

Linking Process Indicators to Outcomes in Evaluations of Home Visiting Programs

Evaluation Brief

Design Options for Home Visiting Evaluation

March 2021

Introduction

Home visiting programs seek to improve the lives of children and families in areas such as maternal and child health, school readiness and achievement, and economic self-sufficiency.¹ Awardees supported with grants from the Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program implement one or more evidence-based models shown to achieve outcomes for families.² MIECHV also supports research and evaluation activities that build knowledge about the implementation and effectiveness of home visiting services and that examine how programs can improve short-term and long-term outcomes for families.

This evaluation brief defines measures of home visiting services called process indicators, describes how process indicators link to short- and long-term outcomes in home visiting evaluations, and provides an example illustrating the role of process indicators in evaluations.

An awardee examining how a home visiting program can improve outcomes for families may focus on linking process indicators (specifically measures related to program activities, services, and work performed) to short-term outcomes. Examples of short-term outcomes include positive parenting practices, sensitive caregiving of infants and children, or parental knowledge of child development. Other outcomes of home visiting programs studied in MIECHV evaluations may take several years to achieve.³ When a process indicator is linked to a short-term outcome that is then linked—either through existing research or evaluation activities—to a longer-term outcome, evaluation findings can indicate that a program is on track to achieve longer-term goals (e.g., reducing cases of substantiated child maltreatment, improving school performance).⁴

How can process indicators be useful in home visiting evaluations?

- || Process indicators linked to outcomes can show whether a program is on track to achieve intended outcomes.
- || Process indicators can help to identify key program activities or “active ingredients” that lead to change.
- || Testing linkages between process indicators and outcomes can enhance understanding of how to improve family outcomes and which activities work for which families.
- || Testing linkages and sharing findings can expand the evidence base in home visiting research.

Identifying linkages between process indicators and outcomes can help programs understand which activities help all families or different types of families. Sharing evaluation findings allows other awardees to replicate and confirm the impact of process indicators on short- or long-term outcomes, verify common measures to include in future evaluations, and provide greater evidence for what works in home visiting.

This brief outlines the advantages of linking process indicators to outcomes. It is important to remember, however, that demonstrating that process indicators *cause* outcomes may only be possible under highly controlled evaluation designs such as randomized controlled trials.

Defining Process Indicators

Process indicators for a particular program often are articulated in the program's logic model, which illustrates the expected relationships among components of the program. Inputs, activities, outputs, and outcomes are terms commonly used in home visiting and public health research. They may be applied somewhat differently across the research and may be adjusted to the specific needs of the study or evaluation plan.

Inputs refer to funding, staff, partners, external influences, participants, and implementation systems (e.g., supports like training and supervision).⁵ With sufficient and appropriate inputs, programs can engage in a variety of activities designed to bring about change for participating families.

Activities are core services and practices of the program, including activities that staff engage in both with and without families.⁶ For example, staff training is an activity.

Outputs are products of the activities or measures of the work performed.⁷ They may include counts of types, levels, and targets of services, staff training, referrals for services, and participant engagement.

Outcomes are the ultimate targets programs hope to affect, such as participant knowledge, behavior, health, or well-being.

Exhibit 1 on the next page illustrates the level of precision needed when defining process indicators by comparing basic and well-specified versions of activities and outputs. A basic definition of an activity may address staff training as measured by the basic output, the number of staff trained. However, that may be insufficient to indicate whether the activity was completed or to reasonably account for changes in outcomes. A more precise, well-specified definition of the activity could focus on specific training on a parenting curriculum. A well-specified output could assess the number of staff trained on the curriculum within 6 weeks of hire or the percentage of staff scoring above a certain threshold on a comprehension test following training.

