



Engaging Community in Prioritizing Outcomes to Improve Family Health in Evidence-Based Nurse Home Visiting: Using a Modified e-Delphi Method

Venice Ng Williams¹ · Jennifer Marshall² · Mirine Richey³ · Mandy Allison^{1,4}

Accepted: 26 October 2023 / Published online: 21 November 2023

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Abstract

Background Evidence-based home visiting programs are designed to improve maternal child health. Nurse-Family Partnership (NFP) is a model evidence-based home visiting program, shown to improve pregnancy outcomes, child development, and economic self-sufficiency for first-time mothers and their families experiencing social and economic adversities, enrolling them early in pregnancy. Recently, NFP has expanded its services to multiparous women (previous live births) and enrolling women past 28 weeks gestation (late registrants) in selected agencies in Florida since 2021.

Objective To study the process and impacts of expanding NFP to expanded populations (multiparous and/or late registrants), we convened a diverse Advisory Committee to guide the NFP expansion evaluation in Florida.

Methods This study employed a modified e-Delphi method with three rounds of data collection, to engage diverse partners to identify process and impact outcomes for the NFP expansion evaluation.

Results Child maltreatment was identified as the highest priority outcome. Process outcomes included program reach, client enrollment, and client engagement, while impact outcomes included maternal physical health, maternal mental health and substance use, birth outcomes, and breastfeeding practices. The Advisory Committee further identified potential data sources to measure these outcomes.

Conclusions for Practice Identifying and selecting key process and impact outcomes using a community-engaged process is necessary to ensure equal buy-in from all partners and to inform rigorous program evaluation. This study showed that using methods such as e-Delphi is feasible and effective for achieving thoughtful and rigorous decision-making, even in times of uncertainty like the COVID-19 pandemic.

Significance

What is Already Known on this Subject? Home visiting programs range widely in terms of goals, scope, intended population, and evidence base, but are increasingly recognized as a unique and impactful resource for improving maternal child health. The expansion of these programs to new intended populations must be evaluated to ensure that the original program as designed remains effective.

What this Study adds? We highlight a systematic process used to identify and select key process and impact outcomes, through a community-engaged process to inform rigorous program evaluation in the context of perinatal and early childhood home visiting program. We demonstrated that effective transdisciplinary engagement, collaboration, and decision-making is feasible in a remote environment.

Keywords Home visiting · Community engagement · Consensus building · Remote environment

✉ Venice Ng Williams
venice.williams@cuanschutz.edu

¹ Prevention Research Center for Family & Child Health,
University of Colorado Anschutz Medical Campus, Aurora,
CO 80045, USA

² University of South Florida, College of Public Health,
Tampa, FL 33612, USA

³ Center for Prevention & Early Intervention Policy, Florida
State University, Tallahassee, FL 32301, USA

⁴ Children's Hospital Colorado, Aurora, CO, USA

Introduction

Scientific evidence suggests that the foundations of life-long health are built in the early years and that investing in healthy development should begin prenatally (Shonkoff et al., 2012). Perinatal and early childhood home visiting is a resource for families delivered in a community or private home setting, aimed to improve a range of health and parenting outcomes (Paulsell et al., 2014). However, home visiting programs vary widely in terms of goals, scope, intended population, and evidence base (Duffee et al., 2017).

Nurse-Family Partnership (NFP) is an evidence-based home visiting program shown to improve the health and development of first-time mothers and their children up to age two years who are experiencing socio-economic adversities (Eckenrode et al., 2010; Olds et al., 2014, 2019). The NFP program aims to improve pregnancy outcomes, child health and development, and families' economic self-sufficiency. NFP nurses provide education and support to first-time mothers early in their pregnancy, enrolling them prior to 28 weeks gestation. NFP nurses also address social and material conditions in the home to support women during pregnancy in the early care and parenting of their children, and in preparing for the future in terms of education, work, and family planning (Olds et al., 2013). They use strengths-based, trauma-informed approaches to tailor the NFP intervention, focusing on goal setting and motivational interviewing to meet families where they are. NFP nurses identify families' needs, refer them to community resources, such as for healthcare, housing, and food, and support mothers to build self-efficacy to achieve their goals.

NFP in Florida began implementation in Palm Beach County in 2008 and in Pinellas County in 2011. Since then, NFP has expanded to serve 7,616 families in 31 Florida counties. NFP in the United States (US) traditionally serves first-time mothers, other than within the context of tribal communities, enrolling them into the program early in their pregnancy (Olds et al., 2013). Most other perinatal and early childhood home visiting programs serve women irrespective of their parity. Given NFP's evidentiary standards, there is a responsibility to develop a version of the program to help pregnant women with previous live births who have limited resources. Therefore, from 2017 to 2020, NFP participated in a formative study in 32 sites across the nation aimed to adapt the program to serve multiparous women, including allowing women to enroll after 28 weeks gestation (Williams et al., 2022).

Based on the success of the formative study, the NFP National Service Office began the Expanded Eligibility Initiative (Initiative), which aims to increase access to evidence-based nurse home visiting for expanded populations. Beginning in January 2021, the Initiative expanded NFP in

Florida to women with previous live births (multiparous) and those after 28 weeks gestation in their pregnancy (late registrants), with 11 out of 13 NFP sites participating.

