

# **Mother and Infant Home Visiting Program Evaluation (MIHOPE)**

## **Implementation Study**

### **Research Questions and Preliminary Analysis Plans**

**September 21, 2015**

The legislation authorizing the Maternal, Infant, and Early Childhood Home Visiting Program (MIECHV or the Home Visiting Program) required an evaluation (a.k.a., MIHOPE) to assess the overall effects of early childhood home visiting on child and parent outcomes with respect to each benchmark area and outcome specified in the legislation (as shown in Table 1 of the overview memo) and to assess effectiveness across programs and participants. In addition, one of the goals of the evaluation is to provide a systematic study of program implementation. The implementation study is a mixed-methods investigation with three major objectives:

#### *Quantitative:*

1. To describe the services received by the MIHOPE program group
2. To identify factors that help explain the observed variation in service delivery, which could potentially influence program impacts

#### *Qualitative:*

3. To shed additional light on why program services vary across families from the perspectives of home visiting staff

This memo aims to bring Committee members up-to-date on our progress and current thinking on translating the study objectives into analytic questions. The memo primarily focuses on our approach to measuring and describing what services families receive, and our strategy for analyzing how programmatic factors at multiple levels explain variation in services.

The memo is organized as follows. First, we present a series of questions that we are seeking advice on from Committee members. Next, we give a brief overview of the various data sources available for the implementation study. Third, we provide more detail on our key research questions and proposed framework for explaining service delivery. Fourth, our proposed measures of service delivery (outputs) are presented and discussed. (More detailed information about how the team is identifying and measuring the implementation characteristics (inputs) of interest is provided in the Implementation Analysis Appendices). A description of our analytic approach to the quantitative data is then provided. Finally, the memo ends by presenting plans for analyzing the qualitative interview data among a subsample of program staff.

## Questions for the Committee

We are especially interested in the Committee's thoughts on the following issues:

- We seek the Committee's feedback on the particular topics we propose to address through analyses linking various inputs (that is, family, staff, local program, community, and national model characteristics) to the outputs of service-delivery. We have identified a set of core issues to highlight in the report, with the understanding that many different types of questions and relationships could be examined with the rich data available. These topics include:
  - To what extent do home visitors tailor services and what organizational and individual level factors influence this?
  - How does home visitor attachment style influence service delivery?
  - How does organizational social context influence service delivery?
  - How do components of the service plan and implementation system interact as influences on service delivery?
  - How do organizational arrangements and staff perceptions influence referral to community resources?
  - How do MIECHV outcome priorities influence service delivery?

Do you agree that these are the most critical/important topics to focus on in the implementation report? What other topics, or variations on these, do you see as important to address in the analyses?

- The implementation study will examine both general service delivery (for example, dosage and participant responsiveness) and two types of outcome-specific service delivery measures: topics discussed and content-specific referral receipt. For outcome-specific service delivery, there are 13 different outcomes or program priorities that could be examined in MIHOPE. These priority goals or outcomes align with the broader outcome domains noted in the authorizing legislation (such as prenatal, maternal and newborn health, child health and development, and family economic self-sufficiency). However, examining the two specific output measures for each of the 13 priority outcomes could be challenging to analyze and summarize in the report. We are interested in the Committee's thoughts on how we should prioritize the outcome-specific service delivery analyses. Should we focus on a few outcomes in the analyses and report? And if so, how should we decide on which outcomes to highlight?

- The team has some specific questions on our proposed measures of general service delivery:
  - As discussed in detail later in the memo, we recommend a composite measure that distinguishes families with a “high dose” of home visiting from other families. We see “high dose” as incorporating both whether a family is enrolled a specific length of time *and* have frequent visits during that time.

We are unsure how to define “frequent visits” and seek Committee members’ perspectives on this. One option is to use the absolute number of visits. Another option is to use an indicator of visit frequency relative to the standard of the national model, for example, whether the family receives at least half the visits called for by the national model. These two options can classify families differently because national models vary in their standards for visit frequency. Thus, two families with the same number of visits might achieve a different proportion of the expected visits for the model used by their local site. For example, three visits in the first six months of enrollment would equal half the expected visits for Parents as Teachers (PAT) but less than this for Nurse-Family Partnership (NFP).

It is important to note that the literature supporting current model standards for visit frequency is scant, calling into question the importance of defining high dose in relation to these standards. If we use an absolute measure of visit frequency, we might inform the field on thresholds of dosage that appear to be beneficial for families. However, this approach would ignore model standards, and models standards, of course, influence visit frequency.

In short, we seek feedback on whether to use an absolute measure of visits, a relative measure of visits, or both.

- We are also interested in the SAC members’ thoughts about the value of a composite measure that would reflect both the number of visits a family receives and the parent’s responsiveness to services as a dependent variable to analyze in regression analyses correlating inputs to general service delivery outputs. We theorize that program impacts are likely to be influenced by the combination of receiving some threshold quantity of services and being actively engaged in those services, suggesting that such a composite could be an appropriate summary measure of parental engagement in services overall. Do you agree that such a composite measure would be an adequate proxy of parental engagement and an appropriate dependent variable to examine?

## Data Available for the MIHOPE Implementation Analyses

Implementation information on participating families, staff, local programs, community context, and national models will be available from many different data sources. These include:

### Family-level data

- A **one-hour interview** with the child's primary caregiver conducted at baseline provides information needed to describe the population of families and children that participated in MIHOPE (both in the home visiting programs and in the comparison group).

### Staff-level data

- **Baseline and 12-month follow-up home visitor and supervisor surveys** provide information on the background characteristics of staff as well as their perceptions, attitudes, and beliefs.
- **Training logs**, filled out monthly by home visitors and supervisors, provide data on the actual training dosage, content, and modality received.
- **Supervision logs**, completed weekly by supervisors, capture supervision intensity, content, and methods used to supervise home visitors.
- **Qualitative semi-structured interviews**, conducted among a subsample of staff in 24 local programs, provide information on differences and similarities in implementation processes from the perspectives of staff.

### Local program-level data

- **Baseline and 12-month follow-up program manager surveys** provide information on the characteristics of local programs, including service plan elements, policies and protocols, presence and types of implementation system supports, and networks of referral to community service providers.
- **Local program document reviews** provide additional detail on implementation system elements for staff recruitment (job descriptions and core competencies), administrative support (forms for documenting visit activities and referrals), and clinical support (parenting curricula).

### National model-level data

- **National model developer surveys, interviews, and document reviews** provide information on the service plan, the implementation system for staff recruitment (job descriptions and core competencies), administrative support (forms for documenting visit

activities and referrals), and clinical support (parenting curricula). For some models, we also have access to training materials.

#### Community characteristics data

- **Neighborhood environment ratings**, based on field interviewers' answers to questions drawn from the Project on Human Development in Chicago, provide assessments of various aspects of the physical and social environment of the sample member's block.
- Selected items from **2010 census tract data**, using geocoded addresses of sample members, capture sociodemographic aspects of communities.
- A **community services inventory survey**, completed twice by the program manager (three months and 12 months after start of the entry in the study), provides information about availability and accessibility of various types of community services.

#### Service delivery data

- **Family service logs**, completed weekly by home visitors for each family, provide information on how often (and for how long) contact with the family occurred, the topics covered and referrals provided, and levels of family responsiveness.
- **Videotaped observations of home visitor-family interactions**, available for a subsample of home visitor-family dyads, provide objectively assessed, detailed information on what happens during the home visit.

