METHODOLOGY





Lisa A. Juckett^{1*}, Kimberly P. Bernard², Melissa A. Clark², Emily A. Gadbois², Bernadette Wright³ and Kali S. Thomas⁴

Abstract

Background The rapid growth of the aging population underscores the need for programs tailored to older adults' complex health needs. Home-delivered meal programs are critical, providing nutrition and socialization support to older adults with greatest economic and social need. However, variations in local implementation complicate our understanding of how specific program practices influence older adult outcomes. This present study applies the core functions and forms framework to identify and prioritize essential home-delivered meal practices—or forms—that can be replicated by other meal programs.

Methods This study was conducted within a pragmatic randomized effectiveness trial comparing two homedelivered meal models and their impacts on health outcomes among older adults. The study involved nine meal programs across the United States and used a three-phase approach characterized by the following: (1) core functions of home-delivered meal programs were identified based on Title III of the Older Americans Act; (2) the full spectrum of program "forms" was gathered through site visits, surveys, and listening sessions; and (3) a modified e-Delphi process was conducted with stakeholders to determine consensus on the most essential forms of home-delivered meal programming.

Results Three core functions were identified from Title III of the Older Americans Act: provide meals to reduce hunger and malnutrition, provide opportunities for socialization, and provide opportunities to promote health and wellbeing. Out of 103 identified program forms, 25 were deemed essential for achieving the core functions of home-delivered meal programs. Essential practices included dietary customization, emergency meal provision, and meaningful client-driver interactions, as examples.

Discussion This study demonstrates that while program variability allows flexibility to meet local client needs, establishing core functions and essential forms provides a foundation for evaluating home-delivered meal program effectiveness. The findings inform home-delivered meal program improvements at the national level, emphasizing a balance between standardized practices and local adaptations. This work serves as a model for characterizing complex interventions in community-based settings, advancing the science of implementation and the impact of home-delivered meals on older adult populations.

Trial registration NCT registration: NCT05357261; April 27, 2022.

*Correspondence: Lisa A. Juckett lisa.juckett@osumc.edu Full list of author information is available at the end of the article



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Keywords Adaptation science, Program implementation, Gerontology and geriatrics, Community-based nutrition services

Contributions to the Literature

- Establishes the core functions (i.e., provide meals to reduce hunger, malnutrition, and food insecurity; provide opportunities for socialization; provide opportunities to promote health and well-being) and prevailing forms for effective home-delivered meal programming provided to older adults
- Uses a stakeholder-engaged e-Delphi methodology and leverages practical input and perspectives to identify the most essential forms of complex health interventions, such as home-delivered meals
- Offers actionable guidance for customizing services to diverse client needs, such as social isolation screening, tailoring of meals, and optimizing driver-client interactions to support high-quality services for older adults

Introduction

With the rapid growth of the aging population, the need for programs tailored to the complex health characteristics of older adults is growing as well [1, 2]. An overwhelming proportion of older adults prefer to age in their own homes and communities [3], underscoring the importance of home- and community-based services for individuals at greatest risk of functional impairment and disability [4, 5]. Home-delivered meal programs are a prime example of one such service and provide health and nutritional support to vulnerable older adults, many of whom are food insecure and highly susceptible to health decline and institutionalization [6]. These programs are funded by a variety of sources, the largest being the Older Americans Act (OAA) Title III, which accounts for over 35% of program funding [7].

