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Checking in with Families in the Mother and Infant Home Visiting Program Evaluation

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Overview

The overarching goal of the Mother and Infant Home Visiting Program Evaluation (MIHOPE) is to provide information about whether families and children benefit from Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program-funded early childhood home visiting programs as they operated from 2012 to 2017, and if so, how. The MIECHV Program is administered by the Health Resources and Services Administration (HRSA) in collaboration with the Administration for Children and Families (ACF).

The MIHOPE study team first estimated the effects of MIECHV-funded early childhood home visiting programs around the time the study child was 15 months of age. To ensure that the study was in a strong position to conduct later data collection with families, the MIHOPE team asked families for updated contact information when children were about 2.5 and 3.5 years of age so that they could be contacted in the future. At the 2.5-year check-in point, the study team maintained contact with 70 percent of families—51 percent of families responded to the survey. At the 3.5-year check-in point, the study team maintained contact with 65 percent of families—48 percent of families responded to the survey.

Although the primary purpose of checking in with families was to obtain updated contact information, families were also asked to complete 30-minute surveys that included a limited set of questions about six outcome areas (maternal health, child health, family economic self-sufficiency, discipline practices and strategies, parental support for cognitive development, and child functioning). This report uses these data to provide a snapshot of families' life circumstances and the effects of MIECHV-funded home visiting, but the study team could only measure a limited set of outcomes and could not comprehensively assess any of the outcome areas examined.

Of the six confirmatory outcomes examined at each time point, only one estimated effect was statistically significant, suggesting that home visiting did not have effects on these particular outcomes as measured through parent report. However, an analysis of all outcomes (both confirmatory and exploratory) in each outcome area indicated positive effects in the areas of parental support for cognitive development and child functioning.

The more extensive data that has been gathered while MIHOPE children are in kindergarten will substantially contribute to expanding the evidence on the longer-term effects of early childhood home visiting programs. In addition, the data gathered through all the MIHOPE follow-up points will allow for a longitudinal examination of the effects of home visiting on family and child well-being.

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Acknowledgments

We would like to acknowledge a number of people who have contributed to this phase of the Mother and Infant Home Visiting Program Evaluation (MIHOPE).

First, we are especially grateful to the families who have continued to contribute to this study, and to the states and local programs that participated in this study. Without them, this study would not be possible.

Throughout the study, MIHOPE has benefited greatly from advice from staff members at the U.S. Department of Health and Human Services. At the Administration for Children and Families (ACF), Nancy Geyelin Margie and Laura Nerenberg have provided regular feedback to the study team. At the Health Resources and Services Administration (HRSA), Kyle Peplinski has also weighed in on various project issues.

We would also like to acknowledge the many contributions of the team that collected the data provided by families. Dave DesRoches and Erin Panzarella led a team at Mathematica Policy Research that conducted the 2.5-year and 3.5-year surveys and the fielding experiments.

At MDRC, Kelly Saunders led the efforts to analyze the data obtained at the MIHOPE 2.5-year and 3.5-year check-in points and directed the work of Emily Davies, Cullen MacDowell, Robert Mitchell, and Ashley Qiang in doing so.

We received thoughtful comments on early drafts of this report from Carolyn Hill, Virginia Knox, and Will Swarts. The report also reflects suggestions from staff members at ACF and HRSA—including Nancy Geyelin Margie, Laura Nerenberg, and Maria Woolverton from ACF; Naomi Goldstein, formerly of ACF; Kyle Peplinski from HRSA; and Alicia Vooris, formerly of HRSA.

Finally, Jennifer Yeaton provided excellent assistance with all aspects of producing the report. She was assisted in checking it for accuracy by Livia Martinez, Harrison Taylor, and Samantha Xia. Will Swarts and Luisa LaFleur edited the report, and it was prepared for publication by Ann Kottner.

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 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 who grow up in families who have lower incomes tend to be at greater risk of encountering adverse experiences that negatively affect their development. For more than a century, home visiting has proved to be a helpful approach. It 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 families with low incomes 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 families who were then characterized as "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] In current practice, home visitors work with families to help 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 2027.[5] The program is administered by the Health Resources and Services

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[1]National Research Council and Institute of Medicine, *From Neurons to Neighborhoods: The Science of Early Childhood Development* (Washington, DC: National Academy Press, 2000).

[2]Heather B. Weiss, "Home Visits: Necessary but Not Sufficient." *The Future of Children* 3, 3 (1993): 113-128.

[3]Terri Combs-Orme, Janet Reis, and Lydia D. Ward, "Effectiveness of Home Visits by Public Health Nurses in Maternal and Child Health: An Empirical Review." *Public Health Reports* 100, 5 (1985): 490-499; Kathryn Harding, Joseph Galano, Jo-anne Martin, Lee Huntington, and Cynthia J. Schellenbach, "Healthy Families America Effectiveness: A Comprehensive Review of Outcomes." *Journal of Prevention and Intervention in the Community* 34, 1 (2007): 149-179; John M. Love, Ellen Eliason Kisker, Christine M. Ross, Peter Z. Schochet, Jeanne Brooks-Gunn, Diane Paulsell, Louisa Banks Tarullo, Rachel Chazan-Cohn, Kimberly Boller, Jill Constantine, Cheri Vogel, Allison Sidle Fuligni, and Christy Brady-Smith, "The Effectiveness of Early Head Start for 3-Year-Old Children and Their Parents: Lessons for Policy and Programs." *Developmental Psychology* 41, 6 (2005): 885-901.

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

[5]Funds 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

Administration (HRSA) in collaboration with the Administration for Children and Families (ACF) within the U.S. 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 communities that states identified as "at-risk."[7]

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.[8] States that received MIECHV funding are required to devote the majority of their MIECHV funding to delivery of services according to the specifications of evidence-based models that meet HHS's criteria for evidence of effectiveness.[9] At the same time, states can spend part of their MIECHV funding on promising approaches to home visiting as long as well-designed and rigorous evaluations of those promising approaches are conducted.[10] The legislation also required an evaluation of MIECHV in its early years, which became the Mother and Infant Home Visiting Program Evaluation (MIHOPE).[11] The overarching goal of MIHOPE is to provide information about whether families and children benefit from MIECHV-funded early childhood home visiting programs as they operated from 2012 to 2017, and if so, how.

OVERVIEW OF 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 program group, whose members could receive services from a MIECHV-funded local home visiting program, or to a control group, whose members received information about other appropriate services in the community.

MIHOPE included 88 local home visiting programs that were implementing one of four evidence-based models: Early Head Start-Home-based option, Healthy Families America, Nurse-Family Partnership, and Parents as Teachers. These programs were operating in 12 states: California, Georgia, Illinois, Iowa,

[6]HRSA distributes funds from the federal MIECHV Program to MIECHV state and territory awardees. In 2022, HRSA provided awards to 56 states and territories, including 47 state agencies; 3 nonprofit 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 in 2022 funded 29 tribes, tribal organizations, and urban Indian organizations across 16 states.

[7]Social Security Act of 1935. SEC. 511 [42 U.S.C. 711] (b).

[8]Social Security Act of 1935. SEC. 511 [42 U.S.C. 711] (h) (3) (A).

[9]Social Security Act of 1935. SEC. 511 [42 U.S.C. 711] (d) (3) (A) (ii).

[10]Social Security Act of 1935. SEC. 511 [42 U.S.C. 711] (d) (3) (A) (i) (II).

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

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 included in MIHOPE and to support five eligible local programs or more, whether they represented each of four geographic regions in the United States (Northeast, South, Midwest and Plains, and Mountain and West), 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—Home-based option 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 operating for at least two years when they entered the study, being able to recruit enough families to fill the program slots and allow for a randomly chosen control group, and being located in areas where control group members would have a difficult time accessing another evidence-based home visiting program, to ensure a true comparison between the program and control groups.

CHARACTERISTICS OF MIHOPE FAMILIES

A total of 4,229 families entered the study from October 2012 to October 2015. 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, speak English or Spanish well enough to provide consent and complete a survey when they entered the study, and not already receive home visiting services from a participating local program. 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, and they were experiencing a variety of risks at study entry that could affect their children's development. Specifically, almost 66 percent 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 a high school diploma. Nearly 75 percent of women in the sample were receiving benefits from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and more than 50 percent were enrolled in the Supplemental Nutrition Assistance Program (SNAP). More than 50 percent 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 33 percent reported substance use before pregnancy, over 40 percent reported symptoms of either depression or anxiety, and about 20 percent reported experiencing or perpetrating physical acts of intimate partner violence.[12]

[12]Substance use before pregnancy includes having seven or more drinks in a week (heavy drinking), consuming four or more drinks in one sitting at least once (binge drinking), or using drugs illicitly (either by using illegal drugs—including marijuana—or by misusing prescriptions). For more information, see Charles Michalopoulos, Kristen Faucetta, Carolyn J. Hill,

EARLY EFFECTS ON MIHOPE FAMILIES

MIHOPE estimated the effects of MIECHV-funded early childhood home visiting programs on family and child outcomes around the time the study child (also referred to as "the child" or "the MIHOPE child" in the remainder of the report) was 15 months of age. This data collection occurred between May 2014 and June 2017. Results included an extensive assessment of all but one of the domains that the legislation that authorized the 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.[13]

The study team found that MIECHV-funded home visiting programs had positive effects for families when children were 15 months of age, and most estimated effects were similar to but somewhat smaller than the average found in past studies of individual home visiting models. Specifically, estimated effects were 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.[14] 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. Results for several exploratory outcomes suggest home visiting may improve maternal health and that home visiting might also reduce household aggression.[15]

CHECKING IN WITH MIHOPE FAMILIES WHEN CHILDREN WERE 2.5 AND 3.5 YEARS OF AGE

Given the evidence of the long-term effects of home visiting from prior studies of the four evidence-based models included in MIHOPE, ACF and HRSA were interested in measuring the effects of home

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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 (Washington, DC: Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, 2019).

[13]Social Security Act of 1935. 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 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.

[14]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 to focus on areas where home visiting programs were likely to have their greatest short-term effects. The team examined the policy relevance of those outcomes, and the quality of the tools available to measure the outcomes. The 12 outcomes are considered "confirmatory," following terminology used in Peter Z. Schochet, "Technical Methods Report: Guidelines for Multiple Testing in Impact Evaluations. NCEE 2008-4018" (Washington, DC: National Center for Education Evaluation and Regional Assistance, 2008).

[15]For more information, see Michalopoulos et al. (2019).

visiting for families in the MIHOPE sample when children were in kindergarten. [16] As an intermediary step, and to ensure that the study was in a strong position to conduct later data collection with families, the MIHOPE team asked families for updated contact information when children were about 2.5 and 3.5 years of age.[17]

Although the primary purpose of checking in with families was to obtain updated contact information, families were also asked to complete brief surveys so that the team could obtain some information about families' current circumstances at these two time points. Because data was obtained through a 30-minute survey, the study team could only measure a limited set of outcomes and could not comprehensively assess any of the domains specified in the MIECHV authorizing legislation.

This report uses data from these brief check-ins with MIHOPE families to provide a snapshot of families' life circumstances and the effects of MIECHV-funded evidence-based home visiting at these time points.

Methods

All families who enrolled in MIHOPE were invited to complete a 30-minute survey on the web or by telephone at the two check-in points.[18] In addition to asking families to update their contact information so that they could be contacted in the future, the surveys included a limited set of questions about six outcome areas:

1. the respondent's health
2. the child's health

[16]Charles Michalopoulos, Kristen Faucetta, Anne Warren, and Robert Mitchell, *Evidence on the Long-Term Effects of Home Visiting Programs: Laying the Groundwork for Long-Term Follow-Up in the Mother and Infant Home Visiting Program Evaluation (MIHOPE). OPRE Report 2017-73.* (Washington, DC: Office for Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, 2017). Children in the MIHOPE sample attended kindergarten in four school years. The first cohort attended kindergarten during the 2018-2019 school year, and the fourth cohort attended kindergarten during the 2021-2022 school year. Data collection for the 2.5-year follow-up began in September 2015, and data collection for the 3.5-year follow-up concluded in June 2019.

[17]Among families who participated in the 2.5-year follow-up, children were on average 2.8 years of age (2 years and almost 10 months old), and children's ages ranged from a little over 2 years of age to almost 3.5 years of age. About 75 percent of children were between 2.5 years of age and 3 years of age. Among families who participated in the 3.5-year follow-up, children were on average 3.8 years of age (3 years and almost 10 months of age), ranging from a little over 3 years of age to almost 5 years of age. About 82 percent of children were between 3.5 years of age and 4 years of age.

[18]The 2.5-year survey was released in six cycles and fielded from September 2015 to June 2018, and the 3.5-year survey was released in six cycles and fielded from June 2017 to June 2019. Because women enrolled in MIHOPE from October 2012 to October 2015, while they were pregnant or before their child was 6 months of age, children reached 2.5 years of age over a four-year period (between January 2015 and November 2018). Due to the small number of children who turned 2.5 years of age in early 2015, the first cycle of the 2.5-year data collection did not begin until September 2015. The fielding period for the 3.5-year survey was shorter than that for the 2.5-year survey because the team waited for approval to use the results of a survey incentive experiment that was conducted at the 2.5-year follow-up.

3. family economic self-sufficiency
4. discipline practices and strategies
5. parental support for cognitive development (particularly, home literacy environment and cognitive stimulation)
6. child functioning (which was only included at the 3.5-year check-in point)

In creating the surveys, the team chose measures that could be administered on the web or over the telephone and were fairly brief, so that some information on several outcome areas could be collected; however, this also meant that no outcome area could be assessed as comprehensively as it had been at the MIHOPE 15-month follow-up. In addition, two outcome areas that home visiting programs try to affect—child maltreatment and intimate partner violence—were intentionally excluded because the study team did not want these sensitive topics to become the focus of the brief survey, which could discourage respondents from completing the rest of the survey or completing future data collection efforts. Decisions about which measures to include on the surveys had to be made before the 15-month data collection had concluded so that the surveys could be conducted when children were 2.5 and 3.5 years of age. That meant the analysis of 15-month impacts could not inform the survey content.[19]

SUCCESS IN MAINTAINING CONTACT WITH FAMILIES

In maintaining contact with families, the study team defined success as having families respond to the survey or being able to verify families' contact information through other means. At the 2.5-year check-in point, the study team maintained contact with 70 percent of families—51 percent of families responded to the survey and contact information was confirmed for an additional 19 percent of families. At the 3.5-year check-in point, the study team maintained contact with 65 percent of families—48 percent of families responded to the survey and contact information was confirmed for an additional 17 percent of families.

ASSESSING POTENTIAL RESPONSE BIAS

To assess whether the response rates for the 2.5-year and 3.5-year check-in surveys might result in biased estimated effects, the team compared survey response rates to standards proposed by the What Works Clearinghouse and conducted two routine analyses.[20] Using Version 4.0 of the What Works Clearinghouse standards, the response rate for the 2.5-year check-in point is considered "tolerable" and

[19]Because of the length of the study's enrollment period and the range of child and gestational ages at enrollment, the 2.5-year check-in data collection began with some MIHOPE families in September 2015, almost two years before the 15-month data collection concluded with other families.

[20]What Works Clearinghouse (2017).

the response rate for the 3.5-year check-in point is considered "tolerable" because survey response does not appear to be related to the intervention. The results of tests conducted by the study team indicate that there is no evidence to suggest there is bias in the estimated effects at 2.5 years and 3.5 years as a result of families not responding to the surveys. However, consistent with the findings from the response bias analysis conducted at the 15-month follow-up, results might not be generalizable to the full MIHOPE sample of families who entered the study.

MIHOPE FAMILIES' LIFE CIRCUMSTANCES

The study team examined trends in program group families' life circumstances from the time women enrolled in MIHOPE through the 3.5-year check-in point, on measures related to maternal health, child health, and family economic self-sufficiency. These three areas were included because the study team obtained relatively consistent information on them across all time points.

Families' circumstances remained fairly similar over time on most measures, but four trends emerged. MIHOPE participants achieved higher levels of education and reported lower levels of receipt of public assistance benefits at later time points. Not unexpectedly, women gave birth to additional children and used non-parental child care at higher rates as their children grew older.

EFFECTS OF EVIDENCE-BASED HOME VISITING WHEN CHILDREN ARE 2.5 AND 3.5 YEARS OF AGE

The six confirmatory outcomes examined for the 2.5-year and 3.5-year check-in points (listed with their outcome areas) are:

- New birth after study entry (maternal health)
- Maternal depressive symptoms (maternal health)
- Maternal self-reported health status (maternal health)
- Number of emergency department visits for injury or accident (child health)
- Education or training (family economic self-sufficiency)
- Use of yelling (discipline practices and strategies)[21]

All outcomes in the areas of parental support for cognitive development and child functioning were designated as exploratory because the evidence from prior studies did not point to particular outcomes

[21]The outcomes that were designated as confirmatory for the 2.5-year and 3.5-year impact analyses were not the same as those designated as confirmatory in the analysis of impacts when children were 15 months of age.

in these areas that were likely to be affected at these time points and because the measurement of these areas at 2.5-year and 3.5-year check-in points was not consistent with that used in prior studies. Specifically, measures used in these MIHOPE check-in points were brief and reported by parents as compared to more comprehensive standardized scales and direct assessments of parenting practices and children's development in other studies.

Of the six confirmatory outcomes (new birth after study entry, maternal depressive symptoms, maternal self-reported health status, number of emergency department visits for injury or accident, pursuing education or training, and use of yelling; representing four outcome areas) examined at each time point, only one estimated effect was statistically significant. These results suggest that home visiting did not have effects on these particular outcomes measured through parent report when children were 2.5 and 3.5 years of age. However, in considering the weight that should be placed on these confirmatory findings, it is important to reiterate that the 2.5-year and 3.5-year impact analysis drew on only one mode of data collection—a parent survey—and that it was necessary to be selective in the measures included in order to keep the survey brief. Therefore, none of the outcome areas examined could be comprehensively assessed at these check-in points, in contrast to the extensive data collected during the MIHOPE follow-up that occurred when children were 15 months of age (which included a one-hour parent survey, administrative data sources, direct assessments, and observations of parents and children). As compared with the 15-month impact analysis, the 2.5-year and 3.5-year impact analysis drew on a limited set of outcomes.

In addition to the six confirmatory outcomes, the study team examined effects on exploratory outcomes in five outcome areas at each timepoint: child health, family economic self-sufficiency, discipline practices and strategies, parental support for cognitive development, and child functioning.[22] To assess whether the patterns of estimated effects for all outcomes (confirmatory and exploratory) in each outcome area suggest positive impacts for families, the study team conducted a statistical test for each outcome area.[23] These tests suggest positive effects in the areas of parental support for cognitive development (on outcomes related to the home literacy environment and cognitive stimulation) and child functioning (on outcomes related to behavioral self-regulation). All outcomes in these two areas were considered exploratory.

[22]Outcomes in the child functioning area were only examined at the 3.5-year check-in point.

[23]This test was not included in the study team's analysis plan but was also used in the MIHOPE 15-month analysis to characterize the effects on confirmatory outcomes. Each outcome area's test included all outcomes (both confirmatory and exploratory) from both check-in points. See Devin Caughey, Allan Dafoe, and Jason Seawright, "Nonparametric Combination (NPC): A Framework for Testing Elaborate Theories." *Journal of Politics* 79, 2 2017: 688-701.

IMPLICATIONS FOR THE NEXT FOLLOW-UP WITH MIHOPE FAMILIES

Families who enrolled in MIHOPE participated in an extensive round of data collection when their children were in kindergarten that was similar in scope to the data collection conducted when children were 15 months of age. This round of data collection was meant to obtain information about outcomes in all the areas that MIECHV-funded home visiting is intended to affect.

The information gained from the 2.5-year and 3.5-year check-ins has implications for the study team's ability to continue to contact families and the methods they use to reach out to families. The study team is using the contact information they verified at the two check-ins to invite families to participate in the kindergarten follow-up.[24] However, even with the advantage of updated contact information, MIHOPE families move frequently, which may make it difficult for the study to continue to follow up with families.[25] In terms of how the study reaches out to families, the survey response rates achieved at the 2.5-year and 3.5-year follow-up points (of 51 percent and 48 percent) were lower than the team's response rate targets, but the study team was not able to use in-person outreach at these check-ins. This experience suggests that in-person outreach is an important tool for achieving higher response rates at the kindergarten follow-up.

Of the six confirmatory outcomes examined at each time point, only one estimated effect was statistically significant. Importantly, though, the positive impacts found on exploratory outcomes in the areas of parental support for cognitive development and child functioning and, in particular, the statistically significant effects on parents' reports of children's behavioral self-regulation, indicate potential areas of further exploration with the kindergarten data collection. In addition to assessing dimensions of parenting and child functioning more fully than was possible with the 2.5-year and 3.5-year surveys, the kindergarten follow-up point will be the first opportunity to examine whether the positive effects related to household aggression that were seen at the follow-up that occurred when children were 15 months of age have persisted.[26] Measures of intimate partner violence and child maltreatment were not included in the brief surveys so outcomes in these areas could not be assessed at this point.

The 2.5-year and 3.5-year check-ins with MIHOPE families provide a snapshot of families' experiences at those time points. But since they obtained a limited set of information about family and child well-

[24]At each point, contact information was verified for 65 to 70 percent of families.

[25]Between 30 and 40 percent of families moved between each MIHOPE data collection time point (for example, 39.3 percent moved between the 2.5 and 3.5-year check-in points); this rate of mobility is higher than national estimates of moving in the past year for the general population (about 14 percent) and for families who have incomes below 100 percent of the poverty level (about 22 percent). About 70 percent of families moved at least once between study entry and the 3.5-year check-in point.

[26]Although measures of these outcomes were included on the brief surveys, they were brief and reported by parents, as compared to more comprehensive standardized scales and to direct assessments of parenting practices and children's development in other studies.

being, they could not comprehensively assess any of the outcome areas examined and could not assess all the domains specified in the MIECHV legislation. The more extensive data gathered when MIHOPE children were in kindergarten will substantially contribute to expanding the evidence on the longer-term effects of early childhood home visiting programs, building on prior studies of the four evidence-based home visiting models included in MIHOPE. In addition, the data gathered through all the MIHOPE follow-up points will allow for a longitudinal examination of the effects of home visiting on family and child well-being.

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 who grow up in families who have lower incomes tend to be at greater risk of encountering adverse experiences that negatively affect their development. For more than a century, home visiting has been a helpful approach. It 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 families with low incomes 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 families who were then characterized as "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] In current practice, home visitors work with families to help 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 2027.[5] The program is administered by the Health Resources and Services

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

[2]Weiss (1993).

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

[4]SEC. 511[42 U.S.C. 711](j)(1).

[5]Funds 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); section 50601 of the Bipartisan Budget Act of 2018, Pub. L.

Administration (HRSA) in collaboration with the Administration for Children and Families (ACF) within the U.S. 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 communities that states identified as "at-risk."[7]

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.[8] States that received MIECHV funding are required to devote the majority of their MIECHV funding to the delivery of services according to the specifications of evidence-based models that meet HHS's criteria for evidence of effectiveness.[9] At the same time, states can spend part of their MIECHV funding on promising approaches to home visiting as long as well-designed and rigorous evaluations of those promising approaches are conducted.[10] The legislation also required an evaluation of MIECHV in its early years, which became the Mother and Infant Home Visiting Program Evaluation (MIHOPE).[11] The overarching goal of MIHOPE is to provide information about whether families and children benefit from MIECHV-funded early childhood home visiting programs as they operated from 2012 to 2017, and if so, how.

OVERVIEW OF 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 program group, whose members could receive services from a MIECHV-funded local home visiting program, or to a control group, whose members received information about other appropriate services in the community.

MIHOPE included 88 local home visiting programs that were implementing one of four evidence-based models: Early Head Start-Home-based option, Healthy Families America, Nurse-Family Partnership, and Parents as Teachers. These programs were operating in 12 states: California, Georgia, Illinois, Iowa, Kansas, Michigan, Nevada, New Jersey, Pennsylvania, South Carolina, Washington, and Wisconsin.

115-123 (fiscal years 2018-2022); and section 6101 of the Consolidated Appropriations Act of 2023 Pub. L. 117-328 (fiscal years 2023-2027).

[6]HRSA distributes funds from the federal MIECHV Program to MIECHV state and territory awardees. In 2022, HRSA provided awards to 56 states and territories, including 47 state agencies; 3 nonprofit 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 in 2022 funded 29 tribes, tribal organizations, and urban Indian organizations across 16 states.

[7]SEC. 511 [42 U.S.C. 711] (b).

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

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

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

[11]SEC. 511 [42 U.S.C. 711] (g) (2).

States were selected based on a number of criteria, including whether they planned to implement more than one of the four evidence-based models included in MIHOPE and to support five eligible local programs or more, whether they represented each of four geographic regions in the United States (Northeast, South, Midwest and Plains, and Mountain and West), 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—Home-based option 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 operating for at least two years when they entered the study, being able to recruit enough families to fill the program slots and allow for a randomly chosen control group, and being located in areas where control group members would have a difficult time accessing another evidence-based home visiting program, to ensure a true comparison between the program and control groups.

CHARACTERISTICS OF EVIDENCE-BASED HOME VISITING MODELS PARTICIPATING 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 and provide comments on their parenting. Home visitors can also provide support during crises such as threats of being evicted or incidents of family violence. In addition, home visitors work to strengthen families' support networks. Home visitors use methods such as positive reinforcement, direct suggestions and encouragement, and motivational interviewing to support healthy behavior and positive parenting.[12]

- **Referral and coordination.** For some family needs, home visitors may think the family will benefit from receiving more specialized services in the community. In MIHOPE, referrals were most commonly made to address breastfeeding and nutrition, economic self-sufficiency, and public

[12]Rubak, 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).

assistance or health insurance. This aspect of home visiting highlights the place of home visiting as one component in a comprehensive system of care for early childhood.[13]

Although all four evidence-based models participating in MIHOPE include 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.

- **Program goals.** While all four models aimed to improve child health and development in the broad sense, their specific goals differed. For example, Early Head Start provided comprehensive services that focused on the development of infants and toddlers, supporting parents in their roles as caregivers and teachers of their children, and promoting school readiness. In addition to the goals of strengthening nurturing parent-child relationships, promoting healthy childhood growth and development, and enhancing family functioning, Healthy Families America emphasized preventing child maltreatment. Nurse-Family Partnership strongly emphasized the social determinants of health, improving birth outcomes through preventive health practices, and improving child health and development. It also aimed to improve mothers' economic self-sufficiency and development. Parents as Teachers focused on supporting families to enhance parents' knowledge of early childhood development, improve parenting practices, detect early signs of developmental delays and health issues, and promote children's school readiness and success.

- **Target population and age at enrollment.** Most of these models served families they identified as being at risk of poor child outcomes, based on one or more family characteristics. Although the indicators used to identify families at risk differed among the models, most models targeted families with low incomes. Nurse-Family Partnership specifically targeted women early in their first pregnancies, while Healthy Families America targeted families during any pregnancy or shortly after birth who faced a variety of risk factors for child maltreatment or other negative childhood experiences (risk factors such as histories of trauma or intimate partner violence, behavioral health issues, and single parenthood). 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 accepted families whose youngest children were up to 3 years old and through kindergarten entry, respectively. In other words, Early Head Start and Parents as Teachers enrolled a much broader range of families than are included in MIHOPE, which includes only families with children under 6 months old at enrollment.

[13]Duggan et al. (2018).

Table 1.1

Planned Services of the Evidence-Based Home Visiting Models in MIHOPE at the Time MIHOPE Began: Goals, Recipients, Enrollment, and Duration

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 Promote healthy family functioning Promote school readiness	Build and sustain community partnerships to systematically engage overburdened parents in home visiting services prenatally or at birth Cultivate and strengthen nurturing parent-child relationships Promote healthy childhood growth and development Enhance family functioning by reducing risk and building protective factors Prevent child maltreatment and adverse experiences	Improve prenatal health and birth outcomes Improve child health and development Improve families' economic self-sufficiency and maternal life course development	Provide parents with child development knowledge and parenting support Provide early detection of developmental delays and health issues Prevent child maltreatment Increase school readiness
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

(continued)

Table 1.1 (continued)

Component	Early Head Start—Home-Based Option	Healthy Families America	Nurse-Family Partnership	Parents as Teachers
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
Intended duration of enrollment	Through the child's third birthday[c]	Through the child's third birthday but can extend to child's fifth birthday	Through the child's second birthday	Local programs required to offer at least two years of services to families; recommend offering three years of services; services can be offered until kindergarten entry

SOURCES: Evidence-based model websites (EHS: eclkc.ohs.acf.hhs.gov/hslc; HFA: www.healthyfamiliesamerica.org; NFP: www.nursefamilypartnership.org; PAT: 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 MIHOPE evidence-based model developer interviews.

NOTES: EHS = Early Head Start–Home-based option, HFA = Healthy Families America, NFP = Nurse-Family Partnership, PAT = Parents as Teachers, TA = technical assistance, FTE = full-time employment.

The information in this table was obtained when the MIHOPE study began.

[a]Goals are as stated by each evidence-based model.

[b]Local programs are recommended to begin conducting visits as early as possible in the pregnancy.

[c]Children can remain with EHS until they transition into other appropriate settings.