## **Local Program Implementation Framework and Research Questions**

### **Background and context**

MIECHV aims to improve a broad range of outcomes. Whether and how local programs provide services to families to address these outcomes reflects a number of dynamics, as outlined in the Conceptual Framework.<sup>1</sup> For example, local programs are using evidence-based models with different historical priorities. States and other organizations can incorporate their own priorities into their MIECHV-funded programs. Local programs operate and families reside within communities that vary in their resources, norms, and stressors. Local programs hire staff with differing professional and psychosocial backgrounds, and they support home visitors' work and their development in different ways. Families who participate in home visiting bring

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<sup>1</sup>See the Overview memo for detail on MIHOPE's Conceptual Framework.

different strengths and risks, and home visitors are encouraged to tailor services to provide the most appropriate benefits to families, given their needs.

The implementation study seeks to understand how forces at multiple levels influence service delivery. Before describing our approach to analyzing influences at these various levels, we briefly summarize how these input components are theoretically connected to each other and to the outputs of service delivery.

### *Influences on local programs*

National models specify planned services and provide implementation system infrastructure. The four models included in MIHOPE — Early Head Start-Home Visiting Option (EHS), Healthy Families America (HFA), Nurse-Family Partnership (NFP), and Parents as Teachers (PAT) — vary in how explicitly and comprehensively they do this. Some models delegate responsibility to local communities and implementing agencies more so than others.

MIECHV is another source of influence. It requires funded local programs to use evidence-based models. It requires states to target high-risk communities. It further identifies particular outcomes to be addressed, such as maternal health, mental health, substance use, and intimate partner violence. It also specifies performance benchmarks aligned with these outcomes. These outcomes may or may not have been high priorities of local programs prior to MIECHV.

Community context is also relevant to understanding local program operations. Communities vary in the accessibility, availability, and quality of resources to meet families' needs. This variation may partly reflect differences in community-level disadvantage or development. Furthermore, even among communities with similar resources, local home visiting programs may vary in their relationships with available resources.

### *Influences of local programs on home visitors and families*

A local program's service plan comprises its definition of intended outcomes, intended recipients, intended providers, intended services, and theories of change. Of note is that while national models have defined key elements of service plans for local programs to follow, local programs may adapt certain service plan components to suit the needs of the families in their communities or in response to other sources of influence.

The implementation system of a local program includes its culture and climate, its infrastructure for staff recruitment and professional development, and the clinical, administrative, and system supports provided to staff to carry out their job functions. A local program's implementation system is the critical link between the services planned and those that

are ultimately delivered. For example, if a local program does not place a priority on a particular outcome, it is unlikely that staff will be equipped with adequate tools or training to identify families' risks and address that outcome. If an outcome is a high priority, but staff members do not have sufficient supports to meet individual families' needs, it is unlikely that families will receive the intended services.

Staff and families are the main participants in home visiting. Local programs' recruitment practices determine the baseline characteristics of newly hired staff and of newly enrolling families. Local programs also support and reinforce participants' abilities to carry out their roles in home visiting.

### *Influence of home visitors on families and families on home visitors*

The essence of the home visitor's role is to influence family behaviors to achieve intended outcomes. The parent's role is to help the home visitor understand the family's situation — its strengths, needs, and concerns — and to forge a partnership to identify and work together to meet mutually agreed-upon objectives. The home visitor's functions are: to gather information (assess and screen); to educate and provide support to encourage families to adopt and practice positive behaviors; to link families with community resources to enable them to practice positive behaviors; and to use positive reinforcement to sustain positive behaviors.<sup>2</sup>

It is important to consider the dyad of the home visitor and parent in understanding service delivery, as each one's behavior during visits motivates or discourages the other's. For example, mothers who respond favorably to discussion of mental health may motivate further discussion and perhaps referrals to more specialized mental health services. In contrast, mothers who respond negatively may discourage future discussion within the dyad and perhaps referrals related to the topic as well.

## **Overview of research questions**

The implementation study's proposed research questions are guided by the need to document and understand each set of potential influences in a systematic manner. **Table 1** lists the study's broad questions, their subquestions, and the analytic techniques we propose to use.

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<sup>2</sup> These functions pertain to the home visiting models in MIHOPE, but some other home visiting models may not emphasize all these functions.

**Table 1. Research Questions and Analytic Approaches**

Research Questions	Analytic Approach
<b><u>INPUTS-FAMILIES</u></b>	
1a. Who is served by MIHOPE programs?	Descriptive statistics
1b. How do families vary across local programs and national models?	Bivariate tests
<b><u>OUTPUTS-SERVICES</u></b>	
2a. What services do families receive?	Descriptive statistics
2b. What proportion of variation in services is at the family, home visitor, and local program levels?	Multilevel models
<b><u>INPUTS OTHER THAN FAMILIES</u></b>	
3a. What are characteristics of staff, local programs, states, and national models in MIHOPE programs?	Descriptive statistics
3b. How do characteristics of inputs at other levels vary by local program? By national model?	Bivariate tests
<b><u>INPUTS AS DETERMINANTS OF OUTPUTS</u></b>	
4a. How do services differ by characteristics of families? Home visitors? Local programs? National models?	Bivariate tests
4b. What family, home visitor, local program, and national model characteristics explain variation in service delivery?	Multilevel models
<b><u>STAFF INSIGHTS ON HOW INPUTS RELATE TO OUTPUTS</u></b>	
5. Why do services differ? How does the interpretation of a program's theory of change by frontline staff differ? What are the potential implications?	Thematic analysis of patterns from qualitative staff interviews

### **Framework for addressing key issues in home visiting program implementation**

Our overall analytic approach to the implementation research questions is “exploratory.” The literature on implementation of home visiting is more limited than the literature on the impact of home visiting, and thus offers only limited guidance for analysis. Many important input-output relationships of potential interest have rarely been examined. The rich data in MIHOPE provide a unique opportunity to understand variations in service delivery and the sources of that variation.

Later in this memo we describe possible methods for multilevel, multivariate model building to test the association of inputs with outputs. Issues abound in scaling up home visiting, as



reflected in the national home visiting research agenda's top ten priorities.<sup>3</sup> The implementation study is uniquely positioned to inform many of these priorities, such as strengthening and broadening effectiveness, identifying core elements of successful programs, improving family engagement, building a stable and competent workforce, and promoting coordination. Further, the study can address many different aspects of each issue. The final MIHOPE implementation research report, however, can address only a portion of these. At the end of the evaluation, archived data will be made available to researchers to continue to explore questions of interest to the field.

Here, we identify six topics that we propose to highlight through analyses of general service delivery (for example, dosage and participant responsiveness) and outcome-specific service delivery (for example, topics discussed and referrals made for particular types of services). We selected these topics because they identify measurable, modifiable factors that could potentially be leveraged to improve service delivery in home visiting. These factors are potential avenues through which stakeholders can better support and improve MIECHV-funded programs, although the team will interpret results carefully to avoid drawing causal inferences from analyses of observational data.

***We propose to focus in the implementation report on the topics outlined below. We are particularly interested in the Committee's thoughts on whether these topics are the most relevant and interesting ones to focus on in the report. Are other salient issues (or variations on these) important to address in the implementation report?***

*Topic 1: Extent of service tailoring and influences on tailoring*

All of the models in MIHOPE value family-centered, strengths-based services that are aligned with the model yet tailored to families' strengths, needs, and interests. We think of "tailoring" as variation in service delivery that is explained by family needs. For example, one would expect a greater emphasis on mental health in visit content for families where the mother is depressed or highly anxious than in other families. One would also expect that an individual mother's visits would be more likely to include content that addresses the outcome areas that she cited as issues of interest when she enrolled. Furthermore, home visitors will vary in how high a priority they assign to specific content areas, their comfort in these areas, and their perception of how much they are expected to adhere to specific protocols rather than tailoring services. We propose to examine whether and how these family and home visitor characteristics interact as influences on service delivery. The results will be useful for decision-making about how to target home visiting services to address particular risk factors, and to support workforce development.

