured interview is too lengthy for an online version to be offered as a mode of response, teachers may complete their survey online. In addition, the study plans to make extensive use of staff who will travel to encourage families to complete data collection activities in person. Consistent with the finding that well-chosen modifications and careful management are important, progress will be monitored closely during data collection, and strategies will be modified as necessary over time to encourage sample members to participate.

Finally, it will continue to be challenging to balance the desire to limit the burden placed on families at each follow-up point with the desire to collect information about a wide range of outcomes. As discussed previously, home visiting is an intervention that has the potential to affect a wide range of outcomes. Particularly because evidence about effects at later follow-up points is limited, it could be important to examine many different areas of family and child functioning through later follow-up points. However, the study team recognizes that it can be difficult for families to make the time to participate in lengthy structured interviews and in-home visits and strives to limit the time required for each of these activities. To achieve this balance, the study will continue to make use of administrative data sources where possible, and sampling methods such as those discussed in Chapter 4 could be used. Finally, the criteria developed for choosing which constructs to measure at the kindergarten follow-up can provide a foundation for decision-making about constructs that could be examined at later follow-up points.

Summary

Children develop fastest in their earliest years, and the skills and abilities they develop in those years help lay the foundation for future success in school and life.⁴ Home visiting programs intervene early in the lives of children whose families face a variety of risk factors because such programs aim to improve the long-term well-being of these children.⁵ MIHOPE-LT can build evidence about these intended long-term effects and provide information about whether and how home visiting might have changed the life courses of MIHOPE families.

⁴National Research Council and Institute of Medicine (2000).

⁵Brooks-Gunn and Duncan (1997).

Appendix A

Measurement of Kindergarten Constructs

This appendix describes the measurement of each construct that is being examined at the kindergarten follow-up. The measurement descriptions, which are organized by outcome area, include information about the scales, tasks, and data sources that will be used.¹

Family Economic Self-Sufficiency

Public Assistance Receipt

Ideally, information about public assistance receipt would come from administrative data sources, which do not have recall error and can provide information over a fairly long period of time. However, the study team is currently unaware of any national data and obtaining information from the 12 MIHOPE states is outside the scope of the current project. As an alternative, the MIHOPE-LT structured interview will ask mothers whether they have received benefits from Temporary Assistance for Needy Families (TANF), the Supplemental Nutrition Assistance Program (SNAP), disability insurance, or the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in the past month, as was done at the MIHOPE 15-month follow-up.² If they have received public assistance in the month preceding the interview, the interview will ask about the amount. To aid in the benefit-cost analysis, respondents will also be asked about the number of months they were receiving these benefits over the 12 months preceding the interview. Respondents will also be asked about the child's receipt of disability benefits. Although the answers to these questions may be subject to substantial recall error, they are the best information that can be obtained within the time constraints and other demands of a structured interview. The Centers for Medicare and Medicaid Services (CMS) Medicaid Analytic eXtract (MAX) files, which contain information on Medicaid enrollment and reimbursed claims, will be used to measure Medicaid receipt.

Data sources: Structured interview, CMS MAX files

Employment and Earnings

The National Directory of New Hires (NDNH) will be used at the kindergarten follow-up to obtain information about maternal employment and earnings. Because NDNH data include information only on jobs covered by unemployment insurance and

¹References to previous home visiting studies and evidence in this appendix are limited to the studies discussed in Chapter 3.

²In cases where the biological mother no longer has custody of the child, data collection will be conducted with the child's primary caregiver, for example the child's father. This approach was also used in the MIHOPE follow-up when children were 15 months of age.

federal employment, they will be supplemented with an item in the structured interview that asks whether the respondent is currently working at a job for pay, including self-employment.

Data sources: Structured interview, NDNH

Income

Income can be a difficult construct to measure accurately during interviews, particularly for low-income families who might have income from a variety of sources or income sources that vary from month to month. However, given the importance of this construct and the lack of accessible administrative data sources, the structured interview will use one item to ask about total household income, including money from jobs and welfare. If respondents are unsure about their exact incomes, the interview will ask them to provide a range.

Data source: Structured interview

Material Hardship

Material hardship will be measured using five items from the Poverty Tracker study,³ which were adapted from the Fragile Families and Child Wellbeing Study and the Survey of Income and Program Participation. These items ask about hardships families may have faced because they lacked money (for example, not being able to pay the full utilities or rent/mortgage amount and forgoing medical care due to cost).

Data source: Structured interview

Food Insecurity

U.S. Department of Agriculture (USDA) U.S. Household Food Security Survey Module — Short Form

To allow for continuity with previous MIHOPE waves, the MIHOPE-LT kindergarten follow-up will use the USDA U.S. Household Food Security Survey Module — Short Form to assess food insecurity.⁴ This six-item measure was used at the MIHOPE 15-month follow-up and asks whether mothers did not have enough money to buy food

³See Robin Hood and Columbia Population Research Center (n.d.).

⁴U.S. Department of Agriculture, Economic Research Service (2017).

and whether, in the past 12 months, they had to forgo food because they could not afford it.

Data source: Structured interview

Housing Status and Mobility

Two items, which were used in surveys in other MDRC studies, will be used to measure housing status and mobility. The first item asks about the respondent's current housing arrangement (for example, owning a home/apartment, renting a home/apartment, etc.), and the second asks about the number of times the respondent has moved in the past 12 months.

Data source: Structured interview

Highest Level of Education

The mother's education level will be measured using an item from the MIHOPE baseline and 15-month surveys. The item asks about the highest grade or year of school the respondent has completed.

Data source: Structured interview

Subsequent Pregnancies and Births

In order to measure subsequent pregnancies and births, the structured interview will ask mothers to report on their history of pregnancy and childbirth since the last survey they completed. These questions were adapted from those asked at the 15-month follow-up as well as the check-ins at 2.5 and 3.5 years. For any children who were born subsequently, the interview also asks about their birthweight, gestational age at birth, and whether they had been admitted to the neonatal intensive care unit.

Data source: Structured interview

Maternal Positive Adjustment

Mastery

Pearlin Mastery Scale

This seven-item measure was used at MIHOPE baseline and the 15-month follow-up and has been used in a number of other home visiting studies, including long-

term follow-ups. The items ask about the extent to which a person thinks life chances are under her control.⁵

Data source: Structured interview

Mobilizing Resources

Healthy Families Parenting Inventory

Four items from the mobilizing resources subscale of the Healthy Families Parenting Inventory will be used to measure whether mothers are able to find resources and feel empowered to do so.⁶ Although this measure has not been used in previous long-term home visiting studies of the four MIHOPE evidence-based models or previous waves of MIHOPE, it was developed specifically for home visiting programs.⁷

Data source: Structured interview

Parenting Stress

Parenting Stress Index — Short Form (PSI-SF)

The PSI-SF is a 36-item measure that has three subscales: (1) parental distress; (2) parent-child dysfunctional interaction; and (3) difficult child.⁸ A five-factor scale of the PSI-SF parental distress and parent-child dysfunctional interaction subscales has also been developed.⁹ These five factors are (1) general distress; (2) parenting demands distress; (3) dyadic interaction; (4) perception of child; and (5) rating of parenting. The MIHOPE-LT kindergarten structured interview will use the general distress, parenting demands distress, and dyadic interaction factors, which have a total of 18 items. The parenting demands distress and dyadic interaction factors were also used at the MIHOPE 15-month follow-up.¹⁰

Data source: Structured interview

⁵Pearlin and Schooler (1978).

⁶LeCroy and Milligan Associates, Inc. (2004).

⁷Krysik and LeCroy (2012); LeCroy and Milligan (2017).

⁸For the PSI-SF, see Abidin (2012).

⁹Whiteside-Mansell et al. (2007).

¹⁰Items from the difficult child subscale are not included in the structured interview because it captures behaviors already captured by other measures, such as the Social Skills Improvement System (SSIS; Gresham and Elliott, 2008) externalizing behaviors subscale.

Parent-Child Separations

Parent-child separations will be measured using items adapted from the Fragile Families and Child Wellbeing Study. The first item asks about the number of times the mother has been separated from the child for two weeks or more. Mothers who have been separated from their children are asked about the reason(s) for the separation. An additional follow-up question, which was adapted from another MDRC study, is asked if mothers indicate that the separation was because the mother was in jail or prison. These items will also capture information about foster care placement and involvement with Child Protective Services, which will be collected from state child welfare records as well.

Data sources: Structured interview, state child welfare records

Household Chaos

Confusion, Hubbub, and Order Scale (CHAOS)

The CHAOS scale is a standard measure used to assess the overall chaotic climate of the home.¹¹ The original measure has 15 items that ask mothers to rate whether the statement (for example, “there is very little commotion in our home”) is true or false. The MIHOPE-LT kindergarten structured interview is using a shorter version of the CHAOS scale that has been used in several other studies.¹² This version has six items and uses a five-point Likert scale asking mothers to rate how true the statement is.

Data source: Structured interview

Self-Regulation (Working Memory)

Digit Span

This measure of working memory (short-term storage of verbal information) assesses the mother’s ability to repeat an increasingly complex set of numbers first forward, and then backward.¹³ It takes about two to five minutes to administer.

