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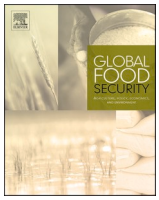
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# Recommendations for action on food insecurity in high-income countries for preconception, pregnancy and early childhood: a modified Delphi study

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ABSTRACT

*Background:* Preventing food insecurity during preconception, pregnancy, and early childhood can improve long-term health and wellbeing for women and children. This study aimed to identify research, policy, and delivery priority actions to prevent and mitigate food insecurity across these life-course stages.
*Methods:* A modified Delphi process was used to solicit and rank expert views on priority actions across research, practice, policy, and voluntary, community, faith and social enterprise (VCFSE) sectors. Four rounds of consultation were conducted (September 2024 - September 2025). Recommendations were considered priorities if $\geq$ 75% of respondents rated them as such. In Rounds 1 and 2, recommendations were grouped thematically and rated for importance. Top-rated recommendations were then ranked in Rounds 3 and 4.
*Results:* Between 30 and 53 participants from 5 to 12 high-income countries responded to each round. Round 1 generated 16-30 recommendations per sector, which were distilled into 10 research, 9 practice, 13 policy, and 9 VCFSE recommendations that met the agreement threshold following Round 2. No recommendations reached this threshold in the ranking rounds. Top-ranked recommendations included: generating food insecurity prevalence data (research; 66%), ensuring universal access to prenatal, infant-feeding and breastfeeding support (practice; 67%), improving access to nutritional and financial safety nets (policy; 68%), and tailored, nutritious temporary food relief (VCFSE; 68%).

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*Conclusion:* This study synthesised expert views into a set of recommendations to address food insecurity during critical life-course stages. The findings underscore that food insecurity is shaped by intersecting social, economic and policy factors, and therefore requires coordinated, cross-sectoral action across a range of priorities.

## 1. Introduction

Women globally disproportionately experience food insecurity (FI; defined as inadequate access to healthy, affordable, and culturally appropriate food), which is associated with numerous adverse health outcomes across the reproductive period (FAO, 1996; HLPE-FSN, 2020; Zinga et al., 2024). Although its prevalence is highest in low- and middle-income countries, FI remains a persistent public health issue in high-income countries, where structural inequities, rising living costs, and gaps in social protection, leave many women and families unable to meet their nutritional needs (Bell et al., 2022; Ivers and Cullen, 2011).

During preconception, FI can limit a woman's ability to consume healthful diets and build adequate nutrient reserves, increasing the risk of adverse pregnancy outcomes and perpetuating intergenerational health and economic inequities (Jyoti et al., 2005; The Lancet Regional Health – Southeast Asia, 2025; Unicef, 2024; Victora et al., 2008). Similarly, women experiencing FI during pregnancy are more likely to have suboptimal dietary intake (Augusto et al., 2020), which has been associated with an increased risk of gestational diabetes (Bell et al., 2024; Cooper et al., 2022; Laraia et al., 2010; Oresnik et al., 2025), low birth weight (de Freitas Rocha et al., 2024), elevated maternal stress (Augusto et al., 2020; Bell et al., 2024), congenital anomalies (Carmichael et al., 2007) and challenges with breastfeeding (Buccini et al., 2024). Given the high burden of FI and its detrimental, long-lasting effects across the life-course, there have been increasing calls to recognise FI during preconception, pregnancy, and early childhood as a public health priority in high-income countries (Andreae et al., 2022; Bell et al., 2024; Food Foundation, 2023; McKay et al., 2022a,b; Santas and Hoke, 2024).

A range of interventions and policies have been implemented to address FI during these life stages. Evidence on which programs and delivery mechanisms are most effective, however, remains limited, particularly outside of the United States. Currently, most interventions focus on nutritional supplementation, nutrition education, food vouchers, or referral to food assistance (McKay et al., 2022a,b; Merchant et al., 2023; Hurley et al., 2026) and have been found to improve dietary intake, food security, and maternal and child health outcomes (Barrett et al., 2024; Chehab et al., 2025; Metallinos-Katsaras et al., 2011; Munger et al., 2016). However, there is limited guidance on how to prioritise, sequence, or integrate policy and programmatic responses across sectors.