The NFP program in Florida offers a unique opportunity to study the process and impacts of expanding to multiparous women and late registrants for three major reasons. First, funding from the Child Abuse Prevention & Treatment Act allowed four Florida NFP programs to expand their nursing team to support individuals affected by substance use, mental health, and/or intimate partner violence, with the ability to enroll them after 28 weeks gestation. Second, Florida's robust maternal child health data system (through Department of Health and Department of Children and Families [DCF]) and legislatively required screening of all pregnant persons at their first prenatal visit for risks for poor health outcomes (the Healthy Start Prenatal Risk Screen) provide an existing data infrastructure available for program evaluation. Third, NFP at the national level collects a range of data as part of program implementation and ongoing quality improvement. The NFP National Service Office routinely examines process outcomes, including referral to enrollment conversion rates, client retention (or early attrition), average caseload, and nurse retention. At the same time, impact data are collected, including maternal health outcomes like mental health and substance use, birth outcomes like preterm birth and low birthweight, healthcare utilization measures, and referrals and use of government services. In community implementation, NFP has been proven to decrease preterm deliveries (Thorland & Currie, 2017), increase breastfeeding rates, and increase infant immunization rates (Thorland et al., 2017). For NFP programs funded by the federal Maternal, Infant, and Early Childhood Home Visiting program, awardees are required to submit annual and quarterly performance reports, including measures across the six benchmark areas of (1) maternal, newborn and child health; (2) child injury and maltreatment; (3) school readiness and child academic achievement; (4) crime or domestic violence; (5) family economic self-sufficiency; and (6) coordination and referrals for community services (Health Resources & Services Administration, 2022). Due to the broad goals of the NFP program, a rigorous process for selecting a subset of important outcomes to evaluate the Initiative in Florida was needed. The purpose of this study was to identify a list of process and impact outcomes to evaluate NFP for expanded populations in Florida.

Methods

Design

We employed a modified *e*-Delphi method with three rounds of data collection via online web surveys and two consensus discussion meetings via Zoom to prioritize key program implementation (process) and impact outcomes of NFP for expanded populations in Florida. Three rounds of data collection were determined based on literature review of best practices of the Delphi method. The Delphi method is a technique used to build consensus by systematically collecting and aggregating judgments from a group of experts through multiple iterations. This method maximizes the benefits of using an expert panel, while reserving anonymity (Dalkey, 1969); and is often used in nursing and health research, particularly in identifying clinical nursing research priorities (Keeney et al., 2011). This study did not require ethics review, as it is not required for non-human subjects research activities such as program evaluation.

Sampling/Participant Selection

We convened a diverse Advisory Committee (n = 10) starting in October 2020 (see Fig. 1 for full timeline of the Advisory Committee recruitment, engagement and *e*-Delphi method). This ongoing Advisory Committee provides recommendations and key information to the Evaluation team to ensure useful and credible findings. The Evaluation team consists of a pediatrician health services researcher serving as the Principal Investigator, a doctoral-trained maternal child health services researcher as Co-Investigator, a biostatistician, a data manager, a nurse project manager, and three masters-trained qualitative research assistants. There were no formal criteria for joining the Advisory Committee. We adopted a flexible approach to include individuals with experience in maternal child health (broadly) in the state

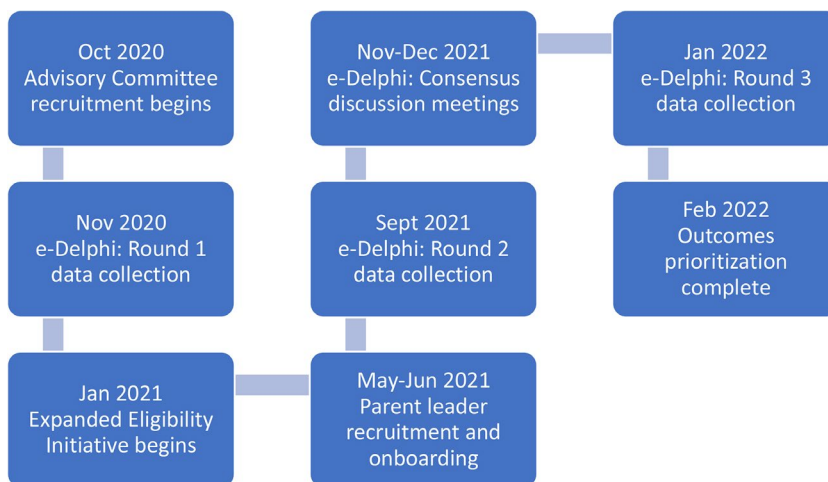
of Florida, home visiting, program evaluation, and to have a desire to participate in an advisory committee to inform research and policy. The Advisory Committee initially consisted of five individuals representing agencies invested in maternal and child health in Florida (Florida Department of Health, Florida DCF [child welfare], Florida Association for Healthy Start Coalitions, and two local academic institutions involved in state-level maternal child health initiatives); and two NFP staff who support Florida NFP programs. After the first round of data collection, the Committee recommended that parent voices be included moving forward; three individuals with lived experience (parent leaders), including two former NFP mothers and a father of young children in Florida, joined the Committee prior to the second round of data collection. See Fig. 2 for details on the Advisory Committee and Evaluation team membership.

Parent leaders received specialized onboarding on the Initiative as well as basic evaluation and research concepts, technology support as requested in the form of a tablet or webcam, and are compensated for their time through a monthly stipend, which also covers child care and internet data support. Committee members meet monthly via Zoom to provide input on defining outcomes of importance, identifying data sources that could be used to measure those shared outcomes, developing data use agreements, providing feedback on evaluation findings, and assisting with dissemination of findings.