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<sup>3</sup>Duggan et al. (2013);  
[http://www.hvrn.org/uploads/3/2/1/0/3210553/home\\_visiting\\_research\\_agenda\\_2013\\_10\\_29\\_final.pdf](http://www.hvrn.org/uploads/3/2/1/0/3210553/home_visiting_research_agenda_2013_10_29_final.pdf).

### *Topic 2: Influence of home visitors' attachment style on service delivery*

Theory and empirical research suggest that front line providers' relationship security – attachment anxiety and attachment avoidance -- influences their job-related well-being, use of supervisory support, and service delivery.<sup>4</sup> In both public and private sectors, employers assess the alignment of job applicants' psychosocial traits with job requirements.<sup>5</sup> Analyzing the nature of the relationship between home visitor attachment style and service delivery (both general and outcome-specific) would allow us to begin to identify particular characteristics of individuals who may be uniquely suited for engaging with high risk families and addressing particular familial risk factors.

### *Topic 3: Influence of organizational social context – culture and climate – on service delivery*

Organizations have varying capacities to implement evidence-based home visiting models. For example, theory and empirical research from other fields suggest that organizational culture and climate influence staff job-related well-being and, through this, service delivery.<sup>6</sup> Other research suggests that there are specific interventions that can improve the social context of community-based organizations, by embedding principles of effective management and service systems into a program's processes and practice, and by providing organizational tools to address service constraints.<sup>7</sup> By assessing the relative influences of organizational culture and climate and staff well-being on both general and outcome-specific service delivery, MIHOPE can identify aspects of organizational social context that appear to promote or hinder home visitors' abilities to deliver services. The results could then apprise stakeholders of the facets of organizational dynamics that may need attention in organizations delivering home visiting programs.

### *Topic 4: Relative and interactive influence of service plan and implementation system on visit content*

Visit content varies greatly across local programs, even among those using the same national model, suggesting that local program characteristics are important for understanding the types of services families receive, above and beyond the other factors that might explain variation (such as family risk or preference for types of services, and home visitor characteristics).<sup>8</sup> We propose to assess the relative importance of local program service plan and implementation system components on services provided; assess whether and how strength in one component can compensate for weakness in another; and determine areas where strength in multiple components creates synergy. In so doing, the results could highlight the relative importance of particular program components, and suggest efficient ways in which to improve local program operations.

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<sup>4</sup> Burrell et al. (2009); McFarlane et al. (2010); West (2015).

<sup>5</sup> Hough and Johnson (2013)

<sup>6</sup> Glisson and Schoenwald (2005); Glisson et al. (2008); O'Brien et al. (2012).

<sup>7</sup> For example, the Availability, Responsiveness, and Continuity (ARC) intervention is focuses on improving organizational culture and climate (Glisson et al., 2013).

<sup>8</sup> Caldera et al. (2007) ; Duggan et al. (2015).

*Topic 5: Service integration and staff perceptions of community resources as influences on referrals*

All of the national models in MIHOPE call for home visitors to refer parents to community resources for needed services, but home visitors do not always refer families to needed services, even when such services are available.<sup>9</sup> We propose to test local programs' affiliation with community resources as well as home visitors' perceptions of service availability, accessibility, and quality, as influences on family referral to community resources for specific outcomes. The results of this inquiry would shed light on the relative roles of community resource accessibility and integration, perceived availability, and perceived quality in explaining differences in referrals made for particular outcomes.

*Topic 6: MIECHV outcome priorities as influences on service delivery*

MIHOPE purposefully selected local programs that were well-established because it can take months or years for a local implementing agency to implement a model with fidelity.<sup>10</sup> However, the MIECHV program itself has influenced local programs' intended outcomes to achieve them. As documented in the early findings from the MIHOPE Report to Congress<sup>11</sup> many local programs report that they have increased the priority they give to specific outcomes as a result of MIECHV.

We propose to examine how local programs' prioritization of outcomes, and changes in outcome priorities, are associated with both general and outcome-specific service delivery, and to examine the ways in which local program implementation systems and home visitors' perceptions of outcome priorities, their role, their self-efficacy, and their morale mediate program-level changes in outcome priorities as influences on service delivery. The results could thus identify the circumstances under which staff are more, and less, supported in carrying out policy-induced changes in local programs.

## **Measurement of Home Visiting Services Provided to Families**

Services provided to families are the outputs of local programs. As such, service delivery indicators are the key dependent variables in the implementation analyses (relating inputs to outputs), and also play a central role in explanatory models that link program implementation to program impacts (linking inputs to outputs to impacts).<sup>12</sup>

Given the importance of assessing service delivery, this section provides information on the team's proposed measures. Most of the earlier examinations of home visiting implementation have relied on a few broad indicators of service delivery, such as the duration of participation and number of visits. This partly reflects the data that are easily available to researchers, but belies the complex nature of service delivery. National models specify how often and for how

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<sup>9</sup> Duggan et al. (2004); Gustin et al. (2014).

<sup>10</sup> Fixen et al. (2005).

<sup>11</sup> Michalopoulos et al. (2013).

<sup>12</sup> See the accompanying memo on "Investigating Variation in Program Impacts."

long a period families should be visited, but there is little empirical evidence on the thresholds or the key components of services needed to improve outcomes for participating families overall or for family subgroups. The team's proposed measures of service delivery incorporates both the need to offer comparable information with earlier home visiting studies, as well as the need to explore additional and more nuanced measures that could further inform the field.

### **Proposed measures of service delivery**

The MIHOPE design report<sup>13</sup> specified four aspects of service delivery: overall dosage, participant responsiveness,<sup>14</sup> visit content, and service quality. The weekly family service logs provide data on overall dosage, participant responsiveness, and two aspects of visit content — (topics discussed and referrals made).<sup>15</sup> For certain analyses, it will be important to have a common data collection measurement period to make comparisons. In these cases, we anticipate using 12 months of data;<sup>16</sup> anything shorter could mask seasonal dips, and anything longer decreases the number of families included because of attrition. Most families in the study will have been recruited early enough that they could have reached 12 months of participation.<sup>17</sup> For other analyses that might not require a common data collection period, data are available for up to three years for families recruited early in the study.

The family service logs collect the following data:

- For each family: key dates such as dates of first and last home visits and reason for a family's departure from the program, to distinguish voluntary from involuntary departure;
- For each week of participation: number of visits for each family;
- For each week's visits: household members and other professionals participating in any visit; which of 23 topics were discussed; types of referrals made across 16 categories and an "other" category; combined length of visits; and levels of family participation during and between visits.

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<sup>13</sup> Michalopoulos et al. (2013). Available at : [http://www.mdrc.org/sites/default/files/Revised\\_Design\\_MIHOPE.pdf](http://www.mdrc.org/sites/default/files/Revised_Design_MIHOPE.pdf)

<sup>14</sup>We have conceptualized "participant responsiveness" as the active participation of family members (especially parents) during home visits and between home visits, such as following through on referrals or suggested parenting behaviors. We use the term "engagement" to refer to the entire category of indicators that includes both dosage and responsiveness, or indicators that combine dosage, or quantity of home visits **and** participant responsiveness, or participation during and between home visits.

<sup>15</sup>Home visitor functions also include information gathering (such as screenings and assessments completed during visits) and education and support (such as role modeling and problem solving). The weekly service logs do not collect data on these aspects of visits.

<sup>16</sup>Note that due to attrition and missing data, not all families will have 12 months of data. Regardless, any family that could have reached 12 months of data will be included in such analyses.

<sup>17</sup>A small number of families recruited between July and -September 2015 will not have an opportunity to reach 12 months and will be excluded from these analyses.

Service delivery elements can be measured at the *visit level* or the *family level* (that is, for the family across all visits). Both levels are important, but we propose to focus on understanding **family-level** variation in service delivery, since the family is the ultimate focus of the home visiting program and impact analysis. Table 2 presents a proposed list of service delivery measures derived from logs, which include both *general* and *outcome-specific* indicators.