- **Program intensity and duration.** The four evidence-based models also varied somewhat in the frequency of their home visits. Early Head Start offered weekly home visits, while Healthy Families America and Nurse-Family Partnership offered weekly visits during critical periods (for example, shortly after birth) and Parents as Teachers specified monthly, biweekly, or weekly visits depending on families' needs (not shown in Table 1.1). The four models also differed in their intended duration of enrollment: Early Head Start offered services through the child's third birthday; Healthy Families America offered services through the child's third birthday but services can extend to the child's fifth birthday; Nurse-Family Partnership offered services through the child's second birthday; and for Parents as Teachers, local programs are required to offer at least two years of services to families, but Parents as Teachers recommends offering three years of services, and services can be offered until kindergarten entry. Although services are offered for these periods of time, families may not participate in home visiting services for as long as the models intend. MIHOPE families' participation in home visiting services is discussed in Chapter 4.

CHARACTERISTICS OF MIHOPE FAMILIES

A total of 4,229 families entered the study from October 2012 to October 2015. 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, speak English or Spanish well enough to provide consent

and complete a survey when they entered the study, and not already be receiving home visiting services from a participating local program. 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, and they were experiencing a variety of risks at study entry that could affect their children's development. Specifically, almost 66 percent 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 a high school diploma. Nearly 75 percent of women in the sample were receiving benefits from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and more than 50 percent were enrolled in the Supplemental Nutrition Assistance Program (SNAP). More than 50 percent 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 33 percent reported substance use before pregnancy, over 40 percent reported symptoms of either depression or anxiety, and about 20 percent reported experiencing or perpetrating physical acts of intimate partner violence.[14]

EARLY EFFECTS ON MIHOPE FAMILIES

MIHOPE estimated the effects of MIECHV-funded early childhood home visiting programs on family and child outcomes around the time 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. This data collection occurred between May 2014 and June 2017. Results included an extensive assessment of all but one of the domains that the legislation that authorized the 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.[15]

Data for the MIHOPE 15-month analysis was obtained from several sources:

- a one-hour telephone interview with the child's mother
- a visit with the mother and child, including a video recording of an interaction between the child and mother during which the child and mother play with toys contained in three bags and place the toys back in the bags; the Preschool Language Scales, Fifth Edition, Auditory Comprehension scale; the

[14]Substance use before pregnancy includes having seven or more drinks in a week (heavy drinking), consuming four or more drinks in one sitting at least once (binge drinking), or using drugs illicitly (either by using illegal drugs—including marijuana—or by misusing prescriptions). For more information, see Michalopoulos et al. (2019).

[15]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 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.

child's weight and height and the mother's weight; and the Infant-Toddler Home Observation for Measurement of the Environment

- administrative data (data collected to help administer 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 National Directory of New Hires)

Overall, the study team found that MIECHV-funded home visiting programs had positive effects for families when children were 15 months of age, and most estimated effects were similar to but somewhat smaller than the average found in past studies of individual home visiting models. Specifically, estimated effects were 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.[16] 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. Results for several exploratory outcomes suggest home visiting may improve maternal health and that home visiting might also reduce household aggression.[17]

CHECKING IN WITH MIHOPE FAMILIES WHEN CHILDREN WERE 2.5 AND 3.5 YEARS OF AGE

Given the evidence of the long-term effects of home visiting from prior studies of the four evidence-based models included in MIHOPE, ACF and HRSA were interested in measuring the effects of home visiting for families in the MIHOPE sample when children were in kindergarten.[18] As an intermediary step, and to ensure that the study was in a strong position to conduct later data collection with families, the MIHOPE team asked families for updated contact information when children were about 2.5 and 3.5 years of age.[19] These two time points were chosen because they provided the opportunity to check in

[16]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 that existed before the analysis began, the policy relevance of those outcomes, and quality of the tools available to measure the outcomes. Following the terminology used in Schochet's 2008 report for the Institute of Education Sciences, the 12 outcomes are considered "confirmatory."

[17]For more information, see Michalopoulos et al. (2019).

[18]Michalopoulos, Faucetta, Warren, and Mitchell (2017). Children in the MIHOPE sample attended kindergarten in four school years. The first cohort attended kindergarten during the 2018-2019 school year, and the fourth cohort attended kindergarten during the 2021-2022 school year. Data collection for the 2.5-year follow-up began in September 2015, and data collection for the 3.5-year follow-up concluded in June 2019.

[19]Among families who participated in the 2.5-year follow-up, children were on average 2.8 years of age (2 years and almost 10 months old), and children's ages ranged from a little over 2 years of age to almost 3.5 years of age. About 75 percent of children were between 2.5 years of age and 3 years of age. Among families who participated in the 3.5-year follow-up,

with MIHOPE families at relatively equal intervals between the initial in-depth follow-up when children were 15 months old and a follow-up when the children were in kindergarten to maximize the study's opportunity of maintaining contact with families. At the same time, the study team wanted to minimize the burden on families to respond to data collection requests, so these follow-ups were planned to be approximately one year apart from each other and the other larger data collections. That timing helped balance the ease of being able to maintain contact with families with what families were asked to do for these data collection efforts.

Although getting updated contact information was the primary purpose of checking in, families were also asked to complete brief surveys to provide some information about their current circumstances at these two time points. This report uses data from these brief check-ins with MIHOPE families to provide a snapshot of families' life circumstances and the effects of MIECHV-funded evidence-based home visiting at these time points. Because data was obtained through a 30-minute survey, the study team could only measure a limited set of outcomes and could not comprehensively assess any of the domains specified in the MIECHV authorizing legislation. The outcome areas assessed were maternal health, child health, family economic self-sufficiency, discipline practices and strategies, parental support for cognitive development, and child functioning.

CONTENTS OF THIS REPORT

Chapter 2 describes **the process the study team used to maintain contact with families. It also reports on how successful the team was in obtaining information from families about their well-being through brief surveys, and how successful the team was in verifying contact information for families who did not complete the surveys.**

Then, using the data described above, this report addresses the following questions:

- **What were families' life circumstances at the time of these check-ins and how have they changed since they entered the study?** Chapter 3 describes trends in families' life circumstances in the areas of maternal health, child health, and family economic self-sufficiency from the time women enrolled in MIHOPE through the 3.5-year check-in point.

children were on average 3.8 years of age (3 years and almost 10 months of age), ranging from a little over 3 years of age to almost 5 years of age. About 82 percent of children were between 3.5 years of age and 4 years of age.

- **What were the effects of home visiting programs at the time of these check-ins?** Chapter 4 compares the outcomes of the program and control groups for six confirmatory outcomes, in four outcome areas, using data from the two check-ins.[20]

The final chapter summarizes the findings and discusses the implications for the study as the team continues to follow up with families.

[20]The outcomes that were designated as confirmatory for the 2.5-year and 3.5-year impact analyses are not the same as those designated as confirmatory in the analysis of impacts when children were 15 months of age.

2

Checking in with Families

Maintaining contact with sample members after study entry can be challenging, particularly as time passes and additional follow-ups occur. This is especially true in studies with populations who are considered by survey researchers to be "hard-to-survey," which includes individuals with lower incomes.[1]

Because a primary purpose of the check-ins that occurred when children were about 2.5 and 3.5 years of age was to maintain contact with Mother and Infant Home Visiting Program Evaluation (MIHOPE) participants, this chapter reviews the process used to stay in touch with and find families, including experiments conducted to test different methods. In addition, this chapter describes how successful the study team was in maintaining contact with families at these time points, by presenting the percentage of families who completed the brief check-in surveys and the percentage of families for whom contact information was verified. Finally, the chapter discusses how the response rates to the surveys affect the ability of the study to reliably estimate effects.

PROCESS USED TO MAINTAIN CONTACT WITH FAMILIES

The Surveys

All families who enrolled in MIHOPE were invited to complete a 30-minute survey on the web or by telephone at the two check-in points.[2] In addition to asking families to update their contact information

[1]Tourangeau (2014).

[2]The 2.5-year survey was released in six cycles and fielded from September 2015 to June 2018, and the 3.5-year survey was released in six cycles and fielded from June 2017 to June 2019. Because women enrolled in MIHOPE from October 2012 to October 2015, while they were pregnant or before their child was 6 months of age, children reached 2.5 years of age over a four-year period (between January 2015 and November 2018). Due to the small number of children who turned 2.5 years of age in early 2015, the first cycle of the 2.5-year data collection did not begin until September 2015. The fielding period for the 3.5-year survey was shorter than that for the 2.5-year survey because the team waited for approval to use the results of a survey incentive experiment that was conducted at the 2.5-year follow-up.

so that they could be contacted in the future, the surveys included a limited set of questions about six outcome areas:

1. the respondent's health
2. the child's health
3. family economic self-sufficiency
4. discipline practices and strategies
5. parental support for cognitive development (in particular, home literacy environment and cognitive stimulation)
6. child functioning (which was only included at the 3.5-year check-in point)

In creating the surveys, the team chose measures that could be administered on the web or over the telephone and were fairly brief, so that some information on several outcome areas could be collected; however, this also meant that no outcome area could be assessed as comprehensively as it had been at the MIHOPE 15-month follow-up. In addition, two outcome areas that home visiting programs try to affect—child maltreatment and intimate partner violence—were intentionally excluded because the study team did not want these sensitive topics to become the focus of the brief survey, which could discourage respondents from completing the rest of the survey or completing future data collection efforts.

Outreach to Families

The study team implemented standard practices for maximizing survey participation and reaching out to families in a longitudinal study. Specifically, at the beginning of data collection for each check-in point, families were invited via letter and email to complete the survey on the web or by telephone. Reminders to complete the survey were then sent via postcard, email, text message, and telephone. These outreach efforts differed from those used during the MIHOPE 15-month follow-up in one important respect: interviewers for the check-in surveys did not conduct in-person outreach to ask families to complete the survey.[3] If initial attempts to reach the family directly were unsuccessful, survey staff attempted to verify families' contact information through custom searches across databases, directory assistance services, and reverse directories. Staff also attempted to contact the families' friends and relatives using contact information provided by the family during prior rounds of follow-up.

[3]For budgetary reasons, in-person outreach was only used early in the fielding of the 2.5-year check-in survey, for the first 17 percent of families who were invited to complete the survey.

The effort to maximize response rates used multiple contact methods. To further increase participation, the study team sent birthday postcards to the child and mother, a newsletter with updates about the study, and a small gift (such as a refrigerator magnet) for the family between the 15-month follow-up and the 2.5-year follow-up and again between the 2.5-year follow-up and the 3.5-year follow-up.

Experiments to Encourage Survey Participation

The study team also conducted experiments at each check-in time point to test different ways to further increase response rates. An early portion of the MIHOPE families was involved in each experiment so the results could inform data collection efforts at the same follow-up point as well as in future follow-ups. A description of the experiments and a brief overview of the results are presented in Appendix A.[4]

SUCCESS IN MAINTAINING CONTACT WITH FAMILIES

In maintaining contact with families, the study team defined success as having families respond to the survey or being able to verify families' contact information through other means. If families did not respond to the surveys, their contact information was considered verified if the family scheduled an appointment to complete the survey but did not keep the appointment, the family spoke to an interviewer and refused to participate in the survey, interviewers reached an answering machine or privacy manager that identified the family, a new telephone number was obtained through the survey staff's effort to locate families through databases and online directories and it was confirmed that the number belonged to the family, or a telephone number was verified by contact with someone other than the respondent (such as a family member or friend).

At the 2.5-year check-in point, the study team maintained contact with 70 percent of families—51 percent of families responded to the survey and contact information was confirmed for an additional 19 percent of families. At the 3.5-year check-in point, the study team maintained contact with 65 percent of families—48 percent of families responded to the survey and contact information was confirmed for an additional 17 percent of families.

The survey response rates were lower for the 2.5-year and 3.5-year check-in points than for the survey conducted at the MIHOPE 15-month follow-up, which had a response rate of 79 percent. However, as previously mentioned, the 15-month data collection effort included interviewers conducting in-person outreach to families (which was not used at the 2.5- and 3.5-year check-in points). In addition, data

[4]The first experiment (conducted with about 40 percent of the 2.5-year check-in sample) assessed whether offering an "early bird" incentive, a prepaid incentive, or the combination of both the early bird incentive and the prepaid incentive yielded higher survey response rates. The second experiment (conducted during the 3.5-year check-in data collection with about 17 percent of the sample) assessed whether contacting families using a particular reminder method (letter, email, or text message) led to higher response rates compared with contacting families using the regular reminder schedule, which used a combination of these methods.

collection at 15 months was conducted at a time point closer to study entry than data collection at the 2.5-year follow-up, and as time passes, families may become more difficult to locate or may be less likely to participate as additional follow-ups occur. Both factors may have contributed to a higher response rate at the 15-month follow-up compared with the check-in follow-ups.

ASSESSING POTENTIAL RESPONSE BIAS

To assess whether the response rates for the 2.5-year and 3.5-year check-in surveys might result in biased estimated effects, the team compared survey response rates to standards proposed by the What Works Clearinghouse and conducted two routine analyses. The What Works Clearinghouse, established by the Institute of Education Sciences in the U.S. Department of Education, aims to be a source of rigorous evidence and to assess the quality of research in education. Its attrition standards are widely used and easily applied.[5]

First, the team compared, separately for the 2.5-year and 3.5-year surveys, the overall survey response rates, and the difference in response rates between the program and control groups, to standards proposed by the What Works Clearinghouse. The What Works Clearinghouse standards categorize studies' response rates as: (1) tolerable, (2) tolerable if survey response is not related to the intervention but unacceptable otherwise, and (3) unacceptable.[6] Using these standards, the response rate for the 2.5-year check-in point is considered "tolerable" and the response rate for the 3.5-year check-in point is considered "tolerable" because survey response does not appear to be related to the intervention. Importantly, response rates for both surveys were similar for the program and control groups.[7]

In addition, regardless of the overall or differential response rate, estimated effects could be biased if program group respondents differ systematically from control group respondents on family characteristics measured at study entry. Similarly, differences between respondents and nonrespondents could mean that estimates based on respondents' data do not represent the effects for the full sample. To assess these two potential sources of bias, the study team conducted two analyses: (1) a comparison of baseline characteristics of program group and control group families who responded to the surveys, and (2) a

[5]The Home Visiting Evidence of Effectiveness (HomVEE) review uses the What Works Clearinghouse (WWC) standards to assess attrition in studies testing the effectiveness of home visiting models. If a randomized controlled trial has a high level of attrition, determined using the WWC standards, a study will be eligible to receive only a "moderate" rating from HomVEE instead of a "high" rating. See Sama-Miller et al. (2020).

[6]What Works Clearinghouse (2017); the team used Version 4.0 of the What Works Clearinghouse Standards Handbook.

[7]At 2.5 years, 51 percent of program group families responded to the survey and 51 percent of control group families responded to the survey, resulting in a differential attrition rate of 0 percent. The WWC considers this combination of overall attrition (51 percent) and differential attrition (0 percent) "tolerable". At 3.5 years, 49 percent of program group families responded to the survey while 47 percent of control group families responded to the survey, resulting in a differential attrition rate of 2 percent. The WWC considers this combination of overall attrition (48 percent) and differential attrition (2 percent) "potentially tolerable."

comparison of baseline characteristics of families who responded to the 2.5-year and 3.5-year surveys and families who did not respond to the surveys.[8]

The first analysis found that respondents in the program group had similar baseline characteristics as respondents in the control group. This suggests that the estimated effects are not affected by any preexisting differences between the two research groups. These findings are consistent with the findings from similar analyses conducted at the 15-month follow-up. Therefore, even though response rates at the check-in time points were lower than at the 15-month follow-up, the level of bias in estimated effects was considered tolerable at all three time points.

The second analysis found, however, that respondents differed significantly from nonrespondents on baseline characteristics. Given the differences between respondents and nonrespondents, it is possible that the estimated effects at 2.5 years and 3.5 years are not generalizable to the full sample of families who entered the study. These differences between respondents and nonrespondents occur frequently in survey research. In particular, the pattern of results is similar to the pattern of results of the same analysis done at the 15-month follow-up, which also showed significant differences between respondents to the 15-month follow-up and nonrespondents.[9] (See Appendix B for more information about both analyses.)

CONCLUSION

The study team was able to verify contact information for 65 percent to 70 percent of families at these check-in points, which will help the team contact MIHOPE families for future follow-up efforts. The response rates for the surveys were lower than the response rate for the survey fielded at the MIHOPE 15-month follow-up point (approximately 50 percent rather than almost 80 percent), but the results of tests conducted by the study team indicate that there is no evidence to suggest there is bias in the estimated effects at 2.5 years and 3.5 years as a result of families not responding to the surveys. However, consistent with the findings from the response bias analysis conducted at the 15-month follow-up, results might not be generalizable to the full MIHOPE sample of families who entered the study.

[8]The purpose of these comparisons is to assess whether there is any bias on the estimated effects at 2.5 years and 3.5 years that is caused by families not responding to the survey. The study team did not compare baseline characteristics between families for whom contact information was verified and families for whom contact information was not verified, since the study team did not collect outcome information for the 19 percent of families who confirmed their contact information but did not complete the survey.

[9]To assess the extent to which these differences in baseline characteristics have an impact on the estimated effects, the study team conducted additional sensitivity analyses presented in Appendix E.

The next chapters provide information on the life circumstances of MIHOPE families at each data collection time point that has occurred since study entry (Chapter 3) and present the estimated effects of home visiting on a limited set of outcomes for MIHOPE families at the 2.5-year and 3.5-year check-in points (Chapter 4).

3

MIHOPE Families' Life Circumstances

This chapter describes trends in families' life circumstances from the time women enrolled in the Mother and Infant Home Visiting Program Evaluation (MIHOPE) through the 3.5-year check-in point, using information the study team obtained at four time points. This information provides reminders and updates about the characteristics of the women who comprise the MIHOPE program group sample (in terms of maternal health, their child's health, and family economic self-sufficiency) and how they compare to all women, and to women with lower incomes, in the United States. In situating the women in the MIHOPE sample in these comparisons, it is important to keep in mind that these findings provide a snapshot of families' lives only during the years they have been enrolled in MIHOPE, and that experiences of stressors or negative circumstances may have prompted women to seek home visiting services. Women in the MIHOPE sample may therefore have experienced more stressors around the time they enrolled in home visiting compared to other points in their lives or compared to all women in the United States. The information in this chapter provides descriptive context for the estimated effects shown in Chapter 4 but does not provide any information regarding the continued effects of home visiting programs.

This chapter shows results for families in the MIHOPE program group at four points in time.[1] These are the study entry point, the 15-month follow-up point, the 2.5-year follow-up point, and the 3.5-year follow-up point.[2] Results show information for the largest possible sample at each time point: 100 percent of families at study entry, 79 percent of families at the 15-month follow-up point, 51 percent of families at the 2.5-year follow-up point, and 48 percent of families at the 3.5-year follow-up point. The study team therefore investigated whether life circumstances changed for families or whether changes represent the shifting sample. This was done by examining the measures presented in Chapter 3 for the 36 percent of program group families who responded to MIHOPE surveys at *all* time points (shown in Appendix

[1]Results do not include families in the control group. Showing results for the program and control groups separately would preview the impact results, which are shown in Chapter 4, and showing results for the program and control groups together would obscure the distinct trajectories of the two groups. The study team limited results to the program group because they thought it was more relevant to show the trajectories of families who had the opportunity to participate in home visiting than for those who did not.

[2]The findings from the first two time points—study entry and the 15-month follow-up point—were previously reported in Michalopoulos et al. (2019). All findings described in this chapter are based on data that was collected prior to March 2020. Study entry occurred between October 2012 and October 2015, the 15-month follow-up point occurred between May 2014 and June 2017, the 2.5-year follow-up point occurred between September 2015 and June 2018, and the 3.5-year follow-up point occurred between June 2017 and June 2019.

Table E.1). The results of this investigation suggest that trends in families' circumstances are substantively similar regardless of which sample is examined.

MATERNAL, CHILD, AND FAMILY CIRCUMSTANCES

Table 3.1 displays measures related to maternal health, child health, and family economic self-sufficiency at the four time points. Home visiting programs try to affect all these outcomes, and they are included in this chapter because the study team obtained relatively consistent information on them across all time points. In contrast, measures of child maltreatment, intimate partner violence, parenting, and child functioning are not shown because the study team either did not obtain information on these areas at all study time points or did not obtain information on similar measures in these areas across time points.[3]

The next section discusses family circumstances in each of the three areas shown in Table 3.1.

Maternal Health

As might be expected given their ages at the time of study entry, the percentage of program group women who had given birth to a child after the MIHOPE child increased over time. Less than 20 percent of women in the MIHOPE program group had given birth to another child at the 15-month follow-up point; by the time of the 3.5-year check-in point, nearly half had given birth to another child. These reports are fairly consistent with the 28.9 percent of mothers nationally who have an interpregnancy interval of less than 18 months, and the median interpregnancy interval of 2 to 2.5 years.[4]

The percentage of program group respondents who reported depressive symptoms varied somewhat over time but was between 23 and 38 percent at all time points. These rates of depressive symptoms are similar to or somewhat higher than national estimates of depression during pregnancy (14 percent to 23 percent among pregnant women in the United States).[5] They are also higher than the overall rate of depression among women ages 20 and over reported by the CDC (about 10 percent), but are more similar to the 19.8 percent rate of depression among women ages 20 and over whose family incomes

[3]As stated in Chapter 2, child maltreatment and intimate partner violence were intentionally excluded from the 2.5-year and 3.5-year follow-up points because the study team did not want these sensitive topics to become the focus of the brief survey, which could discourage respondents from completing the rest of the survey or completing future data collection efforts.

[4]Thoma, Copen, and Kirmeyer (2016).

[5]American College of Obstetricians and Gynecologists (2017).

Table 3.1

Selected Life Circumstances of Program Group Families at Study Entry, 15 Months, 2.5 Years, and 3.5 Years

Measure (%)	Study Entry	15 Months	2.5 Years	3.5 Years
Maternal health				
New birth after study entry	NA	18.3	37.9	47.2
Depressive symptoms	37.6	23.0	30.2	28.4
Health status self-rated as "poor" or "fair"	11.3	17.6	14.7	13.7
Child health				
Health insurance coverage for the child	NA	96.9	93.7	94.4
Had annual well-child visit	NA	96.6	97.7	97.1
Primary care provider for the child	NA	88.6	88.6	90.7
Any emergency department visits	NA	63.0	40.5	42.1
Health status rated by caregiver as "poor" or "fair"	NA	1.8	2.2	1.8
Family economic self-sufficiency				
Use of nonparental child care	NA	50.2	52.1	60.1
Use of center-based child care	NA	17.3	18.4	35.6
Use of home-based child care	NA	38.2	33.6	24.4
Has help paying for child care	NA	NA	15.5	17.5
Pursuing education or training	24.8	23.6	23.6	21.1
Highest education level				
High school equivalent or less than a high school diploma	42.4	33.7	29.4	24.5
High school diploma and no college	32.8	37.5	30.2	31.2
Some college or more	24.8	28.8	40.5	44.3
Received any public assistance during the past month				
Supplemental Nutrition Assistance Program	59.8	58.1	56.9	52.3
Disability insurance	18.0	7.8	8.5	7.9
Temporary Assistance for Needy Families	20.0	15.3	10.3	9.0
Women, Infants, and Children	74.8	71.7	56.1	50.1
Sample size	2,102	1,648	1,044	998

SOURCES: Calculations based on the MIHOPE family baseline survey, 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: See Appendix C for descriptions of the measures used.
NA = not available.
Child health and child care measures are labeled as not available at study entry because only 32 percent of women in the program group sample had given birth prior to study entry.
Distributions may not add to 100 percent because of rounding.
The sample sizes in this table reflect the number of program group families who responded to each of the surveys. Some measures in the table may have smaller sample sizes due to item non-response.

are below the federal poverty level.[6] The higher rates of depressive symptoms reported for the MIHOPE sample at some time points are also comparable to those found in smaller, community-based studies of pregnant women who have low incomes.[7] The health status of women also varied over time, but at all time points only between 11 percent and 18 percent of women rated their health status as "fair" or "poor."

Child Health

The parents of MIHOPE children reported that their child had high rates of health insurance coverage, usage of preventive health care, access to primary care providers, and low rates of poor or fair health status. The rates of health insurance coverage, poor or fair health status, and participation in well-child visits are roughly consistent with national estimates for young children in the United States and for young children in the United States who use Medicaid or public health insurance. MIHOPE children were insured at similar rates as children under 6 years of age nationally (in 2017, 4.5 percent of children under 6 years of age in the United States were uninsured).[8] Less than 3 percent of MIHOPE mothers reported that their child's health status was "poor" or "fair." This is consistent with findings for two similar groups from the 2018 National Health Interview Survey: 3.2 percent of children under 18 years of age who used Medicaid or other public health insurance and 1.2 percent of all children 0 to 4 years of age had their health rated "fair or poor."[9] At each follow-up point, 97 percent of MIHOPE families reported that their children participated in their annual well-child visits, which is higher than the 91.9 percent of children 0 to 4 years of age who received a well-child check-up in 2018.[10]

In contrast to the similarity with national estimates discussed for the three measures of child health already mentioned, the percentage of the MIHOPE sample that reported making emergency department visits for their child (at least 40 percent of families at each time point) is higher than the 23.9 percent of children younger than 6 years of age nationally who had an emergency department visit in the past year, which may be because emergency department use is more common for children living in households with incomes below the poverty level than those living in households with higher incomes.[11]

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[6]Brody, Pratt, and Hughes (2018).

[7]Chung et al. (2004).

[8]Berchick and Mykyta (2019).

[9]Black and Benson (2019).

[10]Black and Boersma (2020).

[11]National Center for Health Statistics (2021). In 2018, almost one-third of children under 6 years of age living in households with incomes below the poverty level had visited an emergency department in the past year (31.8 percent), compared to 16.5 percent of children living in households at 400 percent or more of the poverty level.

Family Economic Self-Sufficiency

Examining measures related to economic circumstances (such as the use of nonparental child care, educational attainment, pursuit of education or training, and receipt of public assistance benefits) provides some insight into the resources available to families, which have been linked to later outcomes for children.[12] MIHOPE respondents reported more use of nonparental child care as their children aged, which might be tied to increases in rates of employment outside the home. About half of MIHOPE children were cared for by people other than their parents on a regular basis when they were about 15 months of age; 60 percent were cared for by others when they were about 3.5 years of age. The percent of MIHOPE children in center-based care also increased as they aged, which corresponded with a decrease in the use of home-based care and grew closer to national estimates of the use of center-based care.[13] The 35.6 percent of children who were in center-based child care at the 3.5-year check-in point is slightly lower than the approximately 42 percent of three-year-olds enrolled in preprimary education in 2018.[14]

At each time point, about 20 percent to 25 percent of women reported pursuing education or training; these pursuits are reflected in the increases in women's education levels over time shown in Table 3.1. Increases in women's education levels are not surprising since about half of women were younger than 23 years of age when they entered the study. At study entry, about a quarter of women reported that their highest education level was at least some college; at the 3.5-year check-in point, almost 45 percent of women reported that they had achieved this education level (this percentage is higher than the 36 percent of individuals who were characterized as having low socioeconomic status in a national survey who had attained some postsecondary education by the time they were about 25 years of age—but the women in the MIHOPE sample were also a little older at the later time points—29 years of age on average at the 3.5-year check-in point).[15] At the 3.5-year check-in point, more than 75 percent of respondents reported that they had at least a high school diploma (as compared to 58 percent of the sample at study entry). These increases in education levels may help women find higher paying employment opportunities.

Receipt of all public assistance benefits among respondents decreased over time, but the rate of decrease was not consistent across benefits. Between study entry and the 3.5-year check-in point, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) benefits had the highest percentage point decrease (75 percent to 50 percent), rates of Temporary Assistance for Needy Families (TANF) benefits were halved (20 percent to 9 percent), and rates of disability insurance decreased from 18 percent to 8 percent. Rates of Supplemental Nutrition Assistance Program (SNAP) benefits were about eight percentage points lower at the 3.5-year check-in point than at study entry; about half of

[12]National Academies of Sciences, Engineering, and Medicine (2019); Duncan, Magnuson, and Votruba-Drzal (2017).

[13]McFarland et al. (2018).

[14]McFarland et al. (2018).

[15]Kena et al. (2015).

respondents reported receiving SNAP benefits at the 3.5-year check-in point. These differential decreases are not unexpected, given that WIC receipt is more prevalent among pregnant women and new mothers, reported receipt of disability insurance may have been tied to pregnancy and birth, and receipt of TANF is time limited.

CONCLUSION

Families' circumstances remained fairly similar over time on most measures, but four trends emerged. MIHOPE participants achieved higher levels of education and reported lower levels of receipt of public assistance benefits at later time points. Not unexpectedly, women gave birth to additional children and used nonparental child care at higher rates as their children grew older. The next chapter presents the estimated effects on the outcomes examined at the 2.5-year and 3.5-year check-in points.

4

Effects of Evidence-Based Home Visiting When Children Were 2.5 and 3.5 Years of Age

As described in Chapter 2, the Mother and Infant Home Visiting Program Evaluation (MIHOPE) study team conducted brief surveys at the 2.5-year and 3.5-year check-in points to collect updated contact information, and used the surveys as an opportunity to obtain information on a small set of measures in the areas of maternal health, child health, family economic self-sufficiency, discipline practices and strategies, parental support for cognitive development, and child functioning. Other areas that home visiting programs aim to affect, such as child maltreatment and intimate partner violence, were not measured because the study team did not want these sensitive topics to become the focus of the brief survey, which could discourage respondents from completing the rest of the survey or completing future data collection efforts. Decisions about which measures to include on the surveys had to be made before the 15-month data collection had concluded so that the surveys could be conducted when children were 2.5 and 3.5 years of age. That meant the analysis of 15-month impacts could not inform the survey content.[1]

To focus the analysis on the outcomes assessed by the brief survey where home visiting programs were most likely to have their greatest effects when children were 2.5 and 3.5 years of age, the study team chose six outcomes as "confirmatory" (following the terminology used in a report written for the Institute of Education Sciences and consistent with the classification used in the MIHOPE 15-month analysis).[2] The study team classified outcomes as confirmatory based primarily on results from the MIHOPE 15-month analysis. Although the 15-month analysis could not be conducted before the 2.5-year and 3.5-year surveys had to be designed, the study team was able to use the 15-month results to inform the plan for analyzing the 2.5-year and 3.5-year data.[3] Information on prior research about the four evidence-

[1]Because of the length of the study's enrollment period and the range of child and gestational ages at enrollment, the 2.5-year check-in data collection began with some MIHOPE families in September 2015, almost two years before the 15-month data collection concluded with other families.