Data Collection and Analysis

Three rounds of data were collected between November 2020 and January 2022. For the first round, all Advisory Committee members were invited to participate in an online open-ended questionnaire with qualitative assessment, the questionnaire was open for 2.5 weeks (via Qualtrics, Provo, UT, USA). They were asked five major questions related to (1) characteristics of families most important to reach with

Fig. 1 Timeline of advisory committee recruitment and *e*-Delphi method



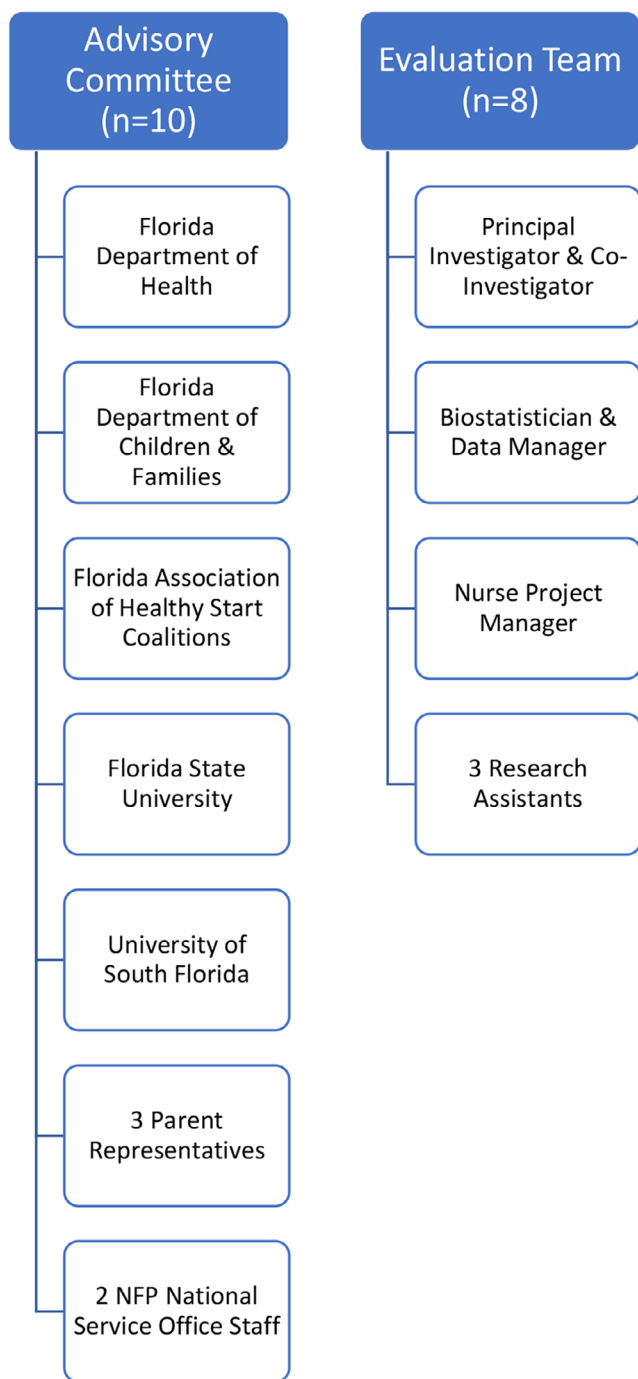


Fig. 2 Advisory committee and evaluation team membership

home visiting programs; (2) key measures of home visiting program implementation; (3) key measures of home visiting program impact; (4) new or non-traditional measures in home visiting program implementation or impact; and (5) potential data sources to measure home visiting program implementation and impact. These questions were generated based on literature review and initial discussions with the Advisory Committee. Once all the responses were

received, the Evaluation team reviewed Round 1 responses and organized the responses by theme for each question. The themes and related outcomes were shared and discussed with members via IdeaBoardz (See Fig. 3 for example). Additional outcomes were added to the list based on members' feedback.

For Round 2 of the process, all Evaluation Team and Advisory Committee members were invited to participate in an online close-ended questionnaire (again via Qualtrics). There were 18 process outcomes and 17 impact outcomes generated from Round 1. Members were asked to rank each outcome using a 5-point Likert scale (Strongly Disagree to Strongly Agree) for a range of criteria, including significance, innovation, relevance, and feasibility. Each criterion was defined as the following: significance referred to potential impact on home visiting practice, innovation referred to exploring of new scientific areas (i.e. is a new/novel outcome) and will create new knowledge, relevance referred to importance to the population served, and feasibility referred to potential to access or gather data in a timely manner with limited funding. Due to the complexity of the questionnaire, some members completed the survey independently during an Advisory Committee meeting.

Predetermined consensus thresholds were used (see Table 1); outcomes that met the inclusion thresholds were automatically included in the final list of outcomes. Outcomes that met the non-consensus threshold were brought forward to the consensus meeting for discussion, while those that met the exclusion consensus threshold were not brought forward for discussion.

Based on the defined threshold, each proposed outcome was discussed by the Advisory Committee over two consensus discussion meetings. A semi-structured agenda was provided to minimize time constraints, and to ensure that all individual participants were allowed a period of uninterrupted time to voice their opinions for each outcome discussed. Each proposed outcome was individually discussed by the group, thereby providing an opportunity for members to reconsider their initial ratings in light of other members' views. We utilized Google Jamboard to document members' perspectives (See Fig. 4 for sample boards).

For Round 3 of the process, following the consensus discussion meetings, all Evaluation Team and Advisory Committee members were invited to participate in an online close-ended questionnaire (again via Qualtrics). They were asked to rank each outcome using a 5-point Likert scale: Lowest Priority to Highest Priority. Again, due to the complexity of the questionnaire, many members completed the survey independently during an Advisory Committee meeting. Once all the questionnaires were received, the Evaluation team reviewed round 3 responses. Outcomes with >50% of respondents scoring as either High or Highest