In short, process indicators—activities and outputs in logic models—reflect the actions taken by program staff and the results of those actions. Process indicators capture practical information about how a program functions, the dosage of services delivered, and whether the program is being implemented with fidelity, or as intended. This information can help identify the mechanisms of change or active ingredients for families, i.e., *how* the program affects outcomes or *why* it does not.⁸ For example, if a family is not screened for needs (the activity), referral to appropriate resources (the output) is unlikely. Importantly, the relationships between process indicators and outcomes often are informed by a theory of change.

Exhibit 1. Examples of Variations When Defining Activities and Outputs

Activity: Basic	Activity: Well specified	Output: Basic	Output: Well specified
Staff training	Staff training on parenting curriculum	Number of staff trained on parenting curriculum	<ul style="list-style-type: none"> • Proportion of staff trained on the curriculum within 6 weeks of hire • Proportion of staff certified to use parenting curriculum before serving clients
Parent screenings	Screenings of parents for basic needs such as food, housing, and medical care	Number of parents screened	<ul style="list-style-type: none"> • Number of parents screened at time of enrollment • Number of screens entered in data system within 24 hours
Referrals	Referrals of parents for needed services such as food, housing, and medical care	Number of referrals provided to parents after screening	<ul style="list-style-type: none"> • Time between screenings and parent referrals to services • Proportion of parents who received referrals for needs indicated by screenings

Theories of Change and Logic Models

Both theories of change and logic models provide information about a program and inform the selection of process indicators and outcomes. A theory of change can inform a logic model by depicting the intended relationships among the program’s resources, services, and anticipated changes in outcomes. The result is called a theory-based logic model.⁹

A theory of change describes how a program can achieve its goals by articulating the pathways between program activities and expected outcomes. Theories of change may be written or visual, such as a paragraph describing how program services will improve outcomes for families, or a chart illustrating the different pathways families may take. A theory of change provides a high-level overview of how a program is expected to work.

A logic model provides detailed information about the program design. A logic model is a systematic and visual representation of the program components, including inputs, activities, outputs, and short- and long-term outcomes. Logic models can change and evolve over time as programs change. Shifts in community resources or priorities, the need for additional staff training, and even advances in technology may affect how services are delivered. Logic models should be revisited regularly and updated to reflect these changes.