#### *General measures of service delivery*

Dosage. Family-level dosage includes duration of participation, visit length, and visit frequency. We will use duration of participation and visit frequency to calculate dosage only if we find that visit length does not vary substantially across families. In addition, we propose to combine these variables to examine visit rate and to look at intensity of visits for example, high dose vs. low dose). We show further detail for these service delivery measures in Table 2:

- **Duration of participation** includes several measures, such as the number of months between the first and last home visits. Families with no visits are reported as zero.
- **Visit length** is the average amount of time (for example, number of minutes) of home visits. Given national model requirements, visit length, on average, should range from 60 minutes to 90 minutes per home visit. Using information on minutes per visit, we can also assess the percentage of home visits per family that conform to model standards.
- **Visit frequency** is the number of visits over a given participation period. It is possible to create an indicator of fidelity — that is, whether a family’s number of visits meets the standards of the national model. Indicators of fidelity are possible only when the national models all have clear standards, of which visit frequency is an example.
- For each family, duration of participation and visit frequency can be used to create a third indicator, **visit rate (number of visits per month of participation)**. This indicator represents service intensity for the time that the person was receiving visits, which can be seen as “standardized” across individuals, regardless of the duration of their participation.

**Table 2. Proposed Family-Level Measures of Service Delivery from Logs**

Aspect of service delivery	General or specific
<b><u>Duration of participation</u></b>	General
Family received at least one visit (yes, no)	
Months of participation	
Family participation status at specific time points (still participating/not) <sup>a</sup>	
<b><u>Visit length, frequency and rate</u></b>	
Family's average visit length <sup>b</sup>	General
All of family's visits conform to model standards for visit length (yes, no) <sup>b</sup>	General
Frequency of visits	General
Number of visits	
Number of visits received meets or exceeds a specific proportion of expected visits (yes, no) <sup>c</sup>	
Visit rate per month	General
Average number of visits per month of participation	
Number of visits received per month meets or exceeds a specific number (yes, no) <sup>d</sup>	
<b><u>High dosage</u></b> <sup>b</sup>	General
Family still participating at a specific time point <i>and</i> met or exceeded receipt of a specific proportion of expected visits through that time point (yes, no) <sup>e</sup>	
<b><u>Responsiveness</u></b> <sup>b, f</sup>	
Family's average visit responsiveness score	General
Family's average between visits responsiveness score	
<b><u>Visit content – topics</u></b>	
Average number of topics discussed per visit	General
Number of visits in which specific topics were discussed	Specific
Discussion of specific topics in <i>any</i> visit (yes, no)	Specific
<b><u>Visit content – referrals</u></b> <sup>b</sup>	
Number of referrals received	General
Month of participation in which first referral received	General
Receipt of at least one referral in content area (yes, no)	Specific

NOTES: Specific is used as shorthand for outcome-specific.

<sup>a</sup>Time points to include the end of prenatal period (for families whose participation began prenatally), child age (for example, 6, 12, and 15 months), and months since participation began (for example, 1, 2, 6, 12, and 15 months).

<sup>b</sup>Among families with at least one visit.

<sup>c</sup>Such as 50% or 85% of expected visits per the model standard.

<sup>d</sup>Such as at least 1 or at least 2 visits. Threshold will be determined using the model standards as a guide.

<sup>e</sup>Specified time points to include enrollment at least 6 months and enrollment at least 12 months.

<sup>f</sup>Visit responsiveness score reflects family participation *during* visits; *between* visits responsiveness score reflects family follow-through on actions agreed upon at last visit.

- **Threshold measure of high dosage:** We recommend a composite measure that distinguishes from other families those families who are still participating at a specified time point (at 6 or 12 months) *and* have frequent visits (“high dose”).<sup>18</sup> Other families would include those who never have a visit, those who have frequent visits but do not stay enrolled for a particular threshold of time, those who have infrequent visits but stay enrolled, and those who have infrequent visits and short enrollment periods. Because national models vary in the expected number of visits, it seems fair to define “frequent visits” in relation to the national model’s standard. Receipt of at least half the expected visits for a particular national model could be a reasonable cut-point between “high” and “low” dosage. Previous research shows that about a quarter to a third of families leave home visiting by six months post enrollment and that about half leave by twelve months; thus it is pragmatic to focus on this period.

*We would especially appreciate the Committee’s advice on the usefulness of this relative measure versus a measure that defines “frequent visits” based on an absolute number of visits.* This is important because while a family might receive the expected number of visits, the absolute number might be much lower for one national model than another. Thus, a relative measure would not fully reflect the absolute differences in treatment between different families. For example, a PAT family with three visits in the first six months would be considered “high dose”, as this is half of the number expected. A NFP family that receives three visits in the first 6 months would not be considered high dose, as that would be less than half of the number expected.

Participant responsiveness. Indicators of participant responsiveness will be based on two entries in the weekly family service log: the home visitor’s rating of the mother’s participation during the week’s visits and the home visitor’s rating of her participation and follow-through since the last week’s visits.

Potential composite measure of overall family engagement in services. *We are interested in the SAC members’ thoughts about the value of a composite measure that would reflect both the number of visits a family receives and the parent’s responsiveness to services.* We theorize that program impacts are likely to be influenced by the combination of receiving some threshold quantity of services and being responsive to those services, suggesting that such a composite could be an appropriate summary measure of parental engagement in services overall. The composite would represent our “best guess” at how programs create impacts for families, but we do not know whether there might be important and interesting differences in the patterns of prediction for these two measures separately.

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<sup>18</sup> Caldera et al. (2007); Duggan et al. (2000); Duggan et al. (2015).

### *Outcome-specific measures of service delivery*

The outcome-specific measures of service delivery incorporate the topics discussed in visits and the referrals made (Table 2), reflecting the degree of emphasis on particular behaviors or outcomes (such as mental health, parenting practices, or child development) and home visitors' use of referrals to support families' particular needs.

- **Topics discussed** can be used to assess visit content at the family level across all visits received. We would, for example, examine whether the family had at least one visit in which a specific topic was discussed.
- Referrals made can be used to assess the **frequency of referrals** made overall, within each referral category, and **relative to the start of participation**.

We propose aggregating most of the service logs' 23 topics and 16 referral categories into 13 broader categories that align with the intended outcomes presented in the MIHOPE Report to Congress.<sup>19</sup> These 13 different program outcomes, in turn, map onto the major domains of parent and child outcomes of MIECHV (including the domains of: prenatal, maternal, and newborn health; crime and domestic violence; family economic self-sufficiency; parenting; and child health and development). Table 3 illustrates how the log content items align with MIECHV domains.

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<sup>19</sup> Michalopoulos et al. (2015).