The documented benefits of home-delivered meal programs are vast and include increased food access [8], decreased feelings of loneliness [9], reduced healthcare expenditures [10], and improved dietary intake [11]. However, there is also evidence to suggest that, despite the delivery of meals to older adults' homes and the frequent interaction with drivers, clients still experience difficulties meeting their recommended dietary needs [12, 13] and engaging in social activities [6], placing their overall health and well-being in jeopardy. One plausible explanation for these differences in findings may be attributed to the heterogeneity in how programs are implemented by local home-delivered meal providers – a network of nearly 4,000 agencies across the United States [14]. While government entities (e.g., State Units on Aging) help regulate OAA-authorized meal programs, local providers have considerable flexibility in how they tailor programming to best fit their own contextual needs (e.g., skills of personnel, availability of drivers) and the needs of their clients [15]. As examples, local homedelivered meal providers may choose to administer specific screening tools (e.g. Malnutrition Screening Tool [16], as a supplement to their standard in-take evaluations, to further quantify clients' risk of malnutrition [17]; others may provide medically tailored meals to eligible clients [18]; and some programs may offer expanded meal options to accommodate clients' unique dietary requirements or restrictions [19]. None of these example practices are formally mandated but represent the wide variation in how local home-delivered meal providers design and implement their routine programming.

Given the multifaceted health characteristics of meal clients, heterogeneity in home-delivered meal programming should be expected. Thus, the ability for providers to tailor services in response to individual client needs may be perceived as a unique strength of these local meal programs. However, such extensive variability in programming potentially undermines our ability to clearly articulate why home-delivered meal programs are effective and for whom [20-22]. Tailored programming represents providers' strong commitment to clientcentered care, but rarely are the components of these customized programs systematically tracked, measured, and disseminated to home-delivered meal constituencies, including clients, providers, and policymakers [23]. This lack of program transparency diminishes our ability to understand which home-delivered meal practices are most essential for helping improve meal client outcomes. Without clarity in understanding what specific practices lead to meal program effectiveness, we subject programs to potential federal-level budget cuts that would have a devastating impact on older adults in greatest need of services to help them continue living safely at home. To avoid this pitfall and advance our knowledge on how home-delivered meals are implemented nationwide, we leveraged the core functions and forms framework [21, 24] and developed a novel approach to identify the key "forms" of meal programs. Below, we explain the core functions and forms framework and our methods for elucidating program variability in one large, pragmatic randomized controlled trial.

The core functions and forms of home-delivered meal programs

The terms "core functions" and "forms" are drawn from the evidence base on complex health interventions – or interventions that have multiple interacting components, target a range of outcomes, and require flexibility in how they are implemented [23, 24]. Broadly defined, core functions are the main purposes or elements of an intervention that produce its intended outcomes. Core functions are typically derived from existing theories, empirical evidence, and/or policy-related mandates, and, if implemented successfully, should result in the intervention being effective. In other words, if core functions are followed, the intervention *should* work. Notably, absence of one or more core functions can compromise the integrity of the intervention and jeopardize its overall effectiveness [21]. Distinct from core functions are the intervention's forms, which are the specific activities or practices that allow for core functions to be carried out. Forms are customized, often in an ongoing and iterative manner, in response to the contextual needs of an agency, workforce, or client population. Changes in forms should not threaten intervention integrity but, arguably, enhance its local effectiveness and implementation success [20, 22].

Though the evidence base on core functions and form is steadily growing [25-27] there is an ongoing need to further build this body of literature and provide methodological guidance for how teams can systematically specify core functions and their prevailing forms. Specific to home-delivered meals, establishing the different forms of programming serves as a necessary first step in understanding how explicit program practices and activities influence client outcomes. For the present study, we expand upon the recommendations proposed by Perez-Jolles et al. [21] to (a) articulate the core functions of federally-funded home-delivered meal programs, (b) deploy a two-phased approach to identify the various forms of meal programming across the U.S., and (c) use iterative stakeholder feedback to establish consensus on the most essential forms to be implemented by home-delivered meal providers.

