Human Services Programs in Rural Contexts
Mixed Methods Analysis, Integration, and Triangulation Plan

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Submitted to:

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EXECUTIVE SUMMARY

In 2019, the Office of Planning, Research, and Evaluation (OPRE) in the Administration for Children and Families (ACF), U.S. Department of Health and Human Services, in collaboration with the Health Resources and Services Administration's (HRSA) Maternal and Child Health Bureau (MCHB)—referred to hereafter as "the OPRE-MCHB Team"—selected 2M Research and its partner, the Urban Institute (referred to hereafter as "the 2M-Urban Team"), to conduct a study to advance the field of human services delivery in rural contexts. Between the fall of 2019 and spring of 2021, the 2M-Urban Team conducted a series of knowledge development tasks, engaged with an array of stakeholders, and developed a mixed methods research design to address the prominent methodological challenges that are often encountered when conducting research in and among rural communities.

This document presents the 2M-Urban Team's detailed plan for analyzing, integrating, and triangulating the diverse quantitative and qualitative data sources included in the study's research design. It builds upon several previous study documents, including a collection of literature reviews, a plan detailing the methodology for measuring unmet need for human services, and a mixed methods research design plan. This analysis plan describes the 2M-Urban Team's approach to addressing the following study goals:

1. Providing a rich description of human services programs in rural contexts
2. Determining the unmet need for human services in rural communities
3. Identifying opportunities for strengthening the capacity of human services programs to promote the economic and social wellbeing of individuals, families, and communities in rural contexts

In particular, this analysis, integration, and triangulation plan describes the study's research design and data sources; discusses the quantitative and qualitative methods used to analyze the study's diverse data sources; and discuss the principles of integration, the methodological approaches used to accomplish integration within this study, and how the goal of methodological triangulation will be achieved.

Study Design

Rural contexts present unique opportunities and challenges for administering human services programs, and ACF and HRSA seek to better understand these contexts through several programs, including:

- Healthy Marriage and Responsible Fatherhood (HMRF)
- Maternal, Infant, and Early Childhood Home Visiting (MIECHV)
- Temporary Assistance for Needy Families (TANF)
- Health Profession Opportunity Grants (HPOG)
- Housing programs

- Early childhood programs
- Family development programs
- Employment programs
- Higher education and technical training programs

The presence of several methodological challenges associated with studying rural communities warrants the use of a mixed methods research design to achieve the study's primary goals. For instance, survey and administrative data on rural communities can have small sample and population sizes, which often introduces high levels of measurement error when employing quantitative analysis methods (Scally et al. 2020). To mitigate the limitations of quantitative approaches, qualitative methods can provide rich descriptions and explanations of processes in individual rural communities. However, qualitative methods have their own limitations related to generalizability, which can be particularly challenging when studying diverse rural communities.

The 2M-Urban Team is implementing a triangulation mixed methods design to address the study's goals and associated research questions. A mixed methods research design has particular appeal for this study because such designs draw on the relative strengths of quantitative and qualitative methods while offsetting the relative shortcomings of each (Hanson et al. 2005; Riccucci 2010). The triangulation of quantitative and qualitative data will allow the 2M-Urban Team to capitalize on the benefits of quantitative and qualitative data sources and obtain a more robust understanding of human services programs in rural contexts.

Quantitative data sources, including administrative and survey data, will provide a broad and generalizable understanding of the commonalities across rural communities:

- The 2M-Urban Team is utilizing administrative data from ACF and HRSA on grantee service areas and the number of clients served through HMRF, MIECHV, TANF, and HPOG programs, in combination with secondary data, to map funding distributions, estimate eligible populations and the populations served by each of the programs, and generate estimates of unmet need at the county level.[1]

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[1] For this study, the primary unit of analysis is a rural county, which is defined in accordance with the U.S. Department of Agriculture's Rural-Urban Continuum Codes (discussed in Section 3.1). However, this plan uses the terms "rural counties" and "rural communities" interchangeably, as multiple rural communities can exist within a single county and a rural community can span more than one county. We expect the terms "rural community" and "rural communities" will be most useful for describing the qualitative findings from our planned interviews. The individuals we speak to may or may not see their rural community as synonymous with the rural county we identify for the quantitative data. The interview findings may thus apply to certain areas within a county or an area that spans one or more rural counties.]

- The 2M-Urban Team is supplementing the primary administrative data provided by ACF and HRSA with relevant secondary data to describe unique social and economic conditions in rural areas.

Qualitative data sources will provide rich and more nuanced descriptions of the complexities of delivering human services programs in rural contexts. The qualitative component of this study focuses on 12 site visits to rural communities to better understand the array of human services programs operating within these communities. The 2M-Urban Team engaged the study's three stakeholder groups—Human Services Practice Field stakeholders, subject matter expert stakeholders, and a Technical Working Group (TWG)—to solicit recommendations for site visits. The 2M-Urban Team then used a purposive sampling approach to select 12 rural counties that were representative of key variables, including rural regions and the HMRF, MIECHV, TANF, and HPOG programs. During the 12 site visits, the 2M Team will collect qualitative data, including program documents and other pertinent materials and conduct semi-structured interviews with human services staff and community stakeholders, to inform a series of case studies.

Analysis Methods

A combination of quantitative, qualitative, and mixed analysis methods will be used to support the study's three goals.

Quantitative Analysis Methods

The 2M-Urban Team will leverage administrative and survey data sources to examine levels of unmet need for human services across the universe of rural counties (N = 1,976). In close collaboration with the OPRE-MCHB Team and the TWG, the 2M-Urban Team developed a framework of needs for the HMRF, MIECHV, TANF, and HPOG programs. The 2M-Urban Team developed a formula to combine administrative and secondary survey data into estimates of unmet need at the rural county level and will develop geographic information system maps that provide information on the spatial distribution of unmet need estimates.

As a second step, the 2M-Urban Team will conduct a hot spot analysis to provide a more rigorous and empirically based approach to identify rural counties with particularly high or particularly low levels of unmet need for human services. The hot spot analysis will use the Getis-Ord Gi* statistic to identify clusters of rural counties with statistically higher values (i.e., hot spots) of unmet need for human services.[2] Similarly, the analysis will identify rural

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[2] The Getis-Ord Gi* statistic compares the local sum of the unmet need in a rural county and its surrounding neighbors to the sum of unmet need for all rural counties in the U.S. The 2M-Ubran Team defines "neighbors" as counties that share a boundary with the rural county of interest. The Getis-Ord Gi* statistic is a z-score with a p-value that indicates whether the difference between the local sum and overall sum is too large to be the

counties with particularly low levels of unmet need (i.e., cold spots). This analysis will help the 2M-Urban Team to better understand the distribution of unmet need in rural counties and identify geographic areas that human services programs may wish to target in the future to increase capacity for addressing unmet need.

Qualitative Analysis Methods

In consultation with the OPRE-MCHB Team and the TWG, the 2M-Urban Team developed a comprehensive set of research questions associated with the study's three goals. These research questions will serve as the foundation for a qualitative thematic analysis of the data collected during the 12 site visits. Data sources, including interview transcripts and program documents, will be analyzed using a five-step qualitative analysis approach (Miles and Huberman 1994):

1. *Coding the data* to identify themes and relationships
2. Using codes to *display and reduce the data* by organizing them into large sections that can then be analyzed
3. *Reordering and reflecting on data* and making any necessary adjustments to the definitions or guidance for specific codes
4. *Extracting key concepts* by conducting a thematic analysis on all coded data to identify themes within each construct or code
5. *Drawing conclusions from the data,* by first analyzing the 12 sites separately (i.e., within-case analysis) to create a holistic and thorough understanding of the nuances of each individual rural site. The 2M-Urban Team will roll up emerging high-level themes to present summary-level findings that look across sites (i.e., cross-case analysis).

Qualitative Comparative Analysis

As previously noted, the relative shortcomings of quantitative and qualitative methods can be exacerbated when studying rural communities. Hence, this study's mixed methods research design incorporates Qualitative Comparative Analysis (QCA) (Ragin 2008), which brings the methodological rigor of quantitative analysis and the causal complexity and inductive sensitivity of qualitative analysis to examine causal relationships (Kahwati and Kane 2020). The QCA method examines set theoretical relationships (e.g., if *X*, then *Y*) and assesses how combinations of conditions come together to produce specific outcomes. In particular, this method considers both necessary and sufficient conditions that lead to the occurrence of an outcome of interest. The 2M-Urban Team will leverage the methodological

result of random chance (i.e., a p-value less than 0.05 is evidence that the difference is not simply random chance). If the difference is large enough, the analysis identifies the county and its neighbors as a hot spot or a cold spot, depending on whether the local sum is significantly higher or lower than the overall sum. For more information on the statistic see Getis and Ord (2010).

strengths of QCA to examine the necessary and sufficient conditions that result in high levels of unmet need for human services across the universe of rural U.S. counties.

Integration and Triangulation

After analyzing the various data using the steps described above, the final step will consist of integrating the data to achieve methodological triangulation. The research team will use a *triangulation protocol* as its primary approach to integrating the findings. The triangulation protocol employs a systematic approach to compare the findings from various methodologies and determine the degree to which they agree or disagree, and provides an appropriate and effective tool for enhancing the overall validity of the study's findings related to the three goals. The *following a thread approach* will provide a secondary approach to integration. The 2M-Urban Team will use this approach to explore new concepts and themes that do not necessarily align with the study's research questions. This approach will facilitate following a concept or theme across multiple methods to develop a multifaceted understanding of a given phenomenon.

The application of the triangulation protocol and following a thread approaches to integration will support the research team and the study in achieving the critical goal of methodological triangulation (O'Cathain, Murphy, and Nicholl 2010). Critically, the triangulation of the diverse qualitative and quantitative analysis methods described throughout this plan will result in a more robust understanding of human services programs in rural contexts by providing a rich description, determining the level of unmet need for human services, and identifying opportunities for strengthening the capacity of human services programs in rural contexts.

1 INTRODUCTION AND STUDY DESIGN

In 2019, the Office of Planning, Research, and Evaluation (OPRE) in the Administration for Children and Families (ACF), U.S. Department of Health and Human Services, in collaboration with the Health Resources and Services Administration's (HRSA) Maternal and Child Health Bureau (MCHB), selected 2M Research and its partner, the Urban Institute (referred to hereafter as "the 2M-Urban Team"), to conduct a study to advance the field of human services delivery in rural contexts. Beginning in the fall of 2019, the 2M-Urban Team engaged in a series of knowledge development tasks, engaged with an array of stakeholders, and developed a mixed methods research design to address the prominent methodological challenges that are often encountered when studying rural communities. This report presents the 2M-Urban Team's detailed plan for analyzing and integrating the quantitative and qualitative data used to address the study's goals.

What is the difference between analysis, integration, and triangulation?
Analysis involves the systematic application of quantitative or qualitative methods to derive meaningful insights and conclusions from data.
Integration involves a specific relationship between two or more methods, in which the different methods retain their paradigmatic nature but are combined to learn more about a topic or theme.
Triangulation is an epistemological claim pertaining to what more can be known about a phenomenon when the findings from data by two or methods are combined.

This mixed methods analysis and integration plan consists of four parts:

- This introductory section provides an overview of the study background and research goals, details the key steps associated with designing a robust mixed methods research design, and then discusses this study's use of a triangulation mixed methods design.
- The second section describes the study's research questions and data sources.
- The third section discusses the quantitative and qualitative methods used to analyze the study's diverse data sources and includes sample table shells and maps that will be used to report and display various findings.
- The final section provides an analysis plan that is guided by the principles of integration, includes a description of the methodological approaches used to accomplish integration within this study, and outline the 2M-Urban Team's plan achieving to achieve the goal of methodological triangulation.

For this study, we will use qualitative comparative analysis (QCA) to integrate quantitative administrative and secondary survey data with qualitative information we will collect from semi-structured interviews in a sample of rural communities. Integration is thus an analytical

method to combine our data sources. After completing the QCA, we will triangulate the findings to make evidence-based claims that answer the study's research questions. Triangulation is thus the process of evaluating integrated results to develop the main findings of our research.

1.1 Study Background and Research Goals

While significant research has been carried out to enhance the collective understanding of how human services programs improve the economic and social wellbeing of individuals and families, notable knowledge gaps persist regarding how these programs can best serve rural communities.[3] Rural contexts present unique opportunities and challenges for administering human services programs (Fleming et al. 2018). This study seeks to better understand rural contexts, opportunities, and challenges through a primary focus on four human services programs: Temporary Assistance for Needy Families (TANF); Healthy Marriage and Responsible Fatherhood (HMRF); Health Profession Opportunity Grants (HPOG); and the Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program. This study also seeks to understand other human services programs operating in rural communities (e.g., housing, early childhood development, family development, employment, and higher education and technical training programs). This study aims to address the enduring knowledge gaps regarding the delivery of human services programs in rural communities and to expand the knowledge base by conducting a mixed methods study focused on the following goals:

1. Providing a rich description of human services programs in rural contexts (*Goal 1: Rich Description)*
2. Determining the unmet need for human services in rural communities (*Goal 2: Unmet Need)*
3. Identifying opportunities for strengthening the capacity of human services programs to promote the economic and social wellbeing of individuals, families, and communities in rural contexts (*Goal 3: Opportunities)*

The presence of several prominent methodological challenges when studying rural communities warrants the use of a mixed methods research design to achieve the study's primary goals. For instance, survey and administrative data on rural communities can have small sample and population sizes, which often introduces high levels of measurement error when employing quantitative analysis methods (Scally et al. 2020). To balance the limitations of quantitative approaches, qualitative methods can provide rich descriptions and explanations of processes in individual rural communities. Qualitative methods, in turn, have

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[3] For this study, the primary unit of analysis is a rural county, which is defined in accordance with the U.S. Department of Agriculture's Rural-Urban Continuum Codes (discussed in Section 3.1). However, this plan uses the terms "rural counties" and "rural communities" interchangeably, as multiple rural communities can exist within a single county.

their own limitations related to generalization across communities. Given the variation across types of rural communities, generalization can be particularly challenging. A mixed methods research design has particular appeal for this study because such designs draw on the relative strengths of quantitative and qualitative methods while offsetting the relative shortcomings of each (Hanson et al. 2005; Riccucci 2010).

1.2 Stakeholder Engagement

A critical aspect of this study is its engagement of three stakeholder groups: Human Services Practice Field (HSPF) stakeholders from an array of human services programs operating in rural contexts; Subject Matter Expert (SME) stakeholders with expertise in rural contexts, diverse human services programs, and research methods; and a Technical Working Group (TWG) consisting of selected individuals from the HSPF and SME stakeholder groups. Their invaluable expertise and experience in delivering and researching human services programs in rural communities have informed the development of the study's mixed methods design. The following section discusses key methodological steps in developing a robust mixed methods research design, then provides an overview of the mixed methods design used to address the study's goals and research questions.

1.3 Methodological Overview: Key Steps in Developing a Robust Mixed Methods Research Design

Mixed methods research designs offer several notable advantages compared to other qualitative and quantitative research designs. First, mixed methods designs leverage the representativeness and generalizability of quantitative findings and the in-depth contextual nature of qualitative findings (Greene and Caracelli 2003). This methodological approach can uncover unique insights and findings that the use of a single method might otherwise overlook (Jick 1979; Plano Clark 2019). Second, mixed methods designs' collection, analysis, and integration of quantitative and qualitative data facilitates researchers addressing complex research questions and providing a more comprehensive understanding of phenomena by exploring divergent viewpoints and providing deeper contextual understandings (Greene 2007; Moran-Ellis et al. 2006; Teddlie and Tashakkori 2009; Tashakkori and Creswell 2007). Finally, mixed methods research designs are especially valuable within applied settings, as the designs provide critical "flexibility in efforts to find solutions to practical, real-world problems" (Riccucci 2010, 61).

While mixed methods research designs offer considerable potential for addressing complex research questions, certain methodological challenges can arise. These challenges are related to designing and effectively implementing quantitative and qualitative methods in ways that generate meaningful and defensible conclusions (Plano Clark 2019). Besides the traditional steps associated with developing a research design—such as determining the study's purpose, developing the research questions, and determining the types of data to

collect—designing a mixed methods study involves three additional steps (Hanson et al. 2005):

What is mixed methods research?
Mixed methods research is a methodological approach that combines both qualitative and quantitative forms of research. It involves philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing of both approaches (Creswell and Creswell 2017).

Step 1. Stating your research agenda. Mixed methods designs leverage both quantitative and qualitative methodologies, which are informed by their own philosophies and paradigms. As such, close attention should be paid to the research agenda that informs a study and the subsequent decisions to develop and implement a mixed methods design (Hanson et al. 2005) and to the respective roles that quantitative and qualitative methodologies play in the research design. In the case of this study, our agenda is to provide federal, state, and local policymakers and program grantees with information to improve the delivery of human services programs in rural contexts. Based on this agenda, we place equal value on quantitative administrative and secondary data sources that can provide information on the level of funding and the unmet needs present in rural communities and on qualitative information that reflect the experience of program directors/leadership, program staff, and local partners that serve rural populations. We integrate and triangulate these qualitative and quantitative sources of information to provide as complete a picture as possible for our intended audiences of policymakers and program grantees.

Step 2. Deciding how data collection will be implemented and prioritized. The next consideration for implementing data collection is determining the order in which quantitative and qualitative data are collected. The data may be collected in a sequential manner with qualitative data collected and analyzed first, followed by the collection and analysis of quantitative data—or in the inverse, with quantitative data collected and analyzed, followed by qualitative data. Qualitative and quantitative data could also be collected and analyzed concurrently. The second consideration for data collection consists of the priority assigned to the two types of data. Quantitative and qualitative data could be given equal weight or emphasis within the design. Conversely, a higher priority could be placed on one type of data, with that data serving as the major component of the design, or by electing to collect a greater amount or level of detail for that particular type of data.