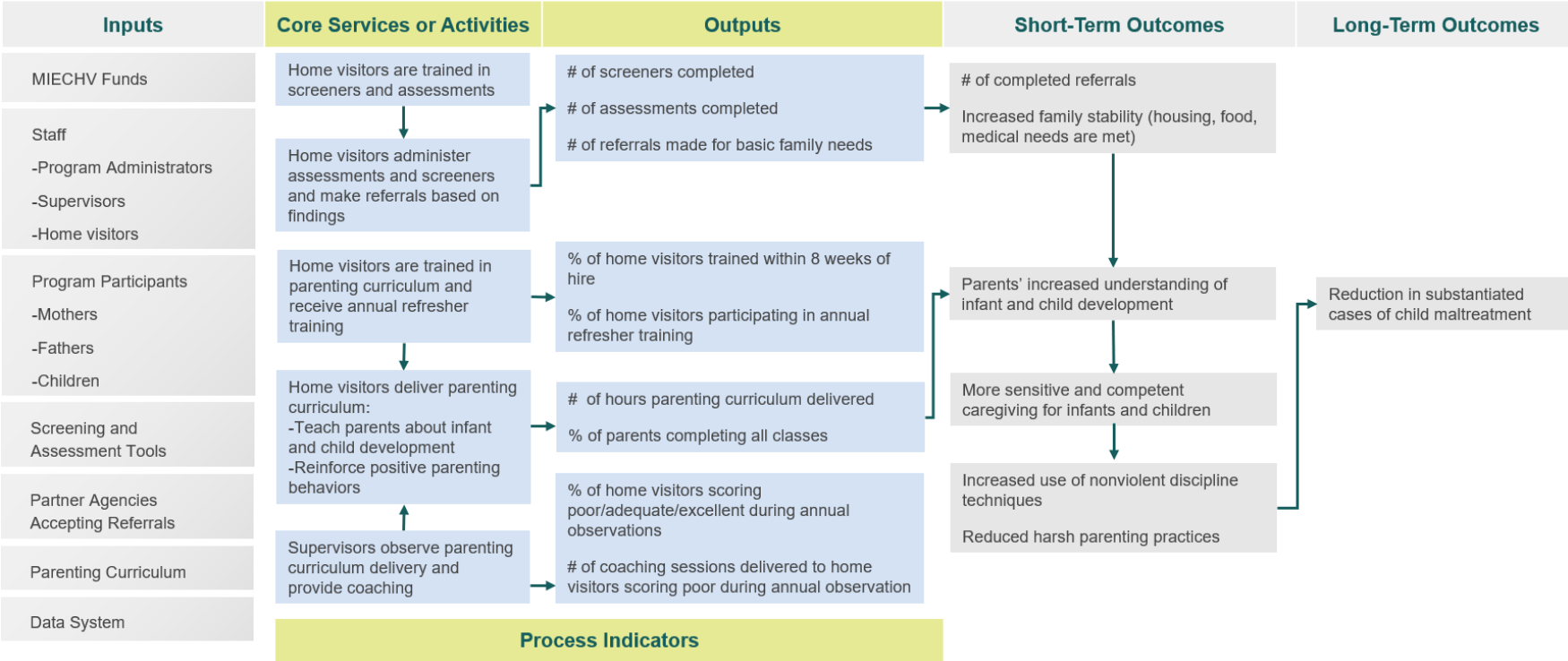
Selected Key Terms

- ||| **Theory of change:** A written or visual description of how a program will achieve its goals; articulates the pathways between program activities and expected outcomes.
- ||| **Logic model:** A systematic and visual representation of the program components, including inputs, activities, outputs, and short- and long-term outcomes.
- ||| **Theory-based logic model:** A depiction of the intended relationships among the available program resources, activities, and anticipated changes or results, and between process indicators and outcomes.

Example Project

To illustrate how process indicators can be used in evaluations, we will use a hypothetical home visiting program designed to reduce child maltreatment. The program includes delivery of a parenting curriculum by home visitors, assessments of parenting practices and knowledge of child development, and parent referrals to needed services. Its goals are to improve parents' overall caregiving competence and to teach effective discipline strategies. The theory of change for the program states, "If parents are screened for basic needs (e.g., housing, food, medical) and receive services to address those needs, then they will have the capacity to engage in a parenting curriculum. If well-trained, well-supported home visitors provide a parenting curriculum, then parents will be more sensitive and competent in their caregiving, ultimately reducing the incidence of substantiated cases of child maltreatment." Exhibit 2 is the program's theory-based logic model, which is informed by the theory of change and highlights pathways to change and relationships between logic model components.

Exhibit 2. Logic Model for the Example Project: Reducing Child Maltreatment



A **theory-based logic model** brings together these two distinct but related tools used by home visiting programs to provide an enhanced understanding of how program components may improve outcomes for children and families. A strong theory-based logic model can help identify the most important process indicators and how they relate to the desired outcomes, thus helping stakeholders visually connect daily work to desired long-term outcomes.¹⁰ Research by Segal et al. found that home visiting programs that aligned their theory of change, logic model, targeted populations, and program components were more likely to achieve success than programs that did not align these components.¹¹ For additional information on theories of change and logic models, see the resources provided at the end of this brief.

Specifying Process Indicators

Specifying the process indicators thought to lead to change (i.e., the active ingredients in an intervention) begins with examining the logic model and the existing research to describe their linkages with outcomes.¹² It is important to specify process indicators that are supported by program theory and that connect activities and outputs to desired outcomes. If available, research that defines process indicators and links them to outcomes of interest can provide a starting point to consider ways of measuring process indicators and the most promising outcomes to assess in an evaluation. Without available evidence linking process indicators to outcomes, programs can rely on sound theoretical models relevant to the area of study, including research and evaluation in public health, child development, and other areas.