Qualitative research further illustrates challenges in implementation. Although pregnant women view food insecurity as an appropriate topic for clinical discussion and expect support from health professionals, providers often report limited knowledge, capacity, and system-level resources to respond effectively (Zinga et al., 2024, 2025; Dickson et al., 2024). This mismatch between patient expectations and provider capacity highlights healthcare settings as a potentially important point of intervention, while underscoring the need for clearer guidance and system-level support. Shame, stigma, and fear of judgement may compound these challenges, deterring women and families from seeking help, disclosing need, or engaging with available services, particularly during the highly scrutinised life-course stages of pregnancy and early parenthood (Bell et al., 2022; Liebe et al., 2025; Pineau et al., 2021).

This body of evidence indicates that the field has reached a critical juncture. While the health and economic consequences of FI during preconception, pregnancy, and early life are well-documented, and attention from health professionals and policymakers is increasing, responses in high-income countries remain fragmented (Chiera et al., 2025; HLPE-FSN, 2020; Iannotti et al., 2024). Existing efforts span healthcare systems, social protection policies, and voluntary, community, faith, and social enterprise (VCFSE) organisations, yet vary widely in scope and approach (Hurley et al., 2026; Merchant et al., 2023). In the absence of clear guidance, decision-makers lack a shared framework for determining which actions to prioritise, for whom, and at what level, to achieve the greatest impact, limiting the effectiveness of current approaches.

Given the complexity of FI during this life-course stage and the to-date untapped insights of individuals with expert knowledge on or lived experience with FI, there is a need to identify priorities to guide future action. Whereas previous studies have sought to gain consensus on defining, measuring and addressing FI in the general population (Gallegos et al., 2023) or among pregnant persons specifically (McKay et al., 2022a,b), the current study aims to highlight priorities that are specific to the preconception, pregnancy, and early childhood periods across high-income countries to inform a more co-ordinated approach and impactful efforts to prevent and mitigate FI during these critical periods.

## 2. Methods

### 2.1. Study design

Delphi consensus methods are well suited for identifying research priorities and solutions that can help to address public health challenges (Rowe and Wright, 1999; Shang, 2023). Through a structured, multi-round process, panellists independently evaluate proposed priorities and are provided with feedback between rounds to build consensus. This systematic integration of diverse perspectives is intended to produce guidance that supports more impactful, sustainable, and equitable policies and practices (Barrett and Heale, 2020).

This study employed a sequential mixed-methods Delphi design, whereby qualitative data collected in Round 1 were used to generate recommendations, and these recommendations subsequently formed the basis of the quantitative rating and ranking exercises in Rounds 2–4. Integration occurred through the transformation of qualitative recommendations into Delphi items and using free-text responses to refine the proposed recommendations and contextualise and interpret quantitative findings. A modification of the traditional Delphi design, allowing new panel members at each round, was employed to maximise the variation of countries and sectors included in the panel.

This Delphi study was developed by a multidisciplinary team from the Nourishing Futures Network (NFN), an international consortium focused on advancing knowledge and practices related to FI during preconception, pregnancy, and early childhood (Nourishing Futures Network, 2023). The team comprises representatives from maternity care, public health, nutrition, sociology, anthropology, and health equity. Further members of NFN with expertise in maternity care, child and family health nursing (also known as health visiting, social nursing or public health nursing), and VCFSE organisations were part of an expert sub-group advising on the method during an in-person workshop (October 2024). Results are reported in accordance with DELPHISTAR guidelines (Niederberger et al., 2024).