Methods

Study context

The present study was conducted in the context of a pragmatic randomized effectiveness trial (the *Deliver-EE* trial) evaluating the effects of two different models of homedelivered meals on the healthcare utilization, healthrelated quality of life, food insecurity, loneliness, and dietary intake of vulnerable older adults in the community. The study compared two models of home-delivered meals currently used in practice: (1) daily-delivered, ready-to-eat meals or (2) bi-weekly delivered, frozen meals. Participants who received daily-delivered, readyto-eat meals also had opportunities to socially interact with their meal delivery driver who could report any client concerns back to local home-delivered meal program staff. Participants who received bi-weekly delivered frozen meals had their meals bulk-shipped from an outside vendor (i.e., not from their local meal program) and delivered via postal service to their home. Participants were drawn from waiting lists at nine home-delivered meal program partners who were members of Meals on Wheels America (MOWA) and were randomized into one of our two delivery models. Given that local homedelivered meal programs were responsible for coordinating daily-delivered meal services, we anticipated there would be greater variability in meal delivery "forms" compared to the bi-weekly delivered meal services. Thus, the core function and form activities below pertain only to daily-delivered meal programming.

Meal program partners

The study started with six program partners in May 2022 and three more sites were later added to expedite recruitment. To qualify as a recruitment site, the program was required to have an active waitlist for meal services and their service daily-delivered meal model needed to align with the clinical trial intervention protocol [28]. These programs were located in Florida, California, Illinois, Texas, North Carolina, and South Carolina and served meals to 600–4500 older adults each week.

Phase 1: Identifying core functions *Overview*

We first sought to identify the core functions of homedelivered meal programs, as defined by Title III of the Older Americans' Act (OAA). Title III of the OAA is the largest federal funding source for the delivery of nutrition services for older adults, age 60 years and older, in the U.S. Given that our nine meal program partners provided meals following OAA requirements, we chose to use OAA legislation to guide our identification of the core functions of home-delivered meal programs.

Data sources

We accessed the online compilation of the OAA that was electronically available in the public domain. While the full OAA legislative document covers all social and nutrition services for older adults and their caregivers, we drew information only from OAA, Title-III C, Section 330 [29]. This section defined the overall purposes of OAA-authorized nutrition services, including home-delivered meals, and these defined purposes were used to establish our core functions.

Analysis

Three members of the study team independently reviewed the overall purposes of OAA-authorized nutrition services and met to review core functions. Once core functions were defined, the team confirmed these definitions with a dietetic expert that had extensive familiarity with home-delivered meal programming. Core functions were then presented and confirmed with partner programs during one, virtual meeting in Spring 2024.

Phase 2: Identifying forms

Overview

After establishing the core functions of meal programs outlined in Title III of the Older Americans Act, we systematically collected and synthesized data from three sources to comprehensively identify the full spectrum of programming forms: 1) in-person site visits with our clinical trial partner programs, 2) results from the most recent Meals on Wheels America Member Survey, and 3) one virtual listening session conducted with our partner program staff members.

Data source 1: Meal program site visits

Our team conducted in-person site visits with six of our partner programs-two in Florida, two in Texas, one in South Carolina, and one in California - between March 2023 - November 2023. Site visits were two days in length and provided opportunities for our study team to assess the contextual factors influencing home-delivered meal services, meet with program leaders and staff, and tour local facilities (e.g., meal kitchens and packaging stations). To examine these factors, we held one-on-one interviews with program staff, collected documents (e.g., printed menus, nutrition education handouts for clients), and completed real-time observations of driver-client interactions during meal delivery "ride-alongs." Field notes from interviews and ride-alongs were documented in the custom Site Visit Guide, developed specifically for this project, and later used for analysis.

Data source 2: Meals on Wheels America Member Survey

In partnership with MOWA leadership, we obtained the survey instrument and results report of the 2021 MOWA Practices and Perspectives Survey – a 59-item questionnaire that included questions about older adults' unmet needs; meal programs' capacity to serve their clients; types of home-delivered meal services provided; safety, socialization and community connections services; meal program infrastructure and data; and programs' financial fitness and funding sources. A total of 503 home-delivered meal programs completed the survey. Survey items that described the different practices (that is, the "forms") meal programs implemented with their clients were retained for our analysis.