[2]Evaluation methodologists have begun to recommend focusing impact studies on a more streamlined set of outcomes in order to reduce the chances of a "false positive" finding in which an intervention with no true effect produces statistically significant impacts on at least one outcome. See Schochet (2008).

[3]Because the study team had to make decisions about the measures included in the brief surveys before the MIHOPE 15-month analysis occurred, some outcomes that had statistically significant positive effects in the 15-month analysis were

based models from follow-ups that occurred around the time children were 2.5 to 3.5 years of age was also used in deciding whether to classify an outcome as confirmatory, but this played a secondary role in the decision because of the limited evidence available from prior studies. For the measures included on the 2.5-year and 3.5-year surveys, this evidence is more limited than the evidence available for the 15-month impact analysis, which drew on follow-ups that occurred between birth and the time children were two years of age in prior studies. The six confirmatory outcomes examined for MIHOPE Check-in (listed with their outcome areas) are:

- New birth after study entry (maternal health)
- Maternal depressive symptoms (maternal health)
- Maternal self-reported health status (maternal health)
- Number of emergency department visits for injury or accident (child health)
- Education or training (family economic self-sufficiency)
- Use of yelling (discipline practices and strategies)[4]

All outcomes in the areas of parental support for cognitive development and child functioning are designated as exploratory because the evidence from prior studies did not point to particular outcomes in these areas that were likely to be affected at these time points and because the measurement of these areas at the 2.5-year and 3.5-year check-in points was not consistent with that used in prior studies. Specifically, measures used in these MIHOPE check-in points were brief and reported by parents as compared to more comprehensive standardized scales and direct assessments of parenting practices and children's development in other studies.

The study team did not estimate effects by evidence-based home visiting models in this report because of concerns the results may not have accurately reflected the effects of each model. The rationale for this decision is described in Appendix B.

PAST EVIDENCE ON CONFIRMATORY OUTCOMES

The next section discusses how the evidence from the MIHOPE 15-month analysis and prior studies of the four evidence-based home visiting models included in MIHOPE was used to inform the designation

not included in the 2.5-year and 3.5 year surveys. For example, the study team did not include a measure of food insecurity on the 2.5-year and 3.5-year surveys, but later analyzed 15-month impacts and found a statistically significant impact on food insecurity.

[4]The outcomes that were designated as confirmatory for the 2.5-year and 3.5-year impact analyses are not the same as those designated as confirmatory in the analysis of impacts when children were 15 months of age.

of outcomes as confirmatory. This information, including each outcome's designation as confirmatory or exploratory in the MIHOPE 15-month analysis, is summarized in Table 4.1.

Maternal Health

New birth after study entry. This outcome is designated as confirmatory because there have been statistically significant impacts on this measure in multiple prior studies of home visiting. Specifically, the Nurse-Family Partnership study in Memphis found that home visiting reduced the rates at which mothers gave birth within 24 months and 36 months of their previous birth while the Nurse-Family Partnership study in Denver found significant impacts at 24 months (but did not report the outcome at 36 months).[5] The average effect size in prior studies is about -0.08 across all four models and about -0.11 for Nurse-Family Partnership.[6] Although the MIHOPE 15-month analysis did not find a statistically significant effect on this outcome (which was designated as confirmatory at that follow-up point), that point may have been too early to find an effect, given that only about 18 percent of MIHOPE mothers had had another pregnancy by that time.

Maternal depressive symptoms. Depressive symptoms are designated as a confirmatory outcome because MIHOPE found a statistically significant effect when children were 15 months of age (the outcome was designated as exploratory at that follow-up point). This statistically significant effect when the child was 15 months of age suggests that families may have benefitted from the increased emphasis that home visiting programs have placed on this outcome in recent years.[7] Prior studies of Early Head Start, Healthy Families America, and Nurse-Family Partnership have examined but not found statistically significant effects on depression severity in the first three years of follow-up.

Maternal self-reported health status. This outcome is designated as a confirmatory outcome because MIHOPE found a statistically significant impact on self-reported health when children were 15 months of age (the outcome was designated as exploratory at that follow-up point). In prior studies, only the national study of Early Head Start has examined the mother's self-reported health status within the first three years and that study did not find a statistically significant effect.[8]

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[5]Kitzman et al. (1997) and Kitzman et al. (2000) report results for the Memphis study while Olds et al. (2002) report results for Denver.

[6]An effect size is a way of standardizing estimated effects, so the result is not sensitive to the scale of the outcome measure.

[7]For example, 35 percent of the local home visiting programs included in MIHOPE indicated they had raised the priority they placed on maternal mental health and substance use since MIECHV came into existence. See Michalopoulos et al. (2015).

[8]Love et al. (2001); Love et al. (2002).

Table 4.1

Summary of Evidence on Confirmatory Outcomes from Past Studies

	Prior Studies			MIHOPE 15-Month Findings				
Outcome	Models Examined	Number of Statistically Significant and Favorable Effects	Average Effect Size	Outcome Examined at 15 Months	Designation	Statistically Significant and Favorable	P-Value	Estimated Effect Size
Maternal health (%)								
New birth after study entry	E, H, N, P	6 out of 23	-0.08	New birth after study entry	Confirmatory	No	0.561	0.02
Depressive symptoms	E, H, N	0 out of 19	-0.01	Depressive symptoms	Exploratory	Yes	0.074	-0.06
Health status self-rated as "poor" or "fair"	E	0 out of 2	-0.03	Health status self-rated as "poor" or "fair"	Exploratory	Yes	0.049	-0.06
Child health								
Number of emergency department visits for accident or injury	E, H, N, P	4 out of 17	-0.02	Number of Medicaid-paid child emergency department visits	Confirmatory	Yes	0.045	-0.06
Family economic self-sufficiency (%)								
Pursuing education or training	E, H, P	7 out of 17	0.12	Pursuing education or training	Confirmatory	No	0.706	0.01
Discipline practices and strategies								
Frequency of yelling	E, H	4 out of 13	-0.01	Frequency of psychological aggression during the past year	Confirmatory	Yes	0.040	-0.07
Sample size (total = 4,215)								

SOURCES: Calculations based on MDRC summary of past research, the MIHOPE 15-month follow-up survey, and Medicaid claims data.

NOTES: See Appendix C for descriptions of the confirmatory outcomes. See Michalopoulos et al. 2019 for descriptions of the outcome measures examined at 15 months.

Results were included if the analysis indicated the follow-up period was four years or less.

E = Early Head Start—Home-based option, H = Healthy Families America, N = Nurse-Family Partnership, P = Parents as Teachers.

Although this report uses the 10 percent significance level in drawing inferences about the effects of MIHOPE, a 5 percent significance level was used in compiling the number of statistically significant and favorable effects because some studies did not provide enough information to determine whether the estimated effect was significant at the 10 percent level.

The average effect size from the prior studies is weighted by the studies' sample sizes.

The p-value indicates the likelihood that the estimated effect (or larger) would have been generated by an intervention with zero true effect.

Child Health

Number of emergency department visits for injury or accident. Home visiting studies have examined several different outcomes related to health care encounters for injuries, accidents, and ingestions. These include broader outcomes such as any injury requiring medical care and any health care encounter for injury. They also include more specific outcomes such as hospitalization for injury, emergency department visit for injury, and outpatient visits for injury. Number of emergency department visits for injury or accident is included as a confirmatory outcome here because MIHOPE found a significant effect on the number of child emergency department visits through the time children were 15 months of age. (In the 15-month analysis, this measure was designated as a confirmatory outcome and was measured using Medicaid claims data.) Prior studies have had mixed results on similar measures. Specifically, the Nurse-Family Partnership studies in Elmira and Memphis found statistically significant effects on health care encounters for injuries and ingestions in the child's first two years, while studies of Early Head Start and Healthy Families America examined health care for injuries and accidents but did not find statistically significant estimated effects.[9]

Family Economic Self-Sufficiency

Pursuing education or training. Pursuing education or training is designated as a confirmatory outcome even though the MIHOPE 15-month analysis did not find a statistically significant effect on this outcome (which was designated as a confirmatory outcome at 15 months as well), because there has been relatively consistent evidence of effects on education and training in prior studies of home visiting. The national study of Early Head Start and the study of Healthy Families America in California found statistically significant impacts on whether the mother pursued education or training in the first few years after study entry, with at least one effect size above 0.20 when children are 2.5-3.5 years old for both Early Head Start and Healthy Families America.[10]

Discipline Practices and Strategies

Use of yelling. Use of yelling is designated as a confirmatory outcome because parents' reports of shouting, yelling, and screaming are one component of the psychological aggression measure for which effects of home visiting have been found in prior studies and in the MIHOPE 15-month analysis. In prior studies, measures that include yelling have been examined 13 times, with 4 found to be statistically significant, and the average effect size has been -0.01. The MIHOPE 15-month analysis also found a statistically significant effect on psychological aggression towards the child, which was designated as a confirmatory outcome, and impacts on several exploratory measures of household aggression.

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[9]Olds, Henderson, Chamberlin, and Tatelbaum (1986) for NFP Elmira; Kitzman et al. (1997) for NFP Memphis; Caldera et al. (2007) for Early Head Start; Chazan-Cohen, Raikes, and Vogel (2013) for Healthy Families America.

[10]Love et al. (2002); Landsverk et al. (2002).

RECEIPT OF HOME VISITING

According to family service logs collected by the study team during the first 12 months after women enrolled in MIHOPE, about 83 percent of women assigned to the program group received at least one home visit from the home visiting program through which they enrolled in the study.[11] In addition, program group families were substantially more likely to have received home visiting and parenting services in the year before the 15-month survey, and families in the program group received much more intensive home visiting services than did those in the control group.[12] The differences between the program group and control group on both of these measures (the larger percentage of families in the program group who received home visiting and the more intensive home visiting services the families in the program group received) are necessary for MIHOPE to find effects on family outcomes.

Comparing women's reports of participating in a home visiting or parenting program at the 2.5-year and 3.5-year check-in points provides information on whether there continues to be a difference in the receipt of such services between the MIHOPE program group and control group, which could contribute to the longer-term effects of those services. Alternatively, it could reveal that the control group has begun to catch up to the program group by receiving more parenting or home visiting services than the program group at later time points. The rates of participation could be affected by continued receipt of services for the MIHOPE child through the Early Head Start, Healthy Families America, or Parents as Teachers home visiting program through which the family enrolled in MIHOPE (the three models participating in MIHOPE that offer services through at least age 3), continued receipt of services for the MIHOPE child through another home visiting program or model, or families (in the program and control groups) receiving home visiting services for subsequent children.

Table 4.2 shows that the percentage of women in the program group who reported participating in a home visiting or parenting program remains higher than the percentage of women in the control group who reported participating in these services at the 2.5-year and 3.5-year check-in points. Families' participation in home visiting or parent services has declined over time for both the program and control

[11]Duggan et al. (2018). Seventeen percent of MIHOPE program group families received no home visits.

[12]Michalopoulos et al. (2019). On the follow-up survey that was conducted when children were about 15 months of age, 51 percent of the program group reported receiving those services compared with 20 percent of the control group during the period when children were about 3 to 15 months old. The MIHOPE family service logs show that 58 percent of program group families received home visiting during this time, so the survey appears to understate the receipt of home visiting services.

Table 4.2

Receipt of Home Visiting or Parenting Services at 15 Months, 2.5 Years, and 3.5 Years, as Reported on MIHOPE Follow-Up Surveys

Outcome (%)	Program Group	Control Group	Difference	P-Value
Receipt of any home visiting or parenting services in the 12 months before follow-up				
15 months	50.7	20.1	30.7	0.000
2.5 years	35.0	18.4	16.6	0.000
3.5 years	23.4	16.5	6.9	0.000
Sample size				
15 months (total = 3,315)	1,648	1,667		
2.5 years (total = 2,090)	1,044	1,046		
3.5 years (total = 1,962)	998	964		

SOURCES: Calculations based on the MIHOPE 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: The p-value indicates the likelihood that the estimated difference (or larger) would have been generated by an intervention with zero true difference.

The sample sizes in this table reflect the number of families who responded to each of the surveys.

groups, but the percentage of program group families using these services remains statistically significantly higher than the percentage of control group families who report using these services. At the MIHOPE 15-month follow-up, there was a 31-percentage point difference in home visiting participation in the prior year between the program and control groups; at the 2.5-year check-in point, there was a 17-percentage point difference; at the 3.5-year check-in point, there was a 7-percentage point difference.

An examination of differences in service receipt by evidence-based home visiting model at the 2.5-year and 3.5-year check-in points (shown in Table 4.3) suggests that the rates of participation among women in the program group varied by model and was consistent with the models' expectations for length of participation. At the 3.5-year check-in point, about 10 percent of women assigned to the program group through a Nurse-Family Partnership program reported receiving home visiting or parenting services; the rates for women assigned to the program group through Early Head Start, Healthy Families America, and Parents as Teachers programs were about 25 percent to 30 percent.

These differing rates of continued participation are consistent with variation in the intended duration of enrollment across the four models: Nurse-Family Partnership has the shortest intended duration—through the child's second birthday; for Early Head Start, the intended duration is through the child's third birthday; for Healthy Families America, the intended duration is through the child's third birthday

Table 4.3

Receipt of Home Visiting or Parenting Services by Evidence-Based Model at 15 Months, 2.5 Years, and 3.5 Years

Outcome (%)	15 Months		2.5 Years		3.5 Years	
	Program Group	Control Group	Program Group	Control Group	Program Group	Control Group
Receipt of any home visiting or parenting services in the 12 months before follow-up						
Early Head Start—Home-based option	51.1	21.1	42.5	22.5	28.5	20.5
Healthy Families America	50.8	20.5	39.3	16.6	31.6	18.1
Nurse-Family Partnership	48.2	19.5	21.4	13.8	9.9	11.1
Parents as Teachers	53.5	19.5	40.0	23.6	25.6	18.1
Sample size						
Early Head Start—Home-based option	238	238	156	163	140	158
Healthy Families America	561	579	355	378	338	325
Nurse-Family Partnership	471	473	291	267	293	265
Parents as Teachers	378	377	242	238	227	216

SOURCES: Calculations based on the MIHOPE 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTE: The sample sizes in this table reflect the number of families who responded to each of the surveys.

but enrollment can be extended to the child's fifth birthday; and for Parents as Teachers, local programs are required to offer at least two years of services to families but recommend offering three years of services, and services can be offered until kindergarten entry.[13]

EFFECTS ON CONFIRMATORY OUTCOMES

This section of the chapter presents estimated effects on confirmatory outcomes.[14] Box 4.1 explains how effects were estimated and presented in the tables that follow.

As shown in Table 4.4, of the six confirmatory outcomes examined at each time point, only the estimated effect on mothers' self-rated health status at the 2.5-year time point was statistically significant.[15] These results are consistent with the number of statistically significant effects that would be expected if there

[13]Michalopoulos et al. (2019).

[14]All effect estimates are based on a regression adjustment designed to increase the statistical precision of the estimates. Appendix E lists the family characteristics that were included in the regression and shows estimated effects for the confirmatory outcomes without the regression adjustment.

[15]A Westfall-Young adjustment for multiple comparisons was planned and made to p-values for the confirmatory outcomes. The tables in the body of the report show unadjusted p-values; adjusted p-values are presented in Appendix Table E.5.

Box 4.1

How to Read the Tables in the Report Showing Estimated Effects

The effects of evidence-based home visiting are estimated by comparing the outcomes of the program and control groups, after accounting for the background characteristics of the sample members. The tables showing effects present a series of numbers that are helpful for interpreting the estimated effects of the home visiting programs. The first two columns of numbers show the average outcomes for the program and control groups. For example, this excerpt from Appendix Table D.5 shows that the average program family read to their MIHOPE child for 22.8 minutes per day, on average, in the week prior to the 3.5-year follow-up survey (the survey conducted when the child was approximately 3.5 years of age), compared with 21.1 minutes on average for control group families.

Appendix Table D.5

Estimated Effects on Parental Support for Cognitive Development Exploratory Outcomes at 15 Months, 2.5 Years, and 3.5 Years (Excerpt)

Outcome	Program Group	Control Group	Difference (Effect)	Effect Size	P-Value	90% Confidence Interval	
						Lower Bound	Upper Bound
Average amount of reading to child per day in the past week (minutes)	22.8	21.1	1.6	0.09	0.064	0.2	3.1

The number in the "Difference (Effect)" column displays the estimated effect, or the difference between the average outcomes of the program group and the control group. As shown in the table, this difference is 1.6 minutes (22.8 minutes in the program group minus 21.1 in the control group). Due to rounding, effects may not be equal to the difference in program and control group means presented. The "Effect Size" column shows a measure of the estimated effect that is adjusted so that all outcomes have the same amount of variation. It is calculated by dividing the estimated effect by the standard deviation of the outcome in the study sample. 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 intelligence quotient (IQ) test has a standard deviation of 10, for example, so an effect size of 0.10 would represent a one-point change in IQ. For an outcome expressed as a percentage, such as the percentage of mothers with a new birth after study entry, an effect size of 0.10 would represent a change of about 3 percentage points to 5 percentage points in the outcome.

The "P-Value" shown in the tables 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 this example, there is a 6.4 percent chance that a program with no effect would have generated the difference between research groups of 1.6 minutes. In this report, estimates are considered statistically significant if there is no more than a 10 percent likelihood that the effect is due to chance based on a two-tailed t-test (that is, assuming effects could appear in a positive or negative direction); that is, if the p-value is less than or equal to 0.100. In this example, therefore, the estimated effect would not be considered statistically significant. The "90% Confidence Interval" column is an estimate of the variability (or statistical imprecision) of the effects of the home visiting program. Specifically, this column shows that there is a 90 percent chance that the estimated effect from any given study would fall within the 90 percent confidence interval. For a specific effect (difference in means or percentages), a narrower confidence interval suggests a more precise estimate than a wider confidence interval (which indicates greater variability and thus greater uncertainty). Confidence intervals that do not contain zero, such as 1.5 to 2.5, or -2.0 to -1.0, indicate that the estimated effect is significantly different than zero at the 10 percent level of statistical significance.

Table 4.4
Estimated Effects on Confirmatory Outcomes at 2.5 Years and 3.5 Years

Outcome	Program Group	Control Group	Difference (Effect)	Effect Size	P-Value	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
Maternal health (%)							
New birth after study entry at 2.5 years	37.3	37.9	-0.6	-0.01	0.772	-4.2	3.0
New birth after study entry at 3.5 years	46.8	48.6	-1.8	-0.04	0.427	-5.6	2.0
Depressive symptoms at 2.5 years	30.8	28.6	2.2	0.05	0.253	-1.0	5.4
Depressive symptoms at 3.5 years	28.8	29.1	-0.3	-0.01	0.864	-3.6	2.9
Health status self-rated as “poor” or “fair” at 2.5 years[a]	15.2	12.8	2.5	0.07	0.100	0.0	4.9
Health status self-rated as “poor” or “fair” at 3.5 years	14.0	12.1	1.9	0.06	0.203	-0.5	4.3
Child health							
Number of emergency department visits for accident or injury at 2.5 years	0.2	0.2	0.0	0.02	0.606	0.0	0.1
Number of emergency department visits for accident or injury at 3.5 years	0.1	0.1	0.0	-0.01	0.890	0.0	0.0
Family economic self-sufficiency (%)							
Pursuing education or training at 2.5 years	24.0	22.7	1.3	0.03	0.486	-1.8	4.4
Pursuing education or training at 3.5 years	21.0	19.5	1.5	0.04	0.411	-1.5	4.5
Discipline practices and strategies (%)							
Use of yelling at 2.5 years	54.3	56.9	-2.7	-0.05	0.227	-6.3	1.0
Use of yelling at 3.5 years	57.5	58.2	-0.8	-0.02	0.732	-4.4	2.9
Sample size							
2.5 years (total = 2,090)	1,044	1,046					
3.5 years (total = 1,962)	998	964					

SOURCES: Calculations based on the MIHOPE 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: See Appendix C for descriptions of the outcome measures used.

Rounding may cause slight discrepancies in sums, differences, effect sizes, and confidence interval bounds.

The p-value indicates the likelihood that the estimated effect (or larger) would have been generated by an intervention with zero true effect.

The sample sizes in this table reflect the number of families who responded to each of the surveys. Outcomes may have smaller sample sizes due to item non-response.

[a]The p-value associated with the estimated effect for “health status self-rated as “poor” or “fair” at 2.5 years” is equal to 0.099978197, which rounds to 0.100.

were no real differences between the program and control groups, which suggests that home visiting did not have effects on these particular outcomes measured via parent report when children were 2.5 and 3.5 years of age. However, in considering the weight that should be placed on these confirmatory findings, it is important to reiterate that the 2.5-year and 3.5-year impact analysis drew on only one mode

of data collection—a parent survey—and that it was necessary to be selective in the measures included in order to keep the survey brief. Therefore, none of the outcome areas examined could be comprehensively assessed at these check-in points, in contrast to the extensive data collected during the MIHOPE follow-up that occurred when children were 15 months of age (which included a one-hour parent survey, administrative data sources, direct assessments, and observations of parents and children). As compared to the 15-month impact analysis, the 2.5-year and 3.5-year impact analysis drew on a limited set of outcomes.

EFFECTS ON CONFIRMATORY AND EXPLORATORY OUTCOMES WITHIN OUTCOME AREAS

In addition to the confirmatory outcomes just described, the study team examined effects on exploratory outcomes in five outcome areas: child health, family economic self-sufficiency, discipline practices and strategies, parental support for cognitive development, and child functioning. To assess whether the patterns of estimated effects for all outcomes (confirmatory and exploratory) in each outcome area suggest positive impacts for families, the study team conducted a statistical test for each outcome area.[16] These tests suggest positive effects in the areas of parental support for cognitive development (on outcomes related to the home literacy environment and cognitive stimulation) and child functioning (on outcomes related to behavioral self-regulation). For more information about the overall pattern of effects for both confirmatory and exploratory outcomes in each outcome area and results for all exploratory outcomes examined at the 2.5-year and 3.5-year check-in points, see Appendix D.

CONCLUSION

Only one of the estimated effects on the six confirmatory outcomes (new birth after study entry, maternal depressive symptoms, maternal self-reported health status, number of emergency department visits for injury or accident, pursuing education or training, and use of yelling; representing four outcome areas) analyzed to examine the effects of home visiting at the 2.5-year and 3.5-year check-in points was statistically significant. However, an analysis of all outcomes (both confirmatory and exploratory) in each outcome area (maternal health, child health, family economic self-sufficiency, discipline practices and strategies, parental support for cognitive development, and child functioning) indicated positive effects in the areas of parental support for cognitive development and child functioning. The next chapter discusses the implications of the findings presented in this report.

[16]The test was suggested by Caughey, Dafoe, and Seawright (2017). This test was not included in the study team's analysis plan but was also used in the MIHOPE 15-month analysis to characterize the effects on confirmatory outcomes. Each outcome area's test included all outcomes (both confirmatory and exploratory) from both check-in points.

5

Implications for the Next Follow-up with MIHOPE Families

This report describes findings from brief check-in surveys with families participating in the Mother and Infant Home Visiting Program Evaluation (MIHOPE) that occurred when children were about 2.5 years and 3.5 years of age. This report is the second installment in researchers' understanding of the effects of early childhood home visiting programs on families who participated in MIHOPE. The first installment estimated the effects of home visiting for the MIHOPE families when children were 15 months of age with a follow-up that used multiple data sources to measure all but one of the domains that the legislation that authorized the Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program indicated MIECHV should affect. This first follow-up point found positive effects of home visiting for families, and results for several exploratory outcomes suggested that home visiting may improve maternal health and that home visiting might also reduce household aggression.

Before the conclusion of the 15-month data collection, the Administration for Children and Families (ACF) contracted with the MIHOPE team to conduct check-ins when children in MIHOPE study families were 2.5 years and 3.5 years of age. This was done to ensure that the study would be in a strong position to measure the long-term effects of MIECHV-funded home visiting when study children were in kindergarten or beyond. In particular, ACF and the Health Resources and Services Administration (HRSA) were interested in a longer-term follow-up because positive effects for families as children grow older have been found in prior studies of the four evidence-based home visiting program models included in MIHOPE. Families who enrolled in MIHOPE participated in an extensive round of data collection when their children were in kindergarten that is similar in scope to the data collection conducted when children were 15 months of age and that obtained information about outcomes in all the areas that MIECHV-funded home visiting is intended to affect. A forthcoming report will share findings from analyses of these kindergarten follow-up data.

Although the primary purpose of checking in with families was to obtain updated contact information, families were also asked to complete brief surveys so that the team could obtain some information about families' current circumstances at these two time points. This chapter briefly discusses the implications of the information obtained through these check-ins for the study as it continues to follow up with families.

First, the information gained from the 2.5-year and 3.5-year check-ins has implications for the study team's ability to continue to contact families and the methods they use to reach out to families. The study team is using the contact information they verified at the two check-ins to invite families to participate in the kindergarten follow-up.[1] However, even with the advantage of updated contact information, the high rate of mobility among MIHOPE families may make it difficult for the study to continue to follow up with families.[2] In terms of how the study reaches out to families, the response rates achieved at the 2.5-year and 3.5-year follow-up points (of 51 percent and 48 percent) were lower than the team's response rate targets, but the study team was not able to use in-person outreach at these check-ins. This experience suggests that in-person outreach is an important tool to use in achieving higher response rates at the kindergarten follow-up.

Second, the levels of measures of maternal and child well-being at the check-in points suggest that there are some areas in which there is more room for future changes than in others. For example, even though MIHOPE participants achieved higher levels of education as their children aged, the educational attainment reported by mothers at the 3.5-year check-in point indicates that some opportunity for further changes in maternal educational attainment remains. Specifically, approximately 75 percent of respondents at the 3.5-year check-in reported that they had at least a high school diploma, but less than half reported that their highest education level was at least some college. In contrast to the opportunity for positive impacts on some economic self-sufficiency measures at future follow-up points, the high rates of positive child health measures (such as having health insurance coverage, having a primary care provider, and participating in well-child visits) seen at the check-in points for both the program and control groups suggest there could be little room for improvement on these outcomes in the future. Findings like these will help inform the study team's work on the kindergarten follow-up.

Third, while only one of the estimated effects on the six confirmatory outcomes examined at the 2.5-year and 3.5-year check-in points was statistically significant, the positive impacts found on exploratory outcomes of parental support for the cognitive development and child functioning areas and, in particular, the statistically significant effects on parents' reports of children's behavioral self-regulation, indicate potential areas of further exploration with the kindergarten data collection. Improvements in self-regulation may improve children's well-being in the near term and in the future; self-regulation is related to children's social-emotional well-being and ability to engage in school and has also been associated with academic skills in kindergarten and later grades.[3]

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[1]At each point, contact information was verified for 65 percent to 70 percent of families.

[2]Between 35 percent and 45 percent of families moved between each MIHOPE data collection time point (for example, 42.3 percent moved between the 2.5 and 3.5-year check-in points); this rate of mobility is higher than national estimates of moving in the past year for the general population (about 14 percent) and for families who have incomes below 100 percent of the poverty level (about 22 percent, American Community Survey 5-year estimates). About 70 percent of families moved at least once between study entry and the 3.5-year check-in point.

[3]Blair (2002); Blair and Razza (2007); Duncan et al. (2007); Blair and Raver (2015).

In addition to assessing dimensions of parenting and child functioning more fully than was possible with the 2.5-year and 3.5-year surveys,[4] the kindergarten follow-up point will be the first opportunity to examine whether the positive effects related to household aggression that were seen at the follow-up that occurred when children were 15 months of age have persisted because intimate partner violence and child maltreatment outcomes were not included in the brief surveys (as shown in Figure 5.1).[5] In addition, mediational analyses may be able to explore how earlier impacts on areas such as household aggression may be related to child functioning as the children get older. The kindergarten follow-up point will also be the first opportunity to determine whether statistically significant positive effects on parental stress and food insecurity when children were 15 months of age have persisted.

Although the information gained from the check-ins with families can inform the study team as they plan to analyze the kindergarten follow-up data, the implications of the findings from the 2.5-year and 3.5-year check-in points for the kindergarten follow-up point are more uncertain in the wake of the COVID-19 pandemic. In March 2020, when the United States began to experience the effects of the COVID-19 pandemic, the MIHOPE team had completed data collection with two of the four kindergarten cohorts (approximately 60 percent of the sample).[6] The study team continued kindergarten data collection during the 2021-2022 school year, when children in the third cohort were in first grade and children in the fourth cohort were in kindergarten. Because the effects that home visiting programs may have on families in the context of the pandemic is uncertain and because the pandemic has significantly influenced the lives of families with young children across the country, the study team conducted a mixed-methods data collection to understand how MIHOPE families have experienced the pandemic.[7] This information will contribute to understanding MIHOPE families' experiences and the analysis of effects of home visiting when children are in kindergarten.