Exhibit 3 identifies several programmatic activities and outputs, including training of home visitors on the parenting curriculum, delivery of the curriculum to parents, and coaching of home visitors by supervisors. Measuring each of these process indicators allows researchers to better determine which elements of an intervention drive changes in outcomes.

Exhibit 3. Process Indicators for the Example Project: Reducing Child Maltreatment

Activities	Outputs
Training of home visitors on screening and assessment instruments	Number (or rate) of completed screenings, assessments, and referrals
Screenings, assessments, and referrals by home visitors	Percentage of home visitors trained on parenting curriculum within 8 weeks of hire
Training of home visitors on curriculum	Percentage of parents completing all parenting classes
Delivery of parenting curriculum	Home visitors' ratings on delivery of parenting curriculum
Coaching of home visitors by supervisors	Percentage of required coaching sessions held by supervisors

Process indicators should be specific, observable, and measurable. Process indicators are well specified when they align with the research questions and are detailed enough to be clearly differentiated from other activities and outputs. It is also important to avoid specifying process indicators that may be difficult to observe, such as changes in opinions or feelings. Finally, process indicators must be measurable. There must be a clear way to tell whether an activity happened or an output was produced, and a way to quantify or describe the occurrence.

When specifying outputs, consider dosage, including the duration, frequency, and quantity of services delivered. By carefully specifying the process indicators of activities and outputs, programs are positioned to (1) measure how well it was implemented, (2) assess whether the program is on track to achieve outcomes, and (3) link process indicators and outcomes.

Short-Term and Long-Term Outcomes

Outcomes can be short term, intermediate, or long term,¹³ depending on the logic model, study design, and timeline. For example, parenting practices at 12 months after program entry may be the primary outcome of interest in a 2-year study, but it may be considered a short-term outcome or may help describe the relationship between a process indicator and long-term outcome in a 4-year study.

Exhibit 4 illustrates short-term outcomes of interest, including positive and harsh parenting practices, as indicated in the logic model in exhibit 1. The long-term outcome is reduction in child maltreatment. For this example, the short-term outcomes are measured at 12 months, and the long-term outcome is assessed at 48 months.

Exhibit 4. Short- and Long-Term Outcomes for the Example Project: Reducing Child Maltreatment

Short-term outcomes (12 months)	Short-term measures
Sensitive and competent caregiving of infants and children	<ul style="list-style-type: none"> • Percentage of parents reporting increase in praising child accomplishments • Percentage of parents reporting giving child extra privilege for good behavior
Use of nonviolent discipline techniques	<ul style="list-style-type: none"> • Percentage of parents reporting increase in use of timeouts • Percentage of parents reporting taking away privileges for inappropriate behavior
Use of harsh parenting practices	<ul style="list-style-type: none"> • Percentage of parents reporting decrease in use of spanking, slapping, or hitting child
Long-term outcome (48 months)	Long-term measure
Child maltreatment	<ul style="list-style-type: none"> • Substantiated Child Protective Services reports

Assessing Long-Term Outcomes

Some outcomes of home visiting and early childhood programs take several years to achieve. Ideally programs could test long-term outcomes but using evaluations to assess program impacts on long-term outcomes presents challenges. First, in the process of collecting data at multiple points in time to demonstrate that long-term outcomes are a result of the program, awardees should consider logistical issues (e.g., access to timeline and data) and resource issues (e.g., funding for follow-up study). For some measures, administrative data are available to assess the linkages between early process indicators and long-term outcomes. Other measures may be incomplete, not part of routine data collection, or limited in terms of subgroup analyses. Second, some measures may not be available through existing data sources and require tracking families over a long period of time, which can be resource intensive in terms of the staff time and funding needed to maintain or re-establish contact with families. Third, it may be easier to directly link program activities to shorter-term outcomes than to longer-term outcomes because other factors or activities could arise during a longer period of time. For example, a home visitor training program may be more strongly associated with parenting practices at 12 months than with parenting practices at 48 months, as parents and children are exposed to other early childhood programs (e.g., Head Start or other preschool programs) or parenting guidance.