Step 3. Determining at which point data analysis and integration will occur. Integration, or the intentional process by which quantitative and qualitative methods are combined in a study, is the centerpiece of mixed methods research (Guetterman, Fetters, and Creswell 2015). Integration is the defining feature that separates mixed methods research designs from other designs, and planning for and achieving meaningful integration is a unique challenge of mixed methods designs (Fetters and Freshwater 2015; Plano Clark 2019). Data analysis and integration could occur by analyzing the data separately and then comparing and contrasting the data at the study's conclusion. Another approach to analysis and

integration consists of transforming one type of data so that they can be analyzed in combination with the other data. As an example, themes identified in qualitative interview data can be transformed into frequencies that can be compared to administrative or quantitative data. Finally, the analyses of quantitative and qualitative data could be connected at one or more points throughout the study. Data could be analyzed in a sequential manner, with either quantitative or qualitative data analyzed first, followed by the other, with the integration of the analyses occurring at designated points throughout a study. In contrast, quantitative and qualitative data could be analyzed separately, with the data integrated near the study's end and a focus on the extent that the data converge, complement, or contradict one another.

The decisions and determinations made in relation to each of these three steps can have a significant impact on the resulting mixed methods design. As such, an array of approaches has been developed for classifying mixed methods designs (Creswell et al. 2003; Hanson et al. 2005), depending upon whether an explicit theoretical lens is employed, whether a sequential or concurrent approach to data collection is used, whether equal or unequal priority is given to quantitative and qualitative data, and the stage at which the data are analyzed and integrated. While a detailed discussion of the various mixed method designs is beyond the scope of this plan, an overview of three mixed methods designs that are relevant to this study and its goals is warranted (Creswell and Clark 2017):

- ***Exploratory Design:*** In this two-phase design, qualitative data are collected and analyzed first to help develop or inform the quantitative data to be collected. This design is particularly useful under several circumstances, including when (1) no measures or instruments to examine a particular phenomenon are available, (2) the particular variables to include are unknown (e.g., examining new phenomena), and/or (3) a framework or theory has not yet been developed.
- ***Explanatory Design:*** This two-phase design uses qualitative data to help either explain or expand on initial quantitative findings. Quantitative data are collected and analyzed first, followed by qualitative data. Typically, quantitative data are weighted more heavily than qualitative data.
- ***Triangulation/Concurrent Design:*** A single-phase design is used to integrate the findings from analyses of quantitative and qualitative data into an overall interpretation with equal weight placed on the quantitative and qualitative data.

1.4 Applying a Triangulation Mixed Methods Design to Answer Questions about Human Services in Rural Contexts

The 2M-Urban Team is implementing a triangulation mixed methods design to address the study's objectives and research questions. This triangulation of quantitative and qualitative data will result in study findings that provide a more robust understanding of human services programs in rural contexts than an analysis of either type of data could alone. Concurrent integration of the qualitative and quantitative data will allow the 2M-Urban Team

to capitalize on the benefits of quantitative and qualitative data sources. Quantitative data sources (e.g., administrative and survey data) will provide a broad and generalizable understanding of the commonalities across rural communities while qualitative data sources (e.g., semi-structured interviews during site visits) will provide rich and more nuanced descriptions of the complexities of delivering human services programs in rural contexts. These sets of data sources are discussed in further detail in Sections 2.3 and 2.4. In Exhibit 1, we provide an overall framework that visually depicts the triangulation mixed methods study design, including study goals, planned data collection methods, and planned data analysis methods to achieve the goals.

Exhibit 1. Triangulation Mixed Methods Study Design

Literature Reviews, Case Studies, Administrative Data

Qualitative Analysis + Qualitative Comparative Analysis (QCA) + Descriptive Statistics

Descriptive Statistics + GIS Mapping + Qualitative Analysis + Hot Spot Analysis + QCA

Administrative and Survey Data, Case Studies

Goal 1: Rich Description

Understanding the distribution of (1) federal human services funding and (2) unmet needs

Goal 2: Unmet Needs

Deeper Understanding of Human Services Programs in Rural Contexts

Understanding capacity in rural contexts

Identifying actionable opportunities that may help address unmet need

Goal 3: Opportunities for Strengthening Capacity

Qualitative Analysis + Hot Spot Analysis + QCA

Literature Reviews, Administrative and Survey Data, Case Studies

Legend:
Circles = Study Goals
Ovals = Data Collection Methods
Rectangles = Data Analysis Methods
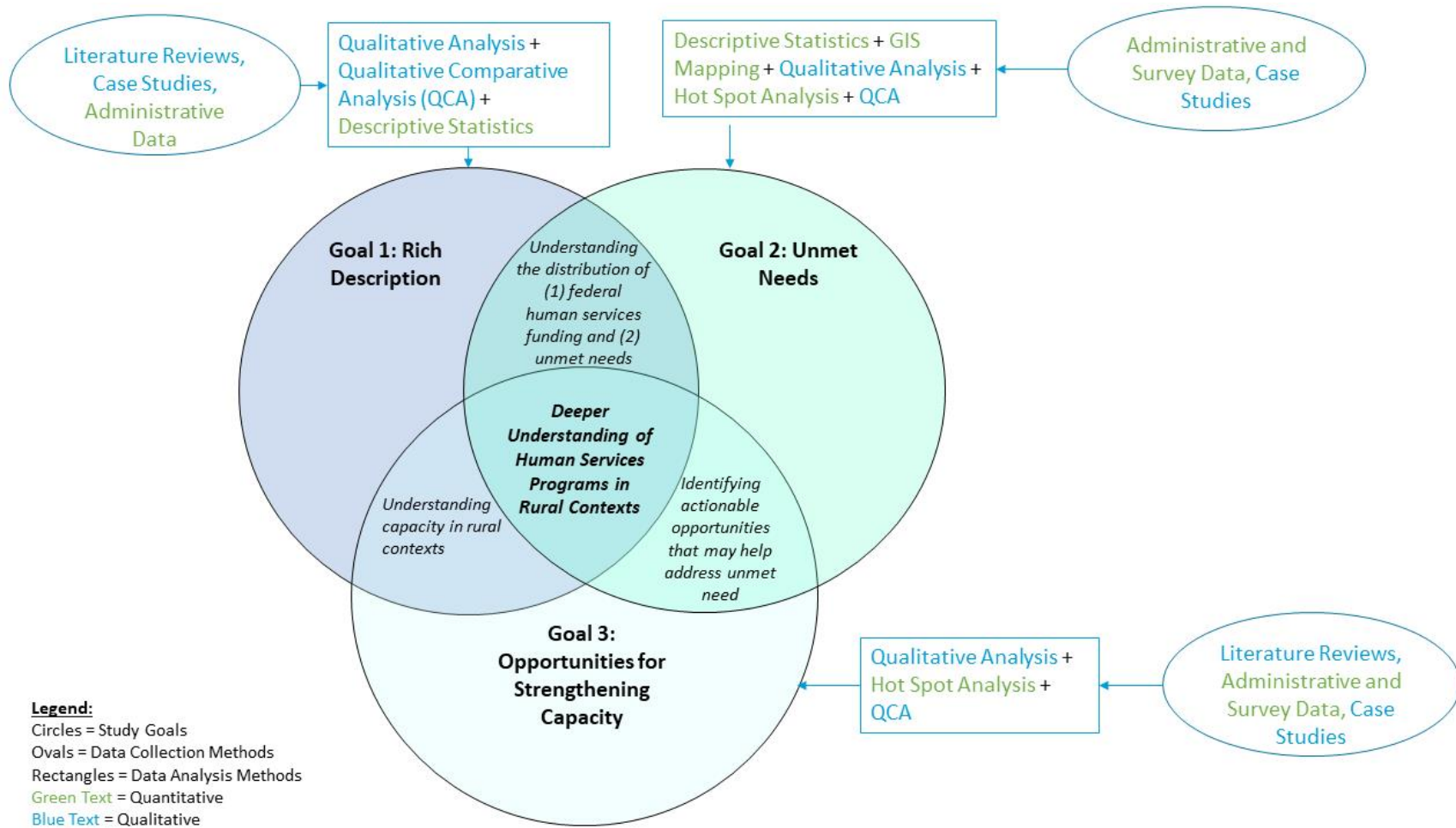Green Text = Quantitative
Blue Text = Qualitative

Exhibit 1 depicts how the 2M-Urban Team will analyze each of the study's data sources to inform the study's three objectives. The three overlapping circles (i.e., Venn diagram) at the center of the exhibit represent the study's three goals. Each goal has an associated set of data collection methods (ovals) and data analysis methods (rectangles). The exhibit shows sources and analyses of quantitative information in green and sources and analyses of qualitative information in blue. We will inform *Goal 1: Rich Description,* the blue circle in the upper left of the Venn diagram, using qualitative analysis and Qualitative Comparative Analysis (QCA)[4] of qualitative literature review data and case study data collected during site visits to rural counties. In contrast, we will inform *Goal 2: Unmet Need,* the green circle in the upper right of the Venn diagram, using a combination of quantitative descriptive statistics, geographic information system (GIS) mapping, and hot spot analysis with qualitative thematic analysis and QCA. The data sources for Goal 2 include administrative data, secondary survey data, and case studies. Finally, we will use a combination of qualitative thematic analysis, hot spot analysis, and QCA on data from literature reviews, administrative data, secondary survey data, and case study data to inform *Goal 3: Opportunities for Strengthening Capacity,* the light green circle at the bottom of the Venn diagram. We provide more information on our approach to each analysis method listed in Exhibit 1 in Section 3.

Exhibit 1 also shows how the 2M-Urban Team will triangulate the findings for each of the three goals to develop deeper and cross-cutting study findings that will serve as the foundation for our final findings and recommendations to OPRE and MCHB. The combination and synthesis of information addressing each study goal will add critical insight. For instance, we will triangulate the primarily qualitative methods used under *Goal 1: Rich Description* with the quantitative and qualitative methods employed under *Goal 2: Unmet Need* to provide a comprehensive understanding of the distribution of federal funding for human services programs and the level of unmet need across rural contexts. We will also triangulate the qualitative methods employed under *Goal 1: Rich Description* with the quantitative and qualitative methods used in *Goal 3: Opportunities* to understand the existing capacity of human services programs in rural contexts and opportunities for strengthening the capacity. Finally, triangulation of the combined quantitative and qualitative methods utilized in Goals 2 and 3 will yield critical insight into identifying actionable opportunities for addressing unmet need. When synthesized collectively, findings will ultimately culminate in a *deeper understanding of human services programs in rural contexts* (as depicted by the overlap of all three goals in Exhibit 1).

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[4] Qualitative Comparative Analysis (Ragin 2008) combines the methodological rigor of quantitative analysis with the causal complexity and inductive sensitivity of qualitative analysis to examine causal relationships. The QCA method examines set theoretic relationships (e.g., if *X*, then *Y*) and assesses how combinations of conditions come together to produce particular outcomes. An overview of the QCA methodology, its benefits, and its utility for studying he unmet need for human services in rural counties is Section 3.4.

2 RESEARCH QUESTIONS AND DATA SOURCES

This section provides an overview of the study's research questions and associated data sources. The section first discusses the process for developing the study's research questions and then details the research questions associated with the three goals. The section concludes with an overview of the quantitative and qualitative data sources.

2.1 Process for Developing Research Questions

A robust and iterative process was employed by the 2M-Urban Team to develop comprehensive research questions for the three study goals. This process began with a pair of knowledge development tasks: (1) a literature review that provided a foundational understanding of human services programs in rural communities and highlighted key gaps in the existing knowledge base and (2) the development of a comprehensive framework of needs that captures the need for human services among individuals and families residing in rural communities. Both of these tasks helped the 2M-Urban Team understand key areas of relevance for the study moving forward and determine what was realistic and achievable given past research, the project timeline, and the availability of administrative and secondary data sources.

After the knowledge development tasks, a series of meetings was conducted between the 2M-Urban Team, the OPRE-MCHB Team, and the TWG. The first meetings were between the 2M-Urban Team and the OPRE-MCHB Team and focused on the study's priorities, the study's three primary goals, and the context and concepts associated with each of the goals. This process began with an initial meeting focused on *Goal 1: Rich Description*, in which the 2M-Urban Team identified overarching questions related to the goal and draft research questions. This was followed by a discussion of the various concepts and definitions associated with the goal. Following that meeting, the 2M-Urban Team revised the draft research questions to incorporate the answers to the 2M-Urban Team's overarching questions and to incorporate the additional concepts and definitions that were discussed during the meeting. Similar meetings were then held for *Goal 2: Unmet Need* and *Goal 3: Opportunities*, with a focus on reviewing draft research questions, discussing the various definitions and concepts associated with the goals, and refining the draft questions to reflect key concepts and discussions.

In the next step, the 2M-Urban Team leveraged a 3-day TWG meeting to obtain the TWG's input on the mixed methods design and its various components. Meeting discussions primarily focused on reviewing the research questions associated with the three goals, determining priority questions, and identifying additional questions for consideration. Upon completion of the meeting, the 2M-Urban Team incorporated the TWG's feedback into the mixed methods design.

2.2 Research Questions

The following subsections provide an overview of the research questions associated with each of the three goals and the data used to answer each research question. The research questions associated with each of the three goals are presented using an Evaluation Planning Matrix (Holden and Zimmerman 2008), which organizes the research questions around goals and objectives, identifies associated data sources, and details the analysis methods. For the sake of parsimony, we have provided a high-level version of the Evaluation Planning Matrix with a detailed version that includes the subquestions associated with each research question in the Appendix.

2.2.1   Research Questions for Goal 1 – Rich Description and Characterizing Capacity

Goal 1: Rich Description largely focuses on gathering descriptive information about human services programs that will also provide context with which to better examine the findings generated under Goals 2 and 3. There are five main objectives for Goal 1:

- **Objective 1a:** Review and synthesize relevant research on rural economic and social wellbeing, including research on human services in rural contexts.
- **Objective 1b:** Review and synthesize relevant federal and state reports on human services and rural communities.
- **Objective 1c:** Identify gaps in the existing knowledge base produced by the above reviews and syntheses.
- **Objective 1d:** Design and conduct case studies and interviews to (a) increase levels of understanding about the experiences of human services participants and prospective participants, staff, and directors in rural contexts; (b) address the knowledge gaps identified above; and (3) address questions that arise about unmet human services needs identified through *Goal 2: Unmet Need*.
- **Objective 1e:** Design and implement a mixed methods approach to analyze, interpret, and synthesize knowledge gained through the reviews, case studies, and interviews.

The research questions for *Goal 1: Rich Description* were generally developed to describe two overarching categories: (1) a general description of human services programs in rural contexts and (2) a description of existing capacity within human services programs operating in rural contexts. This goal, in contrast to *Goal 2: Unmet Need*, will take a broad perspective by focusing on the four programs of focus and the other human services programs operating in the rural communities that are visited. **Exhibit 2** provides the specific research questions to address Goal 1*: Rich Description and Characterizing Capacity* and its accompanying capacity component, along with their associated data source and proposed analysis method.

Exhibit 2. Research Questions for Goal 1: Provide a Rich Description of Human Services in Rural Contexts Characterizing Capacity

Research Question	Data Collection Methods	Data Analysis Methods
- How are rural contexts defined within the extant literature?	- Literature	- Literature review[5]

- What are the associated social wellbeing needs of the populations served by human services programs?	- Literature
	- Program documents
	- Site visit interviews
	  o Program staff
	  o Other*
		- Literature review
		- Qualitative thematic analysis

- What are the associated economic wellbeing needs of the population served by human services programs?	- Literature
	- Program documents
	- Site visit interviews
	  o Program staff
	  o Other*
		- Literature review
		- Qualitative thematic analysis

- What "standard" service delivery models are used by human services programs to deliver the programs in rural contexts?	- Literature
	- Program documents
	- Site visit interviews
	  o Program staff
	  o Other*
		- Literature review
		- Qualitative thematic analysis

- How are human services programs in rural contexts adapting service delivery?	- Literature - Program documents - Site visit interviews o Program staff	- Literature review - Qualitative thematic analysis

- What are the key barriers and facilitators of the delivery of the four human services programs in rural contexts?	- Program documents
	- Site visit interviews
	  o Program staff
	  o Other*
		- Qualitative thematic analysis

- What is the organizational capacity of human services programs to deliver services in rural contexts?	- Administrative data - Program documents - Site visit interviews o Program staff	- Descriptive statistics - Qualitative thematic analysis

- In what ways do key "local" factors impact the capacity of human services programs to provide services in rural contexts?	- Program documents
	- Site visit interviews
	  o Program staff
	  o Other*
		- Qualitative thematic analysis

- What key "federal" factors impact the capacity of human services programs to provide services in rural contexts?	- Program documents
	- Site visit interviews
	  o Program staff
	  o Other*
		- Qualitative thematic analysis

- What components of organizational capacity are identified as most critical to the delivery of human services programs in rural contexts?	- Site visit interviews o Program staff	- Qualitative thematic analysis
- What particular components of organizational capacity are identified by staff from human services programs as most critical to addressing unmet need in rural contexts?	- Administrative data - Site visit interviews o Program staff	- Descriptive statistics - Qualitative thematic analysis - QCA
- In what ways does organizational capacity in rural contexts impact fidelity of implementation for human services programs?	- Site visit interviews o Program staff	- Qualitative thematic analysis - QCA
- What technical assistance (e.g., recruitment/intake, case management, curricula, data use, "other") are human services programs in rural contexts currently receiving?	- Site visit interviews o Program staff	- Qualitative thematic analysis
- How are human services programs in rural contexts using data (e.g., performance measures, evaluation data) to improve their capacity to deliver services?	- Site visit interviews o Program staff	- Qualitative thematic analysis

* The 2M-Urban Team recognizes that there may be additional organizations that play a role in the provision of human services. We will work with each site to determine if there are others we should speak with as time permits.

2.2.2 Research Questions for Goal 2 – Unmet Need

Goal 2: Unmet Need is focused on characterizing and describing the unmet need for human services in rural contexts through the four programs of focus (i.e., HMRF, MIECHV, TANF, and HPOG). There are four main objectives for this goal:

- **Objective 2a:** Determine the distribution of federal human services funds, by program, across the rural U.S. population
- **Objective 2b:** Create a framework of needs, human services that would meet those needs, and indicators to show whether those needs are being met
- **Objective 2c:** Review existing data sources to identify data elements that could serve as key indicators of unmet needs
- **Objective 2d**: Conduct secondary data analyses on selected data sources to provide an assessment of the unmet need for human services in rural contexts.

Exhibit 3 provides the specific research questions to address Goal 2*: Unmet Need* and its associated data source and proposed analysis methods.

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[5] Literature reviews are considered as a data analysis method (Snyder 2019) within the study's mixed methods research design as they yield findings that are integrated with the other methods during the integration phase of the mixed methods design.