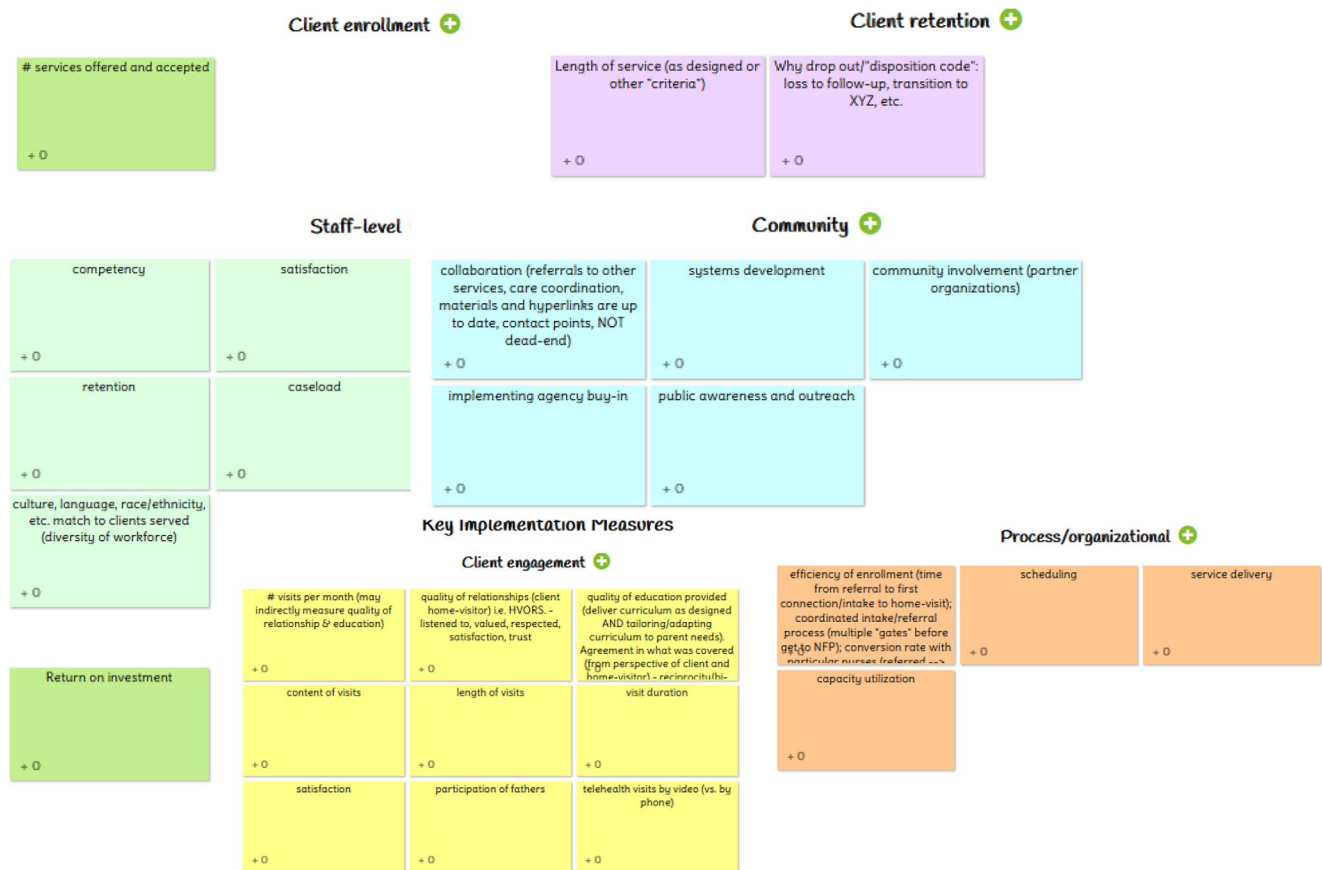


Fig. 3 Sample ideaBoardz documenting outcomes generation process

Table 1 Consensus threshold for round 2

Consensus thresholds	Definitions
Inclusion	> 75% of respondents provide a positive result (four or five) on the Likert scale for all criteria.
Non-consensus	50–75% of respondents provide a positive result (four or five) on the Likert scale for all criteria.
Exclusion	< 50% of respondents provide a positive result (four or five) on the Likert scale for all criteria.

Priority were included in the final list of process and impact outcomes to evaluate NFP for expanded populations in Florida.

Results

In the first round of data collection, the initial survey sought to generate major concepts for consideration as process and impact outcomes for the evaluation of NFP for expanded populations in Florida. Six out of seven Advisory Committee members responded to this first round of data collection and were categorized into themes for each question asked; the three parent leaders were not yet part of the Committee

when Round 1 was implemented (See Table 2). All seven professionals on the Committee participated in the discussion meeting. With regards to family characteristics, Advisory Committee members identified socio-demographics, chronic health, behavioral health, social services engagement, environmental factors, and other aspects of the families supported by home visiting services. In terms of key implementation measures (process outcomes), we identified the themes of: client enrollment, client engagement, client retention, staff-level measures, process/organizational-level measures, community-level measures, and other. In terms of key impact outcomes, we identified the themes of: maternal health, parenting/behaviors, other maternal outcomes, child outcomes, service utilization, systems functioning, and other. New and nontraditional measures included: client engagement, client impact, staff/organizational-level, and other. Finally, data sources were categorized as currently available, new or other.

Based on the Round 1 data collection and subsequent discussion meeting, Advisory Committee members were asked to rank 18 process outcomes and 17 impact outcomes in Round 2. Ranking was based on the criteria of significance, innovation, relevance and feasibility. Seven out of

Fig. 4 Sample jamboard documenting the consensus discussion process



Table 2 Themes identified by advisory committee members

Survey Question	Generated Themes
1. What are the characteristics of families that are most important to reach with home visiting programs such as NFP?	Socio-demographics Chronic health Behavioral health Social services Environmental Other
2. What are key measures of home visiting program implementation?	Client enrollment Client engagement Client retention Staff-level Process/organizational Community Other
3. What are key measures of home visiting program impact?	Maternal health Parenting/Behaviors Other Maternal Child Utilization Systems Functioning Other
4. What are new or non-traditional measures of home visiting program implementation or impact?	Client engagement Client impact Staff-level Other
5. What data sources might be used to measure program implementation and impact?	Currently available New Other

10 Advisory Committee members (3/3 parent leaders, 4/7 professionals) completed this second round of data collection, each with equal weight to meet the consensus threshold. Six members of the Evaluation team also completed the survey; their responses were averaged and included in this second round of outcomes prioritization as one response. Eight process outcomes and nine impact outcomes met the threshold for discussion. Two parent leaders attended both consensus meetings, while one parent leader attended only one. Three additional outcomes (quality of relationship with

nurse, connection to needed services, and social determinants of health) were requested by the Advisory Committee to be added for discussion. Despite not meeting the thresholds previously defined, the Evaluation team deferred to the desires of the Advisory Committee to include these outcomes for discussion. Table 3 lists all the outcomes brought forth for discussion.