### 2.2. Panel recruitment

We sought to recruit panellists with expertise in FI across academic, practice, policy, and VCFSE sectors, focusing on high-income contexts. Countries were considered high-income based on 2024 World Bank

classifications (World Bank, 2026). Restricting the study to high-income countries provided a comparable context for examining responses to FI during preconception, pregnancy, and early childhood, whereby in these contexts, FI is typically driven by economic and social inequalities rather than food availability.

In Round 1, invitations were sent via email to NFN members (n = 67, September 2024). Round 2 invitations were extended to delegates who attended the inaugural NFN international conference held in October 2024 (n = 137). To increase geographic and sector representation, snowball recruitment methods were used, where invitees for Rounds 3 (n = 150, June 2025) and 4 (n = 155, September 2025) were asked to share the invitation with colleagues with expertise in this area. Additionally, panellists who provided their contact details for the purpose of feedback and future contact were invited to subsequent rounds. Panellists were required to be able to communicate in English and self-identified as having expertise in this context. A link to the survey summary and consent statement was included in the recruitment material.

Panellists were asked to indicate their country and select all sectors relevant to their expertise (research, practice, policy, and/or VCFSE). The study sought priorities across four domains representing interconnected mechanisms for addressing food insecurity during preconception, pregnancy, and early childhood: research (evidence generation and knowledge mobilisation), practice (health and social care delivery), policy (structural and legislative action), and VCFSE organisations (community-based support and advocacy). Participants were invited to provide recommendations and subsequently review, rate, and rank recommendations across all domains, reflecting the multisectoral nature of FI and recognising that expertise often extends beyond a single professional role. Consistent with a socioecological perspective, these domains represent interconnected levels of influence operating across structural, organisational, community, and individual contexts

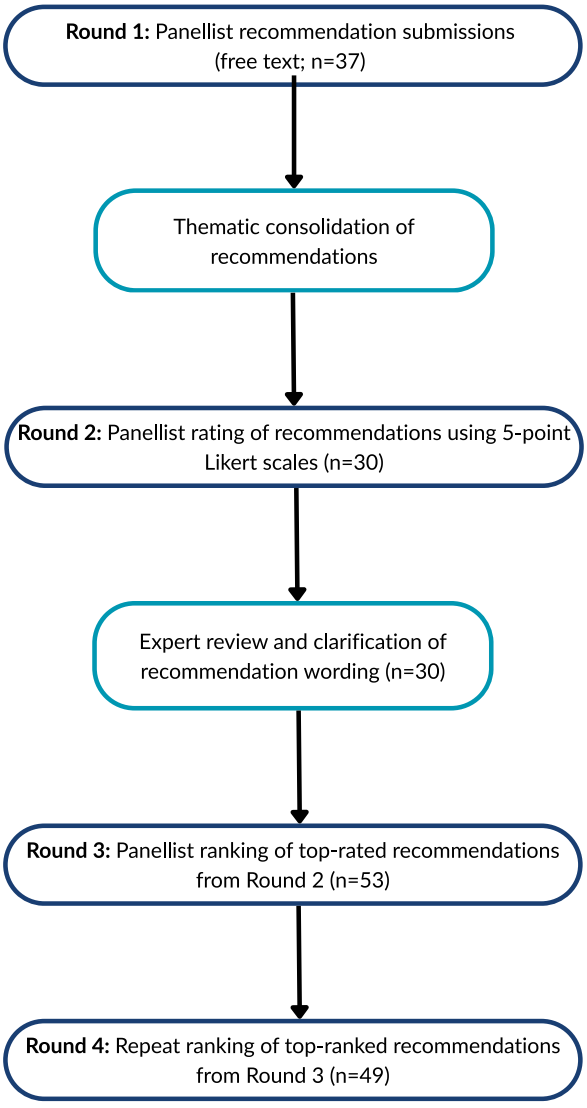



**Fig. 1.** Overview of the modified Delphi process conducted four-rounds, Modified Delphi process (September 2024–September 2025) to identify priority actions for addressing food insecurity during preconception, pregnancy, and early childhood.