Exhibit 3. Research Questions for Goal 2: Determine the Unmet Need for Human Services in Rural Contexts

Research Question	Data Collection Methods	Data Analysis Methods
- How is federal funding for human services programs distributed across rural counties?	- Administrative data	- Descriptive statistics - GIS mapping
- What is the overall level of unmet need for human services programs in rural counties?	- Administrative data - Secondary data	- Descriptive statistics - GIS mapping

- Which combinations of human services programs are found among rural counties with lower and higher levels of unmet need?	- Administrative data
	- Program documents
	- Site visit interviews
	   o Program staff
	   o Other*
		- Descriptive statistics
		- QCA

- What are the key lessons learned about the delivery of human services programs in rural counties with significantly low concentrations (i.e., "cold spots") of unmet need?	- Administrative data
	- Site visit interviews
	   o Program staff
	   o Other*
		- Hot spot analysis
		- Qualitative thematic analysis

- What are the most significant challenges facing the delivery of human services programs in rural counties with significantly high concentrations (i.e., "hot spots") of unmet need?	- Administrative data
	- Site visit interviews
	   o Program staff
	   o Other*
		- Hot spot analysis
		- Qualitative thematic analysis

- What do human services staff in rural contexts perceive to be the greatest needs of the populations served by human services programs?	- Site visit interviews
	   o Program staff
	   o Other*
		- Qualitative thematic analysis

- What do staff from human services programs in rural contexts perceive as the factors influencing the unmet needs of the populations served?	- Site visit interviews
	   o Program staff
	   o Other*
		- Qualitative thematic analysis

- In what ways are nonprofits working to address unmet needs in rural contexts?	- Site visit interviews
	   o Program staff
	   o Other*
		- Qualitative thematic analysis

* The 2M-Urban Team recognizes that there may be additional organizations that play a role in the provision of human services. We will work with each site to determine whether there are others we should speak with as time permits.

2.2.3   Research Questions for Goal 3 – Opportunities

Goal 3: Opportunities is focused on identifying opportunities for strengthening the capacity of human services programs in rural contexts. Similar to *Goal 1: Rich Description*, this goal takes a broader perspective that explores the four programs of focus and the other human services programs operating in the rural counties selected for case study site visits. This goal and its related research questions rely strongly on the data and findings from *Goal 1: Rich Description* and *Goal 2: Unmet Need*. Specifically, *Goal 1: Rich Description* establishes an understanding of the current capacity of human services programs and organizations to provide services in rural contexts. *Goal 3: Opportunities* builds on that foundation of understanding to identify opportunities to strengthen that capacity. Goal 2*: Unmet Need* and *Goal 3: Opportunities* are interconnected, in that Goal 2*: Unmet Need* will help to identify

those areas with high and low unmet need so data can be interpreted within those contexts. Some questions are more analytical in nature and will be addressed by analysis of data collected under Goals 1 and 2. There are two main objectives for Goal 3:

- **Objective 3a:** Organize and integrate findings from above goals to propose opportunities for strengthening human services programs in rural contexts
- **Objective 3b:** Propose innovative and feasible opportunities for research and evaluation to inform and enhance human services in rural contexts

Exhibit 4 provides the specific research questions to address *Goal 3: Opportunities* and their associated data source and proposed analysis method.

Exhibit 4. Research Questions for Goal 3: Identify Opportunities for Strengthening the Capacity of Human Services Programs in Rural Contexts

Research Question	Data Collection Methods	Data Analysis Methods

- What strategies have human services programs in rural contexts found to be effective in strengthening the capacity to meet the needs of their clients?	- Site visit interviews
	  o Program staff
	  o Partners[6]
		- Qualitative thematic analysis

- What are the ongoing needs related to improving the capacity of human services programs in rural contexts?	- Site visit interviews
	  o Program staff
	  o Partners
		- Qualitative thematic analysis

- What are the flexibilities (at the federal/program level) that human services programs in rural contexts need to implement these programs?	- Site visit interviews
	  o Program staff
	  o Partners
		- Qualitative thematic analysis

- What are the key lessons learned that may be particularly important to increase capacity among human services programs in rural contexts?	- Administrative data
	- Site visit interviews
	  o Program staff
	  o Partners
		- Descriptive statistics
		- Qualitative thematic analysis

- What are the suggested areas for future research to strengthen the capacity of human services programs in rural contexts?	- Administrative data
	- Site visit interviews
	  o Program staff
	  o Partners
		- Descriptive statistics
		- Hot spot analysis
		- Qualitative thematic analysis
		- QCA

2.3 Quantitative Data Sources

The 2M-Urban Team is compiling administrative and secondary data to examine the distribution of federal funding and estimate unmet need for human services across rural counties. The following section provides an overview of pertinent quantitative data sources of interest, focusing on administrative data for the four primary programs of focus, and secondary survey and administrative data to describe unique social and economic conditions in rural areas. **Exhibit 5** lists the administrative and public data sources, and the geographic unit of analysis and accessibility of the data. The Exhibit also indicates the

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[6] Partners refers to community partners, as well as nonprofits and other organizations in the community that a human service organization reports working with.

associated human services programs for which the data source may inform an estimate of unmet need.

2.3.1   Administrative Data

The analysis of the distribution of federal funds will rely on publicly available fiscal year (FY) 2018 funding data for HMRF, MIECHV, HPOG, and TANF. Federal funds for these grant programs were dispersed through either annual block grant payment amounts (in the case of TANF), equal annual payments across a multiyear period of performance (in the cases of HMRF and HPOG), or payments that vary by amount across a multiyear period of performance (in the case of MIECHV). The most recent and complete HMRF award cycle provided funding for 85 organizations from FY 2015 through FY 2020. While both non-tribal and Tribal MIECHV programs rely on formula-based funding schemes, annual awards for non-tribal MIECHV vary across years whereas Tribal Home Visiting receives fixed annual payments across a 5-year period. Both non-tribal and Tribal HPOG grantees from the most recent cycle received fixed annual payments beginning in FY 2015. TANF funding is provided through annual block grants to each state. As activities funded by TANF are diverse and greatly vary by state, the study bounds its focus to basic assistance expenditures.

The 2M-Urban Team is utilizing administrative data from ACF and HRSA on grantee service areas and the number of clients served for these four human service programs of focus in combination with secondary data to estimate eligible populations and the populations served by each of the programs and to generate estimates of unmet need[7] at the county level. Appropriately measuring unserved populations entails program-specific scrutiny of reporting requirements (particularly frequency of submissions and units reported) and the comparability of administrative counts to external data of eligible populations.

HMRF Administrative Data. Counts of participating individuals and couples for HMRF grants were obtained from the Information, Family Outcomes, Reporting, and Management (nFORM) system. The nFORM system is a centralized information management system that captures programmatic, service, and client characteristics.

MIECHV Administrative Data. To capture the count of participating pregnant women and children in the MIECHV program, the 2M-Urban Team is utilizing both MIECHV Program Form 1 and Tribal MIECHV Form 1. These two forms are reported annually by grantees and capture various demographic characteristics of the populations served.

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[7] The MIECHV program utilizes an established methodology for estimating unmet need at the county level that was developed as part of the updated statewide needs assessment process completed by program grantees. Caution should be used when comparing the unmet need estimates developed for this study to the unmet need estimates developed by the MIECVH program, as the methodologies and estimates were developed for different purposes.

HPOG Administrative Data. Data on both Tribal and non-tribal HPOG grantees from the most recent award cycle were obtained from the Participant Accomplishment and Grant Evaluation System (PAGES). Client counts by HPOG grantee can be further divided into counts by program site to facilitate a more granular determination of service level.

TANF Administrative Data. Both Tribal and non-tribal TANF grantees submit Form ACF-199on a quarterly basis, which captures all recipients of cash assistance in a given month. While program guidance encourages non-tribal grantees to submit a form for all families and indicate the county of residence, grantees can instead submit a sample of all TANF cases under an approved sampling strategy.

2.3.2   Secondary Survey and Administrative Data

The 2M-Urban Team is supplementing the primary administrative data provided by ACF and HRSA with relevant secondary data to describe unique social and economic conditions in rural areas. Availability, exhaustiveness, and overall reliability of public data for rural areas is often scarce due to lower population counts. As a result of this, obtaining data on rural populations beyond demographic and broad economic variables often requires data use agreements and specialized handling provisions. The 2M-Urban Team has prioritized the use of publicly available county-level data to allow for greater transparency and reduce the burden associated with the handling of restricted use data. Complementary data sources identified by the research team provide insight into local demographics, economic conditions, family health and wellness, and the availability of supportive services important to rural program implementation.

HMRF Program Secondary Data. HMRF programs focus on several areas related to relationships and fatherhood, including building and sustaining healthy marriages and relationships, strengthening father-child engagement, and improving family economic stability. Associated variables on the prevalence of marriage, in addition to cross-tabulations of economic circumstances necessary for stability, are captured by the Census Bureau's American Community Survey (ACS). In addition to adult trainings and activities, Healthy Marriage and Relationship Education (HMRE) grants also provide healthy relationship education to students of high school age. To complement ACS counts of high school enrollment, the National Child Abuse and Neglect Data System (NCANDS) provides data on children of high school age exposed to domestic violence, as well as data on other healthy relationship risk factors.[8]

MIECHV Secondary Data. The 2M-Urban Team will compile various measures of interest to the MIECHV program concerning maternal, prenatal, and infant health; child development;

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[8] Public-access county-level data on the prevalence of fathers is limited. The 2M-Urban Team is currently investigating secondary survey data including the Survey of Income and Program Participation and National Survey of Family Growth as potential data sources for estimating the number of fathers in rural counties.

and social determinants of family health and wellbeing. To capture most health-related measures, the research team will leverage the National Vital Statistics System (NVSS) Natality files. As publicly available data for NVSS is only published for highly populated counties, the research team will limit the materialized variables to focus on preterm births, pregnancy risk factors, and the uptake in prenatal care. Child development measures such as children with special needs, counts of children developmental delays, and child injuries will be obtained from NCANDS data.

HPOG Secondary Data. Secondary data for the HPOG program will concentrate on the accessibility of healthcare occupation trainings and the characteristics of the local healthcare workforce. Numerous surveys of postsecondary institutions capturing location characteristics, physical and distance educational offerings, and costs of attendance are consolidated in the Institute of Education Services (IES), National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS). To measure the current and future supply of healthcare workers, the 2M-Urban team will use data from the Census Bureau's Quarterly Workforce Indicators (QWI) dataset. QWI figures that may provide insight into occupational supply include the number of separations and average age of healthcare workers.

TANF Secondary Data. Measurement of unmet needs for TANF basic assistance warrants attention to multiple facets of local economic conditions. The 2M-Urban Team will extract data from ACS on government assistance, underemployment, poverty rates among families, average hours worked, and residents commuting to neighboring counties for work. Additional labor market indicators from QWI will provide insight into employee churn, which can be decomposed to analyze growth or loss of stable jobs.

Exhibit 5. Administrative and Survey Data Sources

Data Source	Associated Human Services Programs				Geographic Unit of Analysis	Accessibility
	HMRF	TANF	HPOG	MIECHV		
ACF, Adoption and Foster Care Analysis and Reporting System (AFCARS), FY 2018	X	X			County	Restricted
ACF, Early Childhood Learning and Knowledge Center, Head Start Center Locator, 2021				X	Address	Public
ACF, National Child Abuse and Neglect Data System (NCANDS), FY 2018	X			X	County	Restricted
Centers for Disease Control and Prevention (CDC), National Vital Statistics System, Mortality 2016-2019				X	County	Public
CDC, National Vital Statistics System, Natality 2016-2019				X	County	Public
Census, American Community Survey (ACS) 5-year Estimates, 2013-2018	X	X	X	X	County; American Indian Areas/Alaska Native Areas/Hawaiian Homelands	Public
Census, County Business Patterns (CBP) and Nonemployer Statistics (NES), 2017-2018	X	X	X		County	Public
Census, Population Estimates Program (PEP), 2010-2019				X	County	Public
Census, Quarterly Workforce Indicators (QWI), 2018		X	X		County	Public
Census, Small Area Income and Poverty Estimates (SAIPE), 2018	X	X	X	X	County	Public
Census, Survey of Income and Program Participation (SIPP), 2018		X			State	Public
Center for American Progress, Child Care Desert Map, 2017-2018	X	X	X		Census tract	Public
Federal Communications Commission (FCC), 2018 Broadband Deployment Report	X	X	X	X	County	Public

Data Source	Associated Human Services Programs				Geographic Unit of Analysis	Accessibility
	HMRF	TANF	HPOG	MIECHV		
Feeding America, Map the Meal Gap Tool, 2009-2018				X	County	Public
Form ACF-199, TANF Data Report-Section 1, FY 2018		X			County; Tribal grantee area	Restricted
IES, NCES, IPEDS, 2018			X		Address	Public
MIECHV Home Visiting Grantee Form 2: Performance and Systems Outcome Measures, FY 2018				X	Grantee service area	Restricted
MIECHV Home Visiting Grantee Form 4, FY 2018				X	Grantee service area	Restricted
National Survey of Family Growth	X				County	Restricted
nFORM System, FY 2018	X				Program site	Restricted
Participant Accomplishment and Grant Evaluation System (PAGES), FY 2018			X		Program site	Restricted
Robert Wood Johnson Foundation/University of Wisconsin, County Health Rankings, 2019-2020	X		X	X	County	Public
Tribal MIECHV Program Form 2, FY 2018				X	Grantee service area	Restricted
Tribal MIECHV Program Form 4, FY 2018				X	Grantee service area	Restricted
U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics (LAUS), 2018		X		X	County	Public

2.4 Qualitative Data Collection Methods and Data Sources

The qualitative component of this study focuses on case studies of 12 rural communities to better understand the array of human services programs operating within these communities. The qualitative data that the 2M-Urban Team will use to inform these case studies includes a review of program documents and other pertinent materials and semi-structured interviews with human services staff and community stakeholders. Below, we briefly discuss the process used to select rural counties for virtual case study site visits and the qualitative data collected before and during the visits.

2.4.1 Site Visit Selection Process

The 2M-Urban Team used the quantitative data described in Section 2.3 to develop a high-level summary of key characteristics of rural communities. These characteristics were developed based on feedback provided by stakeholders during meetings with the TWG, HSPF, and SME stakeholder groups in the spring and summer of 2020. In February of 2021, the 2M-Urban Team and the OPRE-MCHB Team engaged the members of the study's HSPF and the SME stakeholder groups in a pair of site selection virtual meetings. The focus of these meetings was to discuss the site visit selection process and to solicit recommendations from stakeholder group members to facilitate the selection of a purposive sample of 12 site visit counties from the universe of 1,976 rural counties.[9] In the ensuing weeks, 15 stakeholders provided 145 recommendations (consisting of 117 rural counties) for the 12 virtual site visits.

The 2M-Urban Team developed a purposive sampling approach to select 12 rural counties from the 117 rural counties reflected in the stakeholder recommendations. This process prioritized the selection of counties recommended by multiple stakeholders, as well as counties where stakeholders had personal or professional experience. In the next step, the process prioritized other counties that ensured that the selected counties represented key variables, including rural regions and the primary programs of focus. The purposive sample of 12 rural counties was subsequently compared against the universe of rural counties with descriptive statistics to assess the generalizability[10] of the purposive sample and to denote areas where the purposive sample was under- or over-representative of key variables. The 2M-Urban Team discussed the purposive sample and its inherent strengths and limitations

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[9] The universe of 1,976 rural counties corresponds to the 6 categories of rural counties identified in the U.S. Department of Agriculture's Rural-Urban Continuum Codes. The categories are discussed in detail in Section 3.1.

[10] While generalizability may not be a primary goal of many qualitative studies (Leung 2015), the study team deemed it important to develop a purposive sample that was generalizable to the greatest extent possible (within the confines of non-probability sampling methods) to the universe of rural counties.

with the OPRE-MCHB Team. The purposive sample was reviewed by program staff at ACF and HRSA, and the site recruitment process began in June of 2021.

Review of Program Documents and Other Pertinent Materials

In preparation for the virtual site visits, the 2M-Urban Team will conduct an environmental scan to identify program documents and other materials relevant to the site and its delivery of human services. The 2M-Urban site visits teams will review these materials to identify program-related and contextual information that will be used to tailor the respondent interview guides. During the virtual site visits, the 2M-Urban site visits teams will request any pertinent program documents that may be helpful to addressing the research questions of interest. These may include documents like program applications or progress reports, budget information, tailored recruitment or program materials, or evaluation reports. Documents will be catalogued in a SharePoint folder and in OneNote so they can be easily accessed by anyone from the 2M-Urban Team.

Semi-Structured Interviews Conducted During Virtual Site Visits

Each site may have multiple staff who support the delivery of human services programs. Prior to each site visit, the 2M-Urban site visits teams will identify key staff and stakeholders who should be interviewed based on the study's research questions. The 2M-Urban Team will interview two types of respondent groups to obtain a comprehensive understanding of program implementation and service delivery in each of the 12 rural communities:

1) Human services program staff involved in providing services and supports for each of the four primary programs of focus and other human services programs operating in the community (e.g., housing, early childhood development, family development, employment, and higher education and technical training programs).
2) Representatives from other nonprofit organizations or partners that support individuals that utilize human services.

The 2M-Urban Team will conduct up to 20 semi-structured interviews per site, with each interview lasting approximately 60–120 minutes. Each interview will be conducted by a trained interviewer and note-taker. With permission from the respondent, interviews will be audio recorded and those recordings will be transcribed for analysis.

3 ANALYSIS METHODS

This section provides an overview of the quantitative and qualitative analysis methods that we will triangulate to support the study's three goals (see Exhibit 1). First, the section discusses the quantitative methods the 2M-Urban team will use to analyze unmet need for human services programs at the county level (*Goal 2: Unmet Need*). Second, the section discusses the use of hot spot analysis, a quantitative method, to identify counties with particularly high or low levels of unmet need (*Goal 3: Opportunities for Strengthening Capacity*). Third, the section discusses the qualitative thematic analysis we will use to identify themes and patterns of meaning within the qualitative data (*Goal 1: Rich Description*, *Goal 2: Unmet Need*, and *Goal 3: Opportunities for Strengthening Capacity*). The section concludes with an overview of the use of QCA (Ragin 1987, 2000, 2008), which we will use to integrate qualitative and quantitative analysis methods and identify necessary and sufficient conditions resulting in high levels of unmet need for human services (*Goal 1: Rich Description*, *Goal 2: Unmet Need*, and *Goal 3: Opportunities for Strengthening Capacity*). Throughout this section, we provide example results of our planned analyses using interim data that the 2M-Urban Team collected for this study.