After the two consensus discussion meetings, six out of 10 Advisory Committee members (2/3 parent leaders and 4/7 professionals) responded in Round 3 of the data collection, again each with equal weight to meet the consensus threshold. Five members of the Evaluation team also completed the survey; their responses were averaged and included as one response in this final ranking of outcomes. The Advisory Committee identified child maltreatment as the highest priority outcome, while process outcomes included program reach, client enrollment, and client engagement, and impact outcomes were identified as maternal physical health, maternal mental health and substance use, birth outcomes, and breastfeeding practices (see Table 4).

Discussion

The purpose of this study was to identify and select key maternal and child health outcomes to evaluate the impact of NFP for expanded populations in Florida. The program implementation (process) and client impact outcomes selected by the committee were appropriate for all NFP clients and particularly for multiparous and late registrant participants, the expanded populations served through the Initiative. We recruited and engaged a diverse group of local academic and community partners, government organizations, and family representatives to prioritize the outcomes

Table 3 Outcomes discussed in consensus meetings

Outcomes Discussed	Result	Definition	Data Availability
Program Implementation/Process Outcomes			
Program reach	Inclusion (5/8 responses)	Are we serving the clients we intend to serve who are eligible? Comparison of enrolled program clients to eligible population	Have partial access / accessible through data use agreement
Nurse self-efficacy	Inclusion (5/8 responses)	Nurse's belief in own capacity to deliver NFP effectively	Requires gathering of new data
Community Advisory Board characteristics	Inclusion (5/8 responses)	May include who participates, how it works, how often it meets	Requires gathering of new data
Collaboration with providers	Inclusion (5/8 responses)	How NFP works with other community programs or providers to address family needs	Requires gathering of new data
Screenings and assessments completed	Non-consensus (4/8 responses)	May include nurse conducted assessments for maternal depression, maternal anxiety, child development	Have access
Client enrollment	Non-consensus (4/8 responses)	Program is offered and accepted by person referred	Have access
Client satisfaction	Non-consensus (4/8 responses)	Satisfaction with participation in NFP program	Have access/ requires gathering of new data
Client engagement	Initially excluded (3/8 responses) Requested as additional outcome to discuss by all respondents	Parent participation, including visit duration, number of visits per period (prenatal, infancy, toddlerhood)	Have access
Quality of relationship with nurse	Initially excluded (3/8 responses) Requested as additional outcome to discuss by all respondents	From the perspectives of parents and nurse home visitors	Requires gathering of new data
Program Impact/Impact Outcomes			
Child maltreatment	Inclusion (6/8 responses)	May include childhood injury	Accessible through data use agreement
Maternal physical health	Inclusion (5/8 responses)	During and after pregnancy, many include chronic conditions (diabetes, hypertension, infections in pregnancy)	Requires gathering of new data
Maternal mental health and substance use	Inclusion (5/8 responses)	May include depression, anxiety, smoking	Requires gathering of new data
Maternal toxic stress	Inclusion (5/8 responses)	Stress that impacts mother's body and health, may include intimate partner violence	Requires gathering of new data
Maternal perceptions of health challenges	Non-consensus (4/8 responses)	What mothers feel is challenging for their physical and mental health	Requires gathering of new data
Breastfeeding practices	Non-consensus (4/8 responses)	Starting and continuing breastfeeding	Accessible through data use agreement
Caregiving practices	Non-consensus (4/8 responses)	Parenting knowledge, attitudes and parenting style	Requires gathering of new data
Birth outcomes	Non-consensus (4/8 responses)	May include low birthweight, prematurity	Requires gathering of new data / accessible through data use agreement
Economic self-sufficiency	Non-consensus (4/8 responses)	Parent's growth in capacities, economic stability	Requires gathering of new data
Connection to needed services	Initially excluded (3/8 responses) Requested as additional outcome to discuss by all respondents	For child and parent	Requires gathering of new data
Social determinants of health	Initially excluded (2/8 responses) Requested as additional outcome to discuss by all respondents	Education (job opportunities, income, language and literacy skills), health care access and quality, neighborhood and built environment (housing, transportation, access to nutrition foods/physical activity opportunities, polluted air and water), social and community context (racism, discrimination, violence, isolation, stigma)	Requires gathering of new data

Table 4 Final list of outcomes and proposed data sources

Final Outcomes	Result	Potential Operationalization	Proposed Data Source
Process Outcomes			
Program reach	Inclusion (7/7 responses) Average score = 4.03	Are we serving the clients we intend to serve who are eligible? Comparison of enrolled program clients to eligible population	Florida Healthy Start MomCare Network, Inc. Prenatal and Infant Risk Screen and Healthy Start Services Data
Client enrollment	Inclusion (6/7 responses) Average score = 4.00	Program is offered and accepted by person referred	Florida Healthy Start MomCare Network, Inc. Prenatal and Infant Risk Screen and Healthy Start Services Data, Nurse-Family Partnership Program Implementation Dataset
Client engagement	Inclusion (6/7 responses) Average score = 4.14	Parent participation, including visit duration, number of visits per period (prenatal, infancy, toddlerhood)	Nurse-Family Partnership Program Implementation Dataset
Impact Outcomes			
Child maltreatment	Inclusion from Round 2 of prioritization	Verified reports of child maltreatment, likelihood to remain in home or be placed in foster care, likelihood of achieving permanency through parental reunification	Florida Department of Children and Families Child Maltreatment Data
Maternal physical health	Inclusion (5/7 responses) Average score = 4.17	Chronic conditions (diabetes, hypertension, infections in pregnancy)	Florida Department of Health Birth Certificate Data
Maternal mental health and substance use	Inclusion (6/7 responses) Average score = 4.51	Mental health (depression, anxiety) Tobacco use, cigarette use, alcohol use	Florida Department of Health Birth Certificate Data
Birth outcomes	Inclusion (5/7 responses) Average score = 3.57	Low birthweight, prematurity (gestational age), abnormal conditions (i.e. admission to the Neonatal Intensive Care Unit)	Florida Department of Health Birth Certificate Data
Breastfeeding practices	Inclusion (4/7 responses) Average score = 3.66	Initiation of breastfeeding	Florida Department of Health Birth Certificate Data

to be included in a future evaluation of the Initiative in Florida and beyond.