The 2.5-year and 3.5-year check-ins with MIHOPE families provide snapshots of families' experiences at those time points. But since the study team obtained a limited set of information about family and child well-being, they could not comprehensively assess any of the outcome areas examined and could not assess all the domains specified in the MIECHV legislation. The more extensive data gathered when

[4]Although measures of these outcomes were included on the brief surveys, they were brief and reported by parents, as compared to more comprehensive standardized scales and to direct assessments of parenting practices and children's development.

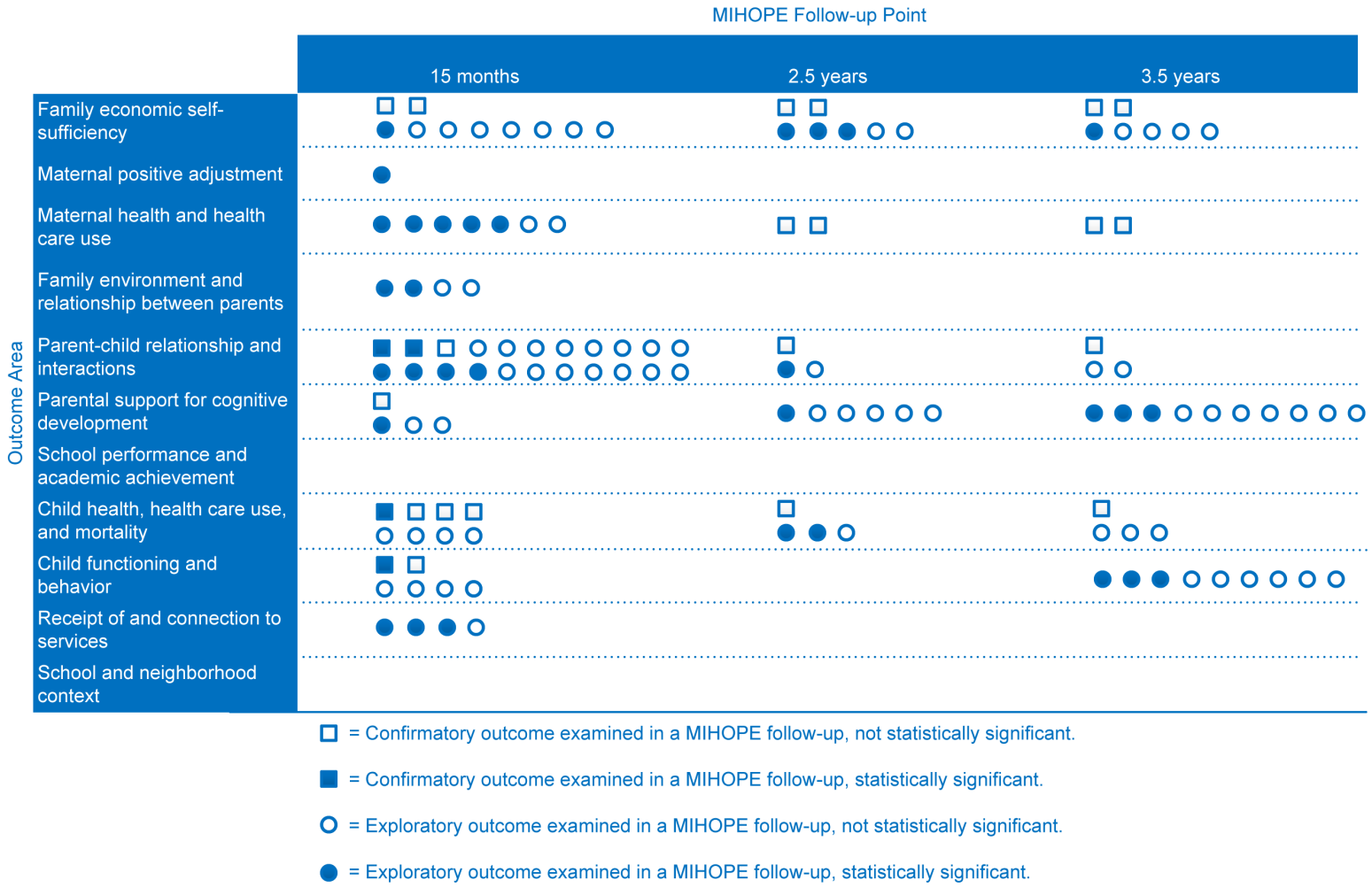
[5]At the kindergarten follow-up point, the study team is obtaining information about outcomes in all the areas that the authorizing legislation intended MIECHV-funded home visiting programs to affect through a range of data sources, including self-reports from parents, direct assessments of children, observations of parent-child interactions, teacher reports, and administrative records.

[6]Children in the MIHOPE sample are attending kindergarten in four school years. The first cohort attended kindergarten during the 2018-2019 school year, and the fourth cohort attended kindergarten during the 2021-2022 school year.

[7]A web survey was conducted in September and October 2020, and qualitative interviews were conducted between October 2020 and January 2021.

Figure 5.1

Effects on Outcomes Examined in MIHOPE Follow-up Points



MIHOPE children were in kindergarten will substantially contribute to expanding the evidence on the longer-term effects of early childhood home visiting programs, building on prior studies of the four evidence-based home visiting program models included in MIHOPE. In addition, the data gathered through all the MIHOPE follow-up points will allow for a longitudinal examination of the effects of home visiting on family and child well-being.

Appendix A

Experiments

As discussed in Chapter 2 of this report, to minimize sample attrition and inform future data collection efforts, the study team conducted two experiments to test methods to increase response rates during the 2.5-year and 3.5-year check-in points. These experiments were conducted with a portion of the MIHOPE families so that the results could inform data collection efforts within the same follow-up period as well as in future follow-ups.

INCENTIVE EXPERIMENT

The first experiment (conducted with about 40 percent of the 2.5-year check-in sample) assessed whether offering an "early bird" incentive, a prepaid incentive, or the combination of both incentives yielded higher survey response rates. In the early bird incentive, a higher incentive amount was offered to families for completing the survey within the first eight weeks of data collection. In the prepaid incentive, a small financial bonus was included with the introductory letter sent to families and an additional payment was sent upon completion of the survey. Prior to data collection, families were randomized into four groups. Families were either offered the standard incentive amount, the early bird incentive, the prepaid incentive, or a combination of the early bird incentive and the prepaid incentive structures upon completion of the 2.5-year survey.

In general, families who were offered the early bird incentive structure responded to the survey at higher rates compared with families who did not receive the early bird incentive. In contrast, the prepaid incentive had no effect on response rates.

Families who were offered the early bird incentive had an average response rate 7 percentage points higher than families who were offered the standard incentive amount (significant at the 0.001 level). In addition, families who were offered the early bird incentive option also responded to the survey sooner than families who were not offered the early bird incentive option. Families who were offered the early bird incentive reached a 50 percent response rate by the eighth week of data collection—when the early bird incentive offer ended—while families not offered the early bird incentive never reached a 50 percent response rate. Having families complete the survey within a shorter timeframe meant fewer resources were expended trying to contact families through outbound dialing; weekly email, letter, and text reminders; locating databases; or calls to friends or relatives of the families.

The added benefit of the early bird incentive prompted the study team to seek—and receive—approval to use the early bird incentive structure during the remainder of fielding the 2.5-year survey and the 3.5-year survey.

PREFERRED CONTACT METHOD EXPERIMENT

The second experiment (conducted with about 17 percent of the 3.5-year check-in sample) assessed whether contacting families using families' preferred reminder method (letter, email, or text message) led to higher response rates compared with contacting families using the regular reminder schedule, which used a combination of these methods. The study team hypothesized that families might appreciate receiving reminders only through their preferred methods. During the 2.5-year survey, families were asked how they would like to be contacted about upcoming surveys and whether they would prefer to be contacted via a letter, email, text message, or phone call.[1] At the 3.5-year follow-up, all families were initially sent a letter and email inviting families to complete the survey. Then, families who responded at the 2.5-year follow-up that they would prefer a letter, email, or text message were randomized to receive reminders to complete the survey using their preferred method of contact or receive reminders using the regular contact schedule, which used all contact methods provided by the respondent. Thirty-two percent of families said they would like to be contacted via a letter in the mail, 26 percent of families said they would prefer an email, and 16 percent of families said they would like to be contacted via text message. Using the family's preferred reminder method did not have a statistically significant effect on response rates.

[1]Respondents were also asked about contact through Facebook, but the study team did not use Facebook as a contact method.

Appendix B

Response Bias Analyses

As discussed in Chapter 2 of this report, 51 percent of MIHOPE families responded to the 2.5-year follow-up survey while 48 percent of families responded to the 3.5-year follow-up survey. The first half of this appendix describes the study team's assessment of the potential bias in study findings that could result from some families not completing the surveys at the 2.5-year and 3.5-year check-in points. Bias in the study findings could occur if (1) program group families who responded to the survey differ from control group families who responded to the survey or (2) families who responded to the surveys differ from families who did not respond to the surveys. Three analyses were used to test for these areas of potential bias.

The second half of this appendix addresses the study team's decision to exclude the estimated effects on confirmatory outcomes by evidence-based model from this report. In the analysis of outcomes when MIHOPE children were about 15 months of age, results were shown by evidence-based model for the report's 12 confirmatory outcomes.[1] A similar approach was considered for the current report but concerns about potential bias in the model-specific findings led the team to not estimate model-specific estimates. The second half of this appendix discusses the analysis that led to that decision.

ASSESSING RESPONSE BIAS IN THE OVERALL SAMPLE

The appendix will first answer three questions to assess whether there is the potential for bias in the estimated effects on confirmatory outcomes for the full sample:

- Are there systematic differences in characteristics at study entry between program and control group families in the respondent sample? To answer this question, the study team compared the characteristics at study entry of program group families who completed the surveys with the characteristics of control group families who completed the surveys. This analysis was conducted separately for the 2.5-year follow-up and 3.5-year follow-up.

- Are there systematic differences in characteristics at study entry between families who responded to the surveys and those who did not? To answer this question, the team compared characteristics at study entry of families who completed the surveys with characteristics of families who did not. This analysis was conducted separately for the 2.5-year follow-up and 3.5-year follow-up.

- Are there differences in the estimated effects on 15-month confirmatory outcomes between families who responded to the 2.5-year and 3.5-year surveys and families who did not respond? To answer this question, the team compared estimated effects on 15-month confirmatory outcomes for families who completed the surveys with estimated effects of families who did not. This analysis was conducted separately for the 2.5-year follow-up and the 3.5-year follow-up.

[1]Michalopoulos et al. (2019).

CHARACTERISTICS AT STUDY ENTRY OF THOSE WHO COMPLETED FOLLOW-UP DATA COLLECTION

Appendix Table B.1[2] and Appendix Table B.2 compare characteristics at study entry between the program group and control group among families who completed the 2.5-year and 3.5-year surveys, respectively. The tables also include p-values to indicate whether differences between the two groups for individual characteristics were statistically significant.

Follow-up surveys might produce biased estimates of effects if program group respondents differed systematically from control group respondents when they entered the study. Although each table shows some significant differences between the research groups, some differences are expected by chance because of the number of characteristics shown. To confirm that there was no systematic difference between the two groups, a logistic regression was run using variables measured at study entry to predict research group status among survey respondents. A joint test indicated that the characteristics at study entry are not collectively related to whether the family was in the program or control group (the p-value is 0.7242 for the 2.5-year follow-up survey and 0.9913 for the 3.5-year follow-up survey). In other words, the number of statistically significant differences between the 153 comparisons is no more than would be expected by chance, suggesting that differences between the groups are unlikely to be a source of bias.

CHARACTERISTICS AT STUDY ENTRY OF RESPONDENTS AND NONRESPONDENTS

Appendix Table B.3 compares the characteristics of families at study entry who completed at least a portion of the 2.5-year survey (respondents) with those of families who did not (nonrespondents), while Appendix Table B.4 presents the same comparison for the 3.5-year survey (between 3.5-year survey respondents and nonrespondents).[3] Differences between respondents and nonrespondents could point to a source of bias if effects differ with family characteristics.

Both tables show many differences between respondents and nonrespondents. In general, respondents fared better than nonrespondents at study entry in the areas of economic self-sufficiency and maternal mental health and well-being. For example, in comparing respondents to each survey with nonrespondents to the respective survey, respondents were less likely to have reported experiencing symptoms of depression or anxiety at the time of study entry. Respondents also reported higher levels of mastery and higher educational attainment at the time of study entry, and more months of

[2]See page 51 for tables in Appendix B.

[3]Families were determined to have completed a portion of the survey if they answered at least one question after the survey introduction. Less than 1 percent of families who responded to the 2.5-year survey partially completed the survey, and less than 1 percent of families who responded to the 3.5-year survey partially completed the survey.

employment during the three years before study entry. Respondents were also less likely to have been pregnant when they entered the study than nonrespondents (and thus to have had a shorter time between the time they entered the study and the time their child turned 2.5 and 3.5 years of age), were about a year and a half older than nonrespondents and were less likely to have moved in the year prior to study entry. Among women who had already given birth prior to study entry, there are a few statistically significant differences between respondents and nonrespondents on child characteristics, but there were no consistent differences on measures across time points, suggesting that there are not systematic differences between groups on these characteristics across both time points. A statistical test indicated that the characteristics at study entry are collectively significantly different for respondents than nonrespondents (the p-value is <0.001 for both the 2.5-year and 3.5-year surveys).

Although there are systematic differences in characteristics at study entry between respondents and nonrespondents, these differences would be a source of bias only if different types of families saw different effects. To assess how likely it is that these differences in characteristics at study entry between respondents and nonrespondents contributed to bias in the effect estimates, Appendix E presents the effect estimates when outcomes are imputed for families who did not respond to the surveys.

COMPARISON OF 15-MONTH EFFECTS FOR RESPONDENTS AND NONRESPONDENTS

Appendix Tables B.5 and B.6 show comparisons of the estimated effects on 15-month confirmatory outcomes for respondents and nonrespondents to the 2.5-year and 3.5-year surveys. Both tables also show whether the estimated effects are statistically significantly different between respondents and nonrespondents.

Across the two tables, there are only two statistically significant differences between estimated effects for respondents and nonrespondents (one at the 2.5-year follow-up point and one at the 3.5-year follow-up point). The scarcity of significant differences between estimated effects at 15 months for respondents and nonrespondents to the 2.5-year and 3.5-year surveys and the similarity between the patterns of estimated effects (when considering the magnitude and direction of effects) for the 15-month sample and the 2.5-year and 3.5-year survey respondent sample suggest that the lower response rates at the 2.5-year and 3.5-year follow-up points are not causing bias in the estimated effects at those follow-up points.

ASSESSING RESPONSE BIAS IN ESTIMATED EFFECTS ON CONFIRMATORY OUTCOMES BY EVIDENCE-BASED MODEL

Having found little evidence of bias in estimated effects for the full sample of 2.5-year and 3.5-year survey respondents, this section assesses the potential for response bias in estimating effects by evidence-based model. The assessment is divided into three sections:

- **Statistical power of model estimates.** Since fewer families responded to the 2.5-year and 3.5-year surveys than to the 15-month survey, the statistical power for examining model-specific findings is lower than at 15 months. This section begins by showing the minimum detectable effects for each of the four evidence-based home visiting models included in MIHOPE. This analysis indicates that the 2.5-year and 3.5-year surveys are positioned to detect statistically significant impacts only if impacts are larger than those that were generally found in the MIHOPE 15-month analysis.

- **Conceptual possibility of bias.** The What Works Clearinghouse classifies studies as having "tolerable," "potentially tolerable," or "unacceptable" risk of producing biased findings based on the overall survey response rate and differences in response rates between the program and control groups in a study that uses random assignment.[4] Applying this standard to each of the four evidence-based models for the 2.5-year and 3.5-year follow-up points indicates that some model-specific comparisons would have a tolerable risk of bias, but others would have an unacceptable risk of bias.

- **Potential for response bias in survey responses.** The response bias analysis conducted for the full sample (and described in the first section of this appendix) was also conducted for each evidence-based model. This analysis indicates that program and control groups are similar among 2.5-year and 3.5-year survey respondents for all four evidence-based models but that there are important differences in the 15-month findings when they are estimated using only 2.5-year survey respondents.[5]

Based on these three analyses, the study team decided not to analyze model-specific findings for the data collected at the 2.5-year and 3.5-year follow-ups. The What Works Clearinghouse standards suggest the potential for bias is unacceptable for some of the evidence-based models. It also raises the possibility that estimated effects large enough to be statistically significant may be subject to some degree of bias. The prospect of bias is likewise raised by differences in estimated impacts at 15 months

[4]This is based on Version 4.0 of the What Works Clearinghouse Standards Handbook. The What Works Clearinghouse, established by the Institute of Education Sciences in the U.S. Department of Education, aims to be a source of rigorous evidence and to assess the quality of research in education. Its attrition standards are widely used and easily applied. The Home Visiting Evidence of Effectiveness (HomVEE) review uses the What Works Clearinghouse standards to assess attrition in studies testing the effectiveness of home visiting models.

[5]Because of the overlap between the 2.5-year and 3.5-year respondent samples, the study team used the 2.5-year respondent sample for this analysis.

between 2.5-year respondents and 15-month respondents, differences that were larger and more frequent than for the full MIHOPE sample.

STATISTICAL POWER OF MODEL ESTIMATES

Since only about half of the MIHOPE sample responded to the 2.5-year and 3.5-year surveys, estimated effects for each of the four evidence-based models will be less precise than at 15 months. To investigate this, minimum detectable effects by model, expressed in effect sizes (that is, the number of standard deviations of the outcome), were calculated (see Appendix Table B.7). In this table, the minimum detectable effect is the smallest true effect that would be found in 80 percent of studies with the same sample size. For comparison, the table also shows the minimum detectable effects when information from all four models is combined.

Reflecting differences in the number of families recruited by model, the minimum detectable effect at 2.5 years ranges from 0.16 standard deviations for Healthy Families America to about 0.20 standard deviations for Nurse-Family Partnership and Parents as Teachers and 0.25 standard deviations for Early Head Start. Because the response rate was slightly lower at 3.5 years than at 2.5 years, the minimum detectable effects are slightly larger at 3.5 years than at 2.5 years. In the MIHOPE 15-month analysis, the largest estimated model-specific effect was 0.17 standard deviations (for Parents as Teachers on parental supportiveness). This means model-specific findings would be statistically significant only if they are larger than those that were generally found in the MIHOPE 15-month analysis or that have been found in past studies of the evidence-based models for children in this age range.

CONCEPTUAL POSSIBILITY OF BIAS

Differences in response rates between the program and control groups increase the possibility that findings are biased. To assess this possibility for the model-specific findings, the study team compared response rates for each evidence-based model to standards proposed by the What Works Clearinghouse. Using the overall response rate and the difference in response rates between program and control group members, What Works Clearinghouse places studies into one of three categories of potential bias: (1) tolerable, (2) tolerable if survey response is not related to the intervention but unacceptable otherwise, and (3) unacceptable.

Appendix Table B.8 shows the response rate by model and research group, the differential response for each model, and where each model fits into the Clearinghouse criteria.[6] The results are somewhat

[6]As noted above, the middle Clearinghouse criteria should be considered to have a tolerable level of bias if survey response is not related to the intervention. Since the response is not systematically higher for the program group or for the control group overall, the survey response does not appear to be related to the intervention (and, in particular, to whether

different between the two follow-up points. At 2.5 years, results for two of the models are in the tolerable range and results for one of the models are in the potentially tolerable range, but the differential response rate for Nurse-Family Partnership is large enough to place it in the "unacceptable" range given its overall response rate.[7] At 3.5 years, the lower overall response rates and larger differential response rates result in only Parents as Teachers being in the potentially tolerable range and the other three models being in the unacceptable range.

POTENTIAL FOR RESPONSE BIAS IN SURVEY RESPONSES

In addition to examining bias by looking at response rates, data from the MIHOPE baseline and 15-month follow-up surveys can also be used to provide information on the likelihood of bias. This section discusses two analyses that used those data to assess the possibility of bias in model-specific findings:

- Characteristics at study entry for program group respondents to the 2.5-year and 3.5-year surveys were compared to characteristics at study entry of control group respondents to the 2.5-year and 3.5-year surveys, by evidence-based model. Analyses were looking to see if, at study entry, program group respondents are significantly different from control group respondents, since that could lead to biased findings.

- Model-specific findings at 15 months were estimated for only the MIHOPE participants who responded to the 2.5-year survey, and these results were compared to model-specific findings for all respondents at 15 months. This analysis looked for whether model-specific estimated effects using 15-month respondents were different from estimates using respondents to the 2.5-year check-in survey, which might suggest model-specific findings at 2.5 and 3.5 years would provide biased estimates of effects. The study team used respondents to the 2.5-year survey for this test because the response rate was slightly higher at 2.5 years than at 3.5 years, and because 85 percent of those who responded to either check-in survey responded to the 2.5-year survey.[8]

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someone was assigned to the program group or control group) and it is therefore appropriate to conclude the Clearinghouse criteria would consider the middle category to be "tolerable."

[7]According to the What Works Clearinghouse standards, a study with a response rate of 51 percent (like Healthy Families America at 2.5 years) is in the potentially tolerable range if the differential response rate is between 1.2 and 3.9 percentage points. By comparison, a study with a response rate of 47 percent (like Nurse-Family Partnership at 2.5 years) is in the potentially tolerable range if the difference in response rates is between 0.6 percentage points and 3.0 percentage points.

[8]Tables showing the characteristics at study entry for program group and control group respondents by evidence-based model and tables showing model-specific findings at 15 months for Check-in respondents are not included in this report. The overall p-values from the comparison of characteristics at study entry (as opposed to p-values for individual characteristics) and the pattern of findings for the 15-month outcomes were used to determine whether these model-specific analyses should be conducted for the Check-in sample.

Comparison of Characteristics at Study Entry

Statistical tests of differences in characteristics at study entry between the program and control group respondents to the 2.5-year survey showed that there was a statistically significant difference on characteristics at study entry for Early Head Start but not for the other three evidence-based models. There were no statistically significant differences on characteristics at study entry between program and control group respondents to the 3.5-year survey.

Comparisons of Estimated Effects on 15-Month Outcomes

Model-specific findings at 15 months looked different using the 15-month respondent sample than using the 2.5-year respondent sample. Based on the 15-month sample and as reported in the MIHOPE 15-month impact report, there were statistically significant differences across the evidence-based models for four outcomes: quality of the home environment, parental supportiveness, Medicaid-paid emergency department visits for the child, and behavior problems.[9] However, using families that responded to the 2.5-year survey, there were statistically significant differences across the evidence-based models for two outcomes: the number of Medicaid-paid emergency department visits for the child, and whether the child received health care related to injury or ingestion. An additional analysis that used multiple imputation of 15-month outcomes for individuals who responded to the 15-month survey but did not respond to the 2.5-year survey found no statistically significant differences across the models, as compared to the four statistically significant differences across models for the 15-month sample.[10]

The number of statistically significant estimates was also calculated for each evidence-based model for the 12 15-month confirmatory outcomes. This analysis found seven statistically significant and favorable estimates using respondents to the 15-month survey, three using respondents to the 2.5-year survey, and none when imputing results for 15-month respondents who did not complete the 2.5-year survey.

Taken together, the comparisons of estimated effects on 15-month outcomes suggest that there is an increased possibility that model-specific findings in MIHOPE Check-in would provide biased estimates of effects at 2.5 and 3.5 years.

CONCLUSION

This appendix described the study team's assessment of the potential bias in study findings that could result from some families not completing the surveys at the 2.5-year and 3.5-year check-in points and

[9]Michalopoulos et al. (2019).

[10]Using imputation, 15-month survey responses were assigned to 2.5-year survey non-respondents based on how similar individuals responded to the 15-month survey. To obtain the correct statistical inferences, the imputation was performed multiple times, with a different amount of randomness added at each imputation. See, for example, Rubin (1987).

also described the study team's decision to exclude the estimated effects on confirmatory outcomes by evidence-based model from this report. By comparing the characteristics at study entry for respondents and nonrespondents, comparing the characteristics at study entry for program group respondents and control group respondents, and comparing the 15-month outcomes for respondents and nonrespondents, the study team found no evidence for bias in the estimated effects at 2.5 years and 3.5 years calculated for the overall respondent samples. However, due to a large differential response rate to the 2.5-year and 3.5-year surveys by evidence-based model and due to differences in the model-specific findings at 15 months using the 15-month respondent sample compared with the 2.5-year respondent sample, there is the increased possibility that the model-specific estimated effects at 2.5 years and 3.5 years may be biased. This contributed to the study team's decision to not present the model-specific estimated effects at 2.5 years and 3.5 years in this report.

Appendix Table B.1
Comparison of Selected Characteristics at Study Entry Between the Program and Control Groups Among 2.5-Year Survey Respondents

Characteristic	Program Group	Control Group	Difference	P-Value
Maternal and household characteristics				
Average age (years)	24.2	24.3	-0.1	0.638
Pregnant (%)	62.6	61.5	1.2	0.581
Relationship status (%)				0.055
Married to the focal child's biological father	23.0	22.1	0.9	
Living with a partner or spouse	26.0	24.1	1.8	
In a relationship but not living together	28.5	26.0	2.5	
Single	22.5	27.8	-5.2	
Race and ethnicity (%)				0.555
Mexican origin	26.4	24.1	2.4	
Other Hispanic	12.3	11.7	0.6	
Non-Hispanic White	26.0	27.4	-1.5	
Non-Hispanic Black	27.8	27.9	-0.1	
Other or multiracial	7.5	8.9	-1.4	
Average number of siblings of the focal child in the home	0.7	0.7	0.0	0.672
Ability to speak English self-rated as “not very well” or “not at all” (%)	10.5	10.9	-0.4	0.786
Moved more than once during the past year (%)	18.5	17.2	1.2	0.460
Family economic self-sufficiency (%)				
Food insecurity[a]	52.9	55.0	-2.1	0.334
Received any public assistance during the past month				
Supplemental Nutrition Assistance Program	59.7	57.0	2.7	0.213
Disability insurance	18.4	18.3	0.1	0.951
Temporary Assistance for Needy Families	17.9	18.1	-0.2	0.904
Women, Infants, and Children	77.3	75.6	1.8	0.338
Maternal highest level of education				0.587
High school equivalent or less than a high school diploma	38.4	39.8	-1.4	
High school diploma and no college	32.0	30.0	2.1	
Some college or more	29.5	30.3	-0.7	
Maternal employment during the past three years				0.051
Not employed	18.9	19.3	-0.4	
Employed for 12 months or fewer	39.0	34.0	5.0	
Employed for more than 12 months	42.1	46.6	-4.6	
Currently taking or planning to take education or training classes	68.2	67.0	1.2	0.565
Maternal health, mental health, and well-being				
Symptoms of depression or anxiety[b] (%)	37.9	40.4	-2.6	0.228
Substance use before pregnancy (%)	30.5	30.6	-0.1	0.944
Average level of verbal abstract reasoning[c]	7.1	7.1	-0.1	0.493
Health status self-rated as “poor” or “fair” (%)	10.5	12.3	-1.8	0.195
Past behavioral health services (%)	19.6	21.4	-1.8	0.319
Average level of mastery[d]	22.3	22.2	0.1	0.469
Smoked during the three months before pregnancy (%)	25.7	27.7	-1.9	0.317
Average body mass index	27.9	27.6	0.3	0.327
Intention to breastfeed (%)	88.6	84.1	4.4	0.023
Future childbearing intention (%)	14.5	13.2	1.3	0.418
Average perception of relationship quality with partner or spouse[e]	6.4	6.5	-0.1	0.028
Health insurance and access to care (%)				
Usual source of well-child care	95.1	91.6	3.6	0.044
Health insurance coverage for the mother	90.8	90.8	0.0	0.989

(continued)

Appendix Table B.1 (continued)

Characteristic	Program Group	Control Group	Difference	P-Value
Crime and intimate partner violence (%)				
Arrested during the past year	5.2	4.4	0.8	0.404
Maternal perpetration of physical violence[f]	16.8	16.7	0.2	0.914
Maternal experience with physical or sexual violence[f]	7.4	7.2	0.2	0.842
Experience with battering[g]	5.9	4.1	1.8	0.067
Past domestic violence services	7.8	8.7	-0.9	0.434
Parenting				
Average quality of home environment[h]				
Parental warmth	4.9	5.2	-0.2	0.146
Parental verbal skills	2.8	2.8	0.0	0.960
Parental lack of hostility	4.6	4.5	0.1	0.463
Home interior	6.9	6.9	0.0	0.754
Low level of maternal empathy[i] (%)	19.1	20.1	-1.0	0.566
Child characteristics				
Average age (months)	1.5	1.5	0.0	0.717
Gender (%)				
Female	51.6	47.5	4.1	0.059
Male	48.4	52.5	-4.1	0.059
Poor health at birth[j] (%)	27.2	21.9	5.3	0.083
Involvement with Child Protective Services before study entry (%)	4.2	3.0	1.2	0.393
Average level of emotionality[k]	2.2	2.3	-0.1	0.411
Sample size (total = 2,090)	1,044	1,046		

(continued)

Appendix Table B.1 (continued)

SOURCES: Calculations based on the MIHOPE family baseline survey, the research team's baseline home observations, state birth records, state administrative child welfare records, and Medicaid enrollment data.

NOTES: Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

To assess differences between the research groups, chi-square tests were used for categorical variables and two-tailed t-tests were used for continuous variables.

The sample size in this table reflects the number of families who responded to the 2.5-year survey; however, sample sizes may vary depending on a specific measure's data source and the frequency of missing values within that data source.