3.1 Descriptive Analysis and GIS Mapping of Unmet Need

The 2M-Urban Team will leverage the administrative and survey data sources discussed in Section 2.3 to examine levels of unmet need for human services across the universe of rural counties (*N* = 1,976). The following sections discuss the approach to defining unmet need followed by the methods used to conduct descriptive analyses and generate GIS maps of unmet need and other key variables.

3.1.1 Definining Unmet Need

In close collaboration with the OPRE-MCHB Team and the TWG, the 2M-Urban Team developed a framework of needs that included information on eligible populations, needs of eligible populations, and key indicators to measure the needs of eligible populations for each of the four federal programs of focus (please refer to the ***Appendix*** for the full framework of needs). The framework developed the following 12 categories of need that would be addressed by the four primary programs of focus:

- Family health and wellbeing – MIECHV
- Family self-sufficiency – HMRF, MIECHV, TANF
- Healthcare jobs in high demand – HPOG
- Healthy child development – MIECHV
- High school relationship and budgeting education – HMRF
- Infant health – MIECHV
- Individual self-sufficiency – HPOG, TANF
- Marital or family stability – HMRF

- Maternal and prenatal care – MIECHV
- Paternal support services – HMRF
- Programmatic support services (e.g., transportation assistance) – HMRF, HPOG, TANF
- Targeted outreach for at-risk high school students – HMRF

The 2M-Urban Team developed a formula to combine administrative and secondary survey data into estimates of unmet need at the rural county level for each category of need outlined above. The 2M-Urban Team's formula consists of several aspects:

1. The formula compares an estimate of the eligible population in the rural county to the actual population served in the rural county. The larger the difference between the two, the larger the unmet need estimate.
2. The formula accounts for the level of state and non-government human services activity in the rural county using state human services administrative data and National Center of Charitable Statistics data. Specifically, the 2M-Urban Team will estimate the expenditures of both nonprofit and state human services organizations related to the need category per family below the poverty line. The larger the expenditures of state and nonprofit human services organizations per family in poverty, the smaller the estimate of unmet need.
3. The formula accounts for the level of need in the rural county using a standardized sum of the key indicators (see the framework in the **Appendix**) for the need category. To calculate a standardized sum, the 2M-Urban Team will first take each key indicator and subtract the mean and divide by the standard deviation. We will then sum the standardized indicators together. The larger the standardized sum of need, the larger the estimate of unmet need.

The 2M-Urban Team will use the following formula to calculate an estimate of unmet need for each need category:

$$\frac{Eligible - PopulationServed}{NonFederalExpenditures\_PerCapita + 1} + Std\_Sum\_Need$$

where $Eligible$ is the total number of the eligible population(s) related to the need category in the rural area, $PopulationServed$ is the total population served by the program(s) addressing the need category in the rural area, $NonFederalExpenditures\_PerCapita$ is the state and nonprofit human services expenditures relevant to the need category per family in poverty in the rural area, and Std_Sum_Need is the standardized sum of the key indicators of need for the need category in the rural area. We add 1 to the state and nonprofit expenditures to ensure the formula does not divide by 0 in instances for which there were no pertinent expenditures within a given rural county. Using this formula, the 2M-Urban Team will create an estimate of unmet need for each category of need listed above. In addition, the 2M-Urban Team will develop an overall estimate of unmet need that is the

standardized sum of the estimates for each need category. The overall unmet need estimate will facilitate the comparison of rural counties in terms of the degree of unmet human services needs.

3.1.2   Descriptive Analysis of Unmet Need Estimates and other Key Variables

The 2M-Urban Team will report unmet need estimates using quintiles, which take a data distribution and divide it into five equal parts. The first quintile has the cases (i.e., rural counties) that fall in the bottom (or lowest) 20% of the distribution, and the fifth quintile has the cases that fall in the top (or highest) 20% of the distribution. Each rural county will fall into one of the five quintiles, which will be defined as "Very High Unmet Need" (quintile 5), "High Unmet Need" (quintile 4), "Moderate Unmet Need" (quintile 3), "Low Unmet Need" (quintile 2), and "Very Low Unmet Need" (quintile 1). The use of quintiles is important for this study because they help enhance the interpretability of the unmet need estimates that are produced for each county. Each county will have a number that estimates unmet need, but this number itself will not have any meaning unless it is compared to the numbers for other rural counties. The use of quintiles will facilitate these comparisons by allowing the 2M-Urban Team to determine whether a given county is higher or lower in terms of unmet need than other counties.

The 2M-Urban Team will report the number and percentage of rural counties in each quintile in the United States and for different categories of rural counties using the U.S. Department of Agriculture's Rural-Urban Continuum Codes (RUCCs). RUCCs subdivide nonmetropolitan counties in terms of population size, population density, and adjacency to metro areas.
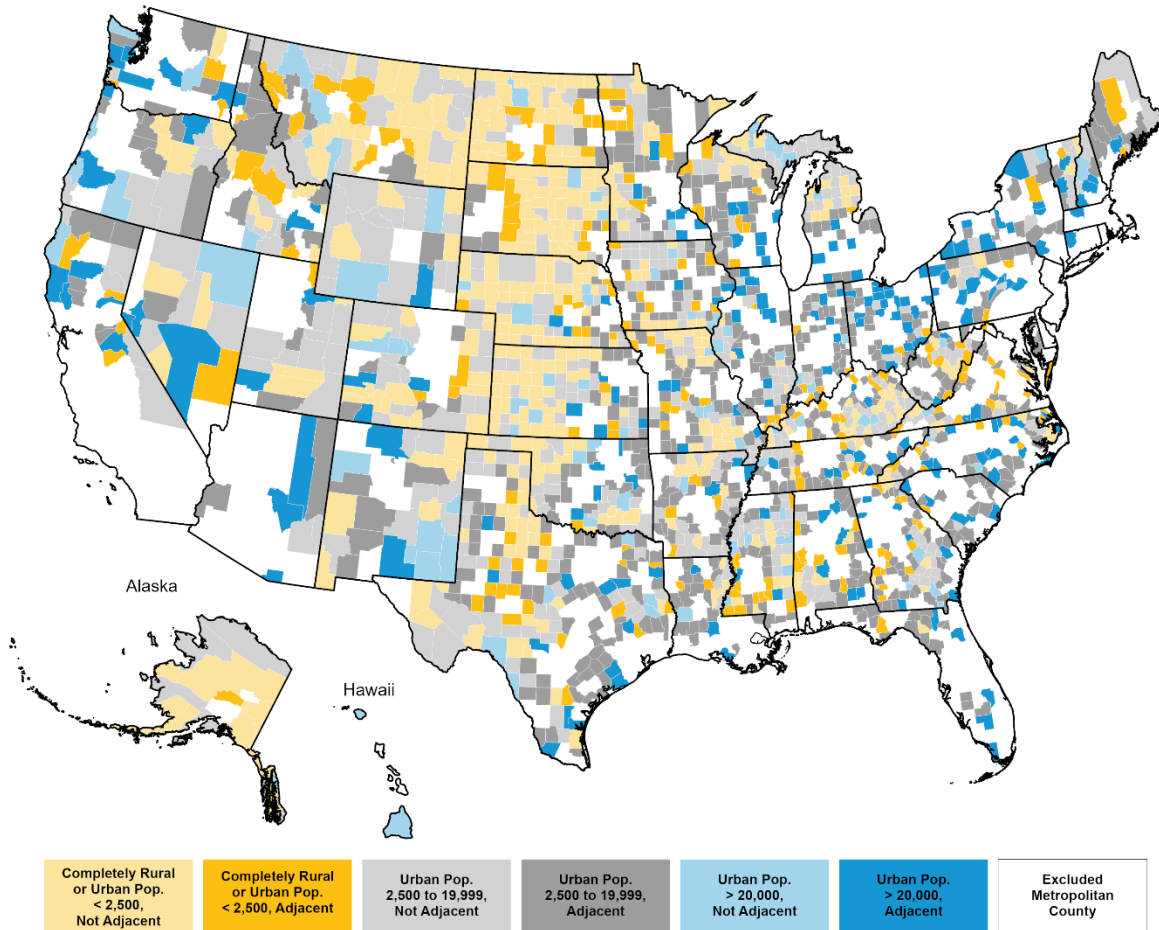
For example, parts of a rural county may be dense in terms of population, especially when the county includes a small town or city that serves as a labor-market area in the region. Other parts of the county may be open countryside with very few people. In other words, many rural nonmetropolitan counties have some "urban" population. The U.S. Census Bureau defines urban populations as parts of the county that have a population density of at least 500 people per square mile and that are connected to an urban nucleus (such as a small town or city) and with a population of at least 2,500 (but fewer than 50,000 in the case of non-metropolitan counties). Rural nonmetropolitan counties also have a "rural" population, which the Census Bureau defines as parts of the county with less than 500 people per square mile. Rural nonmetropolitan counties may vary not only in terms of the amount of urban and rural population within them but also by their proximity to a metropolitan area. RUCCs consider a county to be "adjacent" to a metropolitan area if the county physically adjoins a metropolitan area and if at least 2% of the county's population commute to the metropolitan area for work. As shown in **Exhibit 6**, these considerations of urban/rural population within rural counties and adjacency to metropolitan areas result in six different categories of rural nonmetropolitan counties:

1. Urban population of 20,000 or more, adjacent to a metropolitan area
2. Urban population of 20,000 or more, not adjacent to a metropolitan area

3. Urban population of 2,500 to 19,999, adjacent to a metropolitan area
4. Urban population of 2,500 to 19,999, not adjacent to a metropolitan area
5. Completely rural or less than 2,500 urban population, adjacent to a metropolitan area
6. Completely rural or less than 2,500 urban population, not adjacent to a metropolitan area

Exhibit 6. Map of U.S. Counties Classified as Rural According to the USDA RUCC Definition

| Completely Rural or Urban Pop. < 2,500, Not Adjacent | Completely Rural or Urban Pop. < 2,500, Adjacent | Urban Pop. 2,500 to 19,999, Not Adjacent | Urban Pop. 2,500 to 19,999, Adjacent | Urban Pop. > 20,000, Not Adjacent | Urban Pop. > 20,000, Adjacent | Excluded Metropolitan County |

Notes: Each polygon in the map is a rural county. The white space in this map corresponds to urban (non-rural) counties. Rural counties are shaded depending on each county's RUCCs.

Exhibit 7 provides the table shell the 2M-Urban Team will use to report estimates of unmet need for each need category, as well as for a combined estimate across all four programs and categories of need. There will be a total of 13 tables: 1 for each of the 12 categories of need (see Section 3.1.1) and 1 for the combined estimate.

Exhibit 7. Table Shell for Reporting Unmet Need Estimates Across RUCCs

RUCCs	Total Number of Rural Counties in the RUCC Code	Number (%) of Rural Counties with Very High Unmet Need (Quintile 5)	Number (%) of Rural Counties with High Unmet Need (Quintile 4)	Number (%) of Rural Counties with Medium Unmet Need (Quintile 3)	Number (%) of Rural Counties Low Unmet Need (Quintile 2)	Number (%) of Rural Counties with Very Low Unmet Need (Quintile 1)
Urban population of 20,000 or more, adjacent						
Urban population of 20,000 or more, not adjacent						
Urban population of 2,500 to 19,999, adjacent						
Urban population of 2,500 to 19,999, not adjacent						
Completely rural or less than 2,500 urban population, adjacent						
Completely rural or less than 2,500 urban population, not adjacent						

Exhibit 8 provides the table shell the 2M-Urban Team will use to compare estimates of unmet need across the categories of need. Rather than break up the estimates into the RUCCs categories (as we do in **Exhibit 7**), this table will report estimates of unmet need by need category for all rural counties.

Exhibit 8. Table Shell for Comparing Unmet Need Estimates Across Need Categories

Category of Need	Total Number of Rural Counties in the RUCC Code	Number (%) of Rural Counties with Very High Unmet Need (Quintile 5)	Number (%) of Rural Counties with High Unmet Need (Quintile 4)	Number (%) of Rural Counties with Medium Unmet Need (Quintile 3)	Number (%) of Rural Counties Low Unmet Need (Quintile 2)	Number (%) of Rural Counties with Very Low Unmet Need (Quintile 1)
Family health and wellbeing						
Family self-sufficiency						
Healthcare jobs in high demand						
Healthy child development						

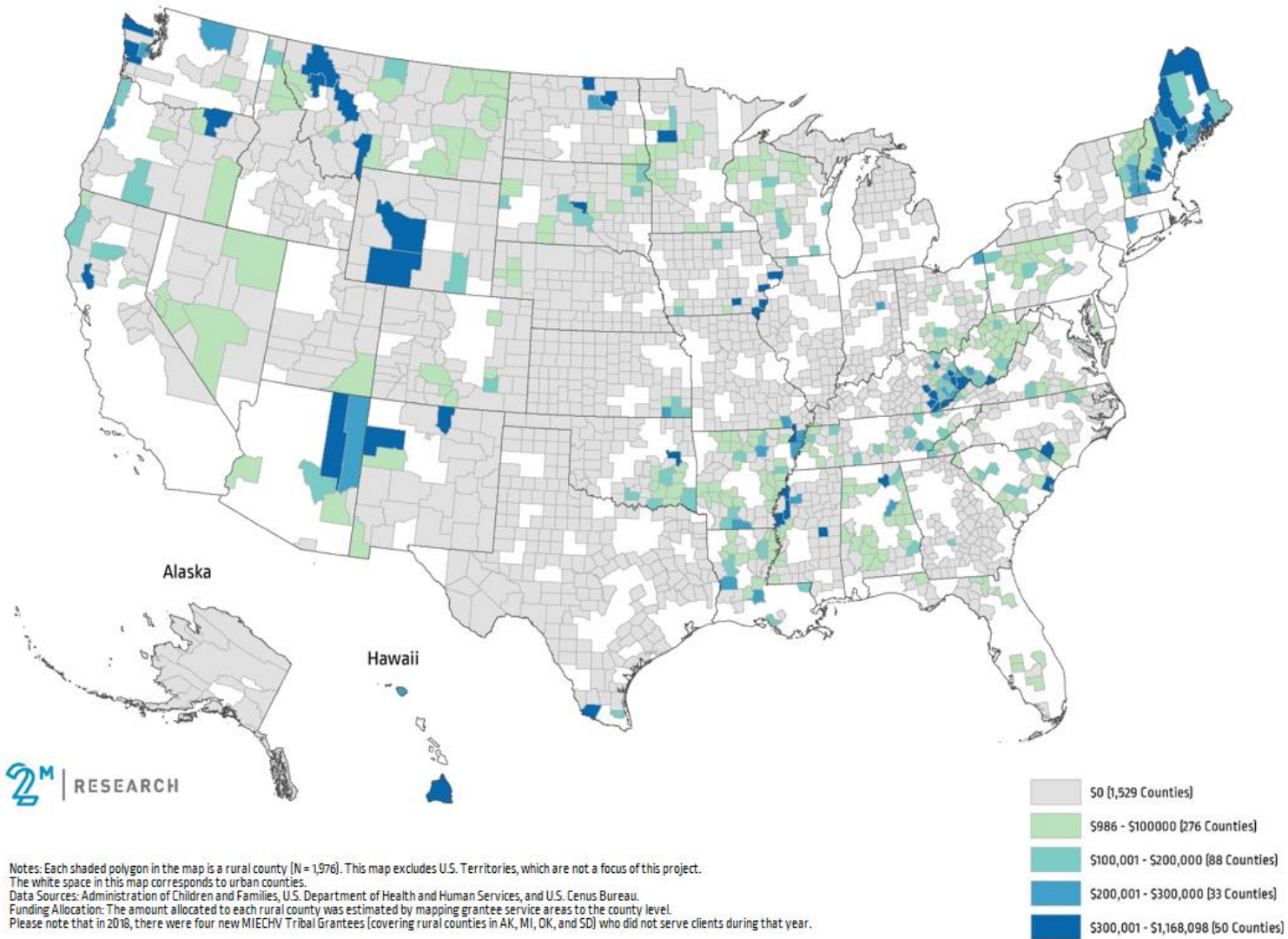| Category of Need	Total Number of Rural Counties in the RUCC Code	Number (%) of Rural Counties with Very High Unmet Need (Quintile 5)	Number (%) of Rural Counties with High Unmet Need (Quintile 4)	Number (%) of Rural Counties with Medium Unmet Need (Quintile 3)	Number (%) of Rural Counties Low Unmet Need (Quintile 2)	Number (%) of Rural Counties with Very Low Unmet Need (Quintile 1)
High school relationship and budgeting education						
Infant health						
Individual self-sufficiency						
Marital or family stability						
Maternal and prenatal care						
Paternal support services						
Programmatic support services (e.g., transportation assistance)						
Targeted outreach for at-risk high school students						
Combined estimate						

Finally, in addition to unmet need estimates, the 2M-Urban Team will also perform descriptive analysis of several other key variables over all counties and for each of the six RUCCs categories. Key variables include funding overall and for each of the four primary programs of interest (with total program funding and per case funding reported at the county level), access to broadband and mobile internet coverage, families in poverty, racial inequities, and other pertinent maps as time and project resources allow. For each of these variables, 2M will report basic descriptive statistics including the mean, median, standard deviation, minimum, and maximum.

3.1.3 GIS Mapping of Unmet Need and Other Key Variables

In addition to descriptive analyses, the 2M-Urban Team will also develop GIS maps that provide information on the spatial distribution of unmet need estimates and the other key variables noted above. **Exhibit 9** provides an example of a GIS map that depicts the estimated amount of funds available in 2018 per MIECHV (tribal and non-tribal) case in rural counties.

Exhibit 9. Example GIS Map Using Interim MIECHV Funding Data

2018 State and Tribal Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Funding Across Rural Counties

Alaska

Hawaii

2M RESEARCH

Notes: Each shaded polygon in the map is a rural county (N = 1,976). This map excludes U.S. Territories, which are not a focus of this project. The white space in this map corresponds to urban counties.
Data Sources: Administration of Children and Families, U.S. Department of Health and Human Services, and U.S. Census Bureau.
Funding Allocation: The amount allocated to each rural county was estimated by mapping grantee service areas to the county level.
Please note that in 2018, there were four new MIECHV Tribal Grantees (covering rural counties in AK, MI, OK, and SD) who did not serve clients during that year.