Date source 3: Virtual listening session

In addition to the data collected on site visits and the MOWA survey, we also held one 60-min listening session with our partner programs in May 2024 to further elucidate the forms of home-delivered meal programming. All listening session attendees were provided with a brief overview of each individual core function and were invited to then share specific examples of how core functions were implemented with their clients. Using shared, online documents that were viewable to all attendees, one member of the study team recorded these specific examples in real-time, allowing program partners to react to programming examples if warranted. Meeting minutes from this listening session were documented by the study's project director to capture the forms described by our partner programs members.

Analysis

Site visit field notes and artifacts, MOWA survey responses, and virtual listening session minutes were compiled in preparation for analysis. The lead author completed an initial review of all data sources and then unitized segments [30] of text that represented different forms implemented by programs. Once segments of text from all data sources had been unitized, the lead author used a deductive coding approach to categorize each form into one of the core functions identified in Phase 1 of our analysis. Once categorized, two additional study team members reviewed the data sources to ensure that forms had been sufficiently identified and coded. Our confirmed analysis yielded a comprehensive list of forms our partner programs implemented to achieve the core functions of home-delivered meal programming.

Phase 3: Establishing the most essential forms *Overview*

From our confirmed list of forms identified in Phase 2, our final phase sought to determine which were considered the "most essential" forms of meal programming. To do this, we used a modified e-Delphi approach, described below, to establish consensus on the essential forms as perceived by home-delivered meal expert stakeholders.

Modified e-Delphi approach

A modified e-Delphi methodology was most appropriate to establish our set of essential forms given that it is a widely used approach to garner expert consensus on complex problems, allows participants to provide anonymous opinions, and serves as an efficient method for geographically diverse samples of experts to contribute their perspectives through electronically distributed surveys [31]. Our "modified" approach is a variation of the standard Delphi methodology in that we used a combination of data sources to generate our initial survey items, and our study team selected the cut-off criteria to determine consensus [32].

Expert panel

To begin our Delphi approach, expert panel members were recruited from the following three groups: 1) members of the Deliver-EE Lived Experience Perspective Stakeholder Advisory Panel (n = 14), 2) members of the Deliver-EE Systems' Perspective Stakeholder Advisory Panel (n = 12), and 3) staff from Deliver-EE's nine home-delivered meal partner programs (n = 30). The Lived Experience Perspective stakeholders consisted of meal clients, family members of meal clients, and Meals on Wheels drivers from our partner programs. Systems Perspective stakeholders were those who had expertise in home delivered meal programming, gerontology, public health, community-based organizations, and healthcare policy. Lastly, expert panel members recruited from partner programs included program administrators, managers, program coordinators, and client assessors.

Development of Delphi survey

The list of forms from Phase 2 were transformed into a Qualtrics survey [33] that was to be administered to our Delphi panel. Forms were grouped in the survey according to their core function, and respondents were invited to rate each form on a scale from 1-9 (1 = Not at all essential for achieving the core function; 9 = Very essential for achieving the core function). A draft version of our survey was piloted by two home-delivered meal program staff not affiliated with the Deliver-EE study as well as by the Senior Director of Research and Data Analytics from Meals on Wheels America. Those who piloted the survey provided their constructive feedback via email to the lead author who then incorporated revisions (e.g., phrasing of instructions; formatting of response options) to the final version of the survey before it was distributed to our expert panel.

Modified e-Delphi Round 1

In June 2024, our study team introduced the purpose of our Delphi panel to all Stakeholder Advisory Panel members and explained how our Delphi items (e.g., forms) were generated. We then invited all members to complete the electronic Delphi survey within one week of it being distributed. As part of the first survey round, experts were asked to report their role on the Deliver-EE project, the organization they represented and its geographical location, and the number of years they had been familiar with home delivered meal programming. In addition to ranking all forms, panelists were also invited to write-in additional, unique practices that were *not* listed in the survey but were perceived to be essential to meeting the core functions of home-delivered meal programming.