**Table 3. Preliminary Outcome-Specific Categories from Log Content**

MIECHV domain	Intended program outcomes	Specific log content item <sup>a</sup>
Prenatal, maternal and newborn health	Improving <b>prenatal health</b>	<u>Topics discussed:</u> <ul style="list-style-type: none"> <li>• Prenatal health behaviors/prenatal care</li> <li>• Health insurance/Medicaid/CHIP<sup>a</sup></li> </ul> <u>Referrals:</u> <ul style="list-style-type: none"> <li>• Prenatal care<sup>a</sup></li> </ul>
Prenatal, maternal and newborn health	Improving <b>birth outcomes</b>	<u>Topics discussed:</u> <ul style="list-style-type: none"> <li>• Child health<sup>a</sup></li> <li>• Health insurance/Medicaid/CHIP<sup>a</sup></li> </ul> <u>Referrals:</u> <ul style="list-style-type: none"> <li>• Prenatal care<sup>a</sup></li> <li>• Child birth education</li> </ul>
Prenatal, maternal and newborn health	Improving <b>maternal physical health</b>	<u>Topics discussed:</u> <ul style="list-style-type: none"> <li>• Maternal physical health (outside of pregnancy)</li> <li>• Health insurance/Medicaid/CHIP<sup>a</sup></li> </ul> <u>Referrals:</u> <ul style="list-style-type: none"> <li>• Maternal preventive care<sup>a</sup></li> </ul>
Prenatal, maternal and newborn health	Improving <b>family planning and birth spacing</b>	<u>Topics discussed:</u> <ul style="list-style-type: none"> <li>• Family planning</li> </ul> <u>Referrals:</u> <ul style="list-style-type: none"> <li>• Family planning and reproductive health care</li> </ul>
Prenatal, maternal and newborn health	Reducing <b>tobacco use</b>	<u>Topics discussed:</u> <ul style="list-style-type: none"> <li>• Tobacco, alcohol, and other drug use<sup>a</sup></li> </ul> <u>Referrals:</u> <ul style="list-style-type: none"> <li>• Maternal preventive care<sup>a</sup></li> </ul>
Prenatal, maternal and newborn health	Addressing <b>mental health and substance use</b>	<u>Topics discussed:</u> <ul style="list-style-type: none"> <li>• Tobacco, alcohol, and other drug use<sup>a</sup></li> <li>• Mental health or stress</li> </ul> <u>Referrals:</u> <ul style="list-style-type: none"> <li>• Substance use (alcohol/drug) treatment</li> <li>• Mental health treatment</li> </ul>
Crime and domestic violence	Addressing <b>intimate partner violence</b>	<u>Topics discussed:</u> <ul style="list-style-type: none"> <li>• Domestic violence or anger management</li> </ul> <u>Referrals:</u> <ul style="list-style-type: none"> <li>• Domestic violence shelter</li> <li>• Domestic violence counseling/anger management</li> </ul>
Family economic self-sufficiency	Improving <b>family economic self-sufficiency</b>	<u>Topics discussed:</u> <ul style="list-style-type: none"> <li>• Job training and employment</li> <li>• Education</li> <li>• Economic management/financial self-sufficiency</li> <li>• Housing</li> <li>• Public/governmental assistance</li> </ul>

**Table 3 (continued)**

MIECHV domain	Intended program outcomes	Specific log content item <sup>a</sup>
Family economic self-sufficiency (cont.)	Improving <b>family economic self-sufficiency</b> (cont.)	<u>Topics discussed (cont.):</u> <ul style="list-style-type: none"> <li>Finding alternate caregivers/child care<sup>a</sup></li> </ul> <u>Referrals:</u> <ul style="list-style-type: none"> <li>Job training and employment</li> <li>Adult education services</li> <li>Housing</li> <li>Public/governmental assistance</li> <li>Child care<sup>a</sup></li> </ul>
Parenting skills	Promoting <b>positive parenting behavior</b>	<u>Topics discussed:</u> <ul style="list-style-type: none"> <li>Parent-child interaction<sup>a</sup></li> <li>Co-parenting<sup>a</sup></li> <li>Discipline/behavior management<sup>a</sup></li> <li>Developmentally appropriate care/routines<sup>a</sup></li> </ul>
Parenting skills	Reducing risk of <b>child maltreatment</b>	<u>Topics discussed:</u> <ul style="list-style-type: none"> <li>Finding alternate caregivers/child care<sup>a</sup></li> <li>Discipline/behavior management<sup>a</sup></li> <li>Child/home safety<sup>a</sup></li> <li>Parent-child interaction<sup>a</sup></li> </ul> <u>Referrals:</u> <ul style="list-style-type: none"> <li>Child care<sup>a</sup></li> </ul>
Child health and development	Improving <b>breastfeeding</b>	<u>Topics discussed:</u> <ul style="list-style-type: none"> <li>Breastfeeding/feeding/nutrition</li> </ul> <u>Referrals:</u> <ul style="list-style-type: none"> <li>Breastfeeding/feeding/nutrition</li> </ul>
Child health and development	Promoting <b>child development</b>	<u>Topics discussed:</u> <ul style="list-style-type: none"> <li>Parent-child interaction<sup>a</sup></li> <li>Developmentally appropriate care/routines<sup>a</sup></li> <li>Co-parenting<sup>a</sup></li> <li>Child development<sup>a</sup></li> <li>Child/home safety<sup>a</sup></li> <li>Lead exposure in home<sup>a</sup></li> </ul> <u>Referrals:</u> <ul style="list-style-type: none"> <li>Early intervention services/Part C services</li> </ul>
Child health and development	Improving <b>child preventive care</b>	<u>Topics discussed:</u> <ul style="list-style-type: none"> <li>Child health<sup>a</sup></li> <li>Child/home safety<sup>a</sup></li> <li>Lead exposure in home<sup>a</sup></li> <li>Health insurance/Medicaid/CHIP<sup>a</sup></li> </ul> <u>Referrals:</u> <ul style="list-style-type: none"> <li>Pediatric primary care</li> </ul>

NOTES: Some log content items are not shown in this table. This includes “social support,” which is one of the topics discussed indicators collected in the service delivery logs, because it is broad and does not map onto any one outcome or domain.

<sup>a</sup>Log content items that align with multiple outcome-specific areas.

### *Service quality measures*

MIHOPE is also collecting video recordings of visits for a subsample of states, sites, home visitors, and families. The planned sample size is 400 video-recorded visits, 100 each per national model. The primary purpose of video-recording visits is twofold:

- To assess the completeness and accuracy of the logs’ reports of visit content; and
- To describe aspects of service delivery (in particular, service quality) that are not well captured by family service logs but that are likely to be strongly associated with family engagement and program impact on outcomes.

Participation in the videos is voluntary for both home visitors and families, and they thus may not be representative of MIHOPE families, staff, or how visits are conducted. However, they will still be useful for analytic purposes.

The first purpose of the video recordings is to assess the completeness and accuracy of the logs in their reporting of visit content. We are coding the content of video-recorded visits using the same topic codes as in the weekly family service log and indicating which topic is discussed for each moment of the visit to measure how time is allocated across topic areas.

To describe the quality of the interactions between home visitor and parent, we are using two valid and reliable observational measures: the Home Visit Rating Scales—Adapted and Extended (HOVRS-A+) and the Roter Interaction Analysis System (RIAS).

HOVRS-A+ is a global rating instrument that assesses seven aspects of visit quality, with an emphasis on how well the home visitor supports positive parent-child interaction. One scale, home visitor responsiveness, assesses how frequently the home visitor engages in responsive behaviors during the visit. Other scales assess home visitor-family relationship, parent-child interaction during home visits, home visitor facilitation of parent-child interaction, home visitor nonintrusiveness, and parent and child engagement during visits.

Because home visiting has broader objectives than promoting positive parent-child interaction, we will also use the RIAS, which offers a broader lens for assessing the quality of home visits. RIAS has been used extensively in assessing the quality of health care providers’ interactions with patients. For MIHOPE, RIAS will provide ratings of the quality of the interaction between home visitor and parent. RIAS uses 34 mutually exclusive, collective

exhaustive codes to classify each utterance of visit participants. The coded utterances are combined to create composite measures of the relative emphasis placed on the functions of information gathering, education and guidance, and rapport-building, including indicators of shared decision-making and family centeredness. In addition to utterance-by-utterance categorization, coders give global ratings of the affect or emotional context of the dialogue on dimensions such as dominance, assertiveness, friendliness, warmth, attentiveness, and respectfulness.

## **Quantitative Approach to Explaining Differences in Service Delivery**

Most of the descriptive research questions identified in Table 1 – including describing the sample of program group families, the characteristics of home visiting staff and local programs, the community context, and the services delivered -- will be informed through the examination of univariate statistics (mean, standard deviations, median, percentage distributions, range). We will also present summary statistics, when relevant, by local program and by national model, testing for significant differences using ANOVA.