Legend:
- $0 (1,529 Counties)
- $986 - $100000 (276 Counties)
- $100,001 - $200,000 (88 Counties)
- $200,001 - $300,000 (33 Counties)
- $300,001 - $1,168,098 (50 Counties)

3.2 Use of Hot Spot Analysis to Identify Level of Unmet Need

After estimating and describing the unmet need estimates, the 2M-Urban Team will conduct a more nuanced hot spot analysis that can identify groups of counties with particularly high levels of unmet need (hot spots) or particularly low levels of unmet need (cold spots). A hot spot analysis is a statistical method that describes how a set of data points (e.g., unmet need estimates at the county level) cluster together in space. Prior to conducting the analysis, it is necessary to define the geographic unit of analysis (e.g., rural counties), the analytical variable (e.g., unmet need), and the geographic "neighbors" of each observation in the data. There are several ways to define neighbors, such as any case that is within a certain distance (e.g., any county within 50 miles) or any case that shares a boundary (e.g., all rural counties that share a boundary with the rural county of interest).

It is important to choose a method that accurately represents how the units of analysis interact in space. In our case, we are using rural counties that have clearly defined boundaries but can vary drastically in size (in terms of both land and population) and socioeconomic and cultural contexts. The 2M-Urban Team will identify counties using a contiguity method that identifies a "neighbor" as any county that shares a boundary with the county of interest. In this way, we will select neighbors that should have relatively similar contexts and neighbors that will facilitate the identification of localized areas in rural America that could be potential targets for enhanced human services initiatives and/or additional research. The 2M-Urban Team will also conduct sensitivity analyses to show the degree to which findings from the hot spot analysis change depending on the definition of "neighbor" used in the analysis.

Once the researcher defines the neighbors, the analysis examines each observation of the analytical variable and the observations of its defined neighbors and determines whether the level of the analytical variable for the cluster of observations is higher or lower than would be expected given the overall distribution of the data.[11] If the level is higher than expected, the analysis identifies the cluster as a hot spot. If the level is lower than expected, the analysis identifies the cluster as a cold spot.

Our hot spot analysis will evaluate the level of unmet need in a county and its neighboring counties to identify hot spots and cold spots of unmet need. We will use the Getis-Ord Gi* statistic to produce a *z*-score for each rural county that indicates how different the local sum (i.e., the unmet need estimates for a given rural county and its neighbors) is from the sum that would be expected based on the data, overall. We will use the *p*-value of the *z*-score to determine whether the local sum is statistically different than the expected value, with
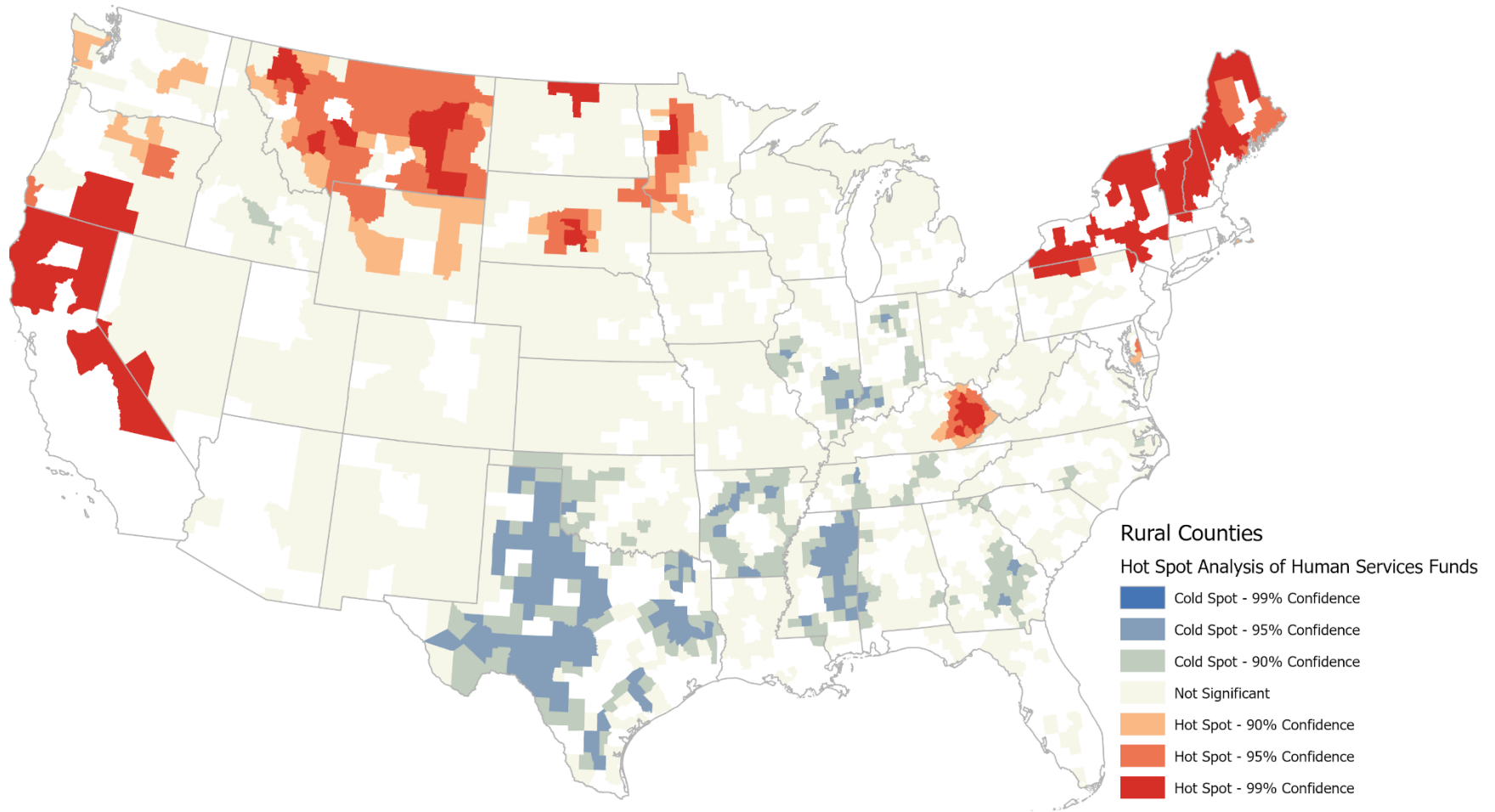
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[11] In hot spot analysis, a spatial weights matrix identifies the neighbors of each county and gives them a weight for the analysis. In this case, the 2M-Urban Team will treat all neighbors equally and allow each neighboring county to have the same influence on the statistical test that will identify hot and cold spots.

statistically significant higher values identified as hot spots and statistically significant lower values identified as cold spots. This analysis will help the 2M-Urban Team to better understand the distribution of unmet need in rural counties and identify geographic areas that human services programs may wish to target in the future to increase capacity to address unmet need.

Exhibit 10 provides an example of a map that resulted from a hot spot analysis of interim data that we collected for this study, and which captures the amount of FY 2018 funding from the four federal programs of focus per family in poverty in each rural county. The interim results show that hot spots (i.e., high levels) of human services funding are present in rural counties in the Northeast in Maine, Vermont, New Hampshire, New York, and northern Pennsylvania and in the Midwest/West in Minnesota, North and South Dakota, Montana, Wyoming, Oregon, and California. There is also a significant hot spot in rural eastern Kentucky. On the other hand, several rural counties in the deep South in Arkansas, Mississippi, Georgia, and Tennessee are cold spots with relatively low levels of human services funding. Rural Texas, Illinois, and Indiana also have several cold spots. The 2M-Urban Team will develop similar maps that show hot spots and cold spots of unmet need in rural counties.

Exhibit 10. Example Hot Spot Analysis of Interim Data On Human Services Funding per Family in Poverty in Rural Counties

Rural Counties

Hot Spot Analysis of Human Services Funds

- Cold Spot - 99% Confidence
- Cold Spot - 95% Confidence
- Cold Spot - 90% Confidence
- Not Significant
- Hot Spot - 90% Confidence
- Hot Spot - 95% Confidence
- Hot Spot - 99% Confidence

Note: The map includes FY 2018 funding information for each of the four federal programs of focus (HMRF, HPOG, MIECHV, and TANF). We identified the counties included in the service areas of each grantee in each program and divided the grantee funding for the service area into counties using the number of families in poverty in the county as a weight. Finally, we divided the funding amount by the number of families in poverty in the county to understand the degree of funding in each rural county in relation to families in poverty.

3.3 Qualitative Thematic Analysis

In qualitative research, data analysis is a complex and iterative process often initiated before and during the actual data collection, as researchers start identifying potential themes based on the research questions. As discussed in detail within Section 2, a literature review and consultations with the OPRE-MCHB Team and the TWG informed the development of a comprehensive set of research questions. These research questions will serve as the foundation for the qualitative thematic analysis.

3.3.1   Preparing the Data

The 2M-Urban Team's process for conducting the qualitative analysis begins with managing the significant volume of data the study will produce over the course of the 12 virtual site visits. A major challenge in qualitative analysis is the considerable amount of data that result from the interviews, field notes, and other sources, like document review (Patton 2002). To manage the qualitative data this study will produce, the 2M-Urban Team will synthesize and integrate these data to prepare for data coding, which is the first step in the analysis. To begin this process, the 2M-Urban site visit teams assigned to each site will follow a post-visit process that will organize the data collected and prepare them for subsequent data cleaning procedures. The 2M-Urban site visit teams will identify and submit any interview recordings for transcription, assigning each data source from the site visit a unique identifier that links the data to the site visit. Any transcripts received will be reviewed, correcting any misspellings or other information that would impede coding of the data. Members of the site visit team will then upload the data to NVivo, a qualitative data analysis software designed to help organize, analyze, and develop qualitative data findings. Data sources, such as interview transcripts, program documents, or other pertinent materials, will be uploaded into the software and serve as the source documents that will be coded.

3.3.2   Qualitative Analysis Methods

Exhibit 11 depicts the interactive process of qualitative data review (Miles and Huberman 1994), in which we simultaneously code, display, and reduce data; reorder and reflect on the data; extract key concepts; and draw conclusions.

Coding the Data

The first step of the analysis method consists of coding the data. Coding is the process of assigning a word or phrase to textual data sources in a systematic way. The word or phrase assigned—the code—describes the concept and assigns meaning. Codes are used to retrieve and categorize data that are similar in meaning, so the researcher can quickly find them. Coding will allow the 2M-Urban Team to organize and analyze the interview data and program documents for each site by using a consistent set of terms to classify the concepts present in the data. To develop the initial coding for the analysis, the 2M-Urban Team will use a version of the Evaluation Planning Matrix (EPM) described in Section 2.2 to create an

initial set of codes (i.e., a priori codes) for the qualitative analysis. These a priori codes and their definitions will be developed into a codebook, which will be used to guide the coding of the interview transcripts and program documents from each site visit.

Display and Reduce the Data

Next, the 2M-Urban Team will use the codes to display and reduce the data by organizing them into large sections that can then be analyzed. These codes (also known as NVivo nodes—e.g., topics/areas of interest) will be used to group the relevant data from each interview into a respective section for additional analysis. For example, all data that relate to modifications to a human services program approach will be coded so that the 2M-Urban Team can then examine all the data together and identify potential themes.

Exhibit 11. Overview of the Qualitative Analysis Approach
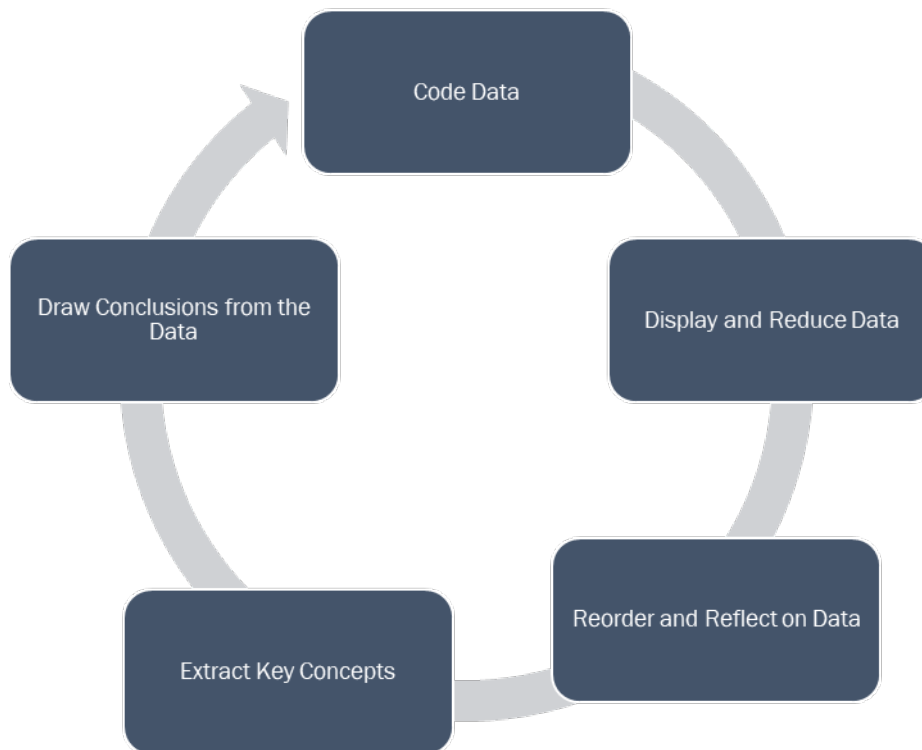
Members of the 2M-Urban Team will be trained on the coding process to ensure consistent application of the codes throughout the analysis. A sample of transcripts and documents will be coded first to test the codebook and code definitions developed. Changes to the codes and definitions, along with any emergent codes agreed upon by members of the 2M-Urban Team, will then be made to the codebook before initiating coding with the larger team. Each member of the coding team will then be responsible for double coding a minimum of three interviews and/or program documents. Double coding ensures that the codes are being

used in a consistent manner across all coders. A Cohen's Kappa statistic will be calculated using NVivo to check for coder consistency in the application of the codebook. If a high level of consensus is not reached, members of the 2M-Urban Team will work to resolve conflicts until reaching a level of high intercoder agreement (0.80).

Reorder and Reflect on Data

In the third step, the 2M-Urban Team will make any necessary adjustments to the definitions or guidance for specific codes and provide updated training to team members. The team will conduct periodic check-ins throughout the coding and analysis process to ensure that all data are coded consistently, and any questions or concerns are addressed.

Extracting Key Concepts

In the fourth step, a thematic analysis will be conducted on all coded data to identify themes within each construct or code. Themes are patterns across datasets that are important to the description of a particular phenomenon and are associated with a specific research question. The 2M-Urban Team will analyze the efforts of sites implementing programs in similar and dissimilar settings. For the case study design, the analysis will begin with a focus on describing within-site efforts to illuminate how a human services program is being implemented in a particular rural context. The coded interviews will be analyzed to develop a set of themes that are represented in the data across the key research questions in the EPM.

The data will be organized using theme tables structured around the research questions and subquestions of interest. These tables will assist the 2M-Urban Team in organizing the data and findings and track where data came from, the theme, key findings within that theme, and quotes that demonstrate the theme. Organizing the data in this manner will also facilitate iterative reviews of the themes and supporting data as part of a quality control process conducted throughout the analysis. For example, organizing data into theme tables ensures that the teams use common language across similar themes and findings. Such common language is important as the 2M-Urban Team moves from within-case to cross-case analysis. See **Exhibit 12** for a sample theme table.

Draw Conclusions from the Data

In the final step, the 12 sites will be analyzed separately (within-case analysis) to create a holistic and thorough understanding of the nuances of each individual rural site. The 2M-Urban Team will roll-up emerging high-level themes to present summary-level findings that look across sites (cross-case analysis). Once the thematic analysis of the data in NVivo is complete, the 2M-Urban Team will begin writing up the themes identified as they relate to the research questions and any emergent topics, where relevant. An emergent topic or theme is one discovered as the data are reviewed, in contrast to the a priori codes that the 2M-Urban Team will develop based on the EPM. The 2M-Urban Team will include

quotes from interviews to illustrate or support data interpretation when feasible. These themes will form the basis of findings that will be reported in the final report and briefs.

Exhibit 12. Example Theme Table: Goal 1 Research Question 5. How are human services programs in rural contexts adapting service delivery?

Instructions: Address the research question by analyzing the coded data. This section should describe the ways sites are adapting their human services delivery to meet the needs of their rural communities. These may be changes or adaptations to a specific program or program activities that allow program staff to implement the program in a way that better meets the needs of the community and its residents. Strategies may also include adaptations to the program or program activities so that the program can be delivered by the staff and resources available and/or within the context of the community. For example, geographic dispersion of program participants may make it difficult for participants to come into the program office, so the program staff could conduct virtual check-ins/meetings with participants.

Program: Please include the program within which the adaptation or modification is occurring (e.g., TANF, MEICHV, HMRF, HPOG).

Code Reports to Review:

1. [tailored execution codes] (This will be unique for each site based on the programs in that community – look at all codes that were added to the codebook to represent the activities.)

Research Subquestion: In what ways are programs adapted to suit the rural contexts within which they operate?

Program	Code Report Reviewed	Theme	Findings	Example Quote(s)

Research Subquestion: What innovative/novel approaches are being used? Why were these approaches chosen?

Program	Code Report Reviewed	Theme	Findings	Example Quote(s)

Research Subquestion: How are these innovative/novel approaches being implemented?

Program	Code Report Reviewed	Theme	Findings	Example Quote(s)

Research Subquestion: What are the benefits of these adaptations? For staff? For program participants?

Program	Code Report Reviewed	Theme	Findings	Example Quote(s)

3.4 Qualitative Comparative Analysis

The preceding sections of this plan highlight the relative benefits of quantitative and qualitative methods, with quantitative methods providing representativeness and generalizability across a large number of cases, while qualitative methods provide deeper insight and richer descriptions of cases. At the same time, the relative shortcoming of each method—such as the limited ability of quantitative methods to provide insight into causal processes and the limited ability of qualitative methods to generalize across settings—can be exacerbated when studying rural communities. Hence, this study's mixed methods research design incorporates QCA (Ragin 1987, 1999, 2008), which brings the methodological rigor of quantitative analysis and the causal complexity and inductive sensitivity of qualitative analysis to examine causal relationships (Kahwati and Kane 2020).