The use of existing research that establishes significant associations between process indicators and long-term outcomes provides an opportunity to build on what is known. When awardees can demonstrate that a home

visiting program is predictive of short-term outcomes—that are in turn known to be predictive of longer-term outcomes—they can use the findings on short-term outcomes to indicate whether they are on track to achieve desired results. This allows a more rapid assessment of the program than waiting to measure the long-term outcome. One challenge with this approach is that, for some measures, there may not be evidence to link home visiting process indicators and long-term outcomes or to link short-term outcomes and long-term outcomes. For example, some home visiting models have reported impacts on long-term outcomes, though links with process indicators or short-term outcomes may not have been tested.¹⁴

Studies of long-term outcomes can make use of multiple cohorts and data sources, inclusion of intermediate outcomes, and a focus on the same research questions across more than one evaluation cycle to establish a link to long-term outcomes. For example, multiple cohorts within an evaluation can assess different relationships (e.g., process indicator to short-term outcome, short-term outcome to long-term outcome) to show connections among a process indicator, short-term outcome, and long-term outcome. Some awardees have used multiple evaluation cycles to establish links between measures. For example, one evaluation may look at an association between a process indicator and a short-term outcome, and the next evaluation may continue by examining the next step identified in the logic model.

Linking Process Indicators to Outcomes

When evidence linking process indicators and outcomes is limited, evaluations are needed to establish the evidence and expand the understanding of how programs achieve outcomes. Evidence produced from evaluations linking process indicators and outcomes also may provide support for the relationships identified or proposed in the program’s logic model and theory of change, and it may demonstrate to funders and other stakeholders that program components can successfully achieve desired outcomes.

Research shows that when the theory of change, logic model, program objectives, and population of interest are aligned (or have coherence), a program is more likely to show achievement of specific outcomes.¹⁵ This alignment is important for evaluations assessing the linkages between process indicators and outcomes, as it optimizes the ability to identify significant associations between the indicators and outcomes and to interpret the results to benefit families receiving home visiting services.

Testing linkages requires a clear statement of the relationships of interest. Clear and measurable research questions that indicate how process indicators relate to outcomes and that are drawn from a theory-based logic model define the relationships to be studied and reinforce alignment of the evaluation components. Once research questions are established, relevant existing research can help identify sources of process indicators, including administrative data such as staff, participant, or service records; measures used in other studies; standardized screenings; or data collection methods.^{16, 17}

What can evaluations that find linkages between process indicators and outcomes offer?

- ▶ Evidence in support of the logic model and theory of change
- ▶ Information about the extent to which program components, objectives, and population are aligned/coherent
- ▶ Evidence that program components can be successful in achieving desired outcomes

Exhibit 5 articulates the research questions for the example project. The questions link process indicators to short-term outcomes and indicate the relationships of interest. For resources on research questions, study designs, and analyses, see the resources provided at the end of this brief.

Exhibit 5. Carefully Specified Research Questions for the Example Project: Reducing Child Maltreatment

Process indicators to outcomes	Research question
Output to short-term outcome	Do families whose home visitors receive more training and supervision use less harsh/more positive parenting practices at 12 months after the birth of their child compared to families whose home visitors receive less training and supervision?
Output to short-term outcome	Do parents who complete all parenting classes show an increased understanding of infant and child development compared to parents who do not complete all parenting classes?
Output to long-term outcome	Do families whose home visitors perform better in annual observations have fewer substantiated reports of child maltreatment at 48 months compared to those with home visitors who perform more poorly on annual observations?