(Bronfenbrenner, 1989; Dahlgren and Whitehead, 2021). This approach acknowledges that FI is both materially and socially mediated, with experiences of stigma and shame operating across these levels and shaping help-seeking, service engagement, and support needs (Bell et al., 2022; Liebe et al., 2025; Pineau et al., 2021). An additional theoretical perspective was applied during interpretation of findings.

### 2.3. Data collection

Round 1 (September 2024) asked panellists to submit their recommendations for action to prevent or better support those experiencing FI in preconception, pregnancy and early childhood across four sectors – research, practice, policy and VCFSE (Fig. 1). The aim of this 'open' round was to gather recommendations, which would then be considered for importance in subsequent rounds. Participants could submit up to ten recommendations per sector (one recommendation per free-text box). A further free-text box was provided per sector for any additional comments or clarifications. Data were grouped thematically by one researcher (KH), retaining verbatim wording for resultant recommendations, where possible, to minimise interpretation bias. The list of recommendations was reviewed for clarity by two senior researchers (NH and FM).

Round 2 (October 2024) asked participants to rate the importance of Round 1 recommendations for preventing or better addressing FI during preconception, pregnancy, and early childhood. Each recommendation was rated on a five-point Likert scale, where one represented low importance, and scores of four or five were considered high priority. The goal was to identify the most important actions within each sector and confirm alignment with participants' views. The survey began with an explanation of how the recommendations were developed and each sector subsection concluded with a free-text field for additional recommendations, clarifications, or comments. The results of panellists' ratings for Round 2 were presented to an international sub-group of experts from the NFN (n = 30) at an in-person workshop (October 2024). Following discussion, top rated recommendations from each sector were reviewed and amended to improve clarity.

Given the frequency of high priority ratings across many recommendations in Round 2, participants in Round 3 (June 2025) were asked to rank the recommendations in order of priority for action in their context (i.e., country and sector). Ranking statements within a Delphi study has been shown to overcome the issue of high scores across the statements and enforces consideration of priority (Jorm, 2025). Recommendations appeared in a random order for each participant and each sector concluded with a free-text field for additional recommendations, clarifications, or comments.

The final round (Round 4; September 2025) was conducted to determine if agreement could be reached on the priorities for action when fewer choices were presented. As our *a priori* agreement limit had not been reached in Round 3 to determine the items to repeat in a final round, a lower pragmatic limit was chosen for the recommendations included in Round 4. These recommendations therefore comprised those ranked highly (being in the top 50% of ranked choices) by at least 50% of the participants in Round 3. Feedback from Round 3 was sent out with the new survey link, highlighting the results of the previous round (available in Supplementary Material 1). Results presented from Round 3 highlighted the highest and lowest ranking recommendations, with their percentage agreement and the percentage of panellists that ranked each recommendation in the top 50%.

### 2.4. Ethics

Ethical approval was provided by Faculty of Medical Sciences Ethics Committee at Newcastle University (Reference: 55724/2023) and the Science, Technology, Engineering and Mathematics Committee at the University of Birmingham (Reference: ERN_3585-Apr2025). All survey responses were anonymised to the researchers and other panellists.

### 2.5. Data analysis

In Round 1, a pragmatic qualitative descriptive approach was used to group panellist-submitted recommendations thematically and amalgamate similar items, retaining verbatim wording wherever possible (Gallegos et al., 2023; Hall and Liebenberg, 2024). Item generation was performed by one researcher (KH) and reviewed by two senior researchers (FM and NH). Submitted recommendations were grouped using NVivo 14.23.3 (Lumervero, 2025). In subsequent rounds, free-text fields were reviewed for additional recommendations and justifications for scoring/ranking to assist understanding of dissent.