Data source: Direct mother assessment

¹¹Matheny, Wachs, Ludwig, and Phillips (1995).

¹²Johnson, Martin, Brooks-Gunn, and Petrill (2008); Deater-Deckard et al. (2009); Pike et al. (2006); Coldwell, Pike, and Dunn (2006).

¹³Flanagan and Kaufman (2009).

Child School Attendance and Tardiness

Information on school attendance and tardiness will primarily be obtained from school records. However, these records will be supplemented with two items on the teacher survey that ask about the number of days the child has been absent and tardy that school year. The survey information will be particularly useful in instances when the respondent no longer lives in a MIHOPE state or lives in a MIHOPE state that may not provide school records.¹⁴

Data sources: Teacher survey, school records

Maternal Behavioral Health

Depressive Symptoms

Center for the Epidemiologic Studies — Depression (CES-D) Scale

To measure depressive symptoms, mothers will complete the standard 10-item version of the CES-D.¹⁵ This measure has also been used extensively in other home visiting studies, including long-term follow-ups.

Data source: Structured interview

Drug and Alcohol Use

The kindergarten structured interview will use separate measures to assess mothers' drug and alcohol use. For continuity, the interview will include the same six items about drug use that appeared on the MIHOPE baseline and 15-month surveys. (These items were adapted from the Pregnancy Risk Assessment Monitoring System, or PRAMS.) However, given the desire to capture policy-relevant information about opioid use, these items have been adapted slightly to ask about cocaine and heroin separately. Similarly, the interview will also use the same items about alcohol use that appeared in the MIHOPE 15-month interview.

Data source: Structured interview

¹⁴The teacher survey also includes questions about when the school year started and when the child joined the teacher's classroom. Answers to these items will serve as controls to this construct as children start school at different times and, consequently, may have more or fewer opportunities to be absent or tardy.

¹⁵Radloff (1977).

Family Environment and Relationship Between Parents

Mother's Relationship Status and Relationship with Biological Father of Child

The structured interview will ask whether the respondent currently has a spouse, partner, or significant other and will ask about the respondent's relationship and marital status. Information about the mother's relationship and marital status are being obtained separately so that the study team can collect information about whether the mother has ever been divorced, which is an adverse childhood experience (ACE). If the mother responds that she has a spouse or partner, she is asked about the spouse or partner's relationship to the child, which is being used to assess whether she is in a relationship with the child's biological father and whether her spouse/partner lives with her. Items about relationship and marital status were adapted from the MDRC Supporting Healthy Marriage survey;¹⁶ items about the child's relationship to the partner were adapted from the MIHOPE 15-month survey.

Data source: Structured interview

Family Conflict

Family Environment Scale (FES)

Five items from the family conflict subscale of the FES will be used to assess the amount of openly expressed anger or lack of cohesion among family members.¹⁷ (The full version of this subscale has nine items.) Respondents are asked to evaluate whether each statement is true or false (for example, whether family members fight a lot or criticize each other). Although this measure has not been used in previous MIHOPE waves, an adapted version of the family conflict measure was used in the national evaluation of Early Head Start.¹⁸

Data source: Structured interview

¹⁶Lowenstein et al. (2014).

¹⁷Moos and Moos (2009).

¹⁸Love et al. (2001).

Physical Violence — Perpetration and Victimization

Conflict Tactics Scales (CTS2)

The physical assault subscale of the CTS2 will be used to measure physical assault perpetration and victimization.¹⁹ These items align with the physical acts that have been included on ACE questionnaires (slap, hit, kick, push, or grab) and allow for continuity with earlier waves of MIHOPE data collection (baseline and 15-month follow-up).

Data source: Structured interview

Experience with Battering

Women’s Experience with Battering (WEB) Scale

A six-item version of the WEB was used in the MIHOPE baseline survey as well as at the 15-month follow-up. This measure, which asks whether the mother’s partner makes her feel unsafe, ashamed, or without control, is an important supplement to the CTS2.²⁰ Specifically, this measure provides information about abuse that may not be captured in the CTS2 physical assault subscale (for example, psychological or emotional abuse) and may provide contextual information about why intimate partner violence occurs, especially the maternal perpetration of physical violence.

Data source: Structured interview

Parent-Child Relationship and Interactions

Parental Warmth

Early Childhood Home Observation for Measurement of the Environment (EC-HOME)

The responsivity subscale from the EC-HOME will primarily be rated by the field staff during their home visits, with two items asked directly of the parent, for a total of

¹⁹For the CTS2, see Straus, Hamby, and Warren (2003).

²⁰For more information on the Women’s Experience with Battering scale, see Smith, Earp, and DeVellis (1995).

nine items.²¹ The items focus on the amount of affection and responsiveness between the mother and child, for example whether the mother praises the child.

Data sources: Structured interview, observer ratings

Parent-Child Interaction

During the in-home visit, the mother and child will be asked to participate in the Three Bags Task, which was administered at the MIHOPE 15-month follow-up. This task takes approximately 10 to 12 minutes and assesses the behavior of the mother and of the child during a semistructured play situation. For the semistructured play activity, the parent and child play with toys in three bags. The pair is instructed to play in whichever way they prefer. The interaction is video-recorded and viewed at a later date by trained coders, who then rate mother and child behavior to assess qualities of parenting (specifically parental sensitivity, parental intrusiveness, parental negative regard, parental positive regard, and parental detachment) and the child's behavior (specifically child engagement of parent, child's quality of play, and child's negativity toward parent). Various adaptations of the task have been successfully administered and coded in a variety of large-scale experimental and longitudinal studies of toddlers.²²

Data source: Video-recorded mother-child interaction

Abuse (Physical, Sexual) and Psychological Aggression

These outcomes will be measured using state child welfare records obtained from the MIHOPE states. Administrative data will be supplemented with items on the structured interview using the Conflict Tactics Scales: Parent Child Version (CTSPC), which will enable (1) the study to measure acts of abuse that may not have come to the attention of the child welfare system, (2) the collection of the same data across states, and (3) the collection of data from MIHOPE participants who no longer live in one of the 12 MIHOPE states.

Conflict Tactics Scales: Parent-Child Version (CTSPC)

The CTSPC was collected at the 15-month follow-up, and continuing to use it as the parent-reported measure of child maltreatment at kindergarten will allow for

²¹For the EC-Home, see Caldwell and Bradley (2003). Two additional items from the EC-HOME will be used in order to create a conceptually derived parental warmth subscale, which has been shown to demonstrate moderate to high reliability and adequate predictive validity across five large-scale data sets (Leventhal, Martin, and Brooks-Gunn, 2004).

²²See, for example, Andreassen and Fletcher (2007); National Institute of Child Health and Human Development Early Child Care Research Network (1997, 1999); Vandell (1979).

continuity with the earlier survey.²³ The eight items from the psychological aggression (five items) and severe physical assault (three items) subscales will be included.²⁴ The eight response categories range from “this never happened” to “once in the past year” to “more than 20 times in the past year.” In MIHOPE, those categories were condensed, given early feedback that respondents were having difficulty remembering them during the phone interview. This adaptation was approved by the CTS developers and will be used at the MIHOPE-LT kindergarten follow-up as well.

Data sources: Structured interview, state child welfare records

Neglect

Information on neglect will come from state child welfare records and will not be supplemented by items on the structured interview.

Data source: State child welfare records

Parental Support for Cognitive Development

Home Literacy Environment

Items from the Early Childhood Longitudinal Study — Kindergarten 2010 cohort will be used to capture a subset of environmental factors that are thought to influence literacy growth. Five items will cover how often literacy activities occurred in the past week, for example how often the child looked at picture books outside of school, as well as the amount of time mothers or others read to the child and the number of children’s books in the home.

Data source: Structured interview

Cognitive Stimulation

In order to capture the breadth of activities that parents may engage in with their children in the home environment, a set of cognitive stimulation items from the Early Childhood Longitudinal Study — Kindergarten 1998 and 2010 cohorts will be used. These items include questions such as how often in a typical week a family member plays games or puzzles with the child or builds something with the child.

²³For the CTSPC, see Straus, Hamby, and Warren (2003).

²⁴Items from the extreme physical assault subscale were not included because these behaviors occur only rarely.

Two additional items, which were adapted from the Zero to Eight: Children's Media Use in America 2013 survey, will be included that ask parents to report on the use of technology to enhance children's reading and math skills.²⁵ Additionally, parental stimulation of cognitive development will be examined from the video-recorded mother-child interaction.

Data sources: Structured interview, video-recorded mother-child interaction

Child Functioning (School Readiness)

Behavior Problems

Social Skills Improvement System (SSIS)

The internalizing, externalizing, and hyperactivity/inattention subscales of the SSIS will be used to measure children's behavior problems.²⁶ This measure has both a parent and teacher version, and each version has a total of 25 and 22 items respectively for these three subscales. Although some of the problem behavior subscales will not be used,²⁷ preventing the study team from calculating a problem behaviors total score, previous long-term home visiting studies have often examined these behaviors separately (for example, calculating externalizing behaviors separately from internalizing behaviors), so there is a precedent for calculating separate scores. The SSIS is the updated version of the Social Skills Rating System (SSRS),²⁸ which is a widely used, nationally normed measure of children's behavior problems and social-emotional skills.²⁹ Previous studies have demonstrated high levels of reliability and validity for the measure,³⁰ but little is currently known about how sensitive this particular measure is to intervention impacts for evaluations done on a large scale.