Key Takeaways

Evaluations that link process indicators to outcomes have the potential to be useful tools for awardees assessing home visiting implementation. Demonstrating linkages between process indicators and outcomes can show whether an intervention is on track to achieve desired long-term outcomes. Finally, testing the links between process indicators and outcomes can add to evidence-based findings of the effectiveness of home visiting programs.

The use of process indicators to examine linkages begins with a theory of change outlining how program activities lead to outcomes. To increase the likelihood of demonstrating successful program results, a well-developed, theory-based logic model that specifies the process indicators and short- and long-term outcomes is recommended. Research questions informed by the theory-based logic model and previous research can then be developed to assess how process indicators are associated with outcomes.

Focusing on the linkages between process indicators and outcomes and using methods that allow moving beyond a one-size-fits-all to a more precise approach will help awardees, model developers, and other stakeholders better understand what works and for whom. This approach can be used in multiple evaluation designs, including studies to identify the active ingredients of a home visiting program, rapid cycle evaluations, and pay for outcomes research. More specific home visiting evaluation findings will allow awardees to better serve children and families while making the best use of limited resources.

Resources

Theory of Change and Logic Models

- [Formative Evaluation Toolkit: A Step-by-Step Guide and Resources for Evaluating Program Implementation and Early Outcomes](#). Provides tools for refining a theory of change and logic model.
- [Tribal TANF–Child Welfare Coordination: Theory of Change and Logic Models](#). Provides an overview of key concepts and strategies for creating a theory of change and logic model.
- [Planning for Success: Mapping Goals, Services, and Outcomes for Program Improvement](#). Reviews the development and use of logic models to improve program quality.
- [Using Logic Models to Bring Together Planning, Evaluation, and Action: Logic Model Development Guide](#). Provides instructions for developing and using a logic model and theory of change.

Research Questions

- [Continuous Quality Improvement Toolkit: A Resource for Maternal, Infant, and Early Childhood Home Visiting Program Awardees](#). Includes the SMART (Specific, Measurable, Attainable, Relevant, and Timebound) framework for generating research questions.
- [The PII Approach: Building Implementation and Evaluation Capacity in Child Welfare](#). Provides a description of the PICO (Population, Intervention, Comparison and Outcome) approach.
- [Using PICO To Build an Evaluation Question](#). Describes how to use PICO to develop questions.

Home Visiting Research

- [The Home Visiting Applied Research Collaborative \(HARC\)](#). Research network to strengthen home visiting using precision home visiting.
- [Home Visiting Evidence of Effectiveness](#). Reviews the effectiveness of home visiting research literature.

Evaluation Design

- [Selecting an Evaluation Approach](#). Discusses programmatic and contextual factors to consider when choosing an evaluation design
- [Challenges in Assessing the Process-Outcome Link in Practice](#). Discusses considerations when conducting analyses on linkages between process indicators and outcomes and how challenges affect the interpretation of findings.
- [Child and Family Program Evaluation: Learning to Enjoy Complexity](#). Proposes a five-tiered approach to evaluation from descriptive and process-oriented information to establishing impacts.
- [Conducting Randomized Controlled Trials in Child Welfare Practice Settings](#). Provides an overview of RCTs and their value in child welfare practice settings. It highlights common challenges and possible solutions informed by grantees' experiences.
- [Quasi-Experimental Design](#). Outlines design, measurement and statistical issues that must be considered prior to the conduct of a quasi-experimental evaluation.

Mediators and Moderators

- [Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations](#). Provides a compendium of analytic procedures appropriate for moderator and mediator distinctions.
- [Mediation Analysis](#). Outlines differences between mediating variables and confounders, moderators, and covariates. Describes statistical methods to assess mediation and modern comprehensive approaches.
- [Innovative Research Methods to Advance Precision in Home Visiting for More Efficient and Effective Programs](#). Proposes four pillars of research that will help achieve precision home visiting services.
- [A General Model for Testing Mediation and Moderation Effects](#). Describes methods for testing mediation and moderation effects in a dataset, both together and separately.