3.4.1   Methodological Overview: QCA and Its Benefits

QCA is a formalized set-theoretic method that focuses on evaluating ***sets*** (i.e., groups of objects that belong together on the basis of sharing similar characteristics) and their relationships (Schneider and Wagemann 2012). The methodology was developed due to the contention that quantitative variable-oriented statistical methods were not well suited for explaining complex social phenomena and that case-oriented, qualitative methods lacked a formal method for conducting cross-case comparisons (Ragin 1987). QCA addresses these issues by preserving cases as holistic units throughout the analysis phase (a key feature of qualitative research) while utilizing necessary and sufficient conditions to generate more parsimonious findings across cases (a key feature of quantitative research) (Kahwati and Kane 2020).

QCA provides a formal, systematic method for comparing complex *cases* (such as rural counties) by conceptualizing cases as a series of conditions. *Conditions* (i.e., condition sets) are the attributes or characteristics of a case and are operationalized as explanatory factors (i.e., they are similar, but not identical, to the independent variables or explanatory factors used in quantitative methods). The QCA methodology examines how condition sets with various combinations of conditions are related to outcomes. As an example, QCA could be used to examine how various combinations of county conditions (such as limited levels of internet access and nonadjacency to a metropolitan area) and the absence of key human services program across cases (i.e., rural counties) contribute to high levels of unmet need for human services.

A prominent benefit of QCA is its ability to examine complex causality (Kahwati and Kane 2020; Schneider and Wagemann 2012). More formally, complex causality is defined by three concepts (Ragin 1999): equifinality, conjunctural causation, and asymmetrical causation. *Equifinality* refers to the concept that there are multiple, mutually non-exclusive paths to an outcome, or that more than one condition or combination of conditions can lead to an outcome. *Conjunctural causation* is the concept that an individual explanatory factor (i.e., condition) may not have a relationship to an outcome on its own but may be part of a combination of conditions that contribute to an outcome. Meanwhile, *asymmetrical causation* refers to the concept that, while the presence of a condition produces an outcome, one cannot assume that the absence of the condition produces the nonoccurrence of the outcome.

QCA explores two types of relationships between conditions (or combinations of conditions): relationships of necessity and sufficiency. A condition (or combination of conditions) is *necessary* if, whenever the outcome is present, the condition is also present. In contrast, a condition (or combination of conditions) is *sufficient* if, whenever the condition is present, the outcome is also present. As discussed further in subsequent sections, QCA utilizes a combination of formal logic and Boolean algebra to examine combinations of conditions across cases to determine the necessary and sufficient conditions for producing an outcome.

3.4.2   Applying Two-Step QCA to Examine High Levels of Unmet Need for Human Services Across the universe of rural counties

The 2M-Urban Team will leverage the methodological strengths of QCA to examine the necessary and sufficient conditions that result in high levels of unmet need for human services across the universe of rural U.S. counties. The 2M-Urban Team will use Two-Step QCA (Schneider 2019; Schneider and Wagemann 2006). Two-Step QCA differs from the traditional QCA approach by dividing conditions into two distinct groups (remote [i.e., distal] and proximal) and then analyzing the effects of the conditions on the outcome in a stepwise

manner.[12] Remote conditions are characterized as factors more removed from the outcome and tend to be contextual and stable over time (i.e., these conditions often consist of structural factors, contexts, or historical legacies [Schneider and Wagemann 2012]). In contrast, proximal conditions involve factors that are closer in time and proximity to the outcome and can be relatively easily modified by human actors (Kahwati and Kane 2020). The focus on remote and proximal conditions allows for robust causal statements by striking an appropriate balance that leverages remote factors that provide causal depth (but which often lack causal explanations of how remote factors produce outcomes) and leveraging proximal conditions that display causal mechanisms (Schneider and Wagemann 2006, 2012).

In the first step, only the remote conditions are analyzed. This analysis focuses on necessity, or instances in which, if a given outcome is present, the condition is also present. As such, the analysis conducted during this stage is not meant to fully explain the outcome but to identify the remote conditions under which the outcome can occur (Schneider 2019; Schneider and Wagemann 2006). In the second step, the remote conditions deemed necessary and the proximal conditions of interest are subjected to an analysis of sufficiency, in which, if a given condition is present, the outcome is also present. Subsequent sections describe the steps involved with employing Two-Step QCA to examine high levels of unmet need for human services across rural U.S. counties.

Specifying the Configural Research Question, Selecting Cases, and Choosing an Outcome and Conditions

QCA typically begins with the formulation of a **configural research question**, a specific type of research question used to identify combinations of explanatory factors among cases with a specified outcome (Kahwati and Kane 2020). As such, this study will utilize QCA to examine the configural research question, *"Which combinations of conditions are necessary, sufficient, or both for high levels of unmet need for human services in rural counties?"* The next steps in the process focus on selecting cases (i.e., the units of analysis); the outcome; and the conditions. The cases in this analysis will consist of the universe of rural counties in the United States (N = 1,976). Although QCA has historically been applied to a small N or medium N number of cases, it has been noted that the methodology can be used effectively with 10 or more cases (Kahwati and Kane 2020), and the methodology has been more recently applied to a larger number of cases, including studies with cases in the thousands (Blackman 2008; Emmenegger, Schraff, and Walter 2014; Roig-Tierno et al. 2017).

The outcome in this analysis consists of high levels of unmet need for human services (**Exhibit 13**). This outcome measure is derived from the county-level unmet need estimates

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[12] This approach is akin to the stepwise regression procedure used in quantitative research, in which variables are independently considered for addition to or subtraction from the explanatory variables included in the regression models based on specified criteria.

developed by the 2M-Urban Team, as discussed in Section 3.1 of this plan. The report next describes the process of choosing conditions and then discusses the approaches used to assign **set membership values** that represent the degree to which a case (i.e., rural county) belongs to a set.

Exhibit 13. QCA Outcome Measure

Outcome	Measure	Data Source
High levels of unmet need for human services	$$\frac{Eligible - PopulationServed}{NonFederalExpenditures\_PerCapita + 1} + Std\_Sum\_Need$$	The 2M Team's county-level estimates of unmet need

A key step in the analysis is determining an appropriate number of conditions. One general rule is that there should be three to four cases for every condition included. A second is that including too many conditions can result in **limited diversity**, in which there are more possible combinations of conditions than cases, thereby limiting the analysis' ability to examine all possible combinations (Kahwati and Kane 2020; Ragin 2008). An additional consideration is that including too many conditions can render interpretation overly complex. With these factors in mind, the 2M-Urban Team carefully selected the collection of remote and proximal conditions shown in **Exhibit 14**. These conditions were informed by the study's literature review and conversations with the stakeholder groups. The remote conditions are characterized as enduring community characteristics that are expected to impact service delivery. These characteristics included low levels of internet access; high percentages of households without vehicles; a lack of adjacency to a metropolitan area; state-supervised, county-administered administrative systems; and high income inequality between populations of color[13] and white populations. In contrast, the proximal conditions pertain to low levels of FY 2018 funding for the four primary human services programs, which were operationalized as per case levels of funding to account for population size and variance in the number of cases served in a county.

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[13] Under this definition and the associated condition discussed in Exhibit 13, "populations of color" are defined as people identifying as Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Some Other Race, Two or More Races, or Hispanic or Latino Origin (of any race). The primary reason for combining these subpopulations into a single populations of color category is the lack of reliable race and ethnicity data on individual subpopulations collected by ACS for small population areas, such as rural counties. Key limitations of this definition and the associated condition are that important nuance is lost regarding the degree of income inequality experienced by each of these subpopulations by combining them into a single populations of color category, and that members of these subpopulations may feel excluded or marginalized by the selected definition and the associated condition.

Exhibit 14. Remote and Proximal Conditions

Remote or Proximal	Condition	Operationalization	Data Sources
Remote Conditions: Enduring Community Characteristics Impacting Service Delivery	Low levels of internet access	The combined percentage of the rural county's population without access to fixed terrestrial broadband and mobile LTE	FCC, 2018 Broadband Deployment Report: Deployment of Fixed Terrestrial 25/3 Mbps and Mobile LTE With a Minimum Advertised Speed of 5/1 Mbps Services By County
Remote Conditions: Enduring Community Characteristics Impacting Service Delivery	High percentage of households without a vehicle	The percentage of owner-occupied and renter-occupied housing units in a rural county with no vehicle available	ACS, 2018: 5-Year Estimates. Tenure by Vehicles Available
Remote Conditions: Enduring Community Characteristics Impacting Service Delivery	Nonadjacent to a metropolitan area	Whether a rural county is not adjacent to a metropolitan area based on the Office of Management and Budget 2013 delineation	USDA, Economic Research Service. 2013 Rural-Urban Continuum Codes
Remote Conditions: Enduring Community Characteristics Impacting Service Delivery	State-supervised, county-administered administrative system	Whether services within a given rural county are delivered by a state-supervised, county-administered system (9 states); a state-administered system (39 states and the District of Columbia); or a hybrid system (2 states)	Child Welfare Information Gateway (2018). State vs. County Administration of Child Welfare Services Fact Sheet
Remote Conditions: Enduring Community Characteristics Impacting Service Delivery	High income inequality between populations of color and white populations	County-level ratio of average income for populations of color to the white population	ACS, 2018: 5-Year Estimates. Household Income in the Past 12 Months

Remote or Proximal	Condition	Operationalization	Data Sources
Proximal Conditions: Programs of Focus	Low Levels of Federal Funding for HMRF	Level of funding per HMRF case	HMRF FY 2018 administrative data
Proximal Conditions: Programs of Focus	Low Levels of Federal Funding for HPOG	Level of funding per HPOG case	HPOG FY 2018 administrative data
Proximal Conditions: Programs of Focus	Low Levels of Federal Funding for MIECHV	Level of funding per MIECHV case	MIECHV FY 2018 administrative data
Proximal Conditions: Programs of Focus	Low Levels of Federal Funding (Basic Assistance Expenditures) for TANF	Level of funding per TANF case	TANF FY 2018 administrative data

Calibration of the Outcome and Conditions

In the next step, the 2M-Urban Team will operationalize the outcome and conditions using a calibration process. **_Calibration_** consists of converting case data into numeric set membership values, ranging from zero to one, that represent the degree to which a case belongs to a set. Earlier applications of QCA commonly used crisp sets, which assigned cases to condition or outcome sets using dichotomous values with one representing a case being "fully in" a given set and values of zero representing "fully out." While crisp sets are still used, QCA has increasingly moved toward using fuzzy set values (Ragin 2008), in which cases can have set membership values between zero and one, thereby allowing for greater representation of differences in degrees of membership. **Exhibit 15** provides an overview of various types of set membership values that are commonly used within QCA applications and that the 2M-Urban Team will consider when calibrating the conditions and outcome.

Exhibit 15. Overview of Various Approaches to Establishing Set Membership Values

Crisp Set	3-Value Fuzzy Set	4-Value Fuzzy Set	6-Value Fuzzy Set	Continuous Fuzzy Set
1 = fully in	1 = fully in	1 = fully in	1 = fully in	1 = fully in
0.5 = neither fully in nor out	0.5 = neither fully in nor out	0.67 = more in than out	0.8 = mostly in	0.9
0 = fully out	0 = fully out	0.5 = neither fully in nor out	0.6 = more in than out	0.8
		0.33 = more out than in	0.5 = neither fully in nor out	0.7
		0 = fully out	0.4 = more in than out	0.6

Crisp Set	3-Value Fuzzy Set	4-Value Fuzzy Set	6-Value Fuzzy Set	Continuous Fuzzy Set
			0.2 = mostly out	0.5 = neither fully in nor out
			0 = fully out	0.4
				0.3
				0.2
				0.1
				0 = fully out

Source: Downey and Stayer (2010)

As shown in the table above, there are multiple approaches to establishing set membership values. Critically, set values should be established using theoretical and substantive knowledge and not based on internal criteria such as mean, median, or mode, which are sample dependent (Ragin 2008). The 2M-Urban Team will leverage its theoretical and substantive knowledge, including consultations with Office of Family Assistance (OFA) and MCHB program staff and members of the stakeholder groups, along with the direct method of calibration (Ragin 2008) to calibrate the conditions and outcome. The direct method of calibration involves setting three qualitative anchors for each measure: the threshold for full membership, the threshold for full nonmembership, and the crossover point (Ragin 2000). The crossover point represents the value where there is maximum ambiguity regarding whether a case is more in or out of a given set. After determining the set membership values of these three anchors, a logistic regression function is used to fit the data among these three calibration points and to transform the data into values between one and zero. The resulting set membership values embody the key strengths of quantitative and qualitative methods, by providing the precision revered in quantitative research along with the use of substantive knowledge that is central to qualitative research.

Constructing and Analyzing the Truth Table

The following step consists of constructing and analyzing a ***truth table,*** a critical component of QCA research. The truth table displays all possible combinations of conditions, the membership of each configuration to the outcome set, and the number of cases within each configuration. Three steps are involved in transforming a dataset into a truth table (Kahwati and Kane 2020) as shown in the example in **Exhibit 16**. The first step involves constructing the truth table shell with the columns from left to right representing each of the conditions, the number of cases associated with a configuration of conditions, and the outcome. The truth table rows correspond to the number of logically possible configurations, which is equal to 2^k where k is the number of conditions. Applying the 2^k principle, the example truth table in **Exhibit 16** consists of 8 rows listing all possible combinations of the three conditions.

Exhibit 16. Example of a Truth Table with Three Conditions

Conditions A	Conditions B	Conditions C	Number of Cases Associated with Each Combination of Conditions	Outcome Value
0	0	0		
1	0	0		
0	1	0		
0	0	1		
1	1	0		
1	0	1		
0	1	1		
1	1	1		

Note: In this example truth table, values of "0" are used to indicate that a given outcome or condition is not present, while values of "1" are used to indicate that a given outcome or condition is present.

The truth table for this study's five remote conditions will consist of 32 rows listing all possible configurations related to internet access; households without a vehicle; a lack of adjacency to a metropolitan area; state-supervised, county-administered administrative systems; and high income inequality between populations of color and white populations. In contrast, the truth table for the four proximal conditions on low levels of funding for TANF, MIECHV, HMRF, and HPOG will consist of a minimum of 16 rows (2^4) along with 2^k rows for the remote conditions that are determined as necessary within the first stage of the Two-Step QCA.

The second step involves assigning cases from the dataset to the corresponding rows in the truth table. Cases that are calibrated using a crisp set are assigned to the appropriate row in the truth table that matches the combination of the set membership values. In contrast, cases that are calibrated using fuzzy-set values will have partial set membership and can partially belong to multiple rows. Boolean algebra will be used to determine a case's set membership value for each row. A case will have a set membership value of greater than 0.5 in only one row of a table, with the case being assigned to that row.

The final step in this process involves assigning outcome values to each truth table row. This process involves using the outcome set membership values for the cases assigned to each row to assign an outcome value for the row. The outcome values for each row are determined by calculating ***row consistency***, which consists of the portion of the cases in the configuration that are also in the outcome set. Row consistency values range between zero and one, with value of 0.8 to 1 demonstrating a strong sufficiency relationship, while values between 0.6 and 0.8 represent a modest sufficiency relationship, and values below 0.6 representing a weak relationship. Outcome values assigned to each row are determined by

comparing the row consistency against a prespecified row consistency threshold, and the 2M-Urban Team will seek strong sufficiency relationships with row consistency values of 0.8 or higher. Using an example of a crisp set membership value, two cases may have a set membership value of 1 while the other three may have values of zero. The row consistency value would be 0.40 as two of the five cases have membership within the outcome set (2/5=0.40). Accordingly, this low level of row consistency would result in a very weak sufficiency relationship to the outcome, subsequently resulting in assigning a value of zero to the outcome column for that row of the truth table.

Conduct Model Analytics

After constructing the truth tables, the 2M-Urban Team will conduct the Two-Step QCA (Schneider and Wagemann 2006). The first step consists of conducting an ***analysis of necessity*** on the remote conditions, where if a given outcome is present, the condition is also present. The 2M-Urban Team will utilize a consistency threshold of 0.90 (Schneider, 2019) during the first step to ensure that a remote condition is truly necessary in that whenever the outcome is present the condition is also present. The next step will consist of a ***logical minimization*** process that utilizes Boolean algebra to reduce the truth table rows into a set of **solution** terms with a smaller number of necessary and sufficient conditions. These solution terms will be represented using the Boolean operators **AND, OR,** and **NOT** to denote the presence or absence of a particular condition within a given solution. Under the logical minimization process, if two truth table rows that are linked to an outcome differ on a single condition (i.e., this condition is present in one row but not the other), this condition can be considered logically redundant for producing the outcome (Schneider and Wagemann 2012). The logically redundant condition can then be removed, and the two rows can be merged into a simpler solution term.

The resulting solution terms will then be further examined using two parameters, coverage (Ragin 2006) and relevance of necessity (Schneider and Wagemann 2012). The ***coverage*** parameter[14] quantifies the degree that a set relationship (i.e., a solution term) has empirical relevance, with values ranging from 0 (not at all empirically relevant) to 1 (completely empirically relevant). The ***relevance of necessity*** (RoN) is a quantitative parameter that provides another assessment of coverage but is used to indicate whether a necessary condition is trivial. RoN values range from 0 (indicating trivialness) and 1 indicating a high degree of relevance. High coverage and RoN thresholds, consisting of 0.60 for coverage and

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[14] The 2M-Urban Team will examine both the raw and unique coverage parameters. Raw coverage corresponds to the portion of cases in the outcome set that are also in the solution term, which will allow for the determination of cases that are covered by more than one solution term. Unique coverage consists of the portion of cases in the outcome set that are also in the solution term set but are not covered by any other solution terms. Notably, cases that are uniquely covered only contribute to the coverage for one solution.

0.50 for RoN (Schneider 2019), will be used to ensure that the solution terms are comprised of necessary conditions for high levels of unmet need for human services.