This section focuses on our strategy for describing and analyzing variation in service delivery measures. For a list of proposed inputs, see the accompanying appendix.

### *Describing the services families receive*

Family-level summaries of family service log data: We plan to characterize average dosage, participant responsiveness and outcome-specific services received using means, standard deviations, medians, and proportions. These statistics will show central tendencies of service receipt across families, as well as the dispersion or range.

Family-level summaries of coded visit video-recordings: We will characterize how time is allocated across outcome-specific domains using means, standard deviations, medians and proportions. We will use similar statistics to characterize the home visitor-family interactions in terms of the visit functions described above. We will do this for the full visit and for visit segments defined by the content topic discussed. We will use similar statistics to characterize global ratings of visit affect from RIAS and HOVRS-A+.

### *Assessing sources of variation*

Composition of variance: We plan to assess the proportion and statistical significance of variation in each output indicator at each level (family, home visitor, program, national model). Doing so will tell us whether and how much each of the levels matters for understanding the observed variation in service delivery. These analyses may not be shown in the main text of the

report, but are a central pre-cursor to multilevel model-building. For example, if we find little or no variation at the local program-level for duration of participation, it will not be useful to incorporate specific program-level characteristics in later multivariate, explanatory models of service delivery for this indicator.

Differences in service delivery by other characteristics: We will first show and discuss, at the bivariate level, differences in service receipt by a select set of family characteristics, by home visitor characteristics, by local program characteristics, and by national model (selection of input characteristics is discussed below). We will use ANOVA to test for statistically significant variation across groups or characteristics. These bivariate analyses will be used to describe basic (not holding constant any other characteristics) patterns in service receipt, across both general and content-specific aspects. These examinations will set the stage for the multivariate models that will describe patterns of service receipt while holding other characteristics constant.

#### *Approach to regression analyses of service delivery on explanatory characteristics*

For key measures of service receipt that do vary across home visitors or local programs, we propose to further examine how implementation inputs are associated with this variation. In addition to using ANOVA to test for differences across groups or characteristics and describe basic patterns of service receipt, we are currently considering two analytic modeling approaches to more thoroughly examine and describe variations in service delivery: (1) multilevel modeling (MLM)<sup>20</sup> and (2) structural equation modeling (SEM).<sup>21</sup> A combined method of multilevel structural equation modeling is available as well.<sup>22</sup> Both MLM and SEM can account for the nested nature of the data in MIHOPE (that is, families nested within home visitors, home visitors nested within local programs, local programs nested within national models). Further discussion of these modeling approaches is included later in this section.

Below, we outline the team's proposed process for specifying and estimating multivariate models for the full sample.

1. **Step 1: Decide on the core service receipt outputs or dependent variables.** As indicated earlier, the team will examine both general and outcome-specific service receipt.
  - **General outputs.** Dosage and participant responsiveness are the proposed primary general measures of service receipt. As noted earlier, there are several ways to capture dosage, and the team is seeking advice on the different options (such as

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<sup>20</sup>See, for example, Raudenbush and Bryk (2001); Aguinis, Gottfredson, and Culpepper (2013); and Rabe-Hesketh and Skrondal (2012).

<sup>21</sup>Buhi, Goodson, and Neilands (2007).

<sup>22</sup>Rabe-Hesketh, Skrondal, and Zheng (2007).

whether to use the absolute number of visits or a relative measure (visits relative to the expected number of visits based on national model standards) to capture visit frequency). Dosage and participant responsiveness will be examined as separate dependent variables. There is also interest in developing a summary measure of parental engagement in services that is a composite of the two general measures, as described earlier, as a third type of dependent variable of general service delivery. The final analysis plan will specify the key general service delivery outputs to examine, incorporating feedback from the SAC and internal discussions in upcoming months.

- **Outcome-specific outputs.** Two types of outcome-specific outputs are proposed: topics discussed and content-specific referral receipt. We propose to focus on both of these because not all families will need or qualify for community-based services, but some home visitors may be able to provide education and support on such services.

We face a challenge in examining outcome-specific outputs, however. MIHOPE includes information on at least 13 different program outcomes (see Table 3). Examining the two specific output measures (topics discussed and content-specific service receipt) for each of the 13 priority outcomes could be challenging, particularly if all of these analyses are to be summarized and reported in the main text of the report.

One option is to focus on fewer outcome-specific analyses. The team would ensure that the selected outcome-specific analyses illustrate a range of program focus (for example, maternal depression, intimate partner violence, positive parenting behaviors, child development). Another option is to analyze all outcome-specific areas, highlighting some in the report and others in an accompanying appendix.

*We are interested in the Committee's thoughts on how we should prioritize the outcome-specific service delivery analyses.*

2. **Step 2: Specify and construct input measures of theoretical and policy or programmatic interest (pre-specified to the extent possible).** There are a large number of potential independent variables (input categories and measures) to include in analyses of outputs. As noted earlier, the team proposes to focus on six key topics in this stage of analysis; however, even within these topics (i.e., the role of implementation system supports and service plan elements) there are many potential measures available. Our process for selecting and operationalizing input measures includes the following considerations:

- a. Identify relevant **theories, frameworks, concepts, and logics** for each output specified above in Step 1), which will directly inform the constructs to be included in the models. Constructs that should be used as **controls** (to address potential omitted variable bias) will be specified at this stage as well.

To the extent possible, the model should be pre-specified prior to estimation and should not be decided based on statistical significance of bivariate relationships or on statistical significance in the multivariate model. However, there may be instances where some intended, pre-specified variables of interest are not included or put into operation as planned in the models. For instance, one of the following circumstances may occur: (1) the empirical correlations may be very high between some pre-specified variables in the model. We would then consider developing a composite instead of entering the variables separately, checking for sensitivity of the model to each specification; (2) a pre-specified variable exhibits a high level of “missing-ness” and thus does not contribute unique information to the model; (3) a pre-specified variable does not vary across the relevant unit of analysis (for example, at the home-visitor level or the local program level). If the model we actually estimate is different from the model we pre-specified, we will document and explain any differences.

- b. Decisions on the **appropriate level of measurement**, if a measure can be put into operation at one or more levels. In some instances, data collected at one level may be used to put into operation a construct at more than one level. In these instances, the team will consider the relevant level for the hypothesized construct (as indicated by theory). For instance, survey responses from individual staff regarding their perceptions of a program’s rigidity may be of interest both as a home visitor-level characteristic and as an aspect of the program’s organizational culture (when responses are aggregated across staff within the local program). Theoretically, the responses would likely be used as an organizational attribute hypothesized to situate and shape the behaviors and interactions of staff within an organization. When theory does not suggest a priority for aggregation, and measurement error is not problematic, we will generally favor using measures at the level of analysis in which they were collected (in this previous example, at the home-visitor level).
- c. **Importance of parsimony.** Not all of the program, staff, and family characteristics will be included in the multivariate models. The summary characteristics to be presented in earlier sections of the report provide informative background regarding home visiting programs. However, in model building for the explanatory part of the analysis, we aim for parsimony for three main reasons. First, we want to avoid a “kitchen sink” approach to covariate selection that includes every variable possible but is of limited use for interpretation (in part due to overcontrolling). Second, we

will need to consider degrees of freedom, particularly at the local program level, and limit the number of variables in the model. Third, using a parsimonious set of factors allows the team to tell a clear story of the study's findings. At the same time, we are aware of the pitfalls of omitted variable bias in the models. This point reaffirms the importance of theory-driven model pre-specification to the extent possible.