Data sources: Structured interview, teacher survey

²⁵Common Sense Media (2013).

²⁶Gresham and Elliott (2008).

²⁷The bullying and autism spectrum subscales were cut because there is no clear theory of change for how home visiting might affect autism and because most of the items from the bullying subscale overlap with those from the externalizing subscale.

²⁸Gresham and Elliott (1990).

²⁹A youth self-report version of the SSIS for children ages 13 to 18 years is also available.

³⁰Gresham and Elliott (2008).

Social-Emotional Skills

Social Skills Improvement System (SSIS) and Teacher-Child Rating Scale (T-CRS)

The SSIS is also being used to measure children's social-emotional skills.³¹ These skills represent learned behaviors that promote positive interactions while simultaneously discouraging negative interactions when applied to appropriate social situations. Both the structured interview and teacher survey use the engagement (joining activities in progress and inviting others to join, initiating conversations, making friends, and interacting well with others) and self-control subscales (responding appropriately in conflict and nonconflict situations), which are seven items each, but the teacher survey also includes the cooperation subscale (helping others, sharing materials, and complying with rules and directions; six items) because these behaviors are more relevant for classroom settings where children are interacting with multiple peers. Additionally, the teacher survey uses the positively worded assertive social skills secondary scale from the T-CRS,³² which assesses children's interpersonal functioning and confidence in dealing with peers.

Data sources: Structured interview, teacher survey

Learning Behaviors and Approaches to Learning

Teacher-Child Rating Scale (T-CRS)

Teachers will be asked to assess children's approaches to learning and behaviors that are important for classroom learning using two positively worded, secondary scales from the T-CRS (four items each):³³ (1) task orientation (assesses a child's ability to focus on school-related tasks) and (2) frustration tolerance (assesses a child's skills in tolerance and adapting to limits imposed by the school environment or by the child's own capabilities). Although there is no evidence that this teacher-reported measure assesses intervention impacts effectively, it is widely used in correlational research and has been shown to be reliable and valid.³⁴ Further, these subscales have been examined together as a composite assessing self-regulated classroom behavior.³⁵

Data source: Teacher survey

³¹Gresham and Elliott (2008).

³²Hightower et al. (1986).

³³Hightower et al. (1986).

³⁴Hightower et al. (1986).

³⁵Obradović, Sulik, Finch, and Tirado-Strayer (2018).

Disciplinary Incidents

Data on disciplinary incidents will come from school records and the teacher survey. The survey asks whether the teacher has ever had to make contact with the child's parent(s) because of behavioral issues, whether the child has experienced any of the eight listed disciplinary actions (for example, detention or suspension) or any other disciplinary action since the beginning of the school year, the number of times the child was subject to these incidents, and the reason(s) why. It will be important to supplement school records with the teacher survey findings because schools' definitions of disciplinary incidents can vary. Additionally, some schools may not provide information on disciplinary incidents, especially less severe actions that are more commonly used for kindergarteners.

Data sources: Teacher survey, school records

Executive Function

Digit Span

This measure of working memory (short-term storage of verbal information) assesses children's ability to repeat an increasingly complex set of numbers, first forward and then backward.³⁶ It takes about two to five minutes to administer. It has also been shown to be sensitive to intervention impacts.³⁷

Hearts and Flowers

This task captures inhibitory control and cognitive flexibility and is administered using an application programmed on a tablet.³⁸ The task includes three sets of trials: (1) 12 congruent "heart" trials, (2) 12 incongruent "flower" trials, and (3) 33 mixed "heart and flower" trials. Children are presented with an image of a red heart or flower on one side of the screen. For the congruent "heart" trials, the children are instructed to press the button on the same side as the presented heart. For incongruent "flower" trials, children are instructed to press the button on the opposite side of the presented flower. It takes approximately five minutes to administer this task. The assessment is sensitive to between-child differences because it captures information not only on accuracy but also on response time to the millisecond. Previous intervention evaluations conducted in early childhood contexts have found impacts using the Hearts and Flowers

³⁶Flanagan and Kaufman (2009).

³⁷Weiland and Yoshikawa (2013).

³⁸Davidson, Amso, Anderson, and Diamond (2006).

assessment,³⁹ but it has never been used to measure an outcome in a study of a home visiting program or in a large-scale independent evaluation of an intervention.

Leiter-3 Attention Sustained Task

This measure is from the third edition of the Leiter International Performance Scale.⁴⁰ Children are shown a series of four pages with pictures of scattered objects, some of which vary in their orientation, and are asked to cross out as many of the objects matching a target object shown at the top of the page as they can without accidentally crossing out any other objects. Children are given a limited amount of time to perform each trial (30 seconds for each trial). Although the Early Head Start follow-up study did not find significant impacts using this measure,⁴¹ this timed task has high internal reliability and offers the advantage of two standardized scores (focused attention and lack of impulsivity) that allow for comparability with a national norming sample. It is appropriate for use over a broader range of ages and can thus also be used in future follow-up waves of MIHOPE-LT.

Preschool Self-Regulation Assessment (PSRA) — Assessor Report

Assessors will rate children's self-regulatory behavior during the full period they spend in the child's home using the 28-item PSRA — Assessor Report to assess children's self-regulation (as in inattention and impulsivity).⁴² Items are coded using a four-point Likert scale. The PSRA — Assessor Report draws from previous work on assessors' global ratings of children's regulation.⁴³

Data sources: Direct child assessment, observer ratings

Math Skills

Woodcock Johnson III Applied Problems Test

The Woodcock Johnson III Applied Problems Test will be used to measure children's early numeracy and math skills.⁴⁴ This test is from the Woodcock Johnson III: Test of Achievement and measures children's ability to solve oral math problems (for example, "How many dogs are there in this picture?"). This test was used in the Early

³⁹Diamond (2013). For a review, see Diamond and Ling (2016).

⁴⁰Roid, Miller, Pomplun, and Koch (2013).

⁴¹Chazan-Cohen, Raikes, and Vogel (2013).

⁴²Smith-Donald, Raver, Hayes, and Richardson (2007).

⁴³Roid and Miller (1997); Wakschlag et al. (2005).

⁴⁴Woodcock, McGrew, and Mather (2001); Woodcock, McGrew, and Mather (2007).

Head Start kindergarten follow-up, and although no impacts were found,⁴⁵ this test has been used in a number of early childhood studies and is relatively easy to administer.⁴⁶ (It takes approximately five minutes to administer this task.) A Spanish version of the test is also available from the Bateria III Woodcock-Muñoz.⁴⁷

Data source: Direct child assessment

Language Skills

Woodcock Johnson IV Picture Vocabulary and Oral Comprehension Tests

Included in the Woodcock Johnson IV tests of Oral Language, these two tests measure oral language development and lexical knowledge (which includes receptive and expressive language items) and listening comprehension, respectively.⁴⁸ The Picture Vocabulary test assesses oral language development by having the children point to a few pictures of objects on an easel panel that the assessor names and then, for other questions, identify the objects to which the assessor is pointing. The Oral Comprehension test assesses the children's ability to understand a short passage by having them provide a missing word based on cues from the sentence (for example, "Water looks blue and grass looks _____"). Though not used in previous long-term follow-up studies of home visiting, the Picture Vocabulary test has been widely used in early childhood studies with children in the targeted age range.⁴⁹ The tests take about five minutes each, and they are relatively easy to administer and to train assessors to use. The Woodcock Johnson IV tests of Oral Language also include reliable and validated Spanish versions of these two tests.

Data source: Direct child assessment

⁴⁵Chazan-Cohen, Raikes, and Vogel (2013).

⁴⁶Morris et al. (2014); Morris, Mattera, and Maier (2016); Reynolds et al. (2019); Weiland and Yoshikawa (2013).

⁴⁷Muñoz-Sandoval, Woodcock, McGrew, and Mather (2005). The Woodcock Johnson IV Applied Problems subtest was not considered for this follow-up because the Spanish version was not available when the design was being finalized.

⁴⁸Schrank, Mather, and McGrew (2014).

⁴⁹Morris et al. (2014); Morris, Mattera, and Maier (2016); Reynolds et al. (2019); Weiland and Yoshikawa (2013).

Receipt of and Connection to Services

Child Received Any Early Intervention Services

On the structured interview, mothers will be asked whether their children ever received early intervention services before starting kindergarten. If a child has received those services before kindergarten, a follow-up question asks about the reason(s) and includes response categories such as developmental delay, speech/language, and autism, which are conditions listed in the EDFacts database.⁵⁰

Data source: Structured interview

Child Care Setting Before Kindergarten

Questions about the child's child care setting were asked at the MIHOPE 2.5- and 3.5-year check-ins, but they were adapted at the kindergarten follow-up from another MDRC study. These items include where the child spent the most time during daytime hours in the year before kindergarten and the average number of hours a week the child was in this arrangement.