[a]Food insecurity is defined as whether in the past year the family either (1) sometimes or often worried about their food running out before they got money to buy more or (2) sometimes or often worried about the food they bought not lasting and they did not have money to get more.

[b]Measured using the Center for Epidemiologic Studies-Depression (CES-D) 10-item (Kohout et al., 1993) scale and Generalized Anxiety Disorder (GAD-7) 7-item scale (Spitzer et al., 2006) scale. A score of 8 or higher on the CES-D 10-item scale indicates clinically significant symptoms of depression. A score of 10 or higher on the GAD-7 indicates moderate or severe anxiety symptoms.

[c]Measured using the similarities subscale of the Wechsler Adult Intelligence Scale-Third Edition (WAIS-III) (Wechsler, 1997). Respondents who took the Spanish version of the survey took the equivalent subscale of the Escala de Inteligencia de Wechsler-Tercera Edición (EIWA-III) (Wechsler, 2008). Scores range from 1 to 19, with higher scores indicating a greater level of verbal abstract reasoning.

[d]Measured using the Pearlin Mastery Scale (Pearlin and Schooler, 1978). Mastery refers to the extent to which one perceives control and autonomy over various aspects of life. Scores range from 7 to 28, with higher scores indicating greater levels of mastery.

[e]Scores range from 1 to 7, with higher scores indicating that the mother is happier in her relationship.

[f]Measured using items from the Revised Conflict Tactics Scale (Straus et al., 2003). Women were considered to have perpetrated or experienced physical violence if they reported violent acts occurring with their current partners during the past year.

[g]Measured using a short form of the Women's Experience with Battering scale (Smith et al., 1995).

[h]Measured using the Home Observation for Measurement of the Environment (HOME) Inventory (Caldwell and Bradley, 1984).

[i]Empathy skills were measured using a subscale of the Adult Adolescent Parenting Inventory-2 (AAPI) (Bavolek and Keene, 1999). For English-speaking women, the cutoff score for low empathy was less than or equal to 32 for adolescents and less than or equal to 38 for adults. For Spanish-speaking women, the cutoff score for low empathy was less than or equal to 29 for adolescents and less than or equal to 28 for adults.

[j]Poor health at birth is defined as the child weighing less than 5.5 pounds at birth, born three weeks premature, or spent time in the NICU.

[k]Measured using the 5-item emotionality subscale of the Emotionality, Activity, Sociability, and Impulsivity (EASI-II) Temperament Survey (Buss and Plomin, 1984). Scores range from 1 to 5, with higher scores indicating greater levels of emotionality.

Appendix Table B.2
Comparison of Selected Characteristics at Study Entry Between the Program and Control Groups Among 3.5-Year Survey Respondents

Characteristic	Program Group	Control Group	Difference	P-Value
Maternal and household characteristics				
Average age (years)	24.2	24.6	-0.3	0.215
Pregnant (%)	66.2	63.6	2.6	0.220
Relationship status (%)				0.489
Married to the focal child's biological father	23.8	22.7	1.1	
Living with a partner or spouse	24.8	25.1	-0.3	
In a relationship but not living together	28.8	26.9	1.9	
Single	22.6	25.3	-2.8	
Race and ethnicity (%)				0.767
Mexican origin	25.2	25.2	0.1	
Other Hispanic	12.4	12.7	-0.3	
Non-Hispanic White	26.2	28.1	-1.8	
Non-Hispanic Black	28.7	26.2	2.5	
Other or multiracial	7.5	7.9	-0.4	
Average number of siblings of the focal child in the home	0.7	0.7	0.0	0.753
Ability to speak English self-rated as “not very well” or “not at all” (%)	11.5	11.4	0.1	0.933
Moved more than once during the past year (%)	17.4	17.5	-0.1	0.941
Family economic self-sufficiency (%)				
Food insecurity[a]	52.1	54.4	-2.4	0.294
Received any public assistance during the past month				
Supplemental Nutrition Assistance Program	58.4	56.9	1.4	0.525
Disability insurance	16.8	17.4	-0.6	0.726
Temporary Assistance for Needy Families	17.3	18.5	-1.2	0.506
Women, Infants, and Children	76.2	76.1	0.1	0.953
Maternal highest level of education				0.945
High school equivalent or less than a high school diploma	36.3	37.0	-0.7	
High school diploma and no college	32.8	32.4	0.4	
Some college or more	30.9	30.6	0.3	
Maternal employment during the past three years				0.222
Not employed	18.5	17.7	0.7	
Employed for 12 months or fewer	38.1	35.0	3.1	
Employed for more than 12 months	43.5	47.3	-3.9	
Currently taking or planning to take education or training classes	67.7	65.3	2.4	0.280
Maternal health, mental health, and well-being				
Symptoms of depression or anxiety[b] (%)	37.2	39.7	-2.5	0.253
Substance use before pregnancy (%)	30.4	30.2	0.2	0.929
Average level of verbal abstract reasoning[c]	7.1	7.1	0.0	0.837
Health status self-rated as "poor" or "fair" (%)	10.9	11.7	-0.8	0.576
Past behavioral health services (%)	19.5	20.1	-0.6	0.745
Average level of mastery[d]	22.3	22.2	0.2	0.295
Smoked during the three months before pregnancy (%)	25.3	27.1	-1.9	0.351
Average body mass index	28.2	28.0	0.3	0.483
Intention to breastfeed (%)	87.6	85.1	2.5	0.206
Future childbearing intention (%)	14.8	13.8	1.0	0.546
Average perception of relationship quality with partner or spouse[e]	6.4	6.5	-0.1	0.225
Health insurance and access to care (%)				
Usual source of well-child care	94.7	92.0	2.7	0.162
Health insurance coverage for the mother	90.7	91.4	-0.6	0.627

(continued)

Appendix Table B.2 (continued)

Characteristic	Program Group	Control Group	Difference	P-Value
Crime and intimate partner violence (%)				
Arrested during the past year	4.9	4.8	0.2	0.871
Maternal perpetration of physical violence[f]	18.5	17.3	1.3	0.463
Maternal experience with physical or sexual violence[f]	7.7	7.9	-0.2	0.839
Experience with battering[g]	5.4	4.6	0.9	0.381
Past domestic violence services	6.4	8.9	-2.5	0.038
Parenting				
Average quality of home environment[h]				
Parental warmth	5.0	5.3	-0.3	0.098
Parental verbal skills	2.8	2.8	0.0	0.962
Parental lack of hostility	4.6	4.5	0.1	0.264
Home interior	7.0	6.9	0.1	0.215
Low level of maternal empathy[i] (%)	18.9	20.7	-1.8	0.315
Child characteristics				
Average age (months)	1.3	1.5	-0.1	0.233
Gender (%)				
Female	51.3	48.1	3.1	0.166
Male	48.7	51.9	-3.1	0.166
Poor health at birth[j] (%)	25.1	21.1	4.0	0.219
Involvement with Child Protective Services before study entry (%)	5.0	3.8	1.1	0.495
Average level of emotionality[k]	2.2	2.3	-0.1	0.136
Sample size (total = 1,962)	998	964		

(continued)

Appendix Table B.2 (continued)

SOURCES: Calculations based on the MIHOPE family baseline survey, the research team's baseline home observations, state birth records, state administrative child welfare records, and Medicaid enrollment data.

NOTES: Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

To assess differences between the research groups, chi-square tests were used for categorical variables and two-tailed t-tests were used for continuous variables.

The sample size in this table reflects the number of families who responded to the 3.5-year survey; however, sample sizes may vary depending on a specific measure's data source and the frequency of missing values within that data source.

[a]Food insecurity is defined as whether in the past year the family either (1) sometimes or often worried about their food running out before they got money to buy more or (2) sometimes or often worried about the food they bought not lasting and they did not have money to get more.

[b]Measured using the Center for Epidemiologic Studies-Depression (CES-D) 10-item (Kohout et al., 1993) scale and Generalized Anxiety Disorder (GAD-7) 7-item scale (Spitzer et al., 2006) scale. A score of 8 or higher on the CES-D 10-item scale indicates clinically significant symptoms of depression. A score of 10 or higher on the GAD-7 indicates moderate or severe anxiety symptoms.

[c]Measured using the similarities subscale of the Wechsler Adult Intelligence Scale-Third Edition (WAIS-III) (Wechsler, 1997). Respondents who took the Spanish version of the survey took the equivalent subscale of the Escala de Inteligencia de Wechsler-Tercera Edición (EIWA-III) (Wechsler, 2008). Scores range from 1 to 19, with higher scores indicating a greater level of verbal abstract reasoning.

[d]Measured using the Pearlin Mastery Scale (Pearlin and Schooler, 1978). Mastery refers to the extent to which one perceives control and autonomy over various aspects of life. Scores range from 7 to 28, with higher scores indicating greater levels of mastery.

[e]Scores range from 1 to 7, with higher scores indicating that the mother is happier in her relationship.

[f]Measured using items from the Revised Conflict Tactics Scale (Straus et al., 2003). Women were considered to have perpetrated or experienced physical violence if they reported violent acts occurring with their current partners during the past year.

[g]Measured using a short form of the Women's Experience with Battering scale (Smith et al., 1995).

[h]Measured using the Home Observation for Measurement of the Environment (HOME) Inventory (Caldwell and Bradley, 1984).

[i]Empathy skills were measured using a subscale of the Adult Adolescent Parenting Inventory-2 (AAPI) (Bavolek and Keene, 1999). For English-speaking women, the cutoff score for low empathy was less than or equal to 32 for adolescents and less than or equal to 38 for adults. For Spanish-speaking women, the cutoff score for low empathy was less than or equal to 29 for adolescents and less than or equal to 28 for adults.

[j]Poor health at birth is defined as the child weighing less than 5.5 pounds at birth, born three weeks premature, or spent time in the NICU.

[k]Measured using the 5-item emotionality subscale of the Emotionality, Activity, Sociability, and Impulsivity (EASI-II) Temperament Survey (Buss and Plomin, 1984). Scores range from 1 to 5, with higher scores indicating greater levels of emotionality.

Appendix Table B.3
Comparison of Selected Characteristics at Study Entry Between 2.5-Year Survey Respondents and Nonrespondents

Characteristic	Respondents	Nonrespondents	Difference	P-Value
Maternal and household characteristics				
Average age (years)	24.3	23.0	1.3	0.000
Pregnant (%)	62.1	70.6	-8.6	0.000
Relationship status (%)				0.000
Married to the focal child's biological father	22.6	14.8	7.7	
Living with a partner or spouse	25.0	26.0	-0.9	
In a relationship but not living together	27.2	30.9	-3.7	
Single	25.1	28.3	-3.1	
Race and ethnicity (%)				0.053
Mexican origin	25.3	22.1	3.1	
Other Hispanic	12.0	12.9	-0.9	
Non-Hispanic White	26.7	26.0	0.7	
Non-Hispanic Black	27.8	29.0	-1.2	
Other or multiracial	8.2	10.1	-1.9	
Average number of siblings of the focal child in the home	0.7	0.6	0.1	0.000
Ability to speak English self-rated as “not very well” or “not at all” (%)	10.7	9.1	1.6	0.083
Moved more than once during the past year (%)	17.8	22.9	-5.1	0.000
Family economic self-sufficiency (%)				
Food insecurity[a]	54.0	55.0	-1.1	0.499
Received any public assistance during the past month				
Supplemental Nutrition Assistance Program	58.4	59.6	-1.2	0.437
Disability insurance	18.4	16.6	1.8	0.138
Temporary Assistance for Needy Families	18.0	22.5	-4.6	0.000
Women, Infants, and Children	76.4	72.7	3.7	0.006
Maternal highest level of education				0.000
High school equivalent or less than a high school diploma	39.1	45.4	-6.3	
High school diploma and no college	31.0	34.2	-3.2	
Some college or more	29.9	20.4	9.5	
Maternal employment during the past three years				0.000
Not employed	19.1	20.9	-1.8	
Employed for 12 months or fewer	36.5	41.3	-4.8	
Employed for more than 12 months	44.4	37.8	6.6	
Currently taking or planning to take education or training classes	67.6	72.1	-4.5	0.002
Maternal health, mental health, and well-being				
Symptoms of depression or anxiety[b] (%)	39.2	45.4	-6.2	0.000
Substance use before pregnancy (%)	30.5	32.6	-2.1	0.153
Average level of verbal abstract reasoning[c]	7.1	6.8	0.3	0.000
Health status self-rated as “poor” or “fair” (%)	11.4	12.6	-1.2	0.234
Past behavioral health services (%)	20.5	23.0	-2.6	0.049
Average level of mastery[d]	22.2	21.9	0.3	0.005
Smoked during the three months before pregnancy (%)	26.7	32.2	-5.5	0.000
Average body mass index	27.8	26.9	0.9	0.000
Intention to breastfeed (%)	86.4	79.8	6.5	0.000
Future childbearing intention (%)	13.8	10.3	3.5	0.001
Average perception of relationship quality with partner or spouse[e]	6.4	6.4	0.0	0.467
Health insurance and access to care (%)				
Usual source of well-child care	93.3	91.2	2.1	0.149
Health insurance coverage for the mother	90.8	91.6	-0.8	0.372

(continued)

Appendix Table B.3 (continued)

Characteristic	Respondents	Nonrespondents	Difference	P-Value
Crime and intimate partner violence (%)				
Arrested during the past year	4.8	7.5	-2.7	0.000
Maternal perpetration of physical violence[f]	16.7	19.6	-2.8	0.019
Maternal experience with physical or sexual violence[f]	7.3	7.0	0.2	0.763
Experience with battering[g]	5.0	5.4	-0.4	0.548
Past domestic violence services	8.3	9.8	-1.6	0.084
Parenting				
Average quality of home environment[h]				
Parental warmth	5.1	5.0	0.0	0.734
Parental verbal skills	2.8	2.8	0.0	0.162
Parental lack of hostility	4.6	4.7	-0.1	0.217
Home interior	6.9	7.0	-0.1	0.155
Low level of maternal empathy[i] (%)	19.6	24.9	-5.3	0.000
Child characteristics				
Average age (months)	1.5	1.3	0.2	0.027
Gender (%)				
Female	49.5	48.2	1.3	0.411
Male	50.5	51.8	-1.3	0.411
Poor health at birth[j] (%)	24.6	26.1	-1.6	0.511
Involvement with Child Protective Services before study entry (%)	3.6	6.7	-3.1	0.017
Average level of emotionality[k]	2.3	2.3	0.0	0.695
Sample size (total = 4,112)	2,090	2,022		

(continued)

Appendix Table B.3 (continued)

SOURCES: Calculations based on the MIHOPE family baseline survey, the research team's baseline home observations, state birth records, state administrative child welfare records, and Medicaid enrollment data.

NOTES: Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

To assess differences between the research groups, chi-square tests were used for categorical variables and two-tailed t-tests were used for continuous variables.

The sample size in this table reflects the number of families who responded to the 2.5-year survey; however, sample sizes may vary depending on a specific measure's data source and the frequency of missing values within that data source.

[a]Food insecurity is defined as whether in the past year the family either (1) sometimes or often worried about their food running out before they got money to buy more or (2) sometimes or often worried about the food they bought not lasting and they did not have money to get more.

[b]Measured using the Center for Epidemiologic Studies-Depression (CES-D) 10-item (Kohout et al., 1993) scale and Generalized Anxiety Disorder (GAD-7) 7-item scale (Spitzer et al., 2006) scale. A score of 8 or higher on the CES-D 10-item scale indicates clinically significant symptoms of depression. A score of 10 or higher on the GAD-7 indicates moderate or severe anxiety symptoms.

[c]Measured using the similarities subscale of the Wechsler Adult Intelligence Scale-Third Edition (WAIS-III) (Wechsler, 1997). Respondents who took the Spanish version of the survey took the equivalent subscale of the Escala de Inteligencia de Wechsler-Tercera Edición (EIWA-III) (Wechsler, 2008). Scores range from 1 to 19, with higher scores indicating a greater level of verbal abstract reasoning.

[d]Measured using the Pearlin Mastery Scale (Pearlin and Schooler, 1978). Mastery refers to the extent to which one perceives control and autonomy over various aspects of life. Scores range from 7 to 28, with higher scores indicating greater levels of mastery.

[e]Scores range from 1 to 7, with higher scores indicating that the mother is happier in her relationship.

[f]Measured using items from the Revised Conflict Tactics Scale (Straus et al., 2003). Women were considered to have perpetrated or experienced physical violence if they reported violent acts occurring with their current partners during the past year.

[g]Measured using a short form of the Women's Experience with Battering scale (Smith et al., 1995).

[h]Measured using the Home Observation for Measurement of the Environment (HOME) Inventory (Caldwell and Bradley, 1984).

[i]Empathy skills were measured using a subscale of the Adult Adolescent Parenting Inventory-2 (AAPI) (Bavolek and Keene, 1999). For English-speaking women, the cutoff score for low empathy was less than or equal to 32 for adolescents and less than or equal to 38 for adults. For Spanish-speaking women, the cutoff score for low empathy was less than or equal to 29 for adolescents and less than or equal to 28 for adults.

[j]Poor health at birth is defined as the child weighing less than 5.5 pounds at birth, born three weeks premature, or spent time in the NICU.

[k]Measured using the 5-item emotionality subscale of the Emotionality, Activity, Sociability, and Impulsivity (EASI-II) Temperament Survey (Buss and Plomin, 1984). Scores range from 1 to 5, with higher scores indicating greater levels of emotionality.

Appendix Table B.4
Comparison of Selected Characteristics at Study Entry Between 3.5-Year Survey Respondents and Nonrespondents

Characteristic	Respondents	Nonrespondents	Difference	P-Value
Maternal and household characteristics				
Average age (years)	24.4	23.0	1.4	0.000
Pregnant (%)	64.9	67.5	-2.5	0.087
Relationship status (%)				0.000
Married to the focal child's biological father	23.2	14.7	8.6	
Living with a partner or spouse	25.0	26.0	-1.0	
In a relationship but not living together	27.9	30.1	-2.2	
Single	23.9	29.3	-5.3	
Race and ethnicity (%)				0.006
Mexican origin	25.2	22.3	2.9	
Other Hispanic	12.5	12.3	0.2	
Non-Hispanic White	27.1	25.6	1.6	
Non-Hispanic Black	27.4	29.3	-1.9	
Other or multiracial	7.7	10.4	-2.8	
Average number of siblings of the focal child in the home	0.7	0.6	0.1	0.042
Ability to speak English self-rated as “not very well” or “not at all” (%)	11.5	8.4	3.1	0.001
Moved more than once during the past year (%)	17.5	22.9	-5.4	0.000
Family economic self-sufficiency (%)				
Food insecurity[a]	53.2	55.7	-2.5	0.115
Received any public assistance during the past month				
Supplemental Nutrition Assistance Program	57.7	60.2	-2.5	0.101
Disability insurance	17.1	17.9	-0.8	0.487
Temporary Assistance for Needy Families	17.9	22.3	-4.4	0.001
Women, Infants, and Children	76.1	73.2	2.9	0.033
Maternal highest level of education				0.000
High school equivalent or less than a high school diploma	36.6	47.3	-10.7	
High school diploma and no college	32.6	32.5	0.1	
Some college or more	30.8	20.2	10.6	
Maternal employment during the past three years				0.000
Not employed	18.1	21.8	-3.6	
Employed for 12 months or fewer	36.5	41.0	-4.5	
Employed for more than 12 months	45.3	37.2	8.1	
Currently taking or planning to take education or training classes	66.5	72.9	-6.4	0.000
Maternal health, mental health, and well-being				
Symptoms of depression or anxiety[b] (%)	38.4	45.7	-7.2	0.000
Substance use before pregnancy (%)	30.3	32.7	-2.4	0.100
Average level of verbal abstract reasoning[c]	7.1	6.8	0.3	0.000
Health status self-rated as “poor” or “fair” (%)	11.3	12.5	-1.2	0.230
Past behavioral health services (%)	19.8	23.6	-3.8	0.003
Average level of mastery[d]	22.3	21.9	0.4	0.000
Smoked during the three months before pregnancy (%)	26.2	32.4	-6.2	0.000
Average body mass index	28.1	26.7	1.5	0.000
Intention to breastfeed (%)	86.4	79.9	6.5	0.000
Future childbearing intention (%)	14.3	10.0	4.3	0.000
Average perception of relationship quality with partner or spouse[e]	6.4	6.4	0.0	0.333
Health insurance and access to care (%)				
Usual source of well-child care	93.3	91.5	1.8	0.214
Health insurance coverage for the mother	91.1	91.3	-0.2	0.784

(continued)

Appendix Table B.4 (continued)

Characteristic	Respondents	Nonrespondents	Difference	P-Value
Crime and intimate partner violence (%)				
Arrested during the past year	4.9	7.3	-2.5	0.001
Maternal perpetration of physical violence[f]	17.9	18.3	-0.4	0.772
Maternal experience with physical or sexual violence[f]	7.8	6.6	1.2	0.151
Experience with battering[g]	5.0	5.4	-0.3	0.626
Past domestic violence services	7.6	10.4	-2.8	0.002
Parenting				
Average quality of home environment[h]				
Parental warmth	5.1	5.0	0.1	0.233
Parental verbal skills	2.8	2.8	0.0	0.099
Parental lack of hostility	4.6	4.7	-0.1	0.179
Home interior	6.9	6.9	0.0	0.993
Low level of maternal empathy[i] (%)	19.8	24.4	-4.7	0.000
Child characteristics				
Average age (months)	1.4	1.5	-0.1	0.409
Gender (%)				
Female	49.7	48.1	1.6	0.309
Male	50.3	51.9	-1.6	0.309
Poor health at birth[j] (%)	23.1	27.4	-4.3	0.066
Involvement with Child Protective Services before study entry (%)	4.4	5.5	-1.1	0.361
Average level of emotionality[k]	2.2	2.3	-0.1	0.068
Sample size (total = 4,110)	1,962	2,148		

(continued)

Appendix Table B.4 (continued)

SOURCES: Calculations based on the MIHOPE family baseline survey, the research team's baseline home observations, state birth records, state administrative child welfare records, and Medicaid enrollment data.

NOTES: Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

To assess differences between the research groups, chi-square tests were used for categorical variables and two-tailed t-tests were used for continuous variables.

The sample size in this table reflects the number of families who responded to the 3.5-year survey; however, sample sizes may vary depending on a specific measure's data source and the frequency of missing values within that data source.

[a]Food insecurity is defined as whether in the past year the family either (1) sometimes or often worried about their food running out before they got money to buy more or (2) sometimes or often worried about the food they bought not lasting and they did not have money to get more.

[b]Measured using the Center for Epidemiologic Studies-Depression (CES-D) 10-item (Kohout et al., 1993) scale and Generalized Anxiety Disorder (GAD-7) 7-item scale (Spitzer et al., 2006) scale. A score of 8 or higher on the CES-D 10-item scale indicates clinically significant symptoms of depression. A score of 10 or higher on the GAD-7 indicates moderate or severe anxiety symptoms.

[c]Measured using the similarities subscale of the Wechsler Adult Intelligence Scale-Third Edition (WAIS-III) (Wechsler, 1997). Respondents who took the Spanish version of the survey took the equivalent subscale of the Escala de Inteligencia de Wechsler-Tercera Edición (EIWA-III) (Wechsler, 2008). Scores range from 1 to 19, with higher scores indicating a greater level of verbal abstract reasoning.

[d]Measured using the Pearlin Mastery Scale (Pearlin and Schooler, 1978). Mastery refers to the extent to which one perceives control and autonomy over various aspects of life. Scores range from 7 to 28, with higher scores indicating greater levels of mastery.

[e]Scores range from 1 to 7, with higher scores indicating that the mother is happier in her relationship.

[f]Measured using items from the Revised Conflict Tactics Scale (Straus et al., 2003). Women were considered to have perpetrated or experienced physical violence if they reported violent acts occurring with their current partners during the past year.

[g]Measured using a short form of the Women's Experience with Battering scale (Smith et al., 1995).

[h]Measured using the Home Observation for Measurement of the Environment (HOME) Inventory (Caldwell and Bradley, 1984).

[i]Empathy skills were measured using a subscale of the Adult Adolescent Parenting Inventory-2 (AAPI) (Bavolek and Keene, 1999). For English-speaking women, the cutoff score for low empathy was less than or equal to 32 for adolescents and less than or equal to 38 for adults. For Spanish-speaking women, the cutoff score for low empathy was less than or equal to 29 for adolescents and less than or equal to 28 for adults.

[j]Poor health at birth is defined as the child weighing less than 5.5 pounds at birth, born three weeks premature, or spent time in the NICU.

[k]Measured using the 5-item emotionality subscale of the Emotionality, Activity, Sociability, and Impulsivity (EASI-II) Temperament Survey (Buss and Plomin, 1984). Scores range from 1 to 5, with higher scores indicating greater levels of emotionality.

Appendix Table B.5
Comparison of Estimated Effects on 15-Month Confirmatory Outcomes Between 2.5-Year Survey Respondents and Nonrespondents

Outcome	Responded to 2.5-Year Survey: Control Group	Responded to 2.5-Year Survey: Difference (Effect)	Did Not Respond to 2.5-Year Survey: Control Group	Did Not Respond to 2.5-Year Survey: Difference (Effect)	P-Value
Maternal health (%)					
New birth after study entry[a]	16.1	0.7	19.8	0.6	0.967
Family economic self-sufficiency (%)					
Pursuing education or training	22.5	1.3	22.9	0.4	0.770
Parenting[b]					
Quality of the home environment	0.02	0.06	-0.13	0.11	0.533
Parental supportiveness	0.07	0.01	-0.17	0.12	0.135
Child maltreatment					
Frequency of minor physical assault during the past year	2.3	-0.2	2.0	0.0	0.649
Frequency of psychological aggression during the past year	3.3	-0.1	3.2	-0.3	0.490
Child health					
Health insurance coverage for the child (%)	97.4	-0.4	93.0	-0.6	0.870
Number of Medicaid-paid well-child visits	5.2	-0.1	4.9	0.0	0.407
Number of Medicaid-paid emergency department visits	2.1	-0.2	2.4	-0.2	0.894
Any Medicaid-paid health care encounter for injury or ingestion (%)	25.7	1.8	28.3	-4.9	0.027
Child development[b]					
Behavior problems	-0.01	-0.02	0.08	-0.11	0.176
Receptive language skills	-0.02	0.02	0.00	0.02	0.943
Sample size (total = 4,112)		2,090		2,022	

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

NOTES: See Appendix C for descriptions of the outcome measures in the areas of maternal health and family economic self-sufficiency. See Michalopoulos et al. (2019) for descriptions of the outcome measures in the areas of parenting, child maltreatment, child health, and child development.

The p-value was calculated with an omnibus test (HT statistic) that tests whether the effects are different across response groups to a statistically significant degree.

The maximum sample size has been displayed; however, sample sizes may vary depending on a specific measure's data source and the frequency of missing values within that data source.

[a]In the 15-month analysis presented in Michalopoulos et al. (2019), the measure “new birth after study entry” was referred to as “new pregnancy after study entry.” The measure has been renamed to “new birth after study entry”; however, the construction of the measure has not changed.

[b]Outcomes are standardized such that effect sizes are shown.

Appendix Table B.6
Comparison of Estimated Effects on 15-Month Confirmatory Outcomes Between 3.5-Year Survey Respondents and Nonrespondents

Outcome	Responded to 3.5-Year Survey: Control Group	Responded to 3.5-Year Survey: Difference (Effect)	Did Not Respond to 3.5-Year Survey: Control Group	Did Not Respond to 3.5-Year Survey: Difference (Effect)	P-Value
Maternal health (%)					
New birth after study entry[a]	15.1	1.0	20.9	-0.3	0.638
Family economic self-sufficiency (%)					
Pursuing education or training	21.9	1.4	23.9	-0.2	0.571
Parenting[b]					
Quality of the home environment	0.02	0.08	-0.14	0.10	0.794
Parental supportiveness	0.03	0.09	-0.09	-0.01	0.196
Child maltreatment					
Frequency of minor physical assault during the past year	2.2	-0.1	2.2	-0.1	0.921
Frequency of psychological aggression during the past year	3.2	0.0	3.5	-0.6	0.059
Child health					
Health insurance coverage for the child (%)	97.9	0.0	92.8	-0.9	0.490
Number of Medicaid-paid well-child visits	5.4	-0.2	4.8	0.0	0.175
Number of Medicaid-paid emergency department visits	2.2	-0.2	2.3	-0.3	0.568
Any Medicaid-paid health care encounter for injury or ingestion (%)	25.9	1.6	27.3	-3.0	0.128
Child development[b]					
Behavior problems	-0.02	-0.07	0.09	-0.03	0.571
Receptive language skills	-0.03	0.04	0.02	-0.01	0.484
Sample size (total = 4,110)		1,962		2,148	

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

NOTES: See Appendix C for descriptions of the outcome measures in the areas of maternal health and family economic self-sufficiency. See Michalopoulos et al. (2019) for descriptions of the outcome measures in the areas of parenting, child maltreatment, child health, and child development.

The p-value was calculated with an omnibus test (HT statistic) that tests whether the effects are different across response groups to a statistically significant degree.

The maximum sample size has been displayed; however, sample sizes may vary depending on a specific measure's data source and the frequency of missing values within that data source.

[a]In the 15-month analysis presented in Michalopoulos et al. (2019), the measure “new birth after study entry” was referred to as “new pregnancy after study entry.” The measure has been renamed to “new birth after study entry”; however, the construction of the measure has not changed.

[b]Outcomes are standardized such that effect sizes are shown.