The second step consists of conducting an analysis of sufficiency on the proximate conditions and the remote conditions that were identified as necessary in the first step. The remote conditions from step one and the four proximate conditions on low levels of federal funding for HMRF, HPOG, MIECHV and TANF will be combined within a second truth table. The **analysis of sufficiency** will focus on identifying sufficient conditions where whenever a given condition is present, the outcome is also present. Sufficiency will be determined using the consistency and coverage parameters. As previously discussed, consistency refers to the proportion (for crisp sets) or the degree of membership (for fuzzy sets) of the cases in the configuration that are also in the outcome set. Coverage is used to quantify the empirical relevance of the solution (and its individual terms) by quantifying how much of the outcome is explained by the combination of conditions identified in the solution (Schneider and Wagemann 2012). High consistency and coverage thresholds, consisting of 0.80 or higher for consistency and 0.60 for coverage will be used during this stage of the analysis (Schneider 2019; Schneider and Wagemann 2012).

The next stage of the analysis will consist of applying logical minimization to the truth table to generate solutions consisting of necessary and/or sufficient conditions or combinations of conditions for the outcome. Three types of solutions, consisting of conservative, parsimonious, and intermediate conditions, will be used to identify the remote and proximal conditions that result in high levels of unmet need for human services (Kahwati and Kane 2020). A key distinction between these solutions is how they handle **logical remainders,** rows of the truth table that have no associated cases. **Conservative solutions** (conversely referred to as the complex solution) ignores all logical remainder rows. The truth table is minimized using only those rows with cases that have outcome values equal to 1 and have been deemed sufficient based on consistency values at or above the stated threshold. **Parsimonious solutions** utilize logical remainders as simplifying assumptions to achieve the fewest terms in a solution. The assumption component pertains to how using a row without any cases requires an assumption about whether hypothetical cases that would belong to the row would have membership in the outcome set. This may entail assuming that membership in the outcome set or assuming nonmembership in an outcome set in order to produce simpler solutions. Meanwhile, the **intermediate solution** uses theory to guide the management of logical remainders during the minimization process. This solution uses directional expectations to indicate whether a condition theoretically should or should not contribute to a case having membership within an outcome set. Critically, these three solutions will result in somewhat different solution terms, but none will contradict the empirical case information as they are all generated from the same truth table (Kahwati & Kane, 2020). As such, the three solutions share a logically consistent relationship, with the conservative solution being a subset of the intermediate solution, which is a subset of the parsimonious solution. **Exhibit 17** provides an example of the format used to report solutions and the parameters of fit.

Exhibit 17. Example of the Format Used to Report Solutions and the Parameters of Fit for High Levels of Unmet Need for Human Services

Solutions	Solution	Consistency	Raw Coverage	Unique Coverage (i.e., sufficient combinations for the outcome)
Conservative [(Condition A * ~Condition B * Condition C) + (~Condition A * Condition B * ~ Condition C)]	Condition A * ~Condition B * Condition C	1.0	0.2	0.2
Conservative [(Condition A * ~Condition B * Condition C) + (~Condition A * Condition B * ~ Condition C)]	~Condition A * Condition B * ~ Condition C	1.0	0.8	0.8
Parsimonious (Condition C + Condition B)	Condition C	1.0	0.3	0.2
Parsimonious (Condition C + Condition B)	Condition B	1.0	0.7	0.8
Intermediate [Condition C + (~Condition A * Condition B * ~Condition C)]	Condition C	1.0	0.2	0.3
Intermediate [Condition C + (~Condition A * Condition B * ~Condition C)]	~Condition A * Condition B * ~Condition C	1.0	0.8	0.7

Note: A tilde (~) indicates the absence of the condition. The asterisk (*) indicates Boolean multiplication (i.e., the logical "AND"). The plus sign (+) indicates Boolean addition (i.e., the logical "OR").

Overall Consistency = 1.0 and Overall Coverage = 1.0.

Consistency denotes the sufficiency of each solution term.

Raw coverage refers to the portion of cases in the outcome set that are also in the solution set.

Unique coverage refers to the portion of cases in the outcome set that are also in the solution set and are not covered by any other solution terms.

Overall consistency and overall coverage refer, respectively, to the sufficiency of the solutions and the portion of the outcome that can be explained by the solutions.

The resulting solutions will be subject to a series of robustness tests (Schneider and Wagemann 2012) to examine the sensitivity of the findings and whether the findings substantively change in response to small changes in the parameters. A first robustness test will consist of changing the calibration points related to whether a given case is more in or out of set. A second robustness test will consist of rerunning the analysis with a consistency threshold of 0.75 and then with a consistency threshold of 0.90, which will impact the number of rows in the truth table that are included in the logical minimization process. Ultimately, solutions will be considered robust if they have similar conditions and combinations and are logically consistent with each other.

Post-Solution Exploration Using Within- and Cross-Case Analysis

In the final step, the 2M-Urban Team will engage in post-solution exploration using within- and cross-case analysis. This process will involve looking within and across cases to explore how solutions operate and to obtain contextual meaning for the solution. During this process, the 2M-Urban Team will focus on four types of cases (Kahwati and Kane 2020; Schneider and Rohlfing 2013):

- *Typical cases* within the solution and outcome sets. These cases contribute to solution consistency and coverage and support the empirical results produced by the analsyis.
- *Unique cases* represent a special category of a typical case. These cases are covered by a single solution term and may be of interest as they may offer a distinct explanation.
- *Deviant cases* do not align with the empirical findings. These cases decrease the consistency and coverage of the identified solutions and may be of interest as they possess the combination of conditions that have been identified as sufficient for the outcome but are not in the outcome set.
- *Irrelevant cases* are neither in the solution nor the outcome set. These cases are not typically informative for within-case analysis but can be useful in cross-case analysis.

4 INTEGRATION AND TRIANGULATION

After analysis of the data identified in the steps above, the final step will consist of integrating the data to achieve methodological triangulation. Integration is a vital, though often underachieved, component of mixed methods research. Notably, integration has been cited as the central and defining feature of mixed methods research (Plano Clark 2019) that separates mixed methods design from other research designs (O'Cathain et al. 2010). However, planning for and achieving meaningful integration can be a challenging endeavor (Fetters and Freshwater 2015), and a sizable number of mixed methods studies have been criticized for failing to effectively integrate qualitative and quantitative data (Fetters, Curry and Creswell 2013; Fetters and Freshwater 2015; Guetterman, Fetters, and Creswell 2015). Accordingly, this section discusses common approaches to achieving effective integration within mixed methods research designs; then, this section specifies the approaches used in this study's design to integrate quantitative and qualitative findings.

4.1 Methodological Overview: Integration in Mixed Methods Designs

Methodologists have increasingly emphasized the integration of qualitative and quantitative data and findings as the centerpiece of mixed methods designs (Guetterman, Fetters, and Creswell, 2015) and as necessary for enhancing both the credibility and relevance of a study's findings and outcomes. Integration is an intentional process, and each integration point in a mixed methods design requires effective planning and implementation of qualitative and quantitative analytic procedures in response to the study's research questions (Bazeley 2018). While an array of integration approaches exists (Fabregues and Molina-Azorin 2017), three approaches are described in detail below. Notably, the approaches discussed here utilize joint displays which consists of tables, matrices, or figures that explicitly relay quantitative and qualitative information in a visual manner (Guetterman, Fetters, and Creswell 2015). Joint displays provide a useful, visual approach to integration by providing a framework for intentionally integrating findings with a clear rationale, thereby illuminating insights beyond separate quantitative and qualitative findings.

4.1.1 Mixed Methods Matrix

This integration approach focuses attention on cases,[15] as opposed to variables or themes. Mixed methods matrices (O'Cathain, Murphy, and Nicholl 2010) display all data collected on each case so that they can be analyzed together. The rows of the matrix represent each case within a given study, while the columns display the various data collected on each case. For instance, one row might represent a case for which interview and administrative data were collected, while another row in the matrix might represent a case for which administrative

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[15] In this instance, "case" is referred to as the unit of analysis for the phenomenon being studied (Miles & Huberman 1994).

and survey data were collected. This approach benefits from a combined focus on within- and cross-case analysis: Greater attention can be given to notable or paradoxical findings within a single case while patterns are identified across all cases. However, a notable limitation of this integration approach is that it can be challenging to implement in studies with a large number of cases.

4.1.2   Following a Thread

This second approach to integration combines inductive and deductive approaches by selecting a research question or theme in one component of the mixed methods design and following that question or theme across the other components of the design (i.e., the thread) to create a collection of findings to develop a multifaceted understanding of a given phenomenon (Moran-Ellis et al. 2006). The methodological approach consists of four key steps. In the first step, the datasets from each methodological strand are analyzed separately to identify key themes, categories, or research questions requiring further exploration. The second step involves identifying emergent findings with a relationship to the research questions or the other datasets and then "picking it up as a thread" to be followed in other methodological strands. The next step consists of following the thread across the other datasets to create a pattern of findings, including categories, codes, and emergent themes that can be iteratively analyzed to refine the analysis. The final step consists of integrating, or interweaving, the findings from the various threads to provide a more comprehensive understanding of the research question or theme that was initially selected.

4.1.3   Triangulation Protocol

The third integration approach consists of listing the findings from each study component side by side and then examining the degree to which the findings from divergent methods agree or disagree. The process begins with collecting and analyzing the data separately for each component of the mixed methods design. The findings from each of the components are then listed and compared to determine whether the findings converge, offer complementarity for a given research question or theme, or contradict each other. In contrast to the other integration approaches, the explicit focus on disagreements is a key component of the triangulation protocol. In particular, the identification and exploration of "inter-method discrepancies" can lead to an improved understanding of the research question or theme (Moffatt et al. 2006).

4.2   Employing Triangulation Protocols and the Following a Thread Approach to Achieve Integration of Quantitative and Qualitative Data on Human Services Programs in Rural Contexts

The approaches described above utilize different procedures and processes to integrate data from the qualitative and quantitative components of mixed methods designs. The mixed methods matrix focuses on individual cases and facilitates both within- and cross-

case analyses. In contrast, the "following a thread" approach to integration combines inductive and deductive approaches to follow a research question or theme across the other components of a design to create a collection of "threads" that can be used to develop a robust, multi-faceted understanding of a given phenomenon. Finally, triangulation protocols employ a systematic approach to comparing the findings from various components and determining the degree to which they agree or disagree, with an emphasis on identifying instances of disagreement that can bring about deeper understanding of the research question.

Critically, all three integration approaches strive for meaningful integration by requiring effective planning and implementation of the qualitative and quantitative analytic procedures associated with each research question. In careful consideration of this study's goals, research questions, and mixed methods research design, the research team will use a triangulation protocol as its primary approach to integrating the findings. The following a thread approach will provide a secondary approach.[16] The triangulation protocol, with its focus on a systematic approach to assessing agreement and disagreement, provides an appropriate and effective tool for enhancing the overall validity of the study's findings related to the three goals. Furthermore, the following a thread approach complements the triangulation protocol's systematic approach to integration: It combines inductive and deductive approaches to identify emergent themes across qualitative and quantitative components, which provides a more robust and nuanced understanding of human services delivery in rural contexts. The following sections provide further insight into the use of the triangulation protocol and the following a thread integration approaches in this study.

4.3 Using Triangulation Protocols to Integrate the Findings for Each Study Goal

For each study goal and the associated research questions, the 2M-Urban Team will use a triangulation protocol to systematically compare the various findings from each analysis method. **Exhibit 18** provides an example matrix depicting how the 2M-Urban Team will apply a triangulation protocol to the research questions under *Goal 1: Rich Description.* For each study goal, the 2M-Urban Team will develop a matrix organized around the research questions associated with the goal. Each row of the matrix will list the research questions, the analysis methods used to answer the research questions, the associated findings, and the determination of the findings.

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[16] While the mixed methods matrix offers considerable utility for this study, the method's focus on listing all applicable cases could prove cumbersome. Notably, this study's application of the QCA methodology to the universe of the 1,976 rural counties would be challenging to incorporate into a mixed methods matrix.

Exhibit 18. Example Triangulation Protocol Matrix for Research Questions under Goal 1: Provide a Rich Description of Human Services in Rural Contexts

Research Question	Data Analysis Methods	Associated Findings	Determination of Findings
What are the associated social wellbeing needs of the populations served by human services programs?	○ Literature review[17] ○ Qualitative thematic analysis		
What are the associated economic wellbeing needs of the populations served by human services programs?	○ Literature review ○ Qualitative thematic analysis		
What "standard" service delivery models are used by human services programs to deliver the programs in rural contexts?	○ Literature review ○ Qualitative thematic analysis		
How are human services programs in rural contexts adapting service delivery?	○ Literature review ○ Qualitative thematic analysis		

After populating the first three columns, the 2M-Urban Team will then review the associated findings for each research question to determine whether there is (a) agreement; (b) partial agreement; (c) silence; or (d) dissonance (Farmer et al., 2006). A determination of ***agreement*** will be assigned when there is full agreement between the findings for two or more methods. In these instances, the findings from multiple methods confirm the findings of each other, thereby providing greater confidence in the findings. A determination of ***partial agreement*** will be assigned when there is a level of agreement among the findings of two or more methods but when the findings fail to reach total agreement on all aspects. In such instances, the divergence between findings can expand insights by simultaneously highlighting the different and complementary aspects of a topic of interest. A determination of ***silence*** will occur when one analysis method provides findings related to the research question but the other analysis methods do not produce findings that answer the research question. In these instances, the 2M-Urban Team will highlight the findings from the single method but will note the lack of triangulation among multiple methods. Finally, a determination of ***dissonance*** will be assigned when there is disagreement among the findings from one or more methods. This determination will be used when the findings from multiple methods contradict, conflict, or disagree with each other (Fetters et al. 2013; O'Catharain et al. 2010). As noted earlier, focusing on disagreements is a key component of

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[17] As noted in Section 2, literature reviews are considered as an analysis method (Snyder 2019) within the study's mixed methods research design and yield findings that are integrated with the other methods to achieve methodological triangulation.

the triangulation protocol, and discrepancies between methods can lead to an improved understanding of a research question.

Separate triangulation protocols will be developed for each of the study's three goals. The triangulation protocol for *Goal 1: Rich Description* will determine the level of agreement among findings produced by various methods, including the study's literature review, qualitative thematic analysis, descriptive statistics, and QCA. The protocol for *Goal 2: Unmet Need* will determine the level of agreement across a collection of methods consisting of descriptive statistics and GIS maps, hot spot analysis, QCA, and qualitative thematic analysis. For *Goal 3: Opportunities*, the triangulation protocol will determine the level of agreement across an array of methods, including descriptive statistics, hot spot analysis, qualitative thematic analysis, and QCA. Finally, 13 of the study's research questions will be answered using a single analysis method. More specifically, these research questions rely upon using qualitative thematic analysis of program documents and site visit interviews to obtain rich thick descriptions that could not be readily attained using quantitative methods. For these research questions, the 2M-Urban Team will focus on highlighting cross-case themes across rural counties, as well as emergent themes pertaining to specific counties.

4.4 Using the Following a Thread Approach to Explore New Concepts

While triangulation protocols will be the primary approach for integrating the findings from the study's various methods, the following a thread approach will be used as a secondary approach. The 2M-Urban Team will use this approach to explore new concepts and themes, identified during the development of the triangulation protocols, that do not necessarily align with the study's research questions. This approach will facilitate following a concept or theme across multiple methods if it shows promise in addressing one or more of the study's goals. Notably, this approach will provide greater confidence in the identification of the new concepts or themes on account of enhanced verification and confidence in the data and the production of nuanced and multifaceted findings (Dupin and Borglin 2020). The 2M-Urban Team will utilize the following four-step process, which is also described in Section 4.1.2:

1. Separately analyzing the datasets from each methodological strand to identify new concepts or themes requiring further exploration.
2. "Following the thread," or determining whether a given concept or theme is found in other methods.
3. Following the threads to create a pattern of findings, which can be iteratively analyzed to refine the analysis.
4. Integrating findings from the various threads to provide a more robust understanding of the concept or theme.

4.5 Triangulation

The application of the triangulation protocol and following a thread approaches to integration will support the research team and the study in achieving the critical goal of methodological triangulation (O'Cathain, Murphy, and Nicholl 2010). The pursuit of methodological triangulation, which depends on effective planning and implementation of qualitative and quantitative analytic procedures to achieve meaningful integration, will enhance the overall validity of this study by increasing the likelihood that the findings are credible. Ultimately, the triangulation of the diverse qualitative and quantitative analysis methods described throughout this plan will result in a more robust understanding of human services programs in rural contexts by providing a rich description of human services programs in rural contexts, determining the level of unmet need for human services, and identifying opportunities for strengthening the capacity of human services programs in rural contexts.