Data source: Structured interview

Child Has Health Insurance Coverage

For continuity, the kindergarten structured interview will use the child health insurance items from both the MIHOPE baseline and 15-month follow-up surveys. The first item asks whether the child has any kind of health care coverage. If the mother responds yes, she is asked what kind of health insurance or health care coverage the child has (for example, private health insurance or Medicaid). For children who are on Medicaid, information on this construct can also be collected from the CMS MAX data files.

Data sources: Structured interview, CMS MAX file

Child Emergency Department Visits and Hospitalizations

Impacts on Medicaid-paid emergency department visits and hospitalizations will be examined using the CMS MAX data files. Since children can shift between Medicaid and private coverage because of changes in family circumstances, a small number of

⁵⁰The EDFacts database contains performance data from prekindergarten through grade 12, which are supplied by K-12 state education agencies and other resources within the U.S. Department of Education. See U.S. Department of Education (2018).

questions on emergency department use and hospital admissions — specifically the number of emergency department visits, nights hospitalized, and visits due to accident or injury — will also be included on the structured interview, as was similarly done on the MIHOPE 15-month survey. Having information from both sources will allow for the imputation of emergency department visits and hospitalizations for families who leave the Medicaid system or who do not match to Medicaid records.

Data sources: Structured interview, CMS MAX files

Child Receiving Any Special Education Services/Has an Individualized Education Program

Because teachers may be more aware of whether their students are in special education or have individualized education programs (IEPs) than are mothers, several items on the teacher survey will be used to measure this construct. Using some items created by the MIHOPE team and some items adapted from the Head Start Family and Child Experiences Survey, the teacher survey asks whether the child is currently receiving special education services and whether the child has been assigned an IEP. If teachers respond “yes” to at least one of these items, they are asked to specify why, using the same response categories as the early intervention item on the structured interview. Teachers are also asked whether they or anyone has identified concerns about the child’s health or development, (and if so, what area[s] appear to be of concern) and what has been done to address the child’s conditions or concerns, including making contact with a specialist, modifying or accommodating the classroom or classroom activities, or placing the child in a self-contained or inclusive Collaborative Team Teaching classroom. Information collected from the teacher survey will be used to supplement information collected from school records.

Data sources: Teacher survey, school records

Social Support

Involvement of the Biological Father or Father Figure with the Child

Maternal Social Support Index

Two items from an adapted version of the Maternal Social Support Index are being used to measure the extent of the biological father’s or father figure’s involvement

with the child,⁵¹ focusing primarily on how often the child sees him. The Maternal Social Support Index has been used in previous home visiting studies, but the MIHOPE-LT interview includes only a subset of items because the measure is very long (about 21 items) and there is a great deal of overlap with the perceived social support measure (see below). Additionally, several items were too specific and probably would not have been affected by home visiting (for example, whether the mother participates in political meetings).

Data source: Structured interview

Social Support

A five-item measure of perceived social support is being used to assess social support.⁵² The main benefits of this measure are that it is short and captures information on various types of social support such as tangible support (“someone to help you with daily chores if you were sick”), emotional support (“someone to confide in or talk to about your problems”), and informational support (“someone to turn to for suggestions about how to deal with a personal problem”). Respondents rate how often each kind of support is available if needed, using a five-point Likert scale.

Data source: Structured interview

School and Neighborhood Context

School Characteristics

Administrative data on school characteristics could be used to put some of the child functioning outcomes into context. Before looking at the effects on these outcomes, the study team may collect information on the characteristics of the schools and districts attended by children in the sample (from the Common Core of Data or the Office of Civil Rights) to look at whether students in the program and control groups are attending similar schools and whether impacts on these outcomes may be affected by district and school policies.

Data source: Common Core of Data or Office of Civil Rights data

⁵¹See Pascoe et al. (1988) for the original Maternal Social Support Index. See Earls, Brooks-Gunn, Raudenbush, and Sampson (1996) for the adapted version.

⁵²McCarrier et al. (2011).

Neighborhood Disadvantage

Since the study team will have sample members' addresses, information about their neighborhoods can be gathered from data sources such as the American Community Survey.

Data source: American Community Survey

Appendix B

Kindergarten Constructs Organized by Data Source

As indicated in Chapter 5, the study team will obtain several data sources at the kindergarten follow-up. Appendix Tables B.1 to B.6 present the constructs that will be measured using each data source. As indicated in the tables, multiple data sources will be used to measure some constructs.

Appendix Table B.1

Kindergarten Constructs Measured Using the Structured Interview

Outcome Area and Construct	Measure	Is This Construct Being Measured with Another Data Source?
<u>Family economic self-sufficiency</u>		
Public assistance receipt ^a	Not applicable	Yes - CMS MAX files ^b
Employment and earnings	Not applicable	Yes - NDNH
Income	Not applicable	No
Material hardship	Not applicable	No
Food insecurity	USDA U.S. Household Food Security Survey Module – Short Form	No
Housing status and mobility	Not applicable	No
Highest level of education	Not applicable	No
Subsequent pregnancies and births	Not applicable	No
<u>Maternal positive adjustment</u>		
Mastery	Pearlin Mastery Scale	No
Mobilizing resources	HFPI	No
Parenting stress	PSI-SF	No
Parent-child separations	Not applicable	Yes - State child welfare records
Household chaos	CHAOS	No
<u>Maternal behavioral health</u>		
Depressive symptoms	CES-D	No
Drug use	Not applicable	No
Alcohol use	Not applicable	No
<u>Family environment and relationship between parents</u>		
Mother's relationship status	Not applicable	No
Mother's relationship with the child's biological father	Not applicable	No
Family conflict	FES	No
Physical violence: perpetration	CTS2	No
Physical violence: victimization	CTS2	No
Experience with battering	WEB	No
<u>Parent-child relationship and interactions</u>		
Parental warmth	EC-HOME	Yes - Observer ratings
Abuse (physical, sexual) ^c	CTSPC	Yes - State child welfare records
Psychological aggression	CTSPC	Yes - State child welfare records
<u>Parental support for child's cognitive development</u>		
Home literacy environment	Not applicable	No
Cognitive stimulation	Not applicable	Yes - Video-recorded mother-child interaction
<u>Child functioning (school readiness)</u>		
Behavior problems	SSIS	Yes - Teacher survey
Social-emotional skills	SSIS	Yes - Teacher survey

(continued)

Appendix Table B.1 (continued)

Outcome Area and Construct	Measure	Is This Construct Being Measured with Another Data Source?
<u>Receipt of and connection to services</u>		
Child received any early intervention services	Not applicable	No
Child care setting before kindergarten	Not applicable	No
Child has health insurance coverage	Not applicable	Yes - CMS MAX files
Child emergency department visits	Not applicable	Yes - CMS MAX files
Child hospitalizations	Not applicable	Yes - CMS MAX files
<u>Social support</u>		
Involvement of the biological father or father figure with the child	MSSI	No
Social support	Not applicable	No

NOTES: CMS MAX files = Centers for Medicare and Medicaid Services Medicaid Analytic eXtract files; NDNH = National Directory of New Hires; HFPI = Healthy Families Parenting Inventory; PSI-SF = Parenting Stress Index – Short-Form; CHAOS = Confusion, Hubbub, and Order Scale; CES-D = Center for the Epidemiologic Studies-Depression Scale; CTS2 = Conflict Tactics Scales; WEB = Women's Experience with Battering Scale; FES = Family Environment Scale; EC-HOME = Early Childhood Home Observation for Measurement of the Environment; CTSPC = Conflict Tactics Scales: Parent-Child Version; SSIS = Social Skills Improvement System; MSSI = Maternal Social Support Index.

^aThe benefits that will be measured are those from the Supplemental Nutrition Assistance Program; disability insurance; Temporary Assistance for Needy Families; Special Supplemental Nutrition Program for Women, Infants, and Children; and Medicaid.

^bMedicaid receipt is being measured using the CMS MAX files. Receipt of other types of public assistance is only being measured on the structured interview.

^cInformation on sexual abuse will not be collected from the structured interview.

Appendix Table B.2

Kindergarten Constructs Measured Using the Teacher Survey

Outcome Area and Construct	Measure	Is This Construct Being Measured with Another Data Source?
<u>Maternal positive adjustment</u>		
Child school attendance and tardiness	Not applicable	Yes - School records
<u>Child functioning (school readiness)</u>		
Behavior problems	SSIS	Yes - Structured interview
Social-emotional skills	SSIS and T-CRS	Yes - Structured interview
Learning behaviors and approaches to learning	T-CRS	No
Disciplinary incidents	Not applicable	Yes - School records
<u>Receipt of and connection to services</u>		
Child receiving any special education services/ has an IEP	Not applicable	Yes - School records

NOTE: SSIS = Social Skills Improvement System; T-CRS = Teacher-Child Rating Scale; IEP = individualized education program.