In the quantitative analysis, median scores and inter-quartile ranges (IQRs) are presented for each item. Variability in responses is described and assessed using the IQR. For Rounds 2 and 3, an IQR of 2 or below signalled low variability in responses (Shang, 2023). For Round 4, where there were fewer recommendations to rank, an IQR of 1 signalled low variability in responses (Shang, 2023). For ranking rounds, items were reverse weighted to ensure that recommendations given the highest priority received the greatest number of points and to maintain consistency across rounds. Percentage of the maximum score was calculated for all items. Variation between contexts and sectors was assessed for Rounds 3 and 4 using Kruskal-Wallis equality of populations rank tests. Post-hoc pairwise comparisons using Dunn's test with a Bonferroni correction were performed where there were significant (5% level) differences identified. Descriptive statistics were calculated using Stata 19 (StataCorp, 2025).

Following guidance by Shang (2023), an *a priori* threshold of 75% was determined to signify agreement in both the rating and ranking rounds. Where no agreement on prioritised actions was found in Round 3, recommendations that were ranked highly (in the top 50%) by at least half of the participants were retained and redistributed in Round 4.

## 3. Results

### 3.1. Participants

Overall, between 30 and 53 panellists from 5 to 12 high-income countries in each round took part in this modified Delphi study. Responses from participants in four countries (UK, Australia, Canada, USA) were received in all four surveys, with UK respondents consistently accounting for over 50% of responses (Table 1). Each survey included respondents from all four. In terms of expertise, research experience was most common, reported by 45–62% of respondents. In contrast, under 20% of panellists in each round indicated experience in the VCFSE sector.

In Round 1, 37 of the 67 invited participants provided recommendations across the four sectors (55% response rate). In Round 2, 30 of the 137 invited participants responded (22% response rate). Due to the low response rate in Round 2, the recruitment strategy was amended for subsequent rounds, with invited panellists asked to share the survey with colleagues who had relevant expertise. Response rates for Rounds 3 and 4 are therefore not available due to this snowball sampling approach; however number of responses increased, to 53 and 49 participants respectively, with increases particularly among individuals with policy and practice experience. This snowball sampling approach also broadened the range of countries participating, with 8 countries being represented for the first time in Rounds 3 or 4.

### 3.2. Recommendations

The median number of recommendations submitted by panellists in Round 1 ranged from two for the VCFSE sector to six for the research sector. Thematic aggregation resulted in 30 research, 16 practice, 18 policy, and 17 VCFSE recommendations that were shared for consideration in Round 2 (the full list can be found in Supplementary Material 2), reflecting the broad range of factors across the socioecological spectrum.

**Table 1**
Characteristics of panellists participating in a modified Delphi study on priority actions to address food insecurity during preconception, pregnancy, and early childhood, by round.

| | Round 1 (n = 37) | | Round 2 (n = 30) | | Round 3 (n = 53) | | Round 4 (n = 49) | |
|---|---|---|---|---|---|---|---|---|
| | **n** | **%** | **n** | **%** | **n** | **%** | **n** | **%** |
| **Countries** | | | | | | | | |
| UK | 22 | 59 | 20 | 67 | 28 | 53 | 35 | 72 |
| Australia | 7 | 19 | 2 | 7 | 12 | 22 | 6 | 12 |
| US | 5 | 14 | 5 | 17 | 3 | 5 | 2 | 4 |
| Canada | 2 | 5 | 2 | 7 | 2 | 4 | 5 | 10 |
| Bulgaria | - | - | - | - | 1 | 2 | - | - |
| Croatia | - | - | - | - | 1 | 2 | - | - |
| Denmark | 1 | 3 | - | - | 1 | 2 | - | - |
| Finland | - | - | - | - | 1 | 2 | - | - |
| Greece | - | - | - | - | 1 | 2 | - | - |
| Luxemburg | - | - | - | - | 1 | 2 | - | - |
| New Zealand | - | - | 1 | 3 | - | - | - | - |
| Singapore | - | - | - | - | - | - | 1 | 2 |
| Slovakia | - | - | - | - | 1 | 2 | - | - |
| Spain | - | - | - | - | 1 | 2 | - | - |
| **Sectors (not mutually exclusive)** | | | | | | | | |
| Research | 28 | 75 | 24 | 80 | 31 | 58 | 29 | 59 |
| Practice | 5 | 14 | 9 | 30 | 18 | 34 | 19 | 39 |
| Policy | 3 | 8 | 4 | 13 | 10 | 19 | 10 | 20 |
| VCFSE | 8 | 21 | 6 | 20 | 4 | 8 | 7 | 14 |
| Other | 1 | 3 | - | - | - | - | - | - |
| Panellists with expertise in more than one sector | 6 | 16 | 7 | 23 | 7 | 13 | 13 | 27 |
| **Previous responses** | | | | | | | | |
| First response | - | - | - | - | 23 | 43 | 19 | 39 |
| At least one previous round | - | - | - | - | 17 | 32 | 20 | 41 |
| Can't remember/prefer not to say | - | - | - | - | 13 | 25 | 10 | 20 |