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APPENDIX – EVALUATION PLANNING MATRIX

Exhibit 19. Goal 1: Provide a Rich Description of Human Services in Rural Contexts General Description

Research Question	Subquestions	Data Collection Methods	Data Analysis Methods
- How are rural contexts defined within the extant literature?	- What data sources are used to define "rural" in existing literature?	- Literature	- Literature review

- What are the associated social wellbeing needs of the populations served by human services programs?	- Are any of these needs unmet by current human services programs? If yes, why?
	- Are these unmet needs being met by other programs/organizations outside of human services programs? How?
		- Literature
		- Program documents
		- Site visit interviews
		   o Program staff
		   o Other*
			- Literature review
			- Qualitative thematic analysis

- What are the associated economic wellbeing needs of the population served by human services programs?	- Are any of these needs unmet by current human services programs? If yes, why?
	- Are these unmet needs being met by other programs/organizations outside of human services programs? How?
		- Literature
		- Program documents
		- Site visit interviews
		   o Program staff
		   o Other*
			- Literature review
			- Qualitative thematic analysis

- What "standard" service delivery models are used by human services programs to deliver the programs in rural contexts?	- What components of these models are reported to work well in rural contexts?
	- What components of these models are reported to not work well in rural contexts? Why?
		- Literature
		- Program documents
		- Site visit interviews
		   o Program staff
		   o Other*
			- Literature review
			- Qualitative thematic analysis

- How are human services programs in rural contexts adapting service delivery?	- In what ways are programs adapted to suit the rural contexts within which they operate? - What innovative/novel approaches are being used? Why were these approaches chosen? - How are these innovative/novel approaches being implemented?	- Literature - Program documents - Site visit interviews o Program staff	- Literature review - Qualitative thematic analysis

- What are the key barriers and facilitators of the delivery of the four human services programs in rural contexts?	- How do those barriers and facilitators impact service delivery?
	- What recommendations do respondents have for improving service delivery?
		- Program documents
		- Site visit interviews
		   o Program staff
		   o Other*
			- Qualitative thematic analysis

Exhibit 20. Goal 1: Provide a Rich Description of Human Services in Rural Contexts Characterizing Capacity

Research Question	Subquestions	Data Collection Methods	Data Analysis Methods
- What is the organizational capacity of human services programs to deliver services in rural contexts?	How do those working in human services in rural areas characterize key components of capacity, including the following? - Funding - Staff - Technology - Physical resources - Materials - Data/evaluation - Partnerships - Other?	- Administrative data - Program documents - Site visit interviews ○ Program staff	- Descriptive statistics - Qualitative thematic analysis

- In what ways do key "local" factors impact the capacity of human services programs to provide services in rural contexts?	What "local" factors are identified as having an impact on capacity?
	- Availability of knowledgeable staff
	- Number of staff relative to geographic spread of program participants
	- Previous experience of staff
	- Other?
		- Program documents
		- Site visit interviews
		  ○ Program staff
		  ○ Other*
			- Qualitative thematic analysis

- What key "federal" factors impact the capacity of human services programs to provide services in rural contexts?	- Flexibility of how funding can be used
	- Key staff needed
	- Reporting requirements
		- Program documents
		- Site visit interviews
		  ○ Program staff
		  ○ Other*
			- Qualitative thematic analysis

- What components of organizational capacity are identified as most critical to the delivery of human services programs in rural contexts?	What do those working in human services in rural areas see as the key components of organizational capacity? - Funding - Staff - Technology - Physical resources - Materials - Data/evaluation - Partnerships - Other? - Which components are the most challenging for human services programs to address?	- Site visit interviews ○ Program staff	- Qualitative thematic analysis
- What particular components of organizational capacity are identified by staff from human services programs as most critical to addressing unmet need in rural contexts?	In what ways do these components impact human service program's capacity to address unmet need? - Funding - Staff - Technology - Physical resources - Materials - Data/evaluation - Partnerships - Other?	- Administrative data - Site visit interviews ○ Program staff	- Descriptive statistics - Qualitative thematic analysis - Qualitative Comparative Analysis (QCA)
- In what ways does organizational capacity in rural contexts impact fidelity of implementation for human services programs?	- What challenges do program staff face when trying to deliver human services according to the original "model" or "design"?	- Site visit interviews ○ Program staff	- Qualitative thematic analysis - QCA

Research Question	Subquestions	Data Collection Methods	Data Analysis Methods
- What technical assistance (e.g., recruitment/intake, case management, curricula, data use, "other") are human services programs in rural contexts currently receiving?	- What entities are providing the technical assistance? - Of the technical assistance currently being received, is it meeting the needs of rural communities? - What technical assistance has been most helpful? - What technical assistance is still needed?	- Site visit interviews ○ Program staff	- Qualitative thematic analysis
- How are human services programs in rural contexts[18] using data (e.g., performance measures, evaluation data) to improve their capacity to deliver services?	- What data system infrastructure exists in these rural contexts? - Do these programs have dedicated staff that are responsible for data management and integration? - What are the challenges that these programs face in collecting program data? How have these challenges been overcome? - What resources would be helpful to support their use of data?	- Site visit interviews ○ Program staff	- Qualitative thematic analysis

Exhibit 21. Goal 2: Determine the Unmet Need for Human Services in Rural Contexts

Research Question	Subquestions	Data Collection Methods	Data Analysis Methods
- How is federal funding for human services programs distributed across rural counties?	- How do funding distributions vary by the programs of focus? - What/where are the counties with more funding in one program over another? - What/where are the counties with limited funding? - What/where are the counties with high levels of funding?	- Administrative data	- Descriptive statistics - GIS mapping
- What is the overall level of unmet need for human services programs in rural counties?	- What/where are the counties with particularly high (and low) levels of unmet need across all programs of focus? - What/where are the counties with higher unmet need in one program over another? - Are there types of unmet need (e.g., unmet individual self-sufficiency needs, unmet infant health needs) that drive high overall unmet need?	- Administrative data - Secondary data	- Descriptive statistics - GIS mapping

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[18] A key area of focus for the MIECHV Program is the development of statewide systems of infrastructure and support. As such, this study will focus on (1) understanding the role that the states play in improving the capacity to deliver home visiting services in rural contexts and (2) understanding service delivery issues specific to rural contexts.

Research Question	Subquestions	Data Collection Methods	Data Analysis Methods

- Which combinations of human services programs are found among rural counties with lower and higher levels of unmet need?	- What helps to explain these combinations and the impact they have on level of unmet need?	- Administrative data
		- Program documents
		- Site visit interviews
		  o Program staff
		  o Other*
			- Descriptive statistics
			- QCA

- What are the key lessons learned about the delivery of human services programs in rural counties with significantly low concentrations (i.e., "cold spots") of unmet need?	- What resources exist in areas with low concentrations of unmet need?
	- What resources are missing in areas with low concentrations of unmet need?
	- What recommendations do program staff, partners, and participants have to address the needs of those working and obtaining services in areas with high unmet need?
	- Which lessons learned could be used to inform technical assistance strategies to address the unmet needs?
		- Administrative data
		- Site visit interviews
		  o Program staff
		  o Other*
			- Hot spot analysis
			- Qualitative thematic analysis

- What are the most significant challenges facing the delivery of human services programs in rural counties with significantly high concentrations (i.e., "hot spots") of unmet need?	- How do these challenges differ from the challenges described by areas with low concentrations of unmet need?
	- What resources are present in areas with high concentrations of unmet need?
	- What resources are missing in areas with high concentrations of unmet need?
	- What recommendations do program staff, partners, and participants have to address the needs of those working and obtaining services in areas with high unmet need?
	- What challenges could be addressed via technical assistance?
		- Administrative data
		- Site visit interviews
		  o Program staff
		  o Other*
			- Hot spot analysis
			- Qualitative thematic analysis

- What do human services staff in rural contexts perceive to be the greatest needs of the populations served by human services programs?	- What resources exist to address these needs?
	- What do human services program participants believe are their greatest needs regarding human services?
	- Do program staff and program participants have similar opinions of what the greatest needs are? How are they similar? How are they different?
	- Have these needs changed over time? How so?
		- Site visit interviews
		  o Program staff
		  o Other*
			- Qualitative thematic analysis

- What do staff from human services programs in rural contexts perceive as the factors influencing the unmet needs of the populations served?	- What resources are needed to address these needs?
	- Do program staff and program participants have similar opinions of what is impacting unmet needs? How are they similar? How are they different?
	- Have these factors changed over time? How so?
		- Site visit interviews
		  o Program staff
		  o Other*
			- Qualitative thematic analysis

Research Question	Subquestions	Data Collection Methods	Data Analysis Methods

- In what ways are nonprofits working to address unmet needs in rural contexts?	- How do nonprofit organizations communicate with human services programs to provide services?
	- In what areas (programmatically) do nonprofits most commonly provide a role in addressing unmet needs?
	- How do these areas align with the services provided by human services programs to address unmet needs?
	- What recommendations do those working for nonprofits have to improve coordination and service delivery for those in areas with unmet needs?
		- Site visit interviews
		   o Program staff
		   o Other*
			- Qualitative thematic analysis

Exhibit 22. Goal 3: Identify Opportunities for Strengthening the Capacity of Human Services Programs in Rural Contexts

Research Question	Subquestions	Data Collection Methods	Data Analysis Methods

- What strategies have human services programs in rural contexts found to be effective in strengthening the capacity to meet the needs of their clients?	- What capacity-strengthening strategies can be supported by ACF and MCHB technical assistance?
	- What other strategies, such as policy changes or federal program changes, should be explored to strengthen the capacity of human services programs in rural areas?
		- Site visit interviews
		  o Program staff
		  o Partners
			- Qualitative thematic analysis

- What are the ongoing needs related to improving the capacity of human services programs in rural contexts?	- What particular program components (e.g., recruitment/intake, case management, curricula, data use, "other") are most challenging to implement? Why?
	- What additional supports are needed to facilitate the successful implementation of particular program components?
	- What suggestions do those working in rural contexts have to access or receive the support they need?
		- Site visit interviews
		  o Program staff
		  o Partners
			- Qualitative thematic analysis

- What are the flexibilities (at the federal/program level) that human services programs in rural contexts need to implement these programs?	- What types of budget flexibilities would be helpful?
	- What types of programmatic flexibilities would be helpful?
	- What type of funding application flexibilities would be helpful?
	- What types of service delivery flexibilities would be helpful?
	- What types of evaluation/data related flexibilities would be helpful?
		- Site visit interviews
		  o Program staff
		  o Partners
			- Qualitative thematic analysis

- What are the key lessons learned that may be particularly important to increase capacity among human services programs in rural contexts?	- What lessons learned from rural contexts may have application in non-rural areas?	- Administrative data
		- Site visit interviews
		  o Program staff
		  o Partners
			- Descriptive statistics
			- Qualitative thematic analysis

- What are the suggested areas for future research to strengthen the capacity of human services programs in rural contexts?	- N/A	- Administrative data
		- Site visit interviews
		  o Program staff
		  o Partners
			- Descriptive statistics
			- Hot spot analysis
			- Qualitative thematic analysis
			- QCA

APPENDIX – FRAMEWORK OF NEEDS

The table below includes an updated framework of needs that contains measurable key indicators of needs for the eligible populations of each of the four human services programs of focus. To develop this framework, the 2M-Urban Team drew on the study's literature review and consultations with members of the study's three stakeholder groups, the OPRE-MCHB Team, and OFA and MCHB program staff. For each of the programs of focus, the framework specifies eligible populations, categories of associated needs, and key indicators for measuring each category of need at the county level. As depicted in the unmet need formula presented in Section 3.1.1., the 2M-Urban Team will include a standardized sum of the county-level key indicators for each need category. While an earlier version of this framework was presented in a preceding project deliverable, this updated framework reflects indicators that the 2M-Urban Team believes are measurable in rural counties using valid and reliable data sources presented in Exhibit 5.

Program	Eligible Population	Needs	Key Indicators
HMRF	HMRE: Individuals in high school	Targeted outreach for at-risk high school students	Percentage of teenagers in unmarried households
HMRF	HMRE: Individuals in high school	Targeted outreach for at-risk high school students	Number of teenagers experiencing maltreatment
HMRF	HMRE: Individuals in high school	Targeted outreach for at-risk high school students	Number of teenagers witnessing domestic violence
HMRF	HMRE: Adult couples or individuals in relationships; New Pathways: Community fathers	Marital or family stability	Divorce rate
HMRF	HMRE: Adult couples or individuals in relationships; New Pathways: Community fathers	Marital or family stability	Separation rate
HMRF	HMRE: Adult couples or individuals in relationships; New Pathways: Community fathers	Marital or family stability	Increasing divorce rate over time
HMRF	HMRE: Adult couples or individuals in relationships; New Pathways: Community fathers	Marital or family stability	Increasing separation rate over time
HMRF	HMRE: Adult couples or individuals in relationships; New Pathways: Community fathers	Marital or family stability	Prevalence of domestic violence
HMRF	HMRE: Adult couples or individuals in relationships; New Pathways: Community fathers	Family self-sufficiency	Number of career development service providers
HMRF	HMRE: Adult couples or individuals in relationships; New Pathways: Community fathers	Family self-sufficiency	Poverty rate of married families
HMRF	HMRE: Adult couples or individuals in relationships; New Pathways: Community fathers	Family self-sufficiency	Unemployment rate of married individuals
HMRF	HMRE: Adult couples or individuals in relationships; New Pathways: Community fathers	Programmatic support services	Lack of public transportation services

Program	Eligible Population	Needs	Key Indicators
HMRF	HMRE: Adult couples or individuals in relationships; New Pathways: Community fathers	Programmatic support services	Lack of individual and family services
HMRF	HMRE: Adult couples or individuals in relationships; New Pathways: Community fathers	Programmatic support services	Lack of religious and civic and social organizations
HMRF	HMRE: Adult couples or individuals in relationships; New Pathways: Community fathers	Programmatic support services	Lack of child daycare services
HMRF	New Pathways: Community fathers	Paternal support services	Number of fathers
HMRF	New Pathways: Community fathers	Paternal support services	Number of children in single-female households
HMRF	ReFORM: Justice-involved fathers	Paternal support services	Number of children with incarcerated parents
MIECHV	Pregnant women	Maternal and prenatal care	Prenatal exposure to drug and alcohol abuse
MIECHV	Pregnant women	Maternal and prenatal care	Percentage of live births with at least one pregnancy risk factor (Gestational Diabetes; Gestational Hypertension; Eclampsia; Pre-pregnancy Diabetes ; Pre-pregnancy Hypertension; Previous Pre-term Birth; Previous Cesarean Delivery; Infertility Treatment Used; Fertility Enhancing Drugs; or Assistive Reproductive Technology)
MIECHV	Pregnant women	Maternal and prenatal care	Rate of births for women aged 15 to 19
MIECHV	Pregnant women	Maternal and prenatal care	Percent of births without at least 1 prenatal visit
MIECHV	Caregivers of children birth to kindergarten entry age	Infant health	Number of births
MIECHV	Caregivers of children birth to kindergarten entry age	Infant health	Number of premature births
MIECHV	Caregivers of children birth to kindergarten entry age	Infant health	Prevalence of low-birth weight births
MIECHV	Caregivers of children birth to kindergarten entry age	Healthy child development	Lack of availably of Head Start
MIECHV	Caregivers of children birth to kindergarten entry age	Healthy child development	Number of children with special needs
MIECHV	Caregivers of children birth to kindergarten entry age	Healthy child development	Number of children with developmental delays
MIECHV	Caregivers of children birth to kindergarten entry age	Healthy child development	Number of child injuries
MIECHV	Caregivers of children birth to kindergarten entry age	Healthy child development	Number of children placed in foster care
MIECHV	Caregivers of children birth to kindergarten entry age	Healthy child development	Number of children experiencing maltreatment
MIECHV	Caregivers of children birth to kindergarten entry age	Family health and wellbeing	Number of at-risk/eligible families

Program	Eligible Population	Needs	Key Indicators
MIECHV	Caregivers of children birth to kindergarten entry age	Family health and wellbeing	Ratio of population to primary care physicians
MIECHV	Caregivers of children birth to kindergarten entry age	Family health and wellbeing	Violent crime rate
MIECHV	Caregivers of children birth to kindergarten entry age	Family health and wellbeing	Percentage of adults that smoke
MIECHV	Caregivers of children birth to kindergarten entry age	Family health and wellbeing	Death rate for drug poisoning
MIECHV	Caregivers of children birth to kindergarten entry age	Family health and wellbeing	Average number of mentally unhealthy days reported in last 30 days
MIECHV	Caregivers of children birth to kindergarten entry age	Family health and wellbeing	Prevalence of maternal depression
MIECHV	Caregivers of children birth to kindergarten entry age	Family health and wellbeing	Ratio of population to mental health providers
MIECHV	Caregivers of children birth to kindergarten entry age	Family health and wellbeing	Prevalence of domestic violence
MIECHV	Caregivers of children birth to kindergarten entry age	Family self-sufficiency	Percentage of families with related children of householder under 5 years below poverty level
MIECHV	Caregivers of children birth to kindergarten entry age	Family self-sufficiency	Number of individuals without a completed high school education
MIECHV	Caregivers of children birth to kindergarten entry age	Family self-sufficiency	Child food insecurity rate
MIECHV	Caregivers of children birth to kindergarten entry age	Family self-sufficiency	Unemployment rate
HPOG	Individuals receiving TANF and other low-income individuals	Individual self-sufficiency	Number of individuals without college credit
HPOG	Individuals receiving TANF and other low-income individuals	Healthcare jobs in high demand*	Number of healthcare training programs provided by postsecondary institutions
HPOG	Individuals receiving TANF and other low-income individuals	Healthcare jobs in high demand*	Percentage of healthcare workers 55 years old and above to total healthcare workforce
HPOG	Individuals receiving TANF and other low-income individuals	Healthcare jobs in high demand*	Healthcare workforce retention
HPOG	Individuals receiving TANF and other low-income individuals	Programmatic support services	Lack of child daycare services
HPOG	Individuals receiving TANF and other low-income individuals	Programmatic support services	Lack of transportation services
HPOG	Individuals receiving TANF and other low-income individuals	Programmatic support services	Lack of financial aid assistance
HPOG	Individuals receiving TANF and other low-income individuals	Programmatic support services	Lack of broadband internet access
HPOG	Individuals receiving TANF and other low-income individuals	Programmatic support services	Low accessibility of computers

Program	Eligible Population	Needs	Key Indicators
TANF	Needy or low-income families	Family self-sufficiency	Percentage of households with cash public assistance or Food Stamps/SNAP
TANF	Needy or low-income families	Family self-sufficiency	Increased rates of government assistance
TANF	Needy or low-income families	Family self-sufficiency	Percentage of families with related children of householder under 18 years below poverty level
TANF	Needy or low-income families	Individual self-sufficiency	Unemployment rate
TANF	Needy or low-income families	Individual self-sufficiency	Underemployment as a measure of fulltime workers below poverty line
TANF	Needy or low-income families	Individual self-sufficiency	Attachment to and stability in the workforce (turnover rate, stable separations, stable hires)
TANF	Needy or low-income families	Individual self-sufficiency	Mean usual hours worked
TANF	Needy or low-income families	Individual self-sufficiency	Low number of employers
TANF	Needy or low-income families	Individual self-sufficiency	Share of workers commuting to other counties for work
TANF	Needy or low-income families	Individual self-sufficiency	Number of individuals without a completed high school education
TANF	Needy or low-income families	Individual self-sufficiency	Lack of postsecondary education institutions
TANF	Needy or low-income families	Programmatic support services	Lack of child daycare services
TANF	Needy or low-income families	Programmatic support services	Presence of non-traditional educational opportunities (business schools and computer and management training; technical schools; trade schools)
TANF	Needy or low-income families	Programmatic support services	Lack of public transportation services

* Key indicators listed in the HPOG needs category "Healthcare jobs in high demand" will be measured for various healthcare occupational fields provided by grantees.