- d. To help achieve parsimony in specification, we will develop **combination or composite measures** when theoretically relevant and empirically appropriate. Use of composites carries two further advantages. First, it allows for the measurement of overarching constructs of potential interest to the field, such as the level of family risk or the overall strength of supervision across and within programs. Second, using composites may reduce measurement error across multiple individual measures of the same construct, improving predictive power in a multivariate model. Composites could be simple “combination” variables (where categories are created by combining two or more items), indices (where conceptually similar individual items are theorized to be monotonic in relationship to the output (as in the case of a risk index) and summed or scored), or latent constructs identified through factor analysis.

For sets of survey items that have not been used together before but are theoretically related to a latent construct, we propose to use the following approach (used in previous OPRE studies). First, exploratory factor analysis will be used (among a randomly split sample) to explore how the items hold together in the MIHOPE sample by examining factor loadings and examining alphas. Next, we would use the other half of the sample to test our hypothesized model using confirmatory factor analysis. Finally, if the confirmatory factor analysis shows good model fit, we would rerun the model and calculate alphas using the full sample.

- e. **Same measure available at two time points.** Many questions on the staff surveys were asked at both baseline and the 12-month follow-up. How these multiple measures are used is likely to depend on the construct of interest and the purpose for including the variables in the model. If the purpose is to include a relatively exogenous measure, then the baseline measure alone is likely preferable. If the purpose is reduce measurement error, averaging the two measures is preferable. If the purpose is to examine stability or change over time (and measurement error is not a concern), then creating a measure of change over time between the two measures is of interest. A further consideration may be aligning the time at which staff responded to the survey with the time when most families in that site were participating in the program.



### 3. Step 3: Plan for a nested modeling approach.

Because we are interested in examining the relationships between each set of factors at each level in stages, the team proposes to use a nested modeling approach. For example:

- a. We would start by running an “empty” model for each service delivery outcome (that is, a model with no covariates or controls).
- b. Family-level inputs would be added next. For some outcome-specific outputs, we have a parallel baseline measure of family risk (for example, depressive symptoms and anxiety to capture maternal mental health; recent experience of physical or psychological aggression to capture intimate partner violence; reports of heavy alcohol or illicit drug use to indicate risk of substance use problems). In these cases, it may be of interest to first examine the association between the baseline measure of risk and the output before adjusting for other family characteristics. For example, maternal depressive symptoms at baseline should be positively associated with discussion of mental health. How that association changes with the inclusion of other family-level covariates (and, in subsequent steps, the inclusion of home-visitor and program-level factors) can then be examined. This staging provides a narrative framework to assess whether services are tailored and to identify the factors that are most salient in explaining differences in service delivery.

For general outputs and for outcome-specific outputs without a parallel baseline measure of risk, the core set of family-level inputs (identified in Step 2) will be added and examined.

- c. The next stage in model building is to add home visitor characteristics. These may be modeled all at once or, alternatively, in several steps. For example, we might adjust first for relationship security (or other psychosocial characteristics), then for sociodemographic characteristics, and lastly job-related attitudes and beliefs.

The team will test the interactive effects of home visitor and family characteristics that have been shown to influence service delivery in earlier home visiting research; an example is the interaction of home visitor and maternal relationship security.<sup>23</sup> The team will also evaluate whether the association of particular home visitor characteristics with service delivery varies by local program.

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<sup>23</sup>McFarlane et al. (2010).

- d. Then, we will add program-level features, that is, measures of the local programs' service plans and implementation systems. Some program-level features are hypothesized to mediate the influence of other inputs on outputs. The team will enter such features in a stepped fashion to test for mediating effects. For example, one of the six issues of interest is the role of organizational culture and climate on home visitor well-being and on service delivery. Given this emphasis, we may first highlight and adjust for staff burnout and work attitudes (home visitor characteristics). And then include adjustment for organizational culture and climate measures. The comparison of the two models would allow us to assess the extent to which any association between worker well-being on service delivery is explained by the programs' organizational social context. Additional program and staff-level controls could be added to examine the robustness of this pattern.
- e. Community-level characteristics will then be incorporated, and adjusted associations will be examined.
- f. National model indicators could be included as a final control, to assess the extent to which associations between other, more proximal implementation inputs and service delivery are independent of national model affiliation. Alternatively, national model could be included as the first independent variable examined and adjusted for (which would parallel the analysis of impact variation approach).

The modeling approach described above is based on MLM, which ensures that standard errors are correctly estimated, given the multilevel nature of the data, and in turn, that the resulting inference is appropriate (assuming model assumptions are met). It is also useful for specifying and testing cross-level interactions (for example, interactive effects between home visitor-level characteristics and local program characteristics).<sup>24</sup>

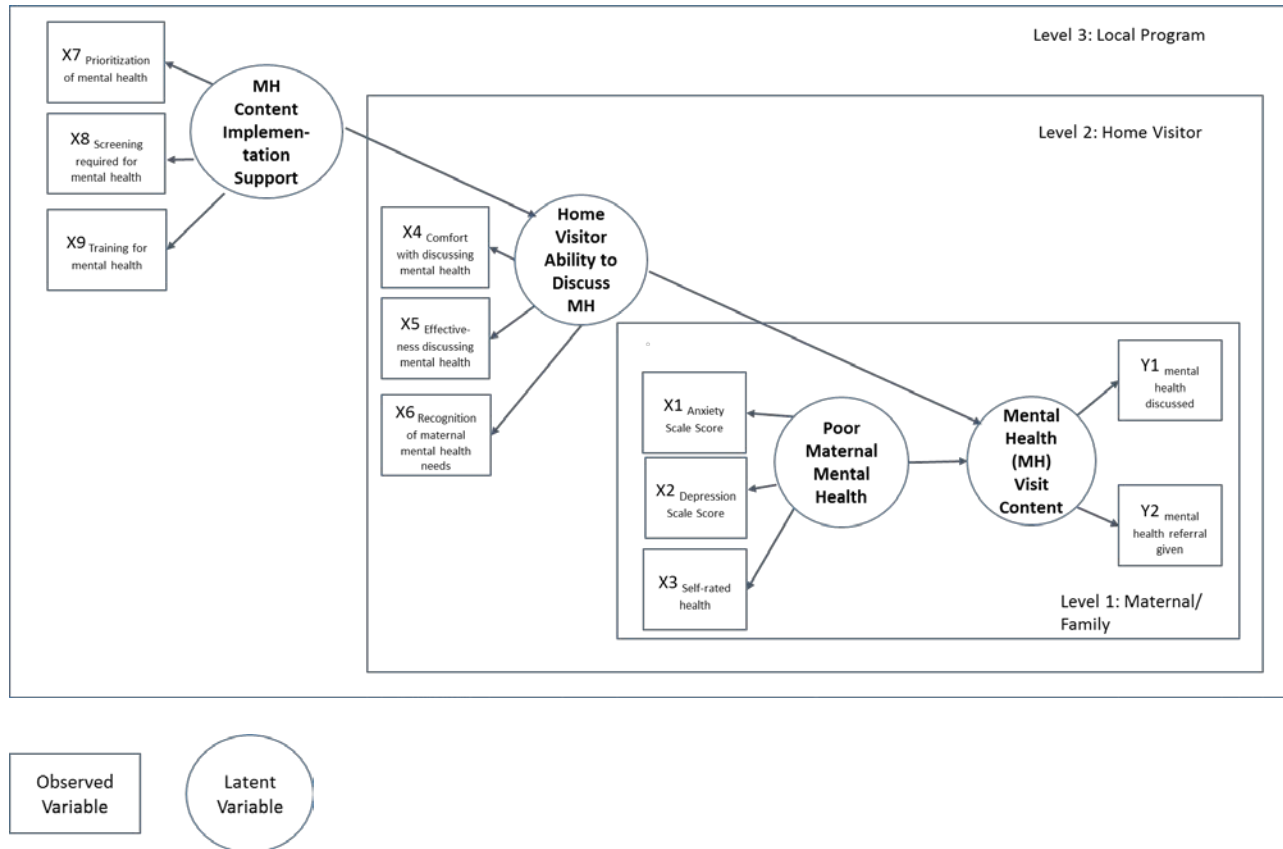
Another approach is multilevel SEM, which may be thought of as a hybrid between regression analysis (to account for independent variables) and factor analysis (to identify and measure latent constructs). It is a confirmatory technique, and thus it is critical to conduct exploratory work, both with the measurement model and the predictive analysis, before specifying the structural equation model. Because latent variables — as either dependent or independent variables — may be difficult to interpret and convey to lay audiences, interpretation of results from these models may not be transparent.