Appendix Table B.7
Minimum Detectable Effects of Estimated Effects for MIHOPE Check-in

Response	15 Months	2.5 Years	3.5 Years
Full sample	0.08	0.10	0.10
Evidence-based model			
Early Head Start—Home-based option	0.20	0.25	0.26
Healthy Families America	0.13	0.16	0.17
Nurse-Family Partnership	0.14	0.19	0.19
Parents as Teachers	0.16	0.20	0.21
Sample size	3,315	2,090	1,962

SOURCES: Calculations based on the MIHOPE 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: Results are the smallest true impact that would generate statistically significant effect estimates in 80 percent of studies with a similar design using two-tailed t-tests with a 10 percent significance level.

No adjustment for multiple comparisons is assumed. Results are based on fixed effect estimates.

Baseline data are assumed to explain 20 percent of variation in outcomes across families, which is consistent with findings at 15 months.

Appendix Table B.8
Comparison of MIHOPE Check-in Response Rates by Evidence-Based Model to What Works Clearinghouse (WWC) Standards

	Response Rate			
Model	Program Group	Control Group	Difference	Versus WWC Standard
2.5 years				
Early Head Start—Home-based option	55.9	57.0	-1.1	Tolerable
Healthy Families America	50.1	52.1	-2.0	Potentially tolerable
Nurse-Family Partnership	49.4	45.6	3.8	Unacceptable
Parents as Teachers	51.7	50.7	1.0	Tolerable
3.5 years				
Early Head Start—Home-based option	50.2	55.2	-5.1	Unacceptable
Healthy Families America	47.7	44.8	2.9	Unacceptable
Nurse-Family Partnership	49.7	45.3	4.4	Unacceptable
Parents as Teachers	48.5	46.2	2.4	Potentially tolerable
Sample size				
2.5 years (total = 4,112)	2,045	2,067		
3.5 years (total = 4,110)	2,045	2,065		

SOURCES: Calculations based on the MIHOPE 2.5-year check-in survey and 3.5-year check-in survey.

NOTE: WWC Standards are based on Table III.1 of the What Works Clearinghouse Standards Handbook (version 4).

Appendix C

Measure Descriptions

This appendix describes how the outcome and descriptive measures were defined and used in the report. It is organized by outcome area as follows: (1) maternal health, (2) child health, (3) family economic self-sufficiency, (4) discipline strategies, (5) parental support for cognitive development, and (6) child functioning.

MATERNAL HEALTH

The measures in the area of maternal health are included in this report as confirmatory outcomes and descriptive measures (see Table C.1 for information on how measures were designated at each study time point). All measures are derived from the baseline, 15-month, 2.5-year, and 3.5-year surveys and are defined in the same way across all time points. In the 2.5-year and 3.5-year impact analysis, all maternal health measures were designated as confirmatory outcomes. For families where the mother was not available to answer the survey (in most cases because she no longer had custody of the child), the child's new caregiver responded to the surveys. The analyses do not include maternal health measures for these families.

Appendix Table C.1

Designation of Maternal Health Measures at Study Entry, 15 Months, 2.5 Years, and 3.5 Years

Measure	Study Entry	15 Months	2.5 Years	3.5 Years
New birth after study entry		C, D	C, D	C, D
Depressive symptoms	D	E, D	C, D	C, D
Health status self-rated as "poor" or "fair"	D	E, D	C, D	C, D

SOURCES: Measures are derived from the MIHOPE family baseline survey, 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: C = confirmatory outcome, D = descriptive measure, E = exploratory outcome.
In the 15-month analysis presented in Michalopoulos et al. (2019), the measure "new birth after study entry" was referred to as "new pregnancy after study entry." The measure has been renamed "new birth after study entry." However, the construction of the measure has not changed.

New birth after study entry indicates whether the mother became pregnant with another child after she began participating in the study. It is based on items from the surveys that ask about current pregnancies and pregnancies since the birth of the child or since the last time the family completed a survey. If the mother indicates that she is currently pregnant or that she has given birth to another baby since study entry, then she is considered to have a new birth after study entry. This measure is used to describe program group families' life circumstances when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age and is designated as a confirmatory outcome at 2.5 years and 3.5 years. This measure was previously designated as confirmatory in the 15-month analysis presented in Michalopoulos et al. (2019) and was referred to as "new pregnancy after study entry".

Current depressive symptoms indicates whether the mother was experiencing clinically significant depressive symptoms at the time of the survey. It is based on a 10-item version of the Center for Epidemiologic Studies-Depression Scale (CES-D), which was administered as part of the surveys.[1] Response options range from 0 (meaning the mother felt this way rarely or none of the time) to 3 (meaning she felt this way most or all of the time). If the mother answered all 10 items, then the depressive symptoms raw score is equal to the sum of the responses. If the mother answered eight or nine items, then the raw score is equal to the mean of the responses present, multiplied by 10. Mothers had to answer eight or more items to be included in this measure.

- If the value of the raw score is greater than or equal to eight, then the mother is considered to have experienced depressive symptoms at the time of the survey.

- If the value is less than eight, then she is not considered to have experienced depressive symptoms at the time of the survey.

This measure is used to describe program group families' life circumstances at study entry and when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age and is designated as an exploratory outcome at 2.5 years and 3.5 years. This measure was previously designated as a confirmatory outcome in the 15-month analysis presented in Michalopoulos et al. (2019).

Health status self-rated as "poor" or "fair" indicates the mother's current health status at the time of the survey. If the mother reported that her health was "poor" or "fair" then she is considered to have been in poor health. If the mother reported that her health was "good," "very good," or "excellent," then she is not considered to have been in poor health. This measure is used to describe program group families' circumstances at study entry and when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age and is designated as a confirmatory outcome at 2.5 years and 3.5 years. This measure was previously designated as an exploratory outcome in the 15-month analysis presented in Michalopoulos et al. (2019).

CHILD HEALTH

The measures in the area of child health are included in this report as confirmatory outcomes, exploratory outcomes, and descriptive measures, as shown in Table C.2. All measures were derived from the baseline, 15-month, 2.5-year, and 3.5-year surveys. In the 2.5-year and 3.5-year impact analysis, child health measures were designated as confirmatory or exploratory outcomes.

[1]Kohout et al. (1993).

Appendix Table C.2

Designation of Child Health Measures at 15 Months, 2.5 Years, and 3.5 Years

Measure	15 Months	2.5 Years	3.5 Years
Number of emergency department visits for accident or injury		C	C
Any emergency department visits	C, D	D	D
Health insurance coverage for the child	C, D	E, D	E, D
Had annual well-child visit	C, D	E, D	E, D
Primary care provider for the child	E, D	E, D	E, D
Health status rated by caregiver as "poor" or "fair"	D	D	D

SOURCES: Measures are derived from the MIHOPE 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: C = confirmatory outcome, D = descriptive measure, E = exploratory outcome.
These measures were not examined at study entry.
The measures had annual well-child visit and “any emergency department visits” were defined as “number of Medicaid-paid well-child visits” and “number of Medicaid-paid emergency department visits” and were designated as confirmatory in the 15-month analysis presented in Michalopoulos et al. (2019). In this report, the measures are presented as binary and measured using only survey data so that the measurements are comparable to the measurements at 2.5 years and 3.5 years.

Number of emergency department visits for accident or injury indicates how many times the child visited the emergency department because of an accident or injury since the previous follow-up point. At 2.5 years and 3.5 years, this measure is based on two items from the surveys that ask about the child’s emergency department use since the time of the last survey regardless of whether they responded to the last survey. For instance, the 2.5-year survey asks about the number of emergency department visits for accident or injury since the child was 15 months old while the 3.5-year survey asks about the number of emergency department visits for accident or injury in the past year. If the respondent indicates that the child made at least one emergency department visit due to an accident or injury, then the number of emergency department visits for accident or injury is equal to the number the respondent reports. If the respondent indicates that the child has not visited the emergency department or that none of the emergency department visits were due to an accident or injury, then the child is considered to have had zero emergency department visits for accident or injury. The measure is designated as confirmatory at 2.5 years and 3.5 years.

Any emergency department visits indicates whether the child visited the emergency department for any reason since the previous follow-up point or since birth. It is based on a survey item that asks whether the child has visited the emergency department. The measure is used to describe program group families’ life circumstances when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age. For the 15-month analysis presented in Michalopoulos et al. (2019), the measure was defined as continuous and created using both survey and Medicaid claims data. To compare the outcome at 15 months to the outcomes at 2.5 years and 3.5 years, the 15-month measure included in this report was redefined as binary and created using only survey data.

Has health insurance coverage indicates whether the child had a qualifying type of health insurance at the time of the surveys. At 15 months, this measure is based on a survey item that asks whether the child has the same health insurance coverage as the respondent or asks whether the child has another type of health insurance. If the respondent indicated that the child was covered by some type of insurance other than a single-service plan or an unknown insurance in the "Other" category, then the child is considered to have health insurance coverage. If the respondent indicated that the child did not have any type of coverage or only had a single-service plan, then the child is considered to not have health insurance coverage. If the respondent did not answer the survey items or indicated that the child only had an unknown insurance type in the "Other" category, then the child is missing on this measure. At 2.5 years and 3.5 years, the measure is based on one survey item that asks whether the child has health insurance coverage. This measure is used to describe program group families' life circumstances when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age and is designated as exploratory at 2.5 years and 3.5 years. This measure was previously designated as confirmatory in the 15-month analysis presented in Michalopoulos et al. (2019). For the 15-month analysis presented in Michalopoulos et al. (2019), the measure was defined using both survey and Medicaid enrollment data. To compare the outcome at 15 months to the outcomes at 2.5 years and 3.5 years, the 15-month measure included in this report was created using only survey data.

Had annual well child visit indicates whether the focal child had an annual well child check-up or has a check-up scheduled. At 15 months, this measure is based on a survey item that asks if the child was seen for their 12-month check-up. At 2.5 years and 3.5 years, this measure is based on an item that asks about annual well child check-ups. If the respondent indicates that the child had their check-up or has one scheduled, then the child is considered to have had an annual well child visit. This measure is used to describe program group families' life circumstances when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age and is designated as exploratory at 2.5 years and 3.5 years. This measure was previously designated as confirmatory in the 15-month analysis presented in Michalopoulos et al. (2019). For the 15-month analysis presented in Michalopoulos et al. (2019), the measure was defined as the "number of Medicaid-paid well child visits" and was measured using only Medicaid claims data. For comparison to the outcomes at 2.5 years and 3.5 years, the 15-month measure included in this report was redefined as "had annual well child visit" and was created using only survey data.

Has primary care provider indicates whether the focal child has a doctor or other type of health professional that knows the child well and is familiar with their health history. It is based on one item from the surveys that asks whether the respondent has a person they think of as the child's personal doctor or nurse. This measure is used to describe program group families' life circumstances when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age and is designated as exploratory at 2.5 years and 3.5 years. This measure was previously designated as exploratory in the 15-month analysis presented in Michalopoulos et al. (2019).

Health status rated by caregiver as "poor" or "fair" indicates the caregiver's report of the focal child's health at the time of the survey. If the caregiver reported that the child's health was "poor" or "fair" then the child is considered to have been in poor health. If the caregiver reported that her health was "good," "very good," or "excellent," then the child is not considered to have been in poor health. This measure is used to describe program group families' life circumstances when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age. This measure was not previously examined in the 15-month analysis presented in Michalopoulos et al. (2019).

FAMILY ECONOMIC SELF-SUFFICIENCY

The measures in the area of family economic self-sufficiency are included as confirmatory outcomes, exploratory outcomes, and descriptive measures in this report (see Table C.3). All measures are derived from the baseline, 15-month, 2.5-year, and 3.5-year surveys. In the 2.5-year and 3.5-year impact analysis, family economic self-sufficiency measures were designated as confirmatory or exploratory outcomes. For families where the mother was not available to answer the survey (in most cases because she no longer had custody of the child), the child's new caregiver responded to the surveys. The analyses do not include family economic self-sufficiency measures for these families.

Appendix Table C.3

Designation of Family Economic Self-Sufficiency Measures at Study Entry, 15 Months, 2.5 Years, and 3.5 Years

Measure	Study Entry	15 Months	2.5 Years	3.5 Years
Pursuing education or training	D	C, D	C, D	C, D
Increase in education level since study entry			E	E
Highest education level				
High school equivalent or less than a high school diploma	D	D	D	D
High school diploma and no college	D	D	D	D
Some college or more	D	D	D	D
Received any public assistance during the past month				
Supplemental Nutrition Assistance Program	D	E, D	E, D	E, D
Disability insurance	D	E, D	E, D	E, D
Temporary Assistance for Needy Families	D	E, D	E, D	E, D
Women, Infants, and Children	D	E, D	E, D	E, D
Use of nonparental child care		D	D	D
Use of center-based child care		D	D	D
Use of home-based child care		D	D	D
Has help paying for child care			D	D

SOURCES: Measures are derived from the MIHOPE family baseline survey, 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTE: C = confirmatory outcome, D = descriptive measure, E = exploratory outcome.

Maternal education or training

Pursuing education or training indicates whether the mother reported that she was currently taking any education or training classes, such as high school, GED, college courses, or job skills training. This measure is used to describe program group families' life circumstances at study entry and when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age and is designated as a confirmatory outcome at 2.5 years and 3.5 years. This measure was previously designated as confirmatory in the 15-month analysis presented in Michalopoulos et al. (2019).

Increase in education level since study entry indicates whether the mother meaningfully increased (see definition below) her education level since the time she entered the study. It is based on one item from the baseline survey and follow-up surveys that ask about the mother's highest grade or year of school that she has completed at the time of the survey. A "meaningful increase" is defined as:

- The mother indicates on the baseline survey that her highest level of education was no formal education or grade school between grades 1 through 12 with no high school diploma and indicates on a follow-up survey that her highest level of education is grade 12 with a diploma or high school equivalent, some college or a college degree, or trade or technical school certificate.

- The mother indicates on the baseline survey that she has a high school diploma or equivalent, and she indicates on the follow-up survey that she has a college degree or a trade or technical school certificate.

- The mother indicates on the baseline survey that she completed some college with no degree, and she indicates on the follow-up survey that she earned a college degree or a trade or technical school certificate.

- The mother indicates on the baseline survey that she has a trade or technical school certificate and indicates on the follow-up survey that she earned a college degree.

- The mother indicates on the baseline survey that she has a college degree and indicates on the follow-up survey that she earned a more advanced degree.

If the mother indicates that she does not have an education path that corresponds to one of the above statements, then she is not considered to have experienced an increase in education. If the mother did not respond to one of the items on either the baseline survey or the follow-up survey, then she is missing on the outcome at the time of the follow-up survey. For instance, if the mother did not respond to the item on the 2.5-year survey, then she is missing on the 2.5-year measure. This measure is used to describe program group families' life circumstances when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age and is designated as exploratory at 2.5 years and 3.5 years.

Less than a high school diploma or equivalent indicates whether the mother's highest level of education is less than a high school diploma or is a high school equivalent education, such as a GED. If the mother indicates that she has not received any formal education, has completed grade 1 through 12 with no high school diploma, or has a high school equivalent education, then she is considered to have less than a high school diploma or equivalent education. This measure is used to describe program group families' life circumstances at study entry and when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age. This measure was not previously examined in the 15-month analysis presented in Michalopoulos et al. (2019).

High school diploma indicates whether the mother's highest level of education is a high school diploma. If the mother indicates that her highest level of education is twelfth grade with a diploma, then she is considered to have a high school diploma. This measure is used to describe program group families' life circumstances at study entry and when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age. This measure was not previously examined in the 15-month analysis presented in Michalopoulos et al. (2019).

Some college or more indicates whether the mother's highest level of education is some college, a technical degree or certificate, or a college degree. If the mother indicates that her highest level of education is some college with no degree, a college degree, or a trade or technical school certificate, then she is considered to have completed some college or more. This measure is used to describe program group families' life circumstances at study entry and when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age. This measure was not previously examined in the 15-month analysis presented in Michalopoulos et al. (2019).

Receipt of Public Assistance Benefits

Received any Supplemental Nutrition Assistance Program benefits during the past month indicates whether the mother reported that she had received benefits from the Supplemental Nutrition Assistance Program (SNAP) in the past month. This measure is used to describe program group families' life circumstances at study entry and when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age and is designated as exploratory at 2.5 years and 3.5 years. This measure was designated as exploratory in the 15-month analysis presented in Michalopoulos et al. (2019).

Received any Temporary Assistance for Needy Families benefits during the past month indicates whether the mother reported that she had received benefits from the Temporary Assistance for Needy Families (TANF) program in the past month. This measure is used to describe program group families' life circumstances at study entry and when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age and is designated as exploratory at 2.5 years and 3.5 years. This measure was designated as exploratory in the 15-month analysis presented in Michalopoulos et al. (2019).

Received any Women, Infants, and Children benefits during the past month indicates whether the mother reported that she had received benefits from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in the past month. This measure is used to describe program group families' life circumstances at study entry and when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age and is designated as exploratory at 2.5 years and 3.5 years. This measure was designated as exploratory in the 15-month analysis presented in Michalopoulos et al. (2019).

Received any disability insurance during the past month indicates whether the mother reported that she had received benefits from Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI) in the past month. This measure is used to describe program group families' life circumstances at study entry and when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age and is designated as exploratory at 2.5 years and 3.5 years. This measure was designated as exploratory in the 15-month analysis presented in Michalopoulos et al. (2019).

Child Care

Use of nonparental child care indicates the child care arrangements that the mother was using at the time of the survey. If the mother reported that the child goes to a program or is watched by someone other than the child's parents for five or more hours per week on a regular basis, then she is considered to have used nonparental child care. This measure is used to describe program group families' life circumstances when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age. This measure was previously designated as exploratory in the 15-month analysis presented in Michalopoulos et al. (2019).

Use of center-based child care indicates whether the mother reported that she used child care that is based in a center and provided by someone other than the child's parents. The center may have been a daycare or preschool program, but that information was not obtained from the survey. It is based on two survey items that ask whether the mother uses nonparental child care on a regular basis at least weekly and if that care is provided in a center or a home. If the mother indicates that she uses nonparental child care and that this care is provided in a center, then she is considered to use center-based care. If the mother indicates that she uses nonparental child care and that the care is provided in a home or if she indicates that she does not use nonparental child care, then she is not considered to use center-based child care. This measure is used to describe program group families' life circumstances when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age. This measure was not previously examined in the 15-month analysis presented in Michalopoulos et al. (2019).

Use of home-based child care indicates whether the mother reported that she used child care that is based in either the child's home or the child care provider's home and is provided by someone other than the child's parents. It is based on two survey items that ask whether the mother uses nonparental child care on a regular basis at least weekly and if that care is provided in a home. If the mother indicates

that she uses nonparental child care and that the care is provided in a center or if she does not use nonparental child care, then she is not considered to use home-based child care. This measure is used to describe program group families' life circumstances when the focal child was 15 months of age, 2.5 years of age, and 3.5 years of age. This measure was not previously examined in the 15-month analysis presented in Michalopoulos et al. (2019).

Has help paying for child care indicates whether a mother using nonparental child care on a regular basis has help paying for that care whether that is from a welfare office or office of employment services, an agency for child development, or a local or community program. It is based on two survey items, one that asks whether the mother uses nonparental child care on a regular basis and another that asks whether she receives any help to pay for child care. If the mother indicates that she regularly uses nonparental child care and that she receives help to pay for this child care, then she is considered to have help paying for child care. If the mother indicates that she regularly uses nonparental child care and indicates that she does not receive help to pay for this child care or if the mother indicates that she does not use nonparental child care, then she is not considered to have help paying for child care. This measure is used to describe program group families' life circumstances when the focal child was 2.5 years of age and 3.5 years of age.

DISCIPLINE PRACTICES AND STRATEGIES

The measures in the area of discipline practices and strategies are included in this report as confirmatory or exploratory outcomes (see Table C.4). All measures are derived from the 15-month, 2.5-year, and 3.5-year surveys. In the 2.5-year and 3.5-year impact analysis, discipline practices and strategies measures were designated as confirmatory or exploratory outcomes. For families where the mother was not available to answer the survey, the child's new caregiver responded to the surveys. The analyses do not include discipline practices and strategies measures for these families.

Frequency of yelling indicates the number of times the mother shouted, yelled, or screamed at the child in the past year. It is based on one item from the Conflict Tactics Scale: Parent-Child version (CTSPC) that was administered as part of the 15-month survey.[2] The mother indicated how often she engaged in this behavior in the past year: never, once, twice, three to five times, or six or more times. To obtain the number of times the behavior was used, responses of three to five were coded as "4" and responses of six or more times were coded as "8." Values range from 0, indicating the mother has never yelled at the

[2]Straus, Hamby, and Warren (2003).

Appendix Table C.4

Designation of Discipline Practices and Strategies Measures at 15 Months, 2.5 Years, and 3.5 Years

Measure	15 Months	2.5 Years	3.5 Years
Frequency of yelling / Use of yelling	C	C	C
Any use of physical discipline	C, E	E	E
Index of discipline strategies		E	E

SOURCES: Measures are derived from the MIHOPE 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: C = confirmatory outcome, E = exploratory outcome.
These measures were not examined at study entry.
At 15 months, the "frequency of yelling" measure indicates the number of times the mother shouted, yelled, or screamed at the child in the past year. At 2.5 years and 3.5 years, the measure "use of yelling" indicates whether the mother frequently yells at the child. The measure "frequency of yelling" is constructed using one item from the "frequency of psychological aggression during the past year" measure, which was designated as confirmatory in the 15-month analysis presented in Michalopoulos et al. (2019).
At 15 months, the measure "any use of physical discipline" is a combination of the measures "frequency of minor physical assault during the past year" and "severe or very severe physical abuse during the past year," which were designated as confirmatory and exploratory, respectively, in Michalopoulos et al. (2019).

child, to 8, indicating the mother has yelled at the child six or more times. This measure was not previously examined in the 15-month impact analysis. In Michalopoulos et al. (2019), the confirmatory outcome "frequency of psychological aggression during the past year" was constructed using the item indicating the number of times the mother shouted, yelled, or screamed at the child in the past year and three additional items.

Use of yelling indicates whether the mother frequently yells at the child. It is based on one item from the survey that asks how often the mother raises her voices or yells at the child. If the mother indicates that she raises her voice or yells at the child often or sometimes, then she is considered to use yelling. If the mother indicates she rarely or never raises her voice or yells at the child, then she is considered to not use yelling. This measure is included as a confirmatory outcome at 2.5 years and 3.5 years.

Any use of physical discipline indicates whether the mother would use or uses any physical discipline strategies with the child.

- At 15 months, this measure is based on seven items from the CTSPC that was administered as part of the survey. These items ask how often the mother has engaged in certain behaviors such as hit, spanked, shook, or slapped the child. If the mother reports that she engaged in one of these behaviors at least once, then she is considered to use physical discipline. If the mother indicates that she has never engaged in any of these behaviors, then she is not considered to use physical discipline. If the

mother is missing on any of these items and does not indicate that she has engaged in any of these behaviors at least once, then she is missing on this outcome. This measure was not previously examined in the 15-month analysis presented in Michalopoulos et al. (2019). In Michalopoulos et al. (2019), two outcomes were created from the CTSPC: "frequency of minor physical assault during the past year" and "severe or very severe physical abuse during the past year." "Frequency of minor physical assault during the past year" was designated as confirmatory and "severe or very severe physical abuse during the past year" was designated as exploratory.

- At 2.5 years and 3.5 years, this measure is based on three items from the surveys that ask how often the mother spanks the child and ask whether the mother would hit or spank the child if the child got so angry that the child would hit the mother. If the mother indicates she often or sometimes spanks the child or she would hit or spank the child if the child hit her, then she is considered to use physical discipline. If the mother indicates that she rarely or never spanks the child and indicates that she would not hit or spank the child if the child hit her, then she is not considered to use physical discipline. If the mother is missing any item and indicates in the remaining items that she would not or does not use physical discipline sometimes or often, then she is missing on the outcome. This measure is included as an exploratory outcome at 2.5 years and 3.5 years.

Index of discipline strategies indicates the severity of the mother's discipline strategies. It is based on nine items that ask how the mother would respond if the child hit her. The response options include:

- Hit them back
- Send them to their room
- Spank them
- Talk to them
- Ignore it
- Give them a household chore
- Hold their hands until they were calm
- Yell at them
- Anything else

When asked whether the mother engaged in any behaviors other than the ones listed, common responses included sending the child to timeout or sitting the child down, taking away or threatening to

take away the child's privileges, and distracting the child. The final measure is defined as the following, with values of 1 being the least severe and values of 3 being the most severe:

- If the mother indicates that she would hit the child back or spank the child, then she has a score of 3.
- If the mother indicates that she would yell at the child but not spank or hit the child, then she has a score of 2.
- If the mother indicates that she would send the child to their room, ignore what the child did, give the child a household chore, send the child to timeout or sit the child down, threaten to take away the child's privileges, take away the child's privileges, talk to the child, distract the child, or hold the child's hands until they were calm and indicates that she would not engage in one of the more severe behaviors, then she has a score of 1.
- If the mother indicates that she would not engage in any of these behaviors, then she is missing on this outcome.
- If the mother says she engaged in a less severe behavior but is missing on one of the more severe behavior items, then she is also missing on this outcome.

This measure is included as an exploratory outcome at 2.5 years and 3.5 years.

PARENTAL SUPPORT FOR COGNITIVE DEVELOPMENT

The measures in the area of parental support for cognitive development are included as exploratory outcomes in this report (see Table C.5) and are divided into two subdomains: home literacy environment and cognitive stimulation. All measures are derived from the 15-month in-home assessment, 2.5-year survey, and 3.5-year survey. For families where the mother was not available to answer the survey (in most cases because she no longer had custody of the child), the child's new caregiver responded to the surveys. These families are not included in the analyses of parental support for cognitive development measures.

Home Literacy Environment

Reads to child at least three times per week indicates whether the child is read to three or more times a week. At 15 months, this measure is based on an item from the Infant-Toddler Home Observation for

Appendix Table C.5

Designation of Parental Support for Cognitive Development Measures at 15 Months, 2.5 Years, and 3.5 Years

Measure	15 Months	2.5 Years	3.5 Years
Home literacy environment			
Reads to child at least 3 times per week	E	E	E
Uses interactive shared book reading practices when reading to child		E	E
Average amount of reading to child per day in the past week			E
Cumulative amount of reading to child in the past week			E
Cognitive stimulation			
Frequency of telling stories, saying nursery rhymes, or singing children's songs with child		E	
While doing everyday things			
Reads aloud to child		E	
Talks to child or asks child questions		E	
Counts, sings, says counting rhymes, or uses numbers		E	
In-home learning activities completed in the past week			
Told child a story			E
Taught child letters, words, or numbers			E
Taught child songs or music			E
Did arts and crafts with child			E
Played sports, active games, or exercised together			E
Played board games or did puzzles with child			E
Total number of in-home learning activities completed in the past week			E

SOURCES: Measures are derived from the MIHOPE in-home assessment, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: E = exploratory outcome.
These measures were not examined at study entry.
At 15 months, "reads to child at least 3 times per week" is measured using one item from the measure "parental support for learning and literacy," which was designated as exploratory in Michalopoulos et al. (2019).

Measurement of the Environment (IT-HOME), which was administered as part of the in-home assessment.[3] The item asks whether the mother reads to the child at least three times a week. At 2.5 years and 3.5 years, this measure is based on one item from the surveys that ask how often the child is typically read to by the mother or someone in the household. If the mother indicates that she or someone in the household reads to the child three to six times a week or every day, then the child is considered to be read to at least three times per week. If the mother indicates that the child was never read to or only read to one to two times a week, then the child is not considered to be read to three or more times a week. This measure is included as an exploratory outcome at 2.5 years and 3.5 years. This measure was not previously examined in the 15-month analysis presented in Michalopoulos et al. (2019). In Michalopoulos et al. (2019), the exploratory outcome parental support for learning and literacy was constructed using 17 items from the IT-HOME, including the item asking whether the mother reads to the child at least three times a week.

[3]Caldwell and Bradley (1984).

Uses interactive shared book reading practices when reading to child indicates whether the mother or someone in the household talks to the child or asks the child questions most of the time when typically looking at or reading books. The 2.5-year measure is based on two items from the survey that ask about the frequency of reading to the child and the frequency of interactive reading. If the mother indicates that she or someone in the household talks to or asks the child questions most of the time when reading to the child, then she is considered to use interactive shared book reading practices. If the mother indicates that she or someone in the household talks to or asks the child questions when reading either fairly often, not very often, or hardly ever, or if she indicates that she or someone in the household never reads books with the child in a typical week, then she is not considered to use interactive shared book reading practices. The 3.5-year measure is based on three items from the survey that asks about the frequency of interactive reading with the child. If the mother indicates that she or someone in the family usually (1) stops reading and asks the child what is in a picture, (2) stops reading and points out letters, or (3) talks about the story and what happened when the book is done, then she is considered to have used interactive shared book reading practices. If the mother says she or someone in the household never or sometimes does all of these when reading to the child, then she is not considered to use interactive shared book reading practices. This measure is included as an exploratory outcome at 2.5 years and 3.5 years.

Average amount of reading to child per day in the past week indicates the average number of minutes the mother or a family member read to the child per day in the past week. It is based on two items from the survey that ask about the frequency of reading in a week and the daily amount of reading. If the mother indicates that she or someone in her family read to the child at least once or twice in the past week for more than zero minutes, then the average amount of reading is equal to the number of minutes provided. If the mother indicates that she or someone in her family read to the child for zero minutes a day on average or indicates that she or a family member did not read to the child at all in the past week, then the average amount of reading is equal to zero minutes. This measure is included as an exploratory outcome at 3.5 years.