Appendix Table B.3

Kindergarten Constructs Measured Using Administrative Data

Data Source, Outcome Area, and Construct	Is This Construct Being Measured with Another Data Source?
<u>National Directory of New Hires (NDNH)</u>	
Family economic self-sufficiency	
Employment and earnings	Yes - Structured interview
<u>State child welfare records</u>	
Maternal positive adjustment	
Parent-child separations	Yes - Structured interview
Parent-child relationship and interactions	
Abuse (physical, sexual)	Yes - Structured interview ^a
Psychological aggression	Yes - Structured interview
Neglect	No
<u>School records</u>	
Maternal positive adjustment	
Child school attendance and tardiness	Yes - Teacher survey
Child functioning (school readiness)	
Disciplinary incidents	Yes - Teacher survey
Receipt of and connection to services	
Child receiving any special education services/has an IEP	Yes - Teacher survey
<u>CMS Medicaid Analytic eXtract (MAX) files</u>	
Family economic self-sufficiency	
Public assistance receipt	Yes - Structured interview ^b
Receipt of and connection to services	
Child has health insurance coverage	Yes - Structured interview
Child emergency department visits	Yes - Structured interview
Child hospitalizations	Yes - Structured interview
<u>Common Core of Data or Office of Civil Rights data</u>	
School and neighborhood context	
School characteristics	No
<u>American Community Survey</u>	
School and neighborhood context	
Neighborhood disadvantage	No

NOTES: IEP = individualized education program; CMS = Centers for Medicare and Medicaid Services.

^aInformation on sexual abuse will not be collected from the structured interview.

^bMedicaid receipt is being measured using the CMS MAX files. Receipt of other types of public assistance is only being measured on the structured interview.

Appendix Table B.4

Kindergarten Constructs Measured Using Direct Assessment

Outcome Area and Construct	Measure	Is This Construct Being Measured with Another Data Source?
<u>Maternal positive adjustment</u>		
Self-regulation (working memory)	Digit Span	No
<u>Child functioning (school readiness)</u>		
Executive function	Digit Span, Hearts and Flowers, and Leiter-3 Attention Sustained task	Yes - Observer ratings
Math skills	Woodcock-Johnson III Applied Problems test ^a	No
Language skills	Woodcock-Johnson IV Picture Vocabulary and Oral Comprehension tests ^a	No

NOTE: ^aFor children assessed in Spanish, the Bateria Muñoz III Problemas Aplicados, Woodcock-Johnson IV Vocabulario Sobre Dibujos, and Woodcock-Johnson IV Comprensión Oral tests are used.

Appendix Table B.5

Kindergarten Constructs Measured Using Observer Ratings

Outcome Area and Construct	Measure	Is This Construct Being Measured with Another Data Source?
<u>Parent-child relationship and interactions</u>		
Parental warmth	EC-HOME	Yes - Structured interview
<u>Child functioning (school readiness)</u>		
Executive function	PSRA — Assessor Report	Yes - Direct assessment

NOTE: EC-HOME = Early Childhood Home Observation for Measurement of the Environment; PSRA = Preschool Self-Regulation Assessment.

Appendix Table B.6

Kindergarten Constructs Measured Using Video-Recorded Mother-Child Interaction

Outcome Area and Construct	Is This Construct Being Measured with Another Data Source?
<u>Parent-child relationship and interactions</u>	No
Parent-child interaction	
Parental sensitivity	
Parental intrusiveness	
Parental negative regard	
Parental positive regard	
Parental detachment	
Child engagement of parent	
Child's quality of play	
Child negativity toward parent	
<u>Parental support for child's cognitive development</u>	
Parental stimulation of cognitive development	Yes - Structured interview

Appendix C

Administrative Data Sources

This appendix provides some information about each of the administrative data sources that may be acquired over the course of the MIHOPE-LT follow-up points.

National Directory of New Hires (NDNH)

NDNH contains information on employment and earnings from state workforce agencies and federal agencies and is available at the national level from the Office of Child Support Enforcement within the U.S. Department of Health and Human Services. It was used at the MIHOPE 15-month follow-up, and it represents a streamlined way to collect information on maternal earnings over a long period of time. The main drawback of NDNH is that it includes only information on jobs covered by the unemployment insurance system, and many low-income workers have jobs that are not covered by the unemployment insurance system (for example, babysitting).

School Records

States' kindergarten through grade 12 longitudinal data systems (SLDS) typically include information about a student's daily attendance and absences, disciplinary incidents in which a student was involved and the consequences (expulsions, suspensions), scores on state assessments in the core subject areas, a student's course transcripts, whether a student has an individualized education program (IEP) and whether a student is in a gifted and talented program.

In some study states, researchers may be able to gain access to student-level information by submitting a proposal to a research review board. In states in which access to student-level data for research purposes is more uncertain, a contingency plan would be to obtain data directly from school districts where a critical mass of the study children are enrolled.

State Child Welfare Records

State child welfare records were obtained from each of the 12 MIHOPE states at the time of the 15-month follow-up, so agreements may be able to be extended. Differences in definitions and policies across states make comparability difficult, but because the study has program and control group sample members in each MIHOPE state, it should be possible to obtain estimates of home visiting's effect on child maltreatment outcomes from child welfare records. In addition, the surveillance effect that home visiting might have on reports to Child Protective Services will have diminished by the time children have attended kindergarten, and particularly by the end of the kindergarten year.

Centers for Medicare and Medicaid Services (CMS) Medicaid Analytic eXtract (MAX) Files

For Medicaid, the CMS MAX files contain information for every state on Medicaid enrollment and reimbursed claims and is designed to be used by researchers. The main disadvantage of MAX data is that information generally would be available later than information that is collected directly from parents or from state Medicaid agencies.

Juvenile Justice Records

State juvenile justice records would allow the study team to obtain information about outcomes that result in involvement with the juvenile justice system, including arrests, convictions, sentences (or dispositions), and detentions.¹ Although it would be possible to collect juvenile justice administrative data at a middle school follow-up, it would likely be too early to detect impacts at that time, so these data may be collected for the first time around high school. The primary challenge with this data source is that many states limit their accessibility to these records for those outside the system, although this practice varies considerably among the 12 MIHOPE states. State laws also differ regarding treatment of minors, which can make comparisons with respect to outcomes more difficult.²

National Death Index

The National Death Index is a centralized database containing death record information from each state's vital statistics office that is made available to researchers by the National Center for Health Statistics. The index includes data such as whether an individual has died, the state in which the death occurred, the date of death, the corresponding death certificate number, and the cause of death. As of July 2020, the National Death Index held records from 1979 to 2018; the database is updated annually with a one-year data lag.

¹Dispositions can include residential or community-based placement (including probations), diversion programs, judicial warnings, fines, and community service.

²Examples include variation in the age of majority for some or all crimes and how status offenses — which are offenses that are illegal only because a person is a minor, such as truancy or running away — are handled. In some states the juvenile justice system handles status offenses and in others a child welfare agency handles them.

Appendix D

**Constructs Considered but not Included in Kindergarten
Data Collection**

Because home visiting programs aim to have an effect on a wide range of areas of adult and child functioning, the study team considered many constructs for the kindergarten follow-up. However, not every construct could be measured because it was important to limit the burden placed on families (through their participation in structured interviews and in-home visits). This appendix briefly describes the reasons some constructs were not included.¹

Family Economic Self-Sufficiency

Spending

Spending is not being measured at the kindergarten follow-up because it is difficult for people to report accurately on and easily recall the amount of money spent on certain goods. Some information on spending will also be captured through the material hardship and food insecurity measures. Additionally, the study team could not find a good measure of spending from similar studies.

Job Characteristics

Information about job characteristics such as hours of work and fringe benefits were considered to provide more context for employment, but this outcome was of secondary interest given the broad range of outcomes that home visiting might affect, the lack of evidence that home visiting would affect job characteristics, and the large number of items it would take to capture information about this construct fully during an interview.

Maternal Positive Adjustment

Problem Solving

Problem solving is not being measured at the kindergarten follow-up because it overlaps to a great extent with mastery.² Both the problem-solving and mastery measures that were under consideration have items that touch on mothers' ability to solve problems, feel in control, and deal with setbacks. The mastery measure, however, has been used more widely in home visiting studies and was used in previous MIHOPE waves. Additionally, some of the problem-solving items do not measure people's actual

¹References to previous home visiting studies and evidence in this appendix are limited to the studies discussed in Chapter 3.

²Mastery measures the extent to which a person thinks life chances are under her control.

ability to solve problems, which is difficult to report on accurately. Instead, it primarily measures people's perceptions of their abilities.

Parenting Self-Efficacy

Similarly, parenting self-efficacy is not being measured at the kindergarten follow-up because there is a great deal of overlap between this construct and mastery, but mastery captures general self-efficacy, which could be more associated with the multiple outcomes that home visiting targets.³ Further, the mastery measure has been used more widely in home visiting studies and was used in previous MIHOPE waves. Finally, there was concern that measures of parenting self-efficacy would be too narrowly focused and that parents would simply endorse the items because the items are not usually very specific.

Maternal Behavioral Health

Suicide Attempts

Although attempted suicide is an adverse childhood experience (ACE), it overlaps substantially with depression, as both of them speak to the mother's mental health. In fact, several studies, when asking about ACEs, have combined suicide attempts with depression and counted both of these constructs as part of mental illness.⁴ Other studies have omitted suicide attempts from their definition of ACEs entirely.⁵ Suicide attempts are also less prevalent than depression and can be covered at later follow-up points, so this construct was not made a priority at kindergarten.