Consistent with Delphi panel recommendations [34, 35], the first round of our e-Delphi panel was used to determine whether our panelists reached consensus on identifying the "essentiality" of forms while later rounds were used to assess consensus of forms *and* the variability of responses (i.e., assessing interquartile ranges). Prior to reviewing panelist responses, three members of our team made a priori determinations on consensus cut-off criteria and established that a practice was "essential" if at least 75% of panelists ranked it with scores of 7, 8, or 9 [36–38]. We also reviewed any forms that were submitted as write-in responses, and any unique practices were added to our second Delphi round.

Modified e-Delphi Round 2

Forms that were deemed as essential in Round 1 were then rated again by our expert panelists in August 2024. For this round, however, we only invited staff from our partner programs to complete the survey as we were interested in identifying forms that were perceived as essential by those individuals who were most accustomed to providing meal services directly to home-delivered meal clients. We used the same rating and cut-off criteria as used in Round 1 and also assessed variability in responses by calculating the interquartile ranges (IQRs) for each item. Items that reached 75% consensus and had IQRs between 0-2 were deemed to have both strong consensus and low-moderate response variability [39]. These items were retained as our final list of essential forms for implementing the core functions of home-delivered meal programming.

Results

Phase 1: Identifying core functions

Analysis of OAA legislative documents yielded three core functions of home-delivered meal programs provided to older adults: 1) provide meals to reduce hunger, food insecurity, and malnutrition; 2) provide opportunities for socialization; and 3) provide opportunities to promote health and well-being. We used these three core functions to guide the categorization of home-delivered meal forms in Phase 2 and the structure of our e-Delphi survey in Phase 3.

Phase 2: Identifying forms

We identified 103 different forms implemented by homedelivered meal programs, categorized into our three core functions. For "Provide meals to reduce hunger, food insecurity, and malnutrition," we identified 41 forms; the core function of "provide opportunities for socialization" yielded 21 forms; and 41 forms were implemented for "provide opportunities to promote health and wellbeing." A full list of all 103 forms is presented in Supplementary File 1.

Phase 3: Establishing the most essential forms Modified e-Delphi panel – Round 1

A total of 24 experts completed the first round of our e-Delphi survey. Thirteen of these experts were staff from our partner programs, six were from the Lived Experiences Panel, and five were from the Systems' Perspective Panel (Table 1). Of the 103 forms ranked by our expert panelists, 32 forms met the criteria for being "essential" based on our definition of consensus and advanced to our next e-Delphi round. Notably, of the 19 write-in responses provided by our panel, none were unique and were therefore removed from additional analyses.

Modified e-Delphi panel – Round 2

Thirteen staff members from our partner programs who participated in our first e-Delphi round completed our second e-Delphi survey and rated the 32 home-delivered meal forms identified in Round 1. Of these forms, 25 met the 75% consensus criteria and had IQRs between 0–2. Table 2 presents each of these practices and their corresponding core functions.

Discussion

While variability in home-delivered meal programming allows meal providers to cater to the diverse needs of their clients and local community, this flexibility also complicates the ability to pinpoint specific program elements that drive positive outcomes. To elucidate this variability, we developed an innovative, multi-method approach to characterize the core functions and forms of home-delivered meal programming. By applying this approach and expanding the methods of others [20, 21], we identified the three core functions of programming and the 25 forms deemed most essential, as perceived by stakeholders involved in our study. Forms such as dietary customization, emergency meal provision, and meaningful communication between drivers and older adults were consistently rated as essential, emphasizing that tailored meal provision and direct engagement with meal clients are central to program effectiveness.