Cumulative amount of reading to child in the past week indicates the total number of minutes the mother or a family member read to the child in the past week. It is based on two items from the survey that ask about the frequency of reading in a week and the daily amount of reading. The measure is created by combining the responses to these two items in the following ways:

- If the mother indicates that she or someone in her family read to the child once or twice in the past week, then the cumulative amount of reading to the child is equal to 1.5 multiplied by the number of minutes the mother provided when asked for how many minutes a day she or someone read to the child.

- If the mother indicates that she or someone in her family read to the child three to six times in the past week, then the cumulative amount of reading to the child is equal to 4.5 multiplied by the number of

minutes the mother provided when asked for how many minutes a day she or someone read to the child.

- If the mother indicates that she or someone in her family read to the child seven times in the past week, then the cumulative amount of reading to the child is equal to 7 multiplied by the number of minutes the mother provided when asked for how many minutes a day she or someone read to the child.

- If the mother indicates that she or someone in her family never read to the child or read to the child on average zero minutes a day, then the cumulative amount of reading to the child is equal to zero.

This measure is included as an exploratory outcome at 3.5 years.

Cognitive Stimulation

Frequency of telling stories, saying nursery rhymes, or singing children's songs with child is based on one item from the survey that asks about the frequency that the mother or someone in the household engages in these activities with the child in a typical week. Response options include never, one to two times a week, three to six times a week, and every day. This measure is included as an exploratory outcome at 2.5 years.

While doing everyday things, reads aloud to child is based on one item from the survey with response options ranging from one to four indicating whether the mother reads aloud to the child hardly ever, not very often, fairly often, and most of the time.[4] This measure is included as an exploratory outcome at 2.5 years.

While doing everyday things, talks to child or asks child is based on one item from the survey with response options ranging from one to four indicating whether the mother talks to the child or asks the child questions hardly ever, not very often, fairly often, or most of the time. This measure is included as an exploratory outcome at 2.5 years.

While doing everyday things, counts, sings or says counting rhymes, or uses numbers is based on one item from the survey with response options ranging from one to four indicating whether the mother counts, sings or says counting rhymes or uses numbers hardly ever, not very often, fairly often or most of the time. This measure is included as an exploratory outcome at 2.5 years.

[4]For all parental support for cognitive development outcomes, measures were only created for families in which the mother was available to respond to the survey; therefore, "mother" is used in this section.

Told child a story is based on one item from the survey that asks whether anyone in the mother's family told the child a story in the past week. This measure is included as an exploratory outcome at 3.5 years.

Taught child letters, words, or numbers is based on one item from the survey that asks whether anyone in the mother's family taught the child letters, words, or numbers in the past week. This measure is included as an exploratory outcome at 3.5 years.

Taught child songs or music is based on one item from the survey that asks whether anyone in the mother's family taught the child songs or music in the past week. This measure is included as an exploratory outcome at 3.5 years.

Did arts and crafts with child is based on one item from the survey that asks whether anyone in the mother's family did arts and crafts with the child in the past week. This measure is included as an exploratory outcome at 3.5 years.

Played sports, active games, or exercised together is based on one item from the survey that asks whether anyone in the mother's family played sports, active games, or exercised together with the child in the past week. This measure is included as an exploratory outcome at 3.5 years.

Played board games or did puzzles with child is based on one item from the survey that asks whether anyone in the mother's family played board games or did puzzles with the child in the past week. This measure is included as an exploratory outcome at 3.5 years.

Number of in-home learning activities indicates the number of in-home learning activities someone in the mother's family engaged in with the child in the past week. It is based on six items from the survey that asked whether someone in the mother's family has (1) told the child a story; (2) taught the child letters, words, or numbers; (3) taught the child songs or music; (4) done arts and crafts with the child; (5) played sports, active games, or exercised together; and (6) played board games or did puzzles with the child. If the mother responded to all six items, then the number of in-home learning activities is equal to the number of activities the mother indicated. If the mother responded to five items, then the number of in-home learning activities is equal to the number of activities the mother indicated multiplied by six. If the mother is missing two or more items, then she is missing on this outcome. This measure is included as an exploratory outcome at 3.5 years.

CHILD FUNCTIONING

All the measures in the area of child functioning are included as exploratory outcomes in this report (see Table C.6). All measures are derived from the 3.5-year survey. In the 3.5-year impact analysis, all child functioning measures were designated as exploratory outcomes.[5]

Appendix Table C.6

Designation of Child Functioning Measures at 3.5 Years

Measure	3.5 Years
Early academic skills	
Recognizes all letters of the alphabet	E
Writes letters of own first name	E
Counts up to 20	E
Fine motor skills	
Uses a pencil with proper grip	E
Language expression	
Clearly explains things	E
Self-regulation	
Is able to sit still	E
Is not easily distracted	E
Can keep working at something until finished	E
Follows instructions to complete a simple task	E

SOURCES: Measures are derived from the MIHOPE 3.5-year check-in survey.

NOTES: E = exploratory outcome.
These measures were not examined at study entry, 15 months, and 2.5 years.

Recognizes all letters of the alphabet is based on one item from the survey that asks how many letters the child can recognize. If the respondent indicates that the child can recognize all letters, then the child is considered to be able to recognize all the letters of the alphabet. If the respondent indicates that the child can recognize most, some, or none of the letters, then the child is not considered to be able to recognize all the letters of the alphabet.

Writes letters of own first name is based on one item from the survey that asks whether the child can write their first name even if some of the letters are not quite right or are backwards. If the respondent indicates the child can write their name all of the time, then the child is considered to be able to write

[5]The following measures are constructed in the same way as the measures seen in O'Donnell (2008) and Belfield and Garcia (2014), which were created using the National Household Education Survey: *recognizes all letters of the alphabet*, *write letters of own first name*, and *uses a pencil with proper grip*. *Counts up to 20 or beyond* is constructed in the same way as the measure seen in O'Donnell (2008).

their own first name. If the respondent indicates the child can write their own name most, some, or none of the time, then the child is not considered to be able to write their own first name.

Counts up to 20 or beyond is based on one item from the survey that asks how high the child can count. If the respondent indicates that the child can count up to 20, up to 50, or up to 100 or more, then the child is considered to be able to count up to 20 or beyond. If the respondent indicates that the child cannot count at all, can count up to 5, or can count up to 10, then the child is not considered to be able to count up to 20.

Uses a pencil with proper grip is based on one item from the survey that asks how the child holds a pencil. If the respondent indicates that the child uses their fingers to hold a pencil, then the child is considered to be able to use a pencil with proper grip. If the respondent indicates that the child grips a pencil in their fist or cannot hold a pencil, then the child is not considered to be able to use a pencil with proper grip.

Clearly explains things is based on one item from the survey that asks how often the child can explain things clearly that he or she has seen so that the respondent has a very good idea of what happened. If the respondent indicates that the child can explain things clearly all of the time, then the child is considered to be able to clearly explain things that he or she has seen. If the respondent indicates that the child can explain things clearly most, some, or none of the time, then the child is not considered to be able to clearly explain things that he or she has seen.

Is able to sit still is based on one item from the survey that asks how often the child is able to sit still compared with other children their age. If the respondent indicates that the child can sit still all or most of the time, then the child is considered to be able to sit still. If the respondent indicates that the child can sit still some or none of the time, then the child is not considered to be able to sit still.

Is not easily distracted is based on one item from the survey that asks how often the child is easily distracted. If the respondent indicates that the child is easily distracted some or none of the time, then the child is considered to be not easily distracted. If the respondent indicates the child is easily distracted all or most of the time, then the child is considered to be easily distracted.

Can keep working at something until finished is based on one item from the survey that asks how often the child keeps working at something until they are finished. If the respondent indicates that the child can keep working at something all or most of the time, then the child is considered to be able to keep working at something until finished. If the respondent indicates that the child can keep working at something some or none of the time, then the child is not considered to be able to keep working at something until finished.

Follows instructions to complete a simple task is based on one item from the survey that asks how often the child can follow instructions to complete a simple activity. If the respondent indicates that the

child can follow instructions all or most of the time, then the child is considered to be able to follow instructions to complete a simple task. If the respondent indicates that the child can follow instructions some or none of the time, then the child is not considered to be able to follow instructions to complete a simple task.

Appendix D

Estimated Effects on Exploratory Outcomes at the 2.5-Year and 3.5-Year Check-in Points

This appendix discusses estimated effects of MIECHV-funded evidence-based home visiting on exploratory outcomes in the areas of child health, family economic self-sufficiency, discipline practices and strategies, parental support for cognitive development, and child functioning at the 2.5-year and 3.5-year check-in points. These outcomes were designated as exploratory because of lack of evidence of effects in the MIHOPE 15-month analysis and lack of evidence of effects in prior studies, particularly evidence about the self-reported measures included in the 2.5-year and 3.5-year surveys.

For ease of comparison with the results presented in Chapter 4, the tables in this appendix show results for confirmatory and exploratory outcomes analyzed in these five areas at the 2.5-year and 3.5-year follow-up points.[1] To provide a more complete picture of the effects the MIHOPE study team has found to date, the tables also show results from the 15-month analysis for these measures.

KEY FINDINGS

- There were more statistically significant effects than would be expected by chance across all the exploratory outcomes.

- However, the percentage of exploratory effects that are statistically significant and favorable varied across outcome areas. The percentage of statistically significant favorable effects was lower for the exploratory outcomes in the child health and family economic self-sufficiency areas than for the exploratory outcomes in the discipline practices and strategies, parental support for cognitive development, and child functioning areas.[2]

The next section discusses results for exploratory outcomes in each outcome area.

[1]Because there are no exploratory outcomes related to maternal health, Appendix Table D.1 shows estimated effects only for the confirmatory outcomes related to maternal health that were discussed in Chapter 4.

[2]As discussed in Chapter 4, to provide information on whether the *pattern* of results across all outcomes (confirmatory and exploratory) in each area is statistically significant, the study team also conducted a statistical test for each outcome area to determine the probability that the pattern of results across all outcomes in each area would have been found if home visiting had no effect on these outcomes. The results of these tests suggest statistically significant positive effects for the parental support for cognitive development and child functioning areas (a 1.5 percent probability for the parental support for cognitive development outcomes and a 6.4 percent probability for the child functioning outcomes), but not for the maternal health, child health, family economic self-sufficiency, and discipline practices and strategies areas (the percent probabilities for each area are: 10.8 percent for the family economic self-sufficiency area; 15.0 percent for the discipline practices and strategies; 36.5 percent for the maternal health area; and 44.8 percent for the child health area).

Appendix Table D.1

Estimated Effects on Maternal Health Confirmatory Outcomes at 15 Months, 2.5 Years, and 3.5 Years

Outcome (%)	Program Group	Control Group	Difference (Effect)	Effect Size	P-Value	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
15 months[a]							
New birth after study entry	18.3	17.5	0.8	0.02	0.561	-1.4	3.0
Depressive symptoms	23.5	26.0	-2.5	-0.06	0.074	-4.9	-0.2
Health status self-rated as "poor" or "fair"	17.8	20.4	-2.5	-0.06	0.049	-4.7	-0.4
2.5 years							
New birth after study entry	37.3	37.9	-0.6	-0.01	0.772	-4.2	3.0
Depressive symptoms	30.8	28.6	2.2	0.05	0.253	-1.0	5.4
Health status self-rated as "poor" or "fair"[b]	15.2	12.8	2.5	0.07	0.100	0.0	4.9
3.5 years							
New birth after study entry	46.8	48.6	-1.8	-0.04	0.427	-5.6	2.0
Depressive symptoms	28.8	29.1	-0.3	-0.01	0.864	-3.6	2.9
Health status self-rated as "poor" or "fair"	14.0	12.1	1.9	0.06	0.203	-0.5	4.3
Sample size							
15 months (total = 3,315)	1,648	1,667					
2.5 years (total = 2,090)	1,044	1,046					
3.5 years (total = 1,962)	998	964					

SOURCES: Calculations based on the MIHOPE 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: See Appendix C for descriptions of the outcome measures used.

Rounding may cause slight discrepancies in sums, differences, and confidence interval bounds.

The p-value indicates the likelihood that the estimated effect (or larger) would have been generated by an intervention with zero true effect.

The sample sizes in this table reflect the number of families who responded to each of the surveys. Outcomes may have smaller sample sizes due to item non-response.

"New birth after study entry" was designated as a confirmatory outcome and referred to as "new pregnancy after study entry" in Michalopoulos et al. (2019). "Depressive symptoms" and "health status self-rated as 'poor' or 'fair'" were designated as exploratory outcomes in Michalopoulos et al. (2019).

[a]These outcomes have been shown in previous reports. See Michalopoulos et al. (2019).

[b]The p-value associated with the estimated effect for "health status self-rated as "poor" or "fair" at 2.5 years" is equal to 0.099978197, which rounds to 0.100.

CHILD HEALTH

Appendix Table D.2 shows estimated effects for three exploratory outcomes related to child health that were examined at the 2.5-year and 3.5-year check-in points: whether the child (1) has health insurance

Appendix Table D.2

Estimated Effects on Child Health Outcomes at 15 Months, 2.5 Years, and 3.5 Years

Outcome	Program Group	Control Group	Difference (Effect)	Effect Size	P-Value	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
15 months (%)[a]							
Health insurance coverage for the child	96.8	97.4	-0.6	-0.03	0.354	-1.5	0.4
Had annual well-child visit	96.6	95.8	0.8	0.04	0.210	-0.3	1.9
Primary care provider for the child	88.6	87.6	1.0	0.03	0.362	-0.8	2.8
2.5 years							
Confirmatory							
Number of emergency department visits for accident or injury	0.2	0.2	0.0	0.02	0.606	0.0	0.1
Exploratory (%)							
Health insurance coverage for the child	93.4	93.2	0.2	0.01	0.853	-1.6	2.0
Had annual well-child visit	97.8	96.5	1.3	0.07	0.076	0.1	2.6
Primary care provider for the child	88.4	91.3	-2.9	-0.10	0.031	-5.1	-0.7
3.5 years							
Confirmatory							
Number of emergency department visits for accident or injury	0.1	0.1	0.0	-0.01	0.890	0.0	0.0
Exploratory (%)							
Health insurance coverage for the child	94.5	93.5	1.0	0.04	0.343	-0.8	2.8
Had annual well-child visit	97.2	97.3	-0.1	0.00	0.934	-1.3	1.2
Primary care provider for the child	90.4	90.2	0.2	0.01	0.892	-2.1	2.4
Sample size							
15 months (total = 3,315)	1,648	1,667					
2.5 years (total = 2,090)	1,044	1,046					
3.5 years (total = 1,962)	998	964					

SOURCES: Calculations based on the MIHOPE 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: See Appendix C for descriptions of the outcome measures used.

Rounding may cause slight discrepancies in sums, differences, effect sizes, and confidence interval bounds.

The p-value indicates the likelihood that the estimated effect (or larger) would have been generated by an intervention with zero true effect.

The sample sizes in this table reflect the number of families who responded to each of the surveys. Outcomes may have smaller sample sizes due to item non-response.

In this table, the 15-month "health insurance coverage for the child" and "child had annual well-child visit" outcomes are measured using only 15-month survey data, whereas, in Michalopoulos et al. (2019), these outcomes were measured using both 15-month survey data and Medicaid enrollment data and only Medicaid claims data, respectively. The outcomes are presented using only survey data so that the measurement is comparable to the measurement of the 2.5-year and 3.5-year outcomes. In Michalopoulos et al. (2019), "health insurance coverage for the child" and "number of Medicaid-paid well-child visits" outcomes were designated as confirmatory while the "primary care provider for the child" outcome was designated as exploratory.

The 15-month estimated effects presented in this table are similar to the estimated effects in Michalopoulos et al. (2019) in that none of the estimated effects are statistically significant. The estimated effect for the outcome "child had annual well-child visit" is favorable, whereas the estimated effect for the outcome "number of Medicaid-paid well-child visits" is not favorable.

[a]These outcomes have been shown in previous reports. See Michalopoulos et al. (2019).

coverage, (2) had their annual well-child visit, and (3) has a primary care provider. At the 2.5-year check-in point, there was a statistically significant positive effect on having an annual well-child visit, a statistically significant negative effect on having a primary care provider, and the effect on health insurance coverage was not statistically significant. Estimated effects on these outcomes were not statistically significant at the 3.5-year check-in point.

As discussed in Chapter 3, nearly all program and control group children had health insurance coverage at each time point, and rates of having an annual well-child visit are above 95 percent at the 2.5-year and 3.5-year check-in points. About 90 percent of children in the program and control groups had a primary care provider at both check-in points. These high rates observed across both study groups at the 2.5-year and 3.5-year follow-up points are consistent with high rates seen at the MIHOPE 15-month follow-up. At all three MIHOPE follow-up points there was little room for home visiting programs to have an effect on these outcomes.

FAMILY ECONOMIC SELF-SUFFICIENCY

Appendix Table D.3 shows estimated effects for five exploratory outcomes related to family economic self-sufficiency: (1) increases in education level since study entry, and receipt of four public assistance benefits, (2) Supplemental Nutrition Assistance Program (SNAP), (3) disability insurance, (4) Temporary Assistance for Needy Families (TANF) and (5) the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

At the 2.5-year check-in point, there were three statistically significant effects across these five exploratory outcomes, with program group families faring better than control group families on two and control group families faring better than program group families on one. Specifically, program group families reported receiving SNAP benefits and WIC benefits at rates that were statistically significantly lower than control group families, but a greater percentage of women in the control group reported an increase in their level of education since study entry than women in the program group. Although the percentage of women in the program group who reported increases in education level is lower than the control group at both check-in points, higher percentages of women in the program group reported pursuing education or training; this apparent inconsistency may be because women had not yet finished their degrees and moved to a new education level at the time they completed the surveys.

In contrast to the statistically significant effects, both positive and negative, observed at the 2.5-year check-in point, there were no statistically significant effects at the 3.5-year check-in point. Taken together, these results suggest that home visiting did not affect economic self-sufficiency outcomes at these two time points.

Appendix Table D.3

Estimated Effects on Family Economic Self-Sufficiency Outcomes at 15 Months, 2.5 Years, and 3.5 Years

Outcome (%)	Program Group	Control Group	Difference (Effect)	Effect Size	P-Value	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
15 months [a]							
Pursuing education or training	23.4	22.8	0.5	0.01	0.706	-1.8	2.9
Received any public assistance during the past month							
Supplemental Nutrition Assistance Program	57.6	59.0	-1.4	-0.03	0.343	-3.9	1.0
Disability insurance	7.7	8.0	-0.3	-0.01	0.705	-1.7	1.1
Temporary Assistance for Needy Families	15.1	14.9	0.2	0.01	0.858	-1.7	2.1
Women, Infants, and Children	71.4	71.3	0.1	0.00	0.952	-2.5	2.6
2.5 years							
Confirmatory							
Pursuing education or training	24.0	22.7	1.3	0.03	0.486	-1.8	4.4
Exploratory							
Increase in education level since study entry	22.5	26.1	-3.6	-0.08	0.044	-6.5	-0.7
Received any public assistance during the past month							
Supplemental Nutrition Assistance Program	56.2	60.1	-3.8	-0.08	0.047	-7.0	-0.7
Disability insurance	8.6	7.8	0.8	0.03	0.462	-1.0	2.6
Temporary Assistance for Needy Families	10.1	11.6	-1.6	-0.05	0.240	-3.8	0.6
Women, Infants, and Children	55.5	60.7	-5.3	-0.11	0.013	-8.8	-1.8
3.5 years							
Confirmatory							
Pursuing education or training	21.0	19.5	1.5	0.04	0.411	-1.5	4.5
Exploratory							
Increase in education level since study entry	25.0	25.9	-1.0	-0.02	0.600	-4.0	2.0
Received any public assistance during the past month							
Supplemental Nutrition Assistance Program	52.3	52.8	-0.5	-0.01	0.784	-3.8	2.7
Disability insurance	8.3	8.8	-0.5	-0.02	0.653	-2.4	1.4
Temporary Assistance for Needy Families	9.2	9.5	-0.3	-0.01	0.798	-2.4	1.8
Women, Infants, and Children	50.3	52.4	-2.1	-0.04	0.332	-5.8	1.5
Sample size							
15 months (total = 3,315)	1,648	1,667					
2.5 years (total = 2,090)	1,044	1,046					
3.5 years (total = 1,962)	998	964					

SOURCES: Calculations based on the MIHOPE family baseline survey, 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: See Appendix C for descriptions of the outcome measures used.

Rounding may cause slight discrepancies in sums, differences, and confidence interval bounds.

The p-value indicates the likelihood that the estimated effect (or larger) would have been generated by an intervention with zero true effect.

The sample sizes in this table reflect the number of families who responded to each of the surveys. Outcomes may have smaller sample sizes due to item non-response.

"Pursuing education or training" was designated as a confirmatory outcome in Michalopoulos et al. (2019). The four outcomes related to "received any public assistance during the past month" were designated as exploratory outcomes.

[a]These outcomes have been shown in previous reports. See Michalopoulos et al. (2019).

DISCIPLINE PRACTICES AND STRATEGIES

Parenting practices related to discipline strategies are proximal targets of home visiting programs. To help parents provide sensitive and competent caregiving and to reduce child maltreatment, home visitors commonly give parents information on positive parenting practices, which may be reflected in the discipline practices that parents report using with their children and the discipline strategies that they endorse as children age. Appendix Table D.4 shows estimated effects for two exploratory outcomes measured at both 2.5 and 3.5 years related to discipline practices and strategies: (1) use of physical discipline and (2) an index of discipline strategies. The measure of physical discipline incorporates parents' reports of spanking from a survey question that asked how frequently parents use various discipline practices and from a survey question that asked about parents' endorsements of hitting that asked parents which discipline strategies they would use in a hypothetical situation.[3] The index of discipline strategies is a measure of the severity of the discipline strategies parents endorsed in response to the question about a hypothetical situation in which the child hit the parent, with the least severe response strategies coded as a level one and the most severe strategies (hitting or spanking the child) coded as a level three.

There was only one statistically significant positive effect on one of these outcomes at one time point; specifically, parents in the program group reported significantly lower rates of the use of physical discipline than parents in the control group at the 2.5-year check-in point. However, the impact on this outcome at the 3.5-year check-in point was not statistically significant. There were also no statistically significant effects on the endorsement of discipline strategies at either check-in point; the average discipline response endorsed by parents in both the program and control groups was between mild (level one; including sending the child to their room and sending the child to timeout or sitting the child down) to moderate (level two; including yelling at the child). Adding to the mixed MIHOPE evidence on these physical discipline behaviors, the minor physical assault outcome (which included parents' reports of hitting and spanking) that was examined when MIHOPE children were 15 months of age also did not find significant effects.

PARENTAL SUPPORT FOR COGNITIVE DEVELOPMENT

Appendix Table D.5 shows estimated effects for the 18 examinations of exploratory outcomes related to parental support for cognitive development, which are divided into the areas of the home literacy environment and cognitive stimulation. Some outcomes examined in this area at the 2.5-year check-in

[3]This measurement is consistent with the physical discipline composite that Bodovski and Youn (2010) created using two similar discipline items from the ECLS-K.

point were not the same as those examined at the 3.5-year check-in point given the different developmental stages of the children at those two time points.

Appendix Table D.4

Estimated Effects on Discipline Practices and Strategies Outcomes at 15 Months, 2.5 Years, and 3.5 Years

Outcome	Program Group	Control Group	Difference (Effect)	Effect Size	P-Value	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
15 months [a]							
Frequency of yelling	1.5	1.7	-0.2	-0.07	0.040	-0.3	0.0
Any use of physical discipline (%)	43.5	45.3	-1.8	-0.04	0.296	-4.6	1.0
2.5 years							
Confirmatory							
Use of yelling (%)	54.3	56.9	-2.7	-0.05	0.227	-6.3	1.0
Exploratory							
Any use of physical discipline (%)	26.7	31.9	-5.2	-0.11	0.011	-8.5	-1.8
Index of discipline strategies	1.6	1.6	0.0	-0.05	0.225	-0.1	0.0
3.5 years							
Confirmatory							
Use of yelling (%)	57.5	58.2	-0.8	-0.02	0.732	-4.4	2.9
Exploratory							
Any use of physical discipline (%)	28.9	30.8	-1.9	-0.04	0.358	-5.3	1.5
Index of discipline strategies	1.6	1.6	0.0	0.00	0.982	-0.1	0.1
Sample size							
15 months (total = 3,315)	1,648	1,667					
2.5 years (total = 2,090)	1,044	1,046					
3.5 years (total = 1,962)	998	964					

SOURCES: Calculations based on the MIHOPE 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: See Appendix C for descriptions of the outcome measures used.

Rounding may cause slight discrepancies in sums, differences, effect sizes, and confidence interval bounds.

The p-value indicates the likelihood that the estimated effect (or larger) would have been generated by an intervention with zero true effect.

The sample sizes in this table reflect the number of families who responded to each of the surveys. Outcomes may have smaller sample sizes due to item non-response.

The 15-month "frequency of yelling" outcome is measured using one item from the "frequency of psychological aggression during the past year" outcome shown in Michalopoulos et al. (2019). The 15-month "any use of physical discipline" outcome is a combination of the items used to measure two outcomes presented in Michalopoulos et al. (2019): "frequency of minor physical assault during the past year" and "severe or very severe physical abuse during the past year." The 15-month "frequency of minor physical assault during the past year" and "frequency of psychological aggression during the past year" outcomes were designated as confirmatory, and "severe or very severe physical abuse during the past year" was designated as exploratory.

The 15-month estimated effects presented in this table are similar to the estimated effects in Michalopoulos et al. (2019). There is a favorable, statistically significant effect on "frequency of psychological aggression during the past year," which remains when looking at "frequency of yelling." The estimated effects on "frequency of minor physical assault during the past year" and "severe or very severe physical abuse during the past year" are not statistically significant.

[a]These outcomes have been shown in previous reports. See Michalopoulos et al. (2019).

Appendix Table D.5

Estimated Effects on Parental Support for Cognitive Development Exploratory Outcomes at 15 Months, 2.5 Years, and 3.5 Years

Outcome	Program Group	Control Group	Difference (Effect)	Effect Size	P-Value	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
Home literacy environment							
15 months (%)[a]							
Reads to child at least 3 times per week	69.8	67.4	2.4	0.05	0.160	-0.4	5.3
2.5 years (%)							
Reads to child at least 3 times per week	73.9	73.1	0.8	0.02	0.671	-2.3	4.0
Uses interactive shared book reading practices when reading to child	68.8	64.2	4.6	0.10	0.028	1.2	8.1
3.5 years							
Reads to child at least 3 times per week (%)	73.8	71.1	2.7	0.06	0.196	-0.7	6.0
Uses interactive shared book reading practices when reading to child (%)	85.8	85.5	0.3	0.01	0.848	-2.4	3.0
Average amount of reading to child per day in the past week (minutes)	22.8	21.1	1.6	0.09	0.064	0.2	3.1
Cumulative amount of reading to child in the past week (minutes)	112.6	106.0	6.5	0.06	0.214	-2.1	15.2
Cognitive stimulation							
2.5 years (%)							
Frequency of telling stories, saying nursery rhymes, or singing children's songs with child					0.562		
Never	2.2	2.1	0.1				
1 or 2 times a week	16.3	14.9	1.4				
3 to 6 times a week	22.3	24.9	-2.6				
Every day	59.2	58.1	1.1				
While doing everyday things							
Reads aloud to child					0.135		
Hardly ever	5.4	4.1	1.3				
Not very often	14.9	13.6	1.3				
Fairly often	29.2	33.5	-4.2				
Most of the time	50.5	48.8	1.7				
Talks to child or asks child questions					0.300		
Hardly ever	1.4	1.0	0.4				
Not very often	3.6	5.2	-1.6				
Fairly often	23.4	24.2	-0.7				
Most of the time	71.5	69.6	1.9				
Counts, sings, says counting rhymes, or uses numbers					0.905		
Hardly ever	0.8	0.5	0.3				
Not very often	2.9	2.8	0.1				
Fairly often	25.8	25.6	0.2				
Most of the time	70.4	71.0	-0.6				

(continued)

Appendix Table D.5 (continued)

Outcome	Program Group	Control Group	Difference (Effect)	Effect Size	P-Value	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
3.5 years							
In-home learning activities completed in the past week (%)							
Told child a story	89.3	86.9	2.4	0.07	0.116	-0.1	4.9
Taught child letters, words, or numbers	96.6	96.8	-0.2	-0.01	0.811	-1.6	1.2
Taught child songs or music	93.3	92.9	0.4	0.01	0.764	-1.6	2.3
Did arts and crafts with child	94.2	89.5	4.7	0.15	0.000	2.6	6.7
Played sports, active games, or exercised together	92.3	91.2	1.0	0.04	0.412	-1.1	3.1
Played board games or did puzzles with child	69.4	67.1	2.3	0.05	0.288	-1.3	5.9
Total number of in-home learning activities completed in the past week	5.4	5.2	0.1	0.10	0.019	0.0	0.2
Sample size							
15 months (total = 2,976)	1,482	1,494					
2.5 years (total = 2,090)	1,044	1,046					
3.5 years (total = 1,962)	998	964					

SOURCES: Calculations based on the MIHOPE 15-month follow-up survey, 15-month in-home assessment, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: See Appendix C for descriptions of the outcome measures used.
Distributions may not add to 100 percent because of rounding.
Rounding may cause slight discrepancies in sums, differences, and confidence interval bounds.
The p-value indicates the likelihood that the estimated effect (or larger) would have been generated by an intervention with zero true effect.
The sample sizes in this table reflect the number of families who responded to each of the surveys. Outcomes may have smaller sample sizes due to item non-response.
The 15-month "reads to child at least 3 times per week" outcome was measured using one item from the parental support for learning and literacy outcome shown in Michalopoulos et al. (2019). "Parental support for learning and literacy" was designated as an exploratory outcome in Michalopoulos et al. (2019).
The estimated effect for "parental support for learning and literacy" as shown in Michalopoulos et al. (2019) was favorable and statistically significant. The estimated effect for "reads to child at least 3 times per week" is favorable; however, it is not statistically significant.
[a]These outcomes
have been shown in previous reports. See Michalopoulos et al. (2019).