Practical Uses of Process Indicators in Home Visiting Evaluations

- [Exploring Active Ingredients](#). Explains how testing linkages between process indicators and outcomes can provide greater precision in targeting services for different types of families and help identify the active ingredients of an intervention.
- [Rapid Cycle Evaluation at a Glance](#). Reviews how rapid cycle evaluation methods can be used to assess the effectiveness of program components, including process indicators, and provide timely and ongoing feedback to program staff to improve program effectiveness.
- [Planning for a Pay for Outcomes Approach in Home Visiting](#). Explores how awardees pursuing a pay for outcomes initiative may evaluate the linkages between process indicators and outcomes to demonstrate a quicker return on investment than measuring outcomes alone.

References

- ¹ McCombs-Thornton, K., Park, C., Higman, S., Kelley, A., & Cachat, P. (2020). *Planning for a pay for outcomes approach in home visiting*. OPRE Report No. 2019-1234. Office of Planning, Research, and Evaluation, Administration for Children and Families, U. S. Department of Health and Human Services
- ² Social Security Act, Title V, Section 511 (42 USC 711) as amended by the Patient Protection and Affordable Care Act, P.L. 111-148, §2951m 124 Stat 334-343.
- ³ Michalopoulos, C., Crowne, S., Portilla, X., Lee, H., Filene, J., Duggan, A., & Knox, V. (2019). *A summary of results from the MIHOPE and MIHOPE-Strong Start studies of evidence-based home visiting*. OPRE Report 2019-09. Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.
- ⁴ Centers for Disease Control and Prevention. (2016). *Indicators: CDC approach to evaluation*. <https://www.cdc.gov/eval/indicators/index.htm>
- ⁵ McCawley, P. (2001). *The logic model for program planning and evaluation*. University of Idaho Extension. <https://www.extension.uidaho.edu/publishing/pdf/CIS/CIS1097.pdf>.
- ⁶ W.K. Kellogg Foundation. (2006). *Using logic models to bring together planning, evaluation, and action: Logic model development guide*. <https://www.wkkgf.org/resource-directory/resource/2006/02/wk-kellogg-foundation-logic-model-development-guide>
- ⁷ James Bell Associates. (2018). *Guide to data-driven decision making: Using data to inform practice and policy decisions in child welfare organizations*. Children's Bureau, Administration for Children and Families, U. S. Department of Health and Human Services.
- ⁸ Yarbrough, K. (2003). Planning for success: Mapping goals, services, and outcomes for program improvement. *Birth to 5 Best Practices*, 2. Ounce of Prevention Fund.
- ⁹ W.K. Kellogg Foundation, 2006.
- ¹⁰ Ingoldsby, E., Morrison, C., Ruben, J., Melz, H., & Cairone, K. (2019). Using logic models grounded in theory of change to support trauma-informed initiatives. Trauma-informed approaches: Connecting research, policy, and practice to build resilience in children and families (ASPE Issue Brief). Submitted to the Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services. <https://www.jbassoc.com/resource/using-logic-models-grounded-in-theory-of-change-to-support-trauma-informed-initiatives/>
- ¹¹ Segal, L., Sara Opie, R., & Dalziel, K. (2012). Theory! The missing link in understanding the performance of neonate/infant home-visiting programs to prevent child maltreatment: A systematic review. *The Milbank Quarterly*, 90(1), pp.47-106.
- ¹² Supplee, L. & Duggan, A. (2019). Innovative research methods to advance precision in home visiting for more efficient and effective programs. *Child Development Perspectives*, 13(3), 173–179.
- ¹³ McCawley, 2001.
- ¹⁴ Home Visiting Evidence of Effectiveness (HOMVEE). <https://homvee.acf.hhs.gov/>
- ¹⁵ Segal et al, 2012.
- ¹⁶ Yarbrough, 2003.
- ¹⁷ Centers for Disease Control and Prevention, 2016.

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