Smoking

Although smoking can have implications for mothers' health, there were no significant effects on smoking at the MIHOPE 15-month follow-up. Consequently, it is unlikely that there will be an effect at kindergarten, several years after the home visiting intervention has ended. Additionally, previous kindergarten follow-ups of home visiting

³Parenting self-efficacy is defined as parents' estimates of their competence in their roles as parents or their abilities to influence their children's behavior and development positively (Coleman and Karraker, 2000). General self-efficacy is defined as individuals' perceptions of their ability to perform across a range of different situations (Chen, Gully, and Eden, 2001).

⁴For example, Felitti et al. (1998) consider living with a household member who was depressed or mentally ill or had attempted suicide to be an ACE.

⁵Dube et al. (2001); Schilling, Aseltine, and Gore (2007).

have not examined effects on smoking, and this outcome is not considered an ACE or a key mediator of any of the long-term outcomes of interest.

Anxiety Symptoms

At the MIHOPE 15-month follow-up, the percentage of the respondent sample whose anxiety symptoms score was at or above the cutoff was relatively low (about 11 percent, with a fairly equal percentage between the program and control groups) and lower than the level at baseline (23 percent). This percentage is also lower than the national percentage of adults with anxiety disorders (18 percent).⁶ Given these relatively low levels, the small difference between the program and control group, and the lack of prior home visiting evidence on this outcome at kindergarten, anxiety is not a priority at this follow-up.

Maternal Health

Self-Reported Health Status

This construct has not been examined in previous long-term home visiting studies and was not considered a key outcome for either the benefit-cost or mediational analyses, since more specific information is needed to be useful.

Family Environment and Relationship Between Parents

Negotiation

The study team considered using the negotiation subscale from the Conflict Tactics Scales (CTS2) as a positive counterpart to the intimate partner violence measures. However, this subscale was omitted because the measure is long (12 items), there is a great deal of overlap between this construct and family conflict, and the measure requires that respondents report on the frequency of these behaviors in the past year. This requirement would likely result in low variability because most mothers would probably report frequent occurrence of these behaviors.

⁶Anxiety and Depression Association of America (n.d.).

Psychological Aggression — Perpetration and Victimization

This outcome is not being measured at the kindergarten follow-up because the experience with battering and family conflict measures were emphasized instead. Additionally, this construct was not examined in previous home visiting studies at this time point nor at the MIHOPE 15-month follow-up, and the measure that would be used to assess this construct (the CTS2) is fairly lengthy (16 items).

Household Roster and Movement of Members into and out of the Household

A household roster is not being collected at the kindergarten follow-up because the time required to collect this information increases as the number of household members increases. That said, the structured interview includes some questions related to the roster that are more relevant, such as whether the mother's spouse/partner lives with her. The movement of members into and out of the household was not included in the structured interview because it is a proxy for household chaos, which is already being measured at the kindergarten follow-up.

Parent-Child Relationship and Interactions

Corporal Punishment

Corporal punishment is not being measured at the kindergarten follow-up because it is unclear whether home visiting is designed to address this issue directly. Even if home visitors addressed this topic when parents were enrolled in the program, punishment tactics that are considered acceptable for a 5-year-old are very different from those considered acceptable for an infant. Additionally, interpretation can be difficult because attitudes toward corporal punishment can have a cultural component.

Nonviolent Discipline

Although significant effects were found on nonviolent discipline in a prior Healthy Families America seven-year follow-up,⁷ nonviolent discipline is not being measured at the kindergarten follow-up. At this point in children's lives, it is not clear whether the frequency of parents' use of these techniques will vary much, and the variability that does exist may be correlated with children's behavior. In addition, the MIHOPE 15-month follow-up did not find statistically significant effects on this construct.

⁷DuMont et al. (2010).

Quality of the Home Environment

The overall quality of the home environment will not be measured using the Early Childhood — Home Observation for Measurement of the Environment (EC-HOME), the version of the HOME intended for use with elementary school children ages 3 to 6 years. The full measure is lengthy, with 24 of 55 items asked in an interview-based format.

With the exception of Early Head Start,⁸ the HOME total score has not been collected in long-term follow-ups of the four MIHOPE home visiting models. However, the MIHOPE-LT kindergarten follow-up sought to capture constructs that can be measured with the HOME using other measures, such as cognitive stimulation and home literacy items from the Early Childhood Longitudinal Study — Kindergarten 1998 and 2010 cohorts; household chaos from the Confusion, Hubbub, and Order Scale (CHAOS); harsh parenting (for example, physical assault and psychological aggression) from the Conflict Tactics Scales: Parent-Child Version (CTSPC); and video-recorded mother-child interactions that will capture parental sensitivity, parental stimulation of cognitive development, parental intrusiveness, parental negative regard, and parental detachment. Further, parental warmth will be captured using the responsiveness subscale and a few items from the EC-HOME, which are primarily rated by the field staff so they do not significantly add to the structured interview burden.

Parental Support for Child’s Cognitive Development

Out-of-Home Enrichment Activities

In the interest of reducing the structured interview burden and because home visiting is an intervention that primarily targets behavioral change within the home, the child’s involvement in out-of-home enrichment activities in kindergarten became less of a priority compared with items capturing children’s cognitive stimulation in the home and their home literacy environment. Moreover, no past kindergarten evidence from home visiting studies is available to support its inclusion.

Involvement in School

Since the kindergarten follow-up is planned to take place in the fall, it is probably too early in the school year to assess whether mothers are involved in their children’s schools. However, given that prior research has found that family involvement in school

⁸Chazan-Cohen, Raikes, and Vogel (2013); Vogel et al. (2010).

is associated with gains in reading and math,⁹ this outcome will be considered at the third-grade follow-up.

Child Functioning (School Readiness)

Motor Skills

Though motor skills met one of the criteria (previous evidence of effects), this outcome will not be measured at the kindergarten follow-up. Current evidence suggests that while fine motor skills and executive functioning both make a unique contribution to children's academic achievement,¹⁰ measures of fine motor skills often require children to focus, sustain attention, and recall instructions to complete the tasks, which are aspects of children's executive functioning.¹¹ Since executive functioning may be implicated in the measurement of children's fine motor skills at the time they make the transition to school, measurement of children's executive functioning is being emphasized over an assessment of motor development.

Child Behavioral Health and Mortality

Symptoms of Depression and Anxiety

Child mental health can be difficult to evaluate from a parent or teacher report. There is evidence that parents and teachers tend to be relatively unaware of signs of affective or emotional disturbances in children, and studies have found that when asked, children at various ages often report more depressive symptoms than their parents report that they have.¹² In addition, internalizing behavior problems are being measured at the kindergarten follow-up using the Social Skills Improvement System (SSIS), and these tend to be similar to depressive symptoms. Consequently, the study team may consider measuring these constructs at later follow-ups and collecting information from child reports. Additionally, the primary scale considered for measurement of this construct (the Child Behavior Checklist) is quite lengthy.

⁹EI Nokali, Bachman, and Votruba-Drzal (2010).

¹⁰Best, Miller, and Naglieri (2011); Cameron et al. (2012).

¹¹McClelland and Cameron (2019).

¹²Angold et al. (1987).

Child Health

Body Mass Index

Although home visitors may emphasize nutrition during their visits, it is unclear whether home visiting will have an effect on this outcome when the child is in kindergarten, especially since effects were not found at the MIHOPE 15-month follow-up. Mothers also tend to be poor reporters of their children's height and weight,¹³ so these characteristics would have to be measured by a direct assessment, which is difficult to do logistically;¹⁴ it may also upset some of the participants, which has negative implications for participation in future follow-up studies.

Asthma

The study team considered measuring asthma symptoms, such as wheezing or tightness in the chest, but it is unclear whether home visiting would have a significant effect on this outcome. For one, asthma symptoms are linked to tobacco exposure,¹⁵ and it is unlikely that effects will be seen on smoking or tobacco exposure at kindergarten, as explained in this appendix. Additionally, asthma has not been examined in prior home visiting studies, so this outcome was not considered as high a priority as the other constructs that are being measured. The study team also considered asking whether the child has been diagnosed with asthma or is currently being treated for asthma. However, it is not clear how home visiting would affect these outcomes since it could encourage parents to make greater use of preventive care — which could increase diagnoses and treatment — or it could help parents learn to maintain an environment where asthma would be less likely to develop — which would presumably decrease diagnosis and treatment.

Nutrition

Although the nutritional practices of children are important for understanding health and development, and conceivably are tied to home visitors' emphasis on instilling good nutritional practices early on,¹⁶ nutritional practices are notoriously hard to

¹³For instance, O'Connor and Gugenheim (2011) found that 21 percent of children who were obese would not have been identified as such according to parent reports.

¹⁴Some logistical challenges include making sure that the right scales are used and carrying stadiometers to measure height, which are hard to carry, especially with all the other in-home materials.

¹⁵Sturm, Yeatts, and Loomis (2004).