Home Literacy Environment

Reading to young children is important for the acquisition of language and literacy skills and provides opportunities to expose children to vocabulary and concepts that are not found in everyday conversations.[4] Further, earlier onset of shared reading with toddlers is associated with better language and literacy outcomes at older ages.[5] Two home literacy environment outcomes were examined at the 2.5 and 3.5-year check-in points: reading to the child at least 3 times per week and the use of interactive

[4]Wasik et al. (2016); Mol, Bus, DeJong, and Smeets (2008).

[5]Dunst, Simkus, and Hamby (2012).

shared book reading practices. At the 3.5-year check-in point, two additional home literacy environment outcomes that measured the quantity of time spent reading were examined: the average amount of reading to child per day in the past week, and the cumulative amount of reading to child in the past week.

MIHOPE families in both the program and control groups demonstrated fairly high levels of home literacy practices, in both the frequency and quantity of reading to their children. Close to three-quarters of children were read to at least three times per week, and there are no significant differences between the MIHOPE program and control group parents in the frequency of reading to the child at either check-in point.[6] Although this reading frequency is fairly high, it is not as frequent as the rates the Early Head Start Family and Child Experiences Study (Baby FACES) found for families of 3-year-olds participating in Early Head Start in 2011 and 2012. Baby FACES found that about 90 percent of 3-year-olds were read to at least once a day.[7]

When families in MIHOPE reported on the quantity of time spent reading to their children at the 3.5-year check-in point, both parents in the program and control group reported reading at least 20 minutes a day, on average, which is the amount of daily reading typically encouraged by schools for children in kindergarten. However, when comparing the quantity of reading between the MIHOPE program and control group parents at the 3.5-year check-in point, the findings are not entirely consistent. There was a statistically significant impact, with program group parents reporting reading to their children for a greater number of minutes per day on average than control group parents, yet the effect on the cumulative amount of reading in a week was not statistically significant. The cumulative amount of reading in a week outcome was constructed by multiplying the daily average of reading minutes by the frequency of reading per week (which was based on categories that reflect ranges of days).[8]

While the frequency of and quantity of time spent reading to children is important for their development of early language and literacy, *how* an adult reads to a child can set a foundation for learning to read by contributing to a child's awareness of the meaning of text and the ability to understand printed or written material.[9] The 2.5-year and 3.5-year check-in surveys asked parents to report how often they engaged

[6]There were also no significant differences between the groups when comparing the percentage of parents who read to their children *every day* in a typical week at the 2.5-year follow-up (both rates were 44 percent). This is about 10 percentage points lower than the parents of 2-year-olds who participated in the Early Head Start Research Evaluation Project (EHSREP; Love et al., 2001).

[7]Though the data from Baby FACES (Vogel et al., 2015) was collected during similar time points and at similar ages to the MIHOPE families in the 3-year check-in point, all the participants in Baby FACES were enrolled in center-based or combination options of Early Head Start or in Early Head Start-Home-based option (which was a model examined in MIHOPE). As seen in Table 3.1, only 36 percent of children in MIHOPE were enrolled in center-based care at the 3.5-year check-in point.

[8]Since the construction of this measure required extrapolation from the categories used to determine the frequency of reading per week, it may not be as sensitive as a more detailed cumulative measure in which respondents tracked the total amount of daily reading with the child in a log for an entire week.

[9]Dunst et al. (2012).

in a variety of interactive shared book reading practices, which typically involve an adult reading a book to the child and engaging the child with the text by asking the child questions, providing explanations about the story, and encouraging the child to point to pictures, letters, words, or attempt to read.[10] However, given the brevity of the check-in surveys, parents were not comprehensively asked about all possible interactive shared book reading practices.[11]

Program group parents reported engaging in these reading practices more often with their children when they were approximately 2.5 years of age than control group parents, as evidenced by the statistically significant impact at the 2.5-year check-in point. However, at the 3.5-year check-in point, no statistically significant difference was observed between the program and control groups, as parents in both groups reported using interactive shared book reading practices at similar rates.

Cognitive Stimulation

Home literacy practices represent only one way that parents engage in stimulating activities with their young children. Toddlers and preschool children who experience enriching activities at home benefit from greater language, literacy, and cognitive skills at school entry.[12] Parents were asked how often they engaged in other stimulating in-home activities with their young children. At the 2.5-year check-in point, the four cognitive stimulation outcomes measured the frequency that parents told stories, sang songs, counted, and spoke to their children in stimulating ways while doing everyday things. At the 3.5-year check-in point, the seven cognitive stimulation outcomes measured the frequency that parents: (1) told the child a story; (2) taught the child letters, words, or numbers; (3) taught the child songs or music; (4) did arts and crafts with the child; (5) played sports, active games, or exercised together; and (6) played board games or did puzzles with the child, plus a composite of the total number of in-home learning activities completed in the past week.

At the 2.5-year check-in point, there were no statistically significant impacts on the ways in which parents engaged with their children through telling stories, singing songs, counting, or speaking to them in stimulating ways while doing everyday things.

However, there was a statistically significant impact at the 3.5-year check-in point, with program group parents reporting a higher total number of in-home learning activities completed in the past week than control group parents. Additionally, although the program group rates were higher or roughly the same as the control group rates for all the activities, the only individual activity for which there was a statistically significant effect was parents' reports of doing arts and crafts with their children in the past week.

[10]Dunst et al. (2012).

[11]See Appendix C for a description of how the outcomes were constructed.

[12]Bodovski and Farkas (2008); Rodriguez and Tamis-LeMonda (2011).

CHILD FUNCTIONING

Appendix Table D.6 shows estimated effects for nine outcomes related to children's early academic skills, fine motor skills, language expression, and behavioral self-regulation, all of which were only examined at the 3.5-year check-in point since the items used were drawn from a national survey conducted with children who were at least 3 years of age.[13] While assessing preschool children's functioning at 3.5 years of age via a small number of parent-reported survey items presents a limited understanding of development at that age, the results nonetheless provide a snapshot in a few domains of children's development.

Appendix Table D.6

Estimated Effects on Child Functioning Outcomes at 3.5 Years

Outcome (%)	Program Group	Control Group	Difference (Effect)	Effect Size	P-Value	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
Early academic skills							
Recognizes all letters of the alphabet	19.3	20.1	-0.8	-0.02	0.636	-3.8	2.1
Writes letters of own first name	8.2	9.2	-1.0	-0.04	0.412	-3.1	1.0
Counts up to or beyond 20	48.5	51.1	-2.7	-0.05	0.227	-6.3	1.0
Fine motor skills							
Uses a pencil with proper grip	71.1	70.2	0.9	0.02	0.667	-2.5	4.3
Language expression							
Clearly explains things	44.7	46.8	-2.1	-0.04	0.353	-5.8	1.6
Self-regulation							
Is able to sit still	47.6	42.2	5.3	0.11	0.016	1.7	9.0
Is not easily distracted	69.8	69.0	0.8	0.02	0.709	-2.7	4.2
Can keep working at something until finished	54.2	49.5	4.7	0.09	0.039	1.0	8.5
Follows instructions to complete a simple task	74.1	70.6	3.5	0.08	0.085	0.2	6.8
Sample size (total = 1,962)	998	964					

SOURCE: Calculations based on the MIHOPE 3.5-year check-in survey.

NOTES: See Appendix C for descriptions of the outcome measures used.

Rounding may cause slight discrepancies in sums, differences, and confidence interval bounds.

The p-value indicates the likelihood that the estimated effect (or larger) would have been generated by an intervention with zero true effect.

The sample size in this table reflects the number of families who responded to the 3.5-year survey. Outcomes may have smaller sample sizes due to item non-response.

[13]Among families who participated in the 2.5-year follow-up, children were on average 2.8 years of age (2 years and almost 10 months of age), and children's ages ranged from a little over 2 years of age to almost 3.5 years of age. About 75 percent of children were between 2.5 and 3 years of age. Among families who participated in the 3.5-year follow-up, children were on average 3.8 years of age (3 years and almost 10 months of age), ranging from a little over 3 years of age to almost 5 years of age. About 82 percent of children were between 3.5 and 4 years of age.

There were no significant differences between the program and control group on outcomes related to children's early academic skills, fine motor skills, or language expression. With regards to early academic skills, the children in the MIHOPE sample were similar to a national household sample of children who were 3 years of age in 2007 in being able to recognize all letters of the alphabet and being able to count up to or beyond 20.[14] Yet children in both the program and control groups were much less likely to be able to write the letters in their names (the national rate was 34 percent, compared to between 8 percent and 10 percent of children in MIHOPE). The children in MIHOPE were also less likely to use a pencil with proper grip (the national rate was 83 percent, compared to between 70 percent and 72 percent of children in MIHOPE).

While there were no statistically significant estimated impacts on these three domains of children's development (early academic skills, fine motor skills, and language expression), there were statistically significant effects on three of the four behavioral self-regulation measures related to children's attention and ability to control impulses: parents' endorsements of children's ability to sit still, keep working at something until finished, and follow instructions to complete a simple task. These types of skills are important for children's ability to engage in educational content once they transition to school and whether they exhibit greater academic skills in kindergarten and later grades.[15]

CONCLUSION

This appendix described the results of the exploratory outcomes that were analyzed to examine the effects of home visiting at the 2.5-year and 3.5-year check-in points in the areas of child health, family economic self-sufficiency, discipline practices and strategies, parental support for cognitive development, and child functioning. There were more statistically significant effects than would be expected by chance across all the exploratory outcomes. However, the percentage of exploratory effects that are statistically significant varied across outcome areas. The percentage of statistically significant effects was lower for the exploratory outcomes in the child health and family economic self-sufficiency areas than for the exploratory outcomes in the discipline practices and strategies, parental support for cognitive development, and child functioning areas.

[14]National Household Education Surveys Program of 2007; O'Donnell (2008).

[15]Blair (2002); Blair and Razza (2007); Duncan et al. (2007).

Appendix E

Sensitivity Test Analyses

This appendix presents several sensitivity checks to the main analyses presented in Chapter 3 and Chapter 4 of this report to ensure that the results shown in these chapters are not sensitive to the analytic decisions made by the team.

The sensitivity test analyses conducted include:

- An analysis of life circumstances of program group families limited to the sample of families who responded to all four surveys (baseline, 15-month follow-up, 2.5-year follow-up, and 3.5-year follow-up). The analysis presented in Chapter 3 uses all families who responded at each time point, meaning the characteristics measured at 15 months, 2.5 years, and 3.5 years may not be measured for the same families. This sensitivity check that limits the analysis to the families who responded to all four of the surveys assesses whether the changes in life circumstances of program group families are caused by the sample changing over time or true changes in circumstances over time.

- Effect estimates for 2.5-year and 3.5-year confirmatory outcomes that are not adjusted for family baseline characteristics. This sensitivity check assesses whether the estimated effects at 2.5 years and 3.5 years presented in Chapter 4 are different when the effects are not adjusted for families' baseline characteristics.

- An analysis using multiple imputations to fill in missing survey data on 2.5-year and 3.5-year confirmatory outcomes. The analysis of confirmatory outcomes at 2.5 years and 3.5 years presented in Chapter 4 uses data for families who responded to the surveys. This sensitivity check imputes missing data for families who did not respond to the surveys and assesses whether the estimated effects at 2.5 years and 3.5 years are affected by survey nonresponses.

- Effect estimates for 2.5-year and 3.5-year confirmatory outcomes limited to families who responded to all follow-up survey waves. The analysis presented in Chapter 4 uses data for all families who responded to each time point. This sensitivity check limits the sample to families who responded to all four surveys (baseline, 15-month follow-up, 2.5-year follow-up, and 3.5-year follow-up). This assesses whether any differences in the effects at 15 months, 2.5 years, and 3.5 years are due to the sample changing over time or by true changes in the effects.

- Estimated effects on 2.5-year and 3.5-year confirmatory outcomes adjusted for multiple hypotheses using the Benjamini-Hochberg method.[1] This sensitivity check adjusts each of the 12 p-values associated with the estimated effects on confirmatory outcomes at 2.5 years and 3.5 years according to the number of tests that were conducted. Given that 12 tests were conducted, it would be expected that 10 percent (or about one) of the tests would show statistical significance by chance if, in fact, there were no actual differences.

[1]See Benjamini and Hochberg (1995).

The results of the sensitivity checks listed above tell a similar story to the description of life circumstances discussed in Chapter 3 and effects on confirmatory outcomes discussed in Chapter 4 and therefore suggest that the findings are not affected by the analytical decisions made by the study team.

LIFE CIRCUMSTANCES OF PROGRAM GROUP FAMILIES WHO RESPONDED TO ALL SURVEY WAVES

An analysis of life circumstances of program group families limited to families who responded to all survey waves is presented in Appendix Table E.1. This analysis corresponds to Table 3.1, which examined life circumstances for a larger portion of the program group sample. The samples for each time point in Table 3.1 differ from one another and include the full respondent sample at each time point, whereas the analysis presented in Appendix Table E.1 limits the sample to families who responded to all three follow-up surveys: the 15-month survey, 2.5-year survey, and 3.5-year survey. This makes up 36 percent of the full program group sample.

As described in Chapter 3, the findings shown in Appendix Table E.1 are generally consistent with the findings shown in Table 3.1. Although the levels of some of the measures differ slightly between the sample of families who responded to all three follow-ups and the respondent sample at each follow-up, the trends across time are similar between the two samples. As a result, the findings presented in Chapter 3—that program group family characteristics remained fairly similar over time on most measures and that there were positive trends on education and public assistance receipt at later time points—hold true regardless of whether using the full sample of program group families who responded at each time point or limiting the sample to program group families who responded to all four surveys, from baseline to 3.5 years.

ESTIMATED EFFECTS ON CONFIRMATORY OUTCOMES UNADJUSTED FOR FAMILY BASELINE CHARACTERISTICS

Appendix Table E.2 shows effect estimates for the 2.5-year and 3.5-year confirmatory outcomes that are not adjusted for family baseline characteristics (whereas the effect estimates for the main analysis shown in Chapter 4 are adjusted using these characteristics). The results in Appendix Table E.2 are generally consistent with the estimated effects shown in Chapter 4; none of the estimated effects are statistically significant in Appendix Table E.2, and only one of the estimated effects shown in Chapter 4 is statistically significant. This suggests that the estimated effects are not impacted by the adjustment for family baseline characteristics.

Appendix Table E.1

Selected Life Circumstances of Program Group Families Who Responded at 15 Months, 2.5 Years, and 3.5 Years

Measure (%)	Study Entry	15 Months	2.5 Years	3.5 Years
Maternal health				
New birth after study entry	NA	15.9	36.3	45.9
Depressive symptoms	32.9	22.2	29.4	28.8
Health status self-rated as "poor" or "fair"	11.4	18.4	14.4	14.0
Child health				
Health insurance coverage for the child	NA	97.7	93.9	94.9
Had annual well-child visit	NA	97.0	97.8	97.5
Primary care provider for the child	NA	89.8	90.0	91.0
Any emergency department visits	NA	61.3	39.9	41.5
Health status rated by caregiver as "poor" or "fair"	NA	2.2	2.1	2.0
Family economic self-sufficiency				
Use of nonparental child care	NA	51.8	52.4	59.6
Use of center-based child care	NA	16.5	19.1	34.3
Use of home-based child care	NA	40.2	33.3	25.1
Has help paying for child care	NA	NA	15.4	17.0
Pursuing education or training	22.8	24.0	24.3	21.6
Highest education level				
High school equivalent or less than a high school diploma	34.9	27.2	25.6	24.0
High school diploma and no college	32.9	38.2	30.0	30.4
Some college or more	32.2	34.7	44.4	45.6
Received any public assistance during the past month				
Supplemental Nutrition Assistance Program	60.1	60.1	57.3	52.5
Disability insurance	17.2	8.1	9.0	8.8
Temporary Assistance for Needy Families	16.7	13.6	10.1	9.2
Women, Infants, and Children	79.2	77.4	59.7	53.2
Sample size (total = 763)				

SOURCES: Calculations based on the MIHOPE family baseline survey, 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: See Appendix C for descriptions of the measures used.
NA = not available.
Child health and child care measures are labeled as not available at study entry because only 36 percent of women in the program group sample who responded to all surveys had given birth prior to study entry.
Distributions may not add to 100 percent because of rounding.
The sample size in this table reflects the number of program group families who responded to the 15-month survey, 2.5-year survey, and 3.5-year survey. Some measures in the table may have smaller sample sizes due to item non-response.

Covariates in the regression adjustment are the same as those used in the MIHOPE 15-month analysis and include the following maternal characteristics: age; race, ethnicity, and place of birth; depression or anxiety; food security; education; substance use before pregnancy; marital status; number of children in the household; perpetration of physical violence; experience of physical or sexual violence; whether the mother was receiving education or training; employment; receipt of benefits from the Supplemental Nutrition Assistance Program, Supplemental Security Income, Temporary Assistance for Needy Families, or the Special Supplemental Nutrition Program for Women, Infants, and Children; verbal

Appendix Table E.2

Non-Regression-Adjusted Estimated Effects on Confirmatory Outcomes at 2.5 Years and 3.5 Years

Outcome	Program Group	Control Group	Difference (Effect)	Effect Size	P-Value	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
Maternal health (%)							
New birth after study entry at 2.5 years	37.6	37.6	0.0	0.00	0.997	-3.6	3.6
New birth after study entry at 3.5 years	46.8	48.5	-1.7	-0.03	0.465	-5.6	2.1
Depressive symptoms at 2.5 years	30.2	29.2	1.0	0.02	0.610	-2.3	4.4
Depressive symptoms at 3.5 years	28.6	29.3	-0.7	-0.02	0.740	-4.1	2.7
Health status self-rated as "poor" or "fair" at 2.5 years	14.7	13.3	1.4	0.04	0.379	-1.2	3.9
Health status self-rated as "poor" or "fair" at 3.5 years	13.8	12.2	1.6	0.05	0.304	-1.0	4.2
Child health							
Number of emergency department visits for accident or injury at 2.5 years	0.2	0.2	0.0	0.02	0.625	0.0	0.1
Number of emergency department visits for accident or injury at 3.5 years	0.1	0.1	0.0	0.00	0.940	0.0	0.0
Family economic self-sufficiency (%)							
Pursuing education or training at 2.5 years	23.7	23.1	0.6	0.01	0.753	-2.5	3.7
Pursuing education or training at 3.5 years	21.2	19.4	1.8	0.05	0.325	-1.2	4.9
Discipline practices and strategies (%)							
Use of yelling at 2.5 years	53.8	57.4	-3.5	-0.07	0.107	-7.2	0.1
Use of yelling at 3.5 years	57.0	58.7	-1.6	-0.03	0.470	-5.4	2.1
Sample size							
2.5 years (total = 2,090)	1,044	1,046					
3.5 years (total = 1,962)	998	964					

SOURCES: Calculations based on the MIHOPE 2.5-year check-in survey and 3.5-year check-in survey.

NOTES: See Appendix C for descriptions of the outcome measures used.
Rounding may cause slight discrepancies in sums, differences, and confidence interval bounds.
The p-value indicates the likelihood that the estimated effect (or larger) would have been generated by an intervention with zero true effect.
The sample sizes in this table reflect the number of families who responded to each of the surveys. Outcomes may have smaller sample sizes due to item non-response.

abstract reasoning; previous arrest; health status, childbearing intentions; health insurance coverage; smoking before pregnancy; previous receipt of behavioral health services; intention to breastfeed (if pregnant); whether the mother was pregnant when she entered the study; maternal body mass index; receipt of domestic violence services; whether any child had involvement with child welfare services; relationship quality; English proficiency; empathy; experience with battering; verbal skills; home interior; parental warmth; lack of hostility; mastery; and which home visiting program enrolled the mother. Covariates also included child sex and, for children who were born before they entered the study, child temperament, whether the child had a usual source of care, whether the child had poor health at birth, and the child's age at enrollment.

ANALYSIS USING MULTIPLE IMPUTATIONS TO FILL IN MISSING DATA

Appendix Table E.3 shows estimated effects on the 2.5-year and 3.5-year confirmatory outcomes for the full MIHOPE sample, using multiple imputations to fill in missing survey data for sample members who did not complete follow-up surveys. The findings using the imputed data are similar to those presented in Chapter 3, but the estimated effects are somewhat smaller (0.00 to 0.04 in the imputed analysis, as opposed to 0.01 to 0.07 in the main analysis). These smaller effects are to be expected as the sample size increases. Nonetheless, the findings do not seem to be affected by the 51 percent response rate to the 2.5-year survey nor the 48 percent response rate to the 3.5-year survey.

Appendix Table E.3

Estimated Effects on Confirmatory Outcomes at 2.5 Years and 3.5 Years Calculated with Multiple Imputation

Outcome	Program Group	Control Group	Difference (Effect)	Effect Size	P-Value	90% Confidence Interval Lower Bound	90% Confidence Interval Upper Bound
Maternal health (%)							
New birth after study entry at 2.5 years	35.7	36.2	-0.6	-0.01	0.730	-3.2	2.1
New birth after study entry at 3.5 years	44.8	46.3	-1.5	-0.03	0.391	-4.3	1.4
Depressive symptoms at 2.5 years	29.6	30.3	-0.7	-0.01	0.657	-3.1	1.8
Depressive symptoms at 3.5 years	28.5	29.3	-0.8	-0.02	0.635	-3.4	1.9
Health status self-rated as “poor” or “fair” at 2.5 years	15.3	14.7	0.6	0.02	0.626	-1.4	2.6
Health status self-rated as “poor” or “fair” at 3.5 years	14.8	14.2	0.6	0.02	0.583	-1.3	2.5
Child health							
Number of emergency department visits for accident or injury at 2.5 years	0.2	0.2	0.0	0.01	0.878	0.0	0.0
Number of emergency department visits for accident or injury at 3.5 years	0.1	0.1	0.0	0.00	0.908	0.0	0.0
Family economic self-sufficiency (%)							
Pursuing education or training at 2.5 years	22.2	21.7	0.5	0.01	0.724	-1.9	2.9
Pursuing education or training at 3.5 years	20.0	19.5	0.6	0.01	0.704	-1.9	3.0
Discipline practices and strategies (%)							
Use of yelling at 2.5 years	52.6	54.6	-2.0	-0.04	0.245	-4.8	0.8
Use of yelling at 3.5 years	54.7	55.0	-0.3	-0.01	0.875	-3.2	2.7
Sample size							
2.5 years (total = 4,112)	2,045	2,067					
3.5 years (total = 4,110)	2,045	2,065					

SOURCES: Calculations based on the MIHOPE 2.5-year check-in survey and 3.5-year check-in survey.

NOTES: See Appendix C for descriptions of the outcome measures used.
Rounding may cause slight discrepancies in sums, differences, and confidence interval bounds.
The p-value indicates the likelihood that the estimated effect (or larger) would have been generated by an intervention with zero true effect.

ESTIMATED EFFECTS ON CONFIRMATORY OUTCOMES FOR FAMILIES WHO RESPONDED TO ALL SURVEY WAVES

Appendix Table E.4 shows estimated effects on 2.5-year and 3.5-year confirmatory outcomes for the sample of families who responded to all follow-up survey waves (the 15-month survey, the 2.5-year survey, and the 3.5-year survey). In contrast, the sample for the main analysis presented in Chapter 4 is the full respondent sample at each time point (for example, all families who responded to the 2.5-year survey are used in the analysis of 2.5-year outcomes.) In general, the findings are similar when using the full respondent samples compared with limiting the sample to those who responded to each of the surveys. The findings from the main analysis (of the full respondent samples at each point, shown in Table 4.4) and the sensitivity analysis of the consistent respondent sample (shown in Appendix Table E.4) are similar, and the statistical significance levels of only two of the 2.5-year and 3.5-year confirmatory outcomes differ (the 2.5-year use of yelling outcome and the 2.5-year health status outcome). Overall, the findings do not seem to be affected by the sample of families used in the analyses, so, as was concluded in the main analysis, this suggests that home visiting did not have effects on the confirmatory outcomes at 2.5 years or 3.5 years.

ESTIMATED EFFECTS ON CONFIRMATORY OUTCOMES AT 2.5 YEARS AND 3.5 YEARS ADJUSTED FOR MULTIPLE COMPARISONS

The number of statistically significant effects observed among the 2.5-year and 3.5-year confirmatory outcomes (1 of 12) is consistent with the number that would be expected if there were no real differences between the program and control groups—if home visiting had no effects on these outcomes. As shown in Appendix Table E.5, when the p-values are adjusted upwards, the Benjamini-Hochberg multiple comparisons adjustment results in none of the estimated effects being statistically significant.

Appendix Table E.4

Estimated Effects on Confirmatory Outcomes for Families Who Responded at 15 Months, 2.5 Years, and 3.5 Years

Outcome	Program Group	Control Group	Difference (Effect)	Effect Size	P-Value	90% Confidence Interval	
						Lower Bound	Upper Bound
Maternal health (%)							
New birth after study entry at 15 months	16.1	14.9	1.1	0.03	0.552	-2.0	4.2
New birth after study entry at 2.5 years	35.9	34.6	1.2	0.03	0.623	-2.9	5.3
New birth after study entry at 3.5 years	45.9	46.0	-0.2	0.00	0.949	-4.4	4.1
Depressive symptoms at 15 months	23.0	23.1	-0.1	0.00	0.951	-3.5	3.3
Depressive symptoms at 2.5 years	29.9	28.4	1.5	0.03	0.521	-2.3	5.2
Depressive symptoms at 3.5 years	28.9	28.6	0.3	0.01	0.896	-3.4	4.0
Health status self-rated as “poor” or “fair” at 15 months	18.9	18.7	0.2	0.00	0.928	-3.0	3.3
Health status self-rated as “poor” or “fair” at 2.5 years	14.8	12.4	2.4	0.07	0.162	-0.4	5.3
Health status self-rated as “poor” or “fair” at 3.5 years	13.7	11.9	1.8	0.06	0.289	-1.0	4.6
Child health							
Number of emergency department visits for accident or injury at 2.5 years	0.2	0.2	0.0	0.07	0.256	0.0	0.1
Number of emergency department visits for accident or injury at 3.5 years	0.1	0.1	0.0	0.02	0.758	0.0	0.0
Family economic self-sufficiency (%)							
Pursuing education or training at 15 months	23.8	21.5	2.3	0.06	0.284	-1.2	5.8
Pursuing education or training at 2.5 years	24.6	23.4	1.2	0.03	0.603	-2.5	4.8
Pursuing education or training at 3.5 years	21.6	20.0	1.6	0.04	0.446	-1.9	5.1
Discipline practices and strategies							
Frequency of yelling at 15 months	1.6	1.7	-0.1	-0.05	0.263	-0.3	0.1
Use of yelling at 2.5 years (%)	54.0	59.4	-5.3	-0.11	0.038	-9.6	-1.1
Use of yelling at 3.5 years (%)	57.6	59.9	-2.3	-0.05	0.373	-6.5	1.9
Sample size (total = 1,524)	763	761					

SOURCES: Calculations based on the MIHOPE 15-month follow-up survey, 2.5-year check-in survey, and 3.5-year check-in survey.

NOTES: See Appendix C for descriptions of the outcome measures used.

Rounding may cause slight discrepancies in sums, differences, effect sizes, and confidence interval bounds.

The p-value indicates the likelihood that the estimated effect (or larger) would have been generated by an intervention with zero true effect.

The sample size in this table reflects the number of families who responded to the 15-month survey, 2.5-year survey, and 3.5-year survey. Some measures in the table may have smaller sample sizes due to item non-response.

Appendix Table E.5

Estimated Effects on Confirmatory Outcomes at 2.5 Years and 3.5 Years with Unadjusted P-Values and P-Values Adjusted for Multiple Comparisons

Outcome	Unadjusted P-Value	Adjusted P-Value
Maternal health (%)		
New birth after study entry at 2.5 years	0.772	0.890
New birth after study entry at 3.5 years	0.427	0.833
Depressive symptoms at 2.5 years	0.253	0.759
Depressive symptoms at 3.5 years	0.864	0.890
Health status self-rated as "poor" or "fair" at 2.5 years	0.100	0.759
Health status self-rated as "poor" or "fair" at 3.5 years	0.203	0.759
Child health		
Number of emergency department visits for accident or injury at 2.5 years	0.606	0.890
Number of emergency department visits for accident or injury at 3.5 years	0.890	0.890
Family economic self-sufficiency (%)		
Pursuing education or training at 2.5 years	0.486	0.833
Pursuing education or training at 3.5 years	0.411	0.833
Discipline practices and strategies (%)		
Use of yelling at 2.5 years	0.227	0.759
Use of yelling at 3.5 years	0.732	0.890
Sample size		
2.5 years (total = 2,090)		
3.5 years (total = 1,962)		

SOURCES: Calculations based on the MIHOPE 2.5-year and 3.5-year check-in surveys.

NOTES: See Appendix C for descriptions of the outcome measures used.

The p-value was calculated using the Benjamini-Hochberg method. See Benjamini and Hochberg (1995).

The sample sizes in this table reflect the number of families who responded to each of the surveys. Outcomes may have smaller sample sizes due to item non-response.

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