First, participants identified *child maltreatment* as highest priority, along with four additional impact outcomes: *maternal physical health*, *maternal mental health and substance use*, *birth outcomes*, and *breastfeeding practices*. In the original NFP trials, the program produced positive effects on three of these outcomes: reduced child abuse/neglect (child maltreatment; Eckenrode et al., 2017), reduced pregnancy-induced hypertension (maternal physical health; Kitzman et al., 1997), and reduced smoking in pregnancy (maternal substance use; Olds et al., 2002). Evaluation of NFP implementation in the community has found positive effects for the other two outcomes: decreased preterm deliveries (birth outcomes; Thorland & Currie, 2017) and increased breastfeeding rates (Thorland et al., 2017). These outcomes have been explored in first-time mothers enrolled prior to 28 weeks, but not specifically among

late registrants or multiparous women. Further, these key outcomes for NFP and many other home visiting programs (Peacock et al., 2013; Sama-Miller et al., 2017) are particularly relevant for participants who may have had previous children or connect with NFP later in pregnancy for various reasons. For example, child welfare involvement, substance use, and mental health challenges are issues with high level of persistence and recurrence (Laslett et al., 2014); therefore, are appropriate outcomes to address for clients who may not have had access to NFP or other support services in previous pregnancies. Furthermore, women impacted by these issues may not have had timely access to healthcare or connection to NFP prior to 28 weeks (Ross et al., 2015; Stone, 2015). Child maltreatment, mental health, and substance use have lifelong impacts for the child and mother (English, 1998); therefore, including clients who enroll later in pregnancy with a focus on improving these high-risk outcomes is necessary.

Similarly, healthy birth outcomes continue to be important outcomes regardless of parity status and especially for Medicaid-insured women who experience high rates of preterm and low-birthweight births (Anum et al., 2010); while breastfeeding initiation and duration has long been known to benefit infants and their mothers and should continue to be evaluated (Binns et al., 2016). These outcomes could be even more important for clients who have not received the full duration of NFP services prenatally. As the therapeutic relationship between the NFP nurse and client may not be fully developed in pregnancy for late registrants, the program's effectiveness in addressing perinatal outcomes may not be as strong as for NFP clients who enroll early in pregnancy.

The next set of outcomes identified through the *e*-Delphi method to be of greatest importance and priority related to program implementation (process), including *program reach*, *client enrollment*, and *client engagement*. NFP's intended population is young mothers living with economic and/or psychosocial adversities (Olds et al., 2013). From an implementation science and program evaluation perspective, measuring program reach (number, proportion and representativeness of the intended population) is necessary to ensure that the processes required to achieved desired program results are being met. Other studies have pointed to the importance of client engagement (participation, including number and duration of completed visits) for ensuring that the supports affecting outcomes are received in sufficient dosage (Nix et al., 2018; Guastafarro et al., 2020; Merrell et al., 2021).

This study is novel in its engagement of parent representatives, by building inclusivity to arrive at a common consensus. Our goal was to build trust with parent representatives, through provision of tools to engage in the research design process, through specific training offered and inclusive facilitation practices, and offering appropriate compensation. Incorporation of participant/community voice in program design, implementation and evaluation is a core component of family-centered care (Kuo et al., 2012) and patient-centered outcomes research (Frank et al., 2014; Oldfield et al., 2019). Throughout the *e*-Delphi method, we aimed to build leadership where parents are integral decision-makers and equal partners on the Advisory Committee. Moving from involvement where parents are enrolled and participate in a program/service, parent leaders become change agents to impact decisions in our research and evaluation (Stark, 2020.)

The prioritization process in this study has informed ongoing work for our evaluation of the Initiative in Florida. For example, the overwhelming consensus to focus on child maltreatment as a primary outcome prompted the Evaluation team to begin conversations with DCF in the fall of

2021, to explore the ability to access individual-level child welfare data. As of fall 2022, we have a fully executed data sharing agreement with DCF to access child welfare reporting, investigation, and reunification data for this evaluation. Similarly, the Evaluation team hopes to engage with the state Medicaid Office over the next year to access physical health data for our ongoing evaluation.

This study also demonstrated that effective transdisciplinary engagement, collaboration, and decision-making is feasible in a remote environment. Advisory Committee and Evaluation team members remained consistently engaged over the 16 months of the project, coinciding with the COVID-19 pandemic, and reported feeling respected, connected, and enthusiastic about the project. Furthermore, as asserted by the National Center for Child Traumatic Stress (n.d.), there is no need to separate parent or community participants from professionals on advisory boards when all perspectives are equally valued. This study showed that diverse Advisory Committee participants can build and maintain strong relationships over time to effectively meet their goals despite geographic differences.