¹⁶A few questions about nutrition were included on the MIHOPE 15-month follow-up survey.

measure well.¹⁷ National surveys, such as the Early Childhood Longitudinal Study, include a series of questions on how often the child consumes sugary drinks, processed foods, and more healthy foods like fruits and vegetables. But these questions rely on the parent to recall nutritional practices, and given that children are in school for large parts of the day, will be incomplete. More problematically, whether reporting on one's own behavior or that of another, it is very difficult to assess accurately the amount of food consumed.

Rating of Child's Overall Health Status

Ratings of child health suffer from measurement problems. Research has found that parents of Hispanic origin who are interviewed in Spanish were more likely to report their children to be in poor, fair, or good health (as opposed to very good or excellent health) than do Hispanic parents who are interviewed in English, non-Hispanic whites, and non-Hispanic blacks. Some of these differences are not fully explained by demographic or socioeconomic differences across groups.¹⁸ Other research has noted that worse self-rated health among Spanish-speaking or Hispanic immigrants is not aligned with other indicators of health, such as health care coverage, rates of illness, and special health care needs among children.¹⁹ These measurement concerns should not affect the program and control groups differentially, but the measure itself and its interpretation is problematic in children.

Tobacco Exposure

Given that effects on maternal smoking are unlikely to be seen at the kindergarten follow-up, it also seems improbable that there would be a statistically significant effect on tobacco exposure at this time point. Prior home visiting studies have also not examined this outcome at kindergarten, and this outcome is not useful for the benefit-cost analysis nor considered an important mediator for any long-term outcomes.

Receipt of and Connection to Services

Child Has a Primary Care Provider

This construct is not being measured at kindergarten because it is unclear whether there will be a lot of variability. At the MIHOPE 15-month follow-up, almost all

¹⁷Kirkpatrick and Collins (2016).

¹⁸Pastor, Reuben, and Duran (2015).

¹⁹Avila and Bramlett (2013).

the mothers said that their children had primary care providers, and consequently effects on this outcome were not found. Additionally, in many states, children are required to visit a doctor and receive a physical examination, necessary immunizations, or both before they start school. Given that the kindergarten follow-up is planned to occur near the beginning of the school year, it is unlikely that this construct will show enough variability to detect an effect.

Child Is Connected to a Medical Home

Because accurate measurement of whether a child is connected to a medical home — that is, an independent physician or a group medical practice where the child receives health care regularly — would be a lengthy addition to the structured interview and because no evidence exists to show that home visiting has any statistically significant effects on this construct, this outcome was not considered a priority.

Well-Child Visits

The number of well-child visits was measured at the MIHOPE 15-month follow-up, and no significant effects were found, so this construct was not made a priority at the kindergarten follow-up.

Immunizations

By the time of the kindergarten follow-up, the vast majority of children should be up-to-date on immunizations, given that all 50 states have requirements for specified vaccinations for students attending public school.²⁰ Thus, there is little reason to believe that there will be a difference between program and control group outcomes by the time of the kindergarten follow-up.

²⁰States do vary, however, in whether they allow for philosophical or religious exemptions for parents who object to immunizations because of personal, moral, or other beliefs.

Appendix E

**Detailed Results from Previous Kindergarten Follow-Ups
of the Four Evidence-Based Home Visiting Models
Participating in MIHOPE**

This appendix presents details on the previous evidence about the effects of the evidence-based models that participated in MIHOPE from follow-up studies with families that occurred around the time of kindergarten (when children were between 5 and 6 years of age). Appendix Table E.1 provides details on all the findings that are included in the tables in Chapter 5. For each finding, Appendix Table E.1 presents the following information:

- the outcome or construct (for example, public assistance receipt)
- the study in which the result was found
- the follow-up period of the finding relative to when families entered the study
- the estimated effect size (in some cases taken from the published studies and in some cases taken from the Home Visiting Evidence of Effectiveness Review)
- the sample size
- a p-value and indication of whether the impact estimate was favorable and statistically significant at the 5 percent significance level
- a brief description of the outcome used in the study

Appendix Table E.1

Past Evidence on Kindergarten Outcomes

Construct and Study	Follow-Up Period	Effect Size	Sample Size	Estimate Statistically Significant and Favorable?	Outcome Used
<u>Family economic self-sufficiency</u>					
Public assistance receipt				2 out of 4	
PAT NY - Drazen and Haust (1993)	4-5 years	NA	40	No ($p=0.05$)	Change in AFDC status
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.22	641	Yes ($p=0.01$)	Months of AFDC (54-72 months) ^a
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.24	641	Yes ($p<0.01$)	Months of food stamps (54-72 months)
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.15	641	No ($p=0.08$)	Months of Medicaid (54-72 months)
Employment and earnings				0 out of 3	
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.00	927	No ($p>0.10$)	Employed
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.00	641	No ($p=0.97$)	Months employed (54-72 months)
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.05	641	No ($p=0.56$)	SES of current job (mother)
Income				1 out of 1	
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.16	927	Yes ($p<0.05$)	Income
Material hardship				Not examined	
Food insecurity				Not examined	
Housing status and mobility				0 out of 1	
EHS Nationwide - Jones Harden et al. (2012)	K entry	-0.02	927	No ($p>0.10$)	Number of moves in the past year
Highest level of education				0 out of 1	
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.07	641	No ($p=0.54$)	Mother graduated from high school/ earned GED diploma
Subsequent pregnancies and births				3 out of 7	
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.26	641	Yes ($p=0.01$)	Months between births of first and second children
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.22	641	Yes ($p=0.01$)	Number of subsequent children
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.22	641	Yes ($p=0.01$)	Number of subsequent pregnancies
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.23	641	No ($p=0.42$)	Subsequent abortion
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.27	641	No ($p=0.50$)	Subsequent miscarriage
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.20	641	No ($p=0.14$)	Subsequent NICU/special care admission
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.22	641	No ($p=0.16$)	Subsequent low birth weight newborn

(continued)

Appendix Table E.1 (continued)

Construct and Study	Follow-Up Period	Effect Size	Sample Size	Estimate Statistically Significant and Favorable?	Outcome Used
Maternal positive adjustment					
Mastery				0 out of 1	
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.07	641	No ($p=0.43$)	Pearlin Mastery Scale
Mobilizing resources				Not examined	
Parenting stress				Not examined	
Parent-child separations				Not examined	
Household chaos				Not examined	
Self-regulation (working memory)				Not examined	
Child school attendance and tardiness				1 out of 1	
PAT NY - Drazen and Haust (1993)	4-5 years	NA	481	Yes ($p<0.05$)	Total days absent
Maternal behavioral health					
Depressive symptoms				0 out of 2	
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	-0.08	927	No ($p>0.10$)	Depression
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.03	641	No ($p=0.76$)	Mental health
Drug use				0 out of 3	
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	-0.04	927	No ($p>0.10$)	Someone in the household had an alcohol/drug problem in the past year ^b
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.19	641	No ($p=0.47$)	Currently using marijuana
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.03	641	No ($p=0.88$)	Behavioral problems attributable to substance use ^b
Alcohol use				0 out of 3	
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	-0.04	927	No ($p>0.10$)	Someone in the household had an alcohol/drug problem in the past year ^b
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.44	641	No ($p=0.11$)	Moderate/heavy drinker ^c
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.03	641	No ($p=0.88$)	Behavioral problems attributable to substance use ^b
Family environment and relationship between parents					
Mother's relationship status				0 out of 2	
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.06	641	No ($p=0.64$)	Has current partner
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.16	641	No ($p=0.18$)	Married

(continued)

Appendix Table E.1 (continued)

Construct and Study	Follow-Up Period	Effect Size	Sample Size	Estimate Statistically Significant and Favorable?	Outcome Used
<u>Family environment and relationship between parents (continued)</u>					
Mother's relationship status with the biological father of the child				0 out of 1	
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.12	641	No ($p=0.45$)	Lives with the father of the study child
Family conflict				Not examined	
Physical violence: perpetration				Not examined	
Physical violence: victimization				0 out of 2	
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	-0.02	927	No ($p>0.10$)	Child witnessed violence
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.02	641	No ($p=0.87$)	Any domestic violence
Experience with battering				Not examined	
<u>Parent-child relationship and interactions</u>					
Parental warmth				Not examined	
Parent-child interaction				0 out of 4	
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.04	829	No ($p>0.10$)	Parent supportiveness during play
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	-0.01	829	No ($p>0.10$)	Child negativity toward parent during play
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.04	829	No ($p>0.10$)	Child engagement during play
EHS Nationwide - Jones Harden et al. (2012)	K entry	-0.01	829	No ($p>0.10$)	Parent negative regard
Abuse (physical, sexual)				0 out of 3	
PAT NY - Drazen and Haust (1993)	4-5 years	0.00	40	No ($p>0.05$)	Abuse and/or neglect - cases remaining open ^b
PAT NY - Drazen and Haust (1993)	4-5 years	0.00	40	No ($p>0.05$)	Abuse and/or neglect - confirmed cases ^b
PAT NY - Drazen and Haust (1993)	4-5 years	NA ^d	40	No ($p>0.05$)	Abuse or neglect - current suspected cases ^b
Psychological aggression				Not examined	
Neglect				0 out of 3	
PAT NY - Drazen and Haust (1993)	4-5 years	0.00	40	No ($p>0.05$)	Abuse or neglect - cases remaining open ^b
PAT NY - Drazen and Haust (1993)	4-5 years	0.00	40	No ($p>0.05$)	Abuse or neglect - confirmed cases ^b
PAT NY - Drazen and Haust (1993)	4-5 years	NA ^d	40	No ($p>0.05$)	Abuse or neglect - current suspected cases ^b