Table 1 Characteristics of e-Delphi panelists: Round 1

	Ν	%
Stakeholder panel		
Program panel	13	54.2%
Lived experiences panel	6	25.0%
Systems perspective panel	5	20.8%
Age		
70 +	2	8.3%
60–69	6	25.0%
50–59	2	8.3%
40–49	5	20.8%
30–39	4	16.6%
18–29	2	8.3%
Prefer not to answer	3	12.5%
Gender		
Woman	15	62.5%
Man	6	25.0%
Prefer not to answer	3	12.5%
Race		
White	14	58.3%
Black or African American	4	16.7%
Asian	3	12.5%
Prefer not to answer	3	12.5%
Ethnicity		
Not Hispanic/Latino/Latina	20	83.3%
Hispanic/Latino/Latina/Latinx	1	4.2%
Prefer not to answer	3	12.5%
Years familiar with home-delivered m	neal programming	
1–5 years	8	33.3%
6–10 years	5	20.8%
11–15 years	4	16.7%
16–20 years	2	8.3%
21 years or more	3	12.5%
Prefer not to answer	2	8.3%

N = 24

This finding aligns with previous studies that highlight the dual importance of nutritional and social support for older adults, particularly those who are homebound and at higher risk of isolation and malnutrition [9, 40].

Our results also suggest that more standardized forms, such as using formal tools for driver-client communication, training staff to respond to changes in clients' health or behaviors, and establishing collaborations with local healthcare providers, contribute to effective home-delivered meal programming. The consensus around these forms indicates a shared understanding among our stakeholders that, while meal programs may vary locally, there are foundational practices that, if implemented universally, could enhance meal program outcomes.

Table 2 Essential forms (n = 25) of home-delivered meal programming

Item	% agreement	IQR
Provide meals to reduce hunger, food insecurity, and malnutrition		
Employ or contract with a registered dietitian nutritionist or certified nutrition professional who can help create monthly menus	100	0.5
Provide meals on special holidays or occasions	100	1
Provide clients with an updated meal menu (printed or electronic)	90.9	2
Offer meals that align with clients' medical needs (e.g., diabetes, renal conditions)	90.9	1.5
Provide 5 or more meals per week to all clients who want and need them	90.9	1
Offer emergency meals or storm packs	90.9	1
Offer supplemental shelf-stable meals for when daily meals cannot be provided	81.8	2
Ask questions that screen clients for malnutrition	81.8	1.5
Provide weekend meals	81.8	1
Provide opportunities to promote socialization		
Have driver make purposeful, face-to-face conversation with clients during meal delivery	90.9	1
Ask questions that screen clients for social isolation or loneliness	81.8	2
Provide opportunities to promote health and well-being		
Use formal tools (e.g., MobileMeals app) so drivers can communicate with agency	100	0
Have staff contact Adult Protective Services if driver reports major safety concern	100	0
Train drivers to recognize and respond to elder abuse	100	0
Train volunteers when it is necessary to call 911 for client concerns vs calling the agency	100	0
Train drivers how to communicate client health concerns back to the agency	100	0
Conduct client satisfaction surveys	100	1
Partner with hospitals to connect clients with nutrition services post-discharge	90.9	2
Refer clients to the local Area Agency on Aging to help coordinate other services (e.g., legal assistance)	90.9	2
Partner with local churches and youth organizations who can deliver meals	90.9	1.5
Recommend clients contact their primary care provider with health concerns	90.9	1
Have a formal process for agency to address driver concerns (e.g., documentation in ServTracker)	90.9	0
Ask questions that screen clients for health and wellness concerns	81.8	2
Have staff contact emergency medical services for major medical concerns discovered at time of delivery	81.8	2
Have drivers complete a standard"change of condition"tool for clients	81.8	2