This study is not without limitations. Data were provided by a self-selected sample of organizational leaders and parent representatives on the Advisory Committee and the Evaluation team. Not all Advisory Committee members participated in all rounds of the *e*-Delphi method. Round one of data collection did not include the perspectives of laypersons with lived experience. However, we aimed to address this limitation by asking parent leaders if additional outcomes should be added in our discussion meetings. Advisory members meet regularly and may therefore influence one another's opinions, however data collection (surveys) were conducted independently. The Advisory Committee also lacked representation from other prominent state agencies, like the state Medicaid agency and the state Perinatal Quality Collaborative, as well as from local NFP teams; however, our NFP representatives who support local sites were able to provide perspectives from local NFP nurses participating in the Initiative, as well as offer updates to pending relevant state policy changes. While internet accessibility, challenges with technology, and inconvenience of entering data into computer-based data screens are known limitations to the *e*-Delphi method (Donohoe et al., 2013); we addressed these limitations by reimbursing parent leaders for their data usage, providing tablets to a parent leader to ensure they have reliable internet access, and walked through the surveys with respondents during virtual meetings to address any questions.

Conclusions for Practice

Identifying and selecting key process and impact outcomes using a community-engaged process is necessary to ensure equal buy-in from all partners and to inform rigorous program evaluation, especially in the context of evidence-based home visiting. Using methods such as e-Delphi is feasible and effective for achieving thoughtful and rigorous decision-making, even in times of uncertainty like the COVID-19 pandemic. Community-based programs should consider incorporating input from subject matter experts and from participant, patient, or client representatives serving as advisors in decision-making regarding all aspects of program planning and evaluation.

Acknowledgements Thanks are due to the Florida Advisory Committee for Evaluation of Expanded Populations for Nurse-Family Partnership, the nurse home visitors who work tirelessly to implement the program, their community partners, as well as the Nurse-Family Partnership National Service Office for supporting this research.

Author Contributions The authors confirm contribution to the paper as follows: study conception and design: VW and MA; data collection: VW and MA; analysis and interpretation of results: VW, JM, MR, and MA; draft manuscript preparation: VW, JM, MR, and MA. Author. All authors reviewed the results and approved the final version of the manuscript.

Funding This study was supported by funds from the Nurse-Family Partnership® (NFP) National Service Office. The funders had no role in the design of the study; collection, analysis, and interpretation of data; writing the manuscript; or the decision to submit the manuscript for publication.

Data Availability The data that support the findings of this study are available from the corresponding author, VW, upon reasonable request.

Declarations

Ethical Approval This study did not require ethics review under the Colorado Multiple Institutional Review Board as it is not required for non-human subjects research activities such as program evaluation.

Consent to Participate All participants consented to participate by means of completing the surveys for data collection and engagement in consensus discussion meetings.

Consent for Publication N/A.

Conflicts of interest All authors declare no competing or financial interests.

References

Anum, E. A., Retchin, S. M., & Strauss, I. I. I., J. F. (2010). Medicaid and preterm birth and low birth weight: The last two decades. *Journal of Women's Health, 19*(3), 443–451. <https://doi.org/10.1089/jwh.2009.1602>.

- Binns, C., Lee, M., & Low, W. Y. (2016). The long-term public health benefits of breastfeeding. *Asia Pacific Journal of Public Health, 28*(1), 7–14. <https://doi.org/10.1177/1010539515624964>.
- Dalkey, N. C. (1969). The Delphi method: An experimental study of group opinion. In N. C. Dalkey, D. L. Rourke, R. Lewis, & D. Snyder (Eds.), *Studies in the quality of life: Delphi and decision-making* (pp. 13–54). Lexington Books.
- Donohoe, H., Stelfox, M., & Tennant, B. (2013). Advantages and limitations of the e-Delphi technique. *Implications for Health Education Researchers, 43*(1), 38–46. <https://doi.org/10.1080/19325037.2012.10599216>.
- Duffee, J. H., Mendelsohn, A. L., Kuo, A. A., Legano, L. A., & Earls, M. F. (2017). Early childhood home visiting. *Pediatrics, 140*(3), e20172150. <https://doi.org/10.1542/peds.2017-2150>.
- Eckenrode, J., Campa, M., Luckey, D. W., Henderson, C. R., Cole, R., Kitzman, H., & Olds, D. (2010). Long-term effects of prenatal and infancy nurse home visitation on the life course of youths: 19-year follow-up of a randomized trial. *Archives of Pediatrics & Adolescent Medicine, 164*(1), 9–15. <https://doi.org/10.1001/archpediatrics.2009.240>.
- Eckenrode, J., Campa, M., Morris, P., Henderson, C. R. Jr., Bolger, K., Kitzman, H., & Olds, D. (2017). The prevention of child maltreatment through the Nurse Family Partnership program: Mediating effects in a long-term follow-up study. *Child Maltreatment, 22*(2), 92–99. <https://doi.org/10.1177/1077559516685185>.
- English, D. J. (1998). The extent and consequences of child maltreatment. *The Future of Children, 8*(1), 39–53.
- Frank, L., Basch, E., Selby, J. V., & Patient-Centered Outcomes Research Institute. (2014). The PCORI perspective on patient-centered outcomes research. *Journal of the American Medical Association, 312*(15), 1513–1514. <https://doi.org/10.1001/jama.2014.11100>.
- Guastafiero, K., Self-Brown, S., Shanley, J. R., Whitaker, D. J., & Lutzker, J. R. (2020). Engagement in home visiting: An overview of the problem and how a coalition of researchers worked to address this cross-model concern. *Journal of Child and Family Studies, 29*(1), 4–10. <https://doi.org/10.1007/s10826-018-1279-x>.
- Health Resources & Services Administration (2022). *MIECHV Data & Continuous Quality Improvement*<https://mchb.hrsa.gov/programs-impact/programs/home-visiting/miechv-data-continuous-quality-improvement>.
- Keeney, S., McKenna, H., & Hasson, F. (2011). *The Delphi technique in nursing and health research*. John Wiley & Sons. <https://doi.org/10.1002/9781444392029>.
- Kitzman, H., Olds, D. L., Henderson, C. R., Hanks, C., Cole, R., Tatelbaum, R., & Barnard, K. (1997). Effect of prenatal and infancy home visitation by nurses on pregnancy outcomes, childhood injuries, and repeated childbearing: A randomized controlled trial. *Journal of the American Medical Association, 278*(8), 644–652. <https://doi.org/10.1001/jama.1997.03550080054039>.
- Kuo, D. Z., Houtrow, A. J., Arango, P., Kuhlthau, K. A., Simmons, J. M., & Neff, J. M. (2012). Family-centered care: Current applications and future directions in pediatric health care. *Maternal and Child Health Journal, 16*(2), 297–305. <https://doi.org/10.1007/s10995-011-0751-7>.
- Laslett, A. M., Room, R., & Dietze, P. (2014). Substance misuse, mental health problems and recurrent child maltreatment. *Advances in Dual Diagnosis, 7*(1), 15–23.
- Merrell, M. A., Crouch, E., Browder, J., Workman, L., Wilson, M., Malbouf, A., & Silverman, A. (2021). Home visiting caregiver satisfaction and engagement in South Carolina. *Journal of Health Visiting, 9*(6), 253–259.
- National Center for Child Traumatic Stress. (n.d.) *A guide to forming advisory boards for family-serving organizations*<https://www.nctsn.org/sites/default/files/resources/>