Figure 1 provides an example of how multilevel SEM might be used to evaluate the maternal, home visitor, and local program factors related to service delivery. The analysis accommodates the multilevel/clustered nature of the data while also capturing latent constructs that provide analytic advantages over multiple indicators of latent constructs.

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<sup>24</sup>Future and more detailed analysis plan memos will provide further information regarding model assumptions, advantages, and disadvantages for the two approaches.

**Figure 1.** Multilevel Structural Equation Model



### *Subgroup analysis*

The relationships identified in the multivariate analysis for the full sample might be expected to vary in systematic ways by key family or other subgroups. To examine this, we propose to use a small set of subgroups to serve as hypothesized moderators of the relationships between the implementation factors described earlier and measures of service delivery. These subgroups are likely to include the same confirmatory subgroups as those proposed for the impact analyses. However, the implementation study will conduct additional subgroup analyses to understand the extent of service tailoring and factors associated with tailoring (Topic 6).

## Qualitative Insights on Why and How Services Vary

The MIHOPE implementation research design includes a qualitative study that was conducted in a subsample of 24 local programs. The qualitative study involved in-person, semi-structured interviews with program staff. They included both individual and group interviews with 112 home visitors and individual interviews with 24 supervisors and 21 program managers. The interviews averaged 90 minutes in length. These interviews were designed to be more focused than the other MIHOPE data collection strategies, in order to delve into particular questions in depth.

This section reviews our motivation and goals in conducting the qualitative study, how we chose the programs included, our current plans for coding and analysis, and our thoughts on how the results will inform and be integrated with the results of the quantitative study.

### Objectives

The goals of the qualitative study are to describe what happens in home visiting and to offer insights on why and how services provided may vary. The objectives are to gather information on how home visiting programs actually operate “on the ground,” to describe the barriers to and pathways that foster family engagement and program influence, and to highlight the types of strategies used to motivate behavioral change in families.

- To describe what happens in home visiting. Major topics include: home visitors’ experiences of working with families with different risks and different barriers to and levels of engagement in home visiting; how staff conceptualize and translate program goals and priorities in their day-to-day work with families; and how their program supports or constrains their work.
- To explain why something happened or did not happen. For example, interviewers asked staff to discuss potential inconsistencies and conflicts between families’ needs and goals and the goals of the program and to provide examples of how they navigated those differences. Home visitors were asked to “walk through” two contrasting families on their caseloads (one that is challenging, and one that is not, as defined by each home visitor). In so doing, the interviews probe how the home visitor’s interactions and strategies with families differ, and how this changes over time.

### Purposive Sampling

Local programs were selected to provide a uniform number of sites for each national model and to represent diversity in organizational culture and climate. We did this because national model

and organizational culture and climate are hypothesized sources of variation that may help us understand both similarities and differences across sites and staff in service delivery. In addition, the programs included in the qualitative sub-study are from six different states that span the major regions of the country.

### **Coding and initial analysis**

Nearly all interviews were audio-recorded so that the recordings and transcripts of the interview could be analyzed. In the few cases where the home visitor did not feel comfortable being audio-recorded, the interviewer took detailed notes, which will be analyzed in place of a transcript. A team of trained research staff will systematically code the interview transcripts and field note observations completed by interviewers after field visits. Coders will use Dedoose, a web-based qualitative analysis software package.<sup>25</sup>

The lead research team member will develop *structural codes*<sup>26</sup> based on the topics that were intentionally included in most interviews (following the semi-structured questions and probes of the protocols). These “broad” codes (for example, “perceptions of program priorities”) essentially will serve as a labeling and indexing device. They will be used to evaluate the consistency of the interviews (how commonly was the code covered) and the richness (the extent to which topics were explicated and covered in the interviews) of data collected, as different team members conducted interviews.

Similarly coded segments will then be collected for more detailed coding and analysis of interview transcripts. A randomly selected set of transcripts will be reviewed by a team of MIHOPE implementation researchers who have training in qualitative coding. These coders will review each transcript independently, applying the structural codes while also generating new codes from the interview data, which may fall within or outside the structural codes. The newly generated codes will be more detailed than the structural codes and will likely consist of several different types of codes of relevance. These include “value” codes (expressions of values, attitudes, or beliefs), “evaluation” codes (codes that capture how staff make distinctions about families who are more or less challenging, how they respond to differing circumstances, and the ways in which they describe what works and what doesn’t for families), and “open” codes (including descriptions and general impressions).

Team members will meet to compare and discuss their use of structural codes, including any inconsistencies. They will also discuss each coder’s creation and use of more detailed codes. Through iterative discussions and debates, the lead researcher will create a “working” list of specific codes that synthesizes the codes generated by each coder. Both structural and specific

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<sup>25</sup> <http://www.dedoose.com/>

<sup>26</sup> Saldana (2009).

codes will be organized into a codebook, which details the code name and definition and provides illustrative quotes. As is typical practice in large, qualitative interview studies, coders will develop “internal coding memos” to document questions and concerns about existing codes, relationships among codes, and the need for additional codes. The codebook will be refined throughout the coding process and team discussions.

Because coders’ individual interpretation of narratives and responses to open-ended questions inherently involves some subjectivity, a second set of transcripts (exact number to be determined) will be coded by at least two coders. Inter-coder reliability will be calculated using Dedoose. When reliability is found to be low, the coders will meet with the lead researcher to discuss sources of discrepancy, and the lead researcher will provide concrete guidance on how to resolve these disagreements. Once an acceptable level of inter-coder reliability has been reached, and there are no fundamental disagreements between the coders about code definitions, the coders will code the remaining transcripts.

The creation of codes and the development of memos documenting and explaining them are foundational parts of qualitative data analysis, which is in practice, ongoing. The next stage of analysis will involve the creation of “themes,” which are the main outcomes of the coding process. Themes are a way to categorize a set of similar codes that highlight repeated ideas. The development of themes (in which both the frequency of codes and their salience are considered), can indicate that some structural and content codes may reveal very little in terms of developing a deeper understanding of how home visitors think about and do their work, and thus would be of less interest to highlight in the study.

### **Deeper analysis and mixed-method integration**

Beyond the stage of describing and documenting themes, the most central analytic task for the research team will be to uncover significant patterns (or “classes” of things, persons, or events described), and the properties that characterize these patterns, using pattern codes.<sup>27</sup> Pattern coding and analysis can be both hypothesis testing and hypothesis generating. For example, exploration of potential patterns will be guided by the purposeful sampling design, which was informed by prior research suggesting that the sampling inputs (national model and OSC) are important contextual sources of influence in program operations. By examining similarities and differences in themes by these categories, the findings of the qualitative analysis (even if there do not *appear* to be meaningful differences in staff experiences, behaviors, or perceptions) can be used to shed light on the quantitative examination of these program inputs.

There will surely be many more potential categories and typologies of interest to examine; these will be generated from and tested with the interview data (that is, they are “emergent”

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<sup>27</sup>Marshall and Rossman (1995).

themes). Some of these typology developments may not align with the types of measures and patterns of associations that will be described in the quantitative analysis. Instead, they will illuminate differences among home visitors that are hard to quantify or capture with survey measures or that, as articulated and experienced by staff, are multidimensional, nonlinear, and nuanced.

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