IQR interquartile range

This study makes meaningful contributions to the evidence base in both implementation science and homedelivered meal programming for several reasons. First, it presents a structured, three-phase methodology that incorporates the collection and analysis of multiple data sources to define the core functions and operational forms of a complex health intervention. This approach may provide a valuable framework for other research teams aiming to delineate their interventions, identify a comprehensive range of intervention forms, and assess which forms yield improved health outcomes. Second, while researchers have typically drawn from theoretical and empirical evidence to identify the core functions also known as core components, key elements, or active ingredients [22, 23, 41] - of complex interventions, our methodological approach uniquely included the iterative involvement of stakeholders to define intervention forms. Specifically, our methods engaged frontline home-delivered meal providers who have an extensive understanding as to *how* and *why* meal services are adapted to meet the needs of their local clients. This stakeholder-engaged methodology offers a replicable model for other research teams focused on understanding how interventions are customized to fit client or contextual needs as part of routine community practice. Finally, our modified e-Delphi panel yielded critical insights into the forms deemed essential for standard home-delivered meal programs. While one strength of meal programming is its flexibility to be tailored at the local level, there are still opportunities to better meet the increasingly diverse needs of home-delivered meal clients. The latest strategic plan by Meals on Wheels America [42] highlights initiatives to support programs in delivering high-quality, personalized services that align with clients' service preferences and nutritional needs. Findings from our e-Delphi panel indicate that much of this support should emphasize tailoring meals to health needs, screening for social isolation risks, and training drivers to observe and report on clients' health status. Thus, while the findings of our e-Delphi panel directly inform our parent clinical trial (i.e., the Deliver-EE trial), they also have broader, national implications for home-delivered meal programming across the United States.

Though this study makes several unique contributions to the core functions and forms literature and the evidence for home-delivered meals, it is not without limitations. While we aimed to capture a comprehensive set of forms, the program partners for this study were limited to those were affiliated with the Deliver-EE project, which may not fully represent the broader spectrum of home-delivered meal providers nationwide, particularly providers who do not maintain active waitlists or who are not members of the Meals on Wheels America Network. Relatedly, the program partners who participated in our modified e-Delphi panel represent leaders in the field given their willingness to engage in a clinical trial; therefore, their e-Delphi survey rankings may differ from their peers. Moreover, our e-Delphi rankings may have been subject to historical effects, suggesting that the forms rated as "most essential" presently may not hold the same perceived essentiality over time with the changing needs of the aging populations. Lastly, the core functions of meal programs were based on Older Americans Act legislation, which, while foundational, may not encompass the current health, cultural, social, and economical profiles of vulnerable older adults.

Conclusion

Our study contributes to a growing understanding of what makes home-delivered meal programs effective and provides an evidence-based foundation for replicating "forms" that maximize impact. Further efforts to track, measure, and disseminate these forms will be critical for ensuring that home-delivered meal programs remain responsive to the complex nutritional, social, and health needs of older adults in the community.

Abbreviations

MOWA Meals on Wheels America OAA Older Americans Act

Supplementary Information

The online version contains supplementary material available at https://doi. org/10.1186/s43058-025-00728-7.

Supplementary Material 1. List of all items (n = 103) rated in e-Delphi round 1.

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Authors' contributions

LAJ conceptualized the present study and was responsible for leading study activities; KPB led site visit activities, coordinated communication with all home-delivered meal programs, and assisted with data collection and analysis; MAC provided guidance on e-Delphi methodology and survey development; EAG assisted with site visit data collection and analysis; BW refined survey items and assisted with survey methodology; KST led the parent pragmatic trial (Deliver-EE), co-conceptualized the present study activities, and assisted with data collection and analysis. All authors read, revised, and approved the manuscript's final version.

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Data availability

Modified e-Delphi panel data are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

Brown University ceded regulatory oversight of the study to Advarra, Inc., an independent Institutional Review Board (IRB). This study was approved by the Advarra IRB as a minimal risk study.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Author details

¹School of Health and Rehabilitation Sciences, Division of Occupational Therapy, The Ohio State University, 453 West 10 th Avenue, Columbus, OH 43210, USA. ²School of Public Health, Brown University, Providence, RI, USA. ³Meals on Wheels America, Arlington, VA, USA. ⁴School of Nursing, Johns Hopkins University, Baltimore, MD, USA.

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