- [resource-guide/a_guide_to_forming_advisory_boards_for_family_serving_organizations.pdf](#).
- Nix, R. L., Bierman, K. L., Motamedi, M., Heinrichs, B. S., & Gill, S. (2018). Parent engagement in a Head Start home visiting program predicts sustained growth in children's school readiness. *Early Childhood Research Quarterly*, *45*, 106–114. <https://doi.org/10.1016/j.ecresq.2018.06.006>.
- Oldfield, B. J., Harrison, M. A., Genao, I., Greene, A. T., Pappas, M. E., Glover, J. G., & Rosenthal, M. S. (2019). Patient, family, and community advisory councils in health care and research: A systematic review. *Journal of General Internal Medicine*, *34*(7), 1292–1303. <https://doi.org/10.1007/s11606-018-4565-9>.
- Olds, D. L., Robinson, J., O'Brien, R., Luckey, D. W., Pettitt, L. M., Henderson, C. R. Jr., & Talmi, A. (2002). Home visiting by paraprofessionals and by nurses: A randomized, controlled trial. *Pediatrics*, *110*(3), 486–496. <https://doi.org/10.1542/peds.110.3.486>.
- Olds, D., Donelan-McCall, N., O'Brien, R., MacMillan, H., Jack, S., Jenkins, T., & Beeber, L. (2013). Improving the nurse–family Partnership in community practice. *Pediatrics*, *132*(Supplement 2), S110–S117. <https://doi.org/10.1542/peds.2013-1021I>.
- Olds, D. L., Kitzman, H., Knudtson, M. D., Anson, E., Smith, J. A., & Cole, R. (2014). Effect of home visiting by nurses on maternal and child mortality: Results of a 2-decade follow-up of a randomized clinical trial. *JAMA Pediatrics*, *168*(9), 800–806. <https://doi.org/10.1001/jamapediatrics.2014.472>.
- Olds, D. L., Kitzman, H., Anson, E., Smith, J. A., Knudtson, M. D., Miller, T., & Conti, G. (2019). Prenatal and infancy nurse home visiting effects on mothers: 18-year follow-up of a randomized trial. *Pediatrics*, *144*(6), e20183889. <https://doi.org/10.1542/peds.2018-3889>.
- Paulsell, D., Del Grosso, P., & Supplee, L. (2014). Supporting replication and scale-up of evidence-based home visiting programs: Assessing the implementation knowledge base. *American Journal of Public Health*, *104*(9), 1624–1632. <https://doi.org/10.2105/AJPH.2014.301962>.
- Peacock, S., Konrad, S., Watson, E., Nickel, D., & Muhajarine, N. (2013). Effectiveness of home visiting programs on child outcomes: A systematic review. *Bmc Public Health*, *13*(1), 1–14. <https://doi.org/10.1186/1471-2458-13-17>.
- Ross, L. E., Vigod, S., Wishart, J., Waese, M., Spence, J. D., Oliver, J., & Shields, R. (2015). Barriers and facilitators to primary care for people with mental health and/or substance use issues: A qualitative study. *BMC Family Practice*, *16*(1), 1–13. <https://doi.org/10.1186/s12875-015-0353-3>.
- Sama-Miller, E., Akers, L., Mraz-Esposito, A., Coughlin, R., & Zukiewicz, M. (2017). *Home visiting evidence of effectiveness review: Executive summary*. Mathematica Policy Research.
- Shonkoff, J. P., Garner, A. S., Siegel, B. S., Dobbins, M. I., Earls, M. F., & Wood, D. L. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, *129*(1), e232–e246.
- Stark, D. R. (2020). *Stepping up and speaking out: The evolution of parent leadership in Michigan*. Early Childhood Investment Corporation and Michigan Home Visiting Initiative.
- Stone, R. (2015). Pregnant women and substance use: Fear, stigma, and barriers to care. *Health & Justice*, *3*(1), 1–15.
- Thorland, W., & Currie, D. W. (2017). Status of birth outcomes in clients of the nurse–family Partnership. *Maternal and Child Health Journal*, *21*(5), 995–1001. <https://doi.org/10.1007/s10995-017-2267-2>.
- Thorland, W., Currie, D., Wiegand, E. R., Walsh, J., & Mader, N. (2017). Status of breastfeeding and child immunization outcomes in clients of the nurse–family Partnership. *Maternal and Child Health Journal*, *21*(3), 439–445. <https://doi.org/10.1007/s10995-016-2231-6>.
- Williams, V. N., McManus, B. M., Brooks-Russell, A., Yost, E., Allison, M. A., Olds, D. L., & Tung, G. J. (2022). A qualitative study of effective collaboration among nurse home visitors, healthcare providers and community support services in the United States. *Health & Social Care in the Community*, *30*(5), 1881–1893. <https://doi.org/10.1111/hsc.13567>.

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