(continued)

Appendix Table E.1 (continued)

Construct and Study	Follow-Up Period	Effect Size	Sample Size	Estimate Statistically Significant and Favorable?	Outcome Used
<u>Parental support for child's cognitive development</u>					
Home literacy environment				3 out of 3	
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.14	927	Yes ($p < 0.05$)	Children's books (26 or more)
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.16	927	Yes ($p < 0.05$)	HOME language and literacy
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.15	927	Yes ($p < 0.05$)	Percentage reading daily
Cognitive stimulation				1 out of 1	
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.15	927	Yes ($p < 0.05$)	Teaching activities
<u>Child functioning (school readiness)</u>					
Behavior problems				2 out of 11	
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	-0.13	927	Yes ($p < 0.05$)	FACES social behavior problems
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	-0.09	927	No ($p > 0.10$)	CBCL aggressive behavior
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	-0.07	927	No ($p > 0.10$)	FACES aggression
NFP CO - Olds, Holmberg et al. (2014)	6 years	0.76	396	No ($p = 0.42$)	Externalizing problems (borderline/clinical)
NFP CO - Olds, Holmberg et al. (2014)	6 years	0.42	396	No ($p = 0.28$)	Internalizing problems (borderline/clinical)
NFP CO - Olds, Holmberg et al. (2014)	6 years	0.45	396	No ($p = 0.08$)	Total problems (borderline/clinical)
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.11	615	No ($p = 0.43$)	Externalizing problems (borderline/clinical)
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.11	615	No ($p = 0.50$)	Internalizing problems (borderline/clinical)
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.37	615	Yes ($p = 0.04$)	Total problems (borderline/clinical)
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.10	615	No ($p = 0.26$)	Dysregulated aggression (MSSB)
NFP TN - Sidora-Arcoleo et al. (2010)	6 years	NA	721	No ($p > 0.10$)	Physical aggression
Social-emotional skills				0 out of 3	
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.02	802	No ($p > 0.10$)	Observed Leiter emotion regulation
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.14	615	No ($p = 0.13$)	Warmth/empathy (MSSB)
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.03	615	No ($p = 0.71$)	Classroom social skills (HTC)
Learning behaviors and approaches to learning				1 out of 2	
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.18	927	Yes ($p < 0.01$)	FACES positive approaches to learning
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.03	615	No ($p = 0.72$)	Academically engaged (HTC)
Disciplinary incidents				Not examined	

(continued)

Appendix Table E.1 (continued)

Construct and Study	Follow-Up Period	Effect Size	Sample Size	Estimate Statistically Significant and Favorable?	Outcome Used
Child functioning (school readiness) (continued)					
Executive function				2 out of 5	
PAT NY - Drazen and Haust (1993)	4-5 years	0.62	24	No ($p>0.05$)	Mental processing (KABC)
PAT NY - Drazen and Haust (1993)	4-5 years	-1.27	24	Yes ($p<0.05$)	Mental processing (KABC) - percentage below score of 90
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.09	802	No ($p>0.10$)	Leiter attention sustained
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.07	802	No ($p>0.10$)	Observed attention
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.18	615	Yes ($p=0.03$)	Mental processing composite (KABC)
Math skills				0 out of 4	
PAT NY - Drazen and Haust (1993)	4-5 years	NA	481	No ($p>0.05$)	Mean math test score
PAT NY - Drazen and Haust (1993)	4-5 years	NA	481	No ($p>0.05$)	Proportion failing math test
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.08	802	No ($p>0.10$)	Woodcock Johnson Applied Problems
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.09	615	No ($p=0.30$)	Arithmetic achievement (KABC)
Language skills				4 out of 11	
PAT NY - Drazen and Haust (1993)	4-5 years	0.57	40	Yes ($p<0.05$)	Language acquisition quotient (PLS)
PAT NY - Drazen and Haust (1993)	4-5 years	-0.80	40	Yes ($p<0.05$)	Language acquisition quotient - percentage below age level (PLS)
PAT NY - Drazen and Haust (1993)	4-5 years	NA	481	No ($p>0.05$)	Mean reading test score
PAT NY - Drazen and Haust (1993)	4-5 years	NA	481	Yes ($p<0.05$)	Proportion failing reading test
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.05	802	No ($p>0.10$)	English receptive vocabulary (PPVT)
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	0.03	802	No ($p>0.10$)	Woodcock Johnson Letter-Word Identification (English)
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	-0.10	802	No ($p>0.10$)	Speech problems
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.17	615	Yes ($p=0.04$)	Receptive vocabulary (PPVT-III)
NFP TN - Olds, Kitzman et al. (2004)	6 years	-0.16	615	No ($p=0.07$)	Percentage incoherent stories (MSSB)
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.02	615	No ($p=0.84$)	Reading achievement (KABC)
NFP TN - Sidora-Arcoleo et al. (2010)	6 years	0.14	721	No ($p>0.05$)	Child's verbal ability
Receipt of and connection to services					
Child received any early intervention services				0 out of 1	
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.26	641	No ($p=0.05$)	Child attended Head Start, preschool, day care, or early intervention (age 24-54 months) ^b

(continued)

Appendix Table E.1 (continued)

Construct and Study	Follow-Up Period	Effect Size	Sample Size	Estimate Statistically Significant and Favorable?	Outcome Used
<u>Receipt of and connection to services (continued)</u>					
Child care setting before kindergarten NFP CO - Olds, Robinson et al. (2004)	4 years	-0.29	424	1 out of 3 No ($p=0.03$) ^e	Child attended Head Start, preschool, center-based day care, or government-supported family care
EHS Nationwide - Jones Harden et al. (2012)	K entry	0.13	927	Yes ($p<0.05$)	Child in formal program at ages 3 and 4
NFP TN - Olds, Kitzman et al. (2004)	6 years	0.26	641	No ($p=0.05$)	Child attended Head Start, preschool, day care or early intervention (age 24-54 months) ^b
Child has health insurance coverage				Not examined	
Child emergency department visits				Not examined	
Child hospitalizations				Not examined	
Child receiving special education services/ has an IEP				0 out of 4	
PAT NY - Drazen and Haust (1993)	4-5 years	NA	481	No ($p>0.05$)	Mean number of special education services received per child
PAT NY - Drazen and Haust (1993)	4-5 years	NA	481	No ($p>0.05$)	Proportion receiving special education services
PAT NY - Drazen and Haust (1993)	4-5 years	NA	481	No ($p>0.05$)	Number of special education services received per child receiving them
EHS Nationwide - Chazan-Cohen et al. (2013)	K entry	-0.02	927	No ($p>0.10$)	Child has an IEP
<u>Social support</u>					
Involvement of the biological father or father figure with the child				Not examined	
Social support				Not examined	
<u>School and neighborhood context</u>					
School characteristics				Not examined	
Neighborhood disadvantage				0 out of 2	
NFP CO - Hanks et al. (2011)	6 years	0.12	394	No ($p=0.34$)	Neighborhood Disadvantage index
NFP TN - Hanks et al. (2011)	6 years	-0.11	627	No ($p=0.38$)	Neighborhood Disadvantage index

(continued)

Appendix Table E.1 (continued)

SOURCES: Cited in the body of the table and the U.S. Department of Health and Human Services Home Visiting Evidence of Effectiveness (HomVEE) website (homvee.acf.hhs.gov).

NOTES: PAT = Parents as Teachers, NA = not available, AFDC = Aid to Families with Dependent Children, NFP = Nurse-Family Partnership, SES = socioeconomic status, EHS = Early Head Start – Home-based option, GED = General Educational Development, NICU = neonatal intensive care unit, HOME = Home Observation for Measurement of the Environment, FACES = Family and Child Experiences Survey, CBCL = Child Behavior Checklist, MSSB = McArthur Story Stem Battery, HTC = Hightower Teacher-Child Rating Scale, KABC = Kaufman Assessment Battery for Children, PLS = Preschool Language Scales, PPVT = Peabody Picture Vocabulary Test, PPVT-III = Peabody Picture Vocabulary Test, 3rd edition, IEP = individualized education program.

This table includes studies of EHS, NFP, and PAT that were included in HomVEE and rated as high or moderate quality. Only past evidence from follow-ups around kindergarten age is included. No Healthy Families America kindergarten follow-ups that are rated high or moderate quality are currently listed on HomVEE.

In a few instances when HomVEE and the original sources did not match, the study team used the information available in the original sources. In addition, the study team was not able to confirm all of the information reported in HomVEE.

^aRefers to 54 to 72 months after the birth of the study child.

^bOutcome is included under two constructs.

^cDefined as having three or more drinks at least three times a month.

^dAn effect size is reported in HomVEE but is not reported here due to an inconsistency between the p-values of Drazen and Haust (1993) and HomVEE.

^eThis outcome was statistically significant but in an unfavorable direction.

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