In Round 2, participants tended to rate most recommendations highly, with 56-78% of recommendations in each sector achieving both a high median score, indicating high priority (4-5), and an IQR $\leq 1$, indicating low variability in responses. The predefined level of agreement was met for 10 research (33%), 8 practice (50%), 11 policy (61%), and 10 VCFSE recommendations (55%).

Though verbatim wording was retained where possible to minimise interpretation bias by the researchers when amalgamating the submitted recommendations, free-text responses in Round 2 indicated that some items were unclear or were felt to '*combine two points*' *(VCFSE recommendations, Round 2)*. Following discussion with an international, interdisciplinary expert sub-group (n = 30), the wording for the top-rated recommendations were streamlined and simplified to ensure each recommendation contained only one concept. This process resulted in 10 research, 9 practice, 13 policy, and 9 VCFSE recommendations that were re-distributed for priority ranking (Round 3).

Round 3 indicated greater variability in priority ranking of the recommendations in each sector (Table 2). Some of this variation occurred between country of origin of panellists in Round 3. For example, the other European respondents showed significantly higher average scores (mean score = 9.0) for the research recommendation '*map existing local and national programmes and policies that* support *pregnant and postpartum people*' than respondents from the UK (mean score = 4.0) or Australia (mean score = 3.0; Supplementary Material 3). Only two recommendations showed a significant difference between sector groups in Round 3 after Bonferroni corrections were applied, with researchers scoring '*maximising enrolment to national and local nutritional safety nets*' higher than respondents with multi-sector roles (e.g., held a dual research and practitioner role; researcher mean score = 4.5; Multi-sector group mean score = 2.5; Supplementary Material 3) and the VCFSE sector scoring '*develop a national and international network*' higher than researchers (VCFSE means score = 9.0; researcher mean score = 4.0; Supplementary Material 3).

No recommendation scored above the *a priori* threshold of 75% of the maximum score. However, within each sector, approximately half of the recommendations were scored highly by over 50% of the participants. The prioritisation activity was therefore repeated with this smaller set of recommendations to determine if agreement could be met on a smaller number of recommendations.

Although the ranking order differed slightly between Rounds 3 and 4, the highest-ranking recommendations showed some consistency (Table 3). For examples, the top two priorities remained unchanged for the research and VCFSE sectors: for research to '*generate [FI] prevalence data*' (64.5%, Round 3 and 65.5%, Round 4) and '*continue cross-sector working to identify research that will make system level change*' (62.4%, Round 3 and 64.3%, Round 4); for the VCFSE sector, priorities were to provide both '*emergency food relief tailored to the needs of these life-course stages*' (69.6%, Round 3 and 68.1%, Round 4) and '*guidance, referrals and access to multisector partnerships*' (66.0%, Round 3 and 64.4%, Round 4). Similarly, for policy recommendations, whilst the order changed, the top-three ranked priorities remained the same between Rounds 3 and 4: '*improving access to nutritional and financial safety nets*' (67.5%, Round 3 and 64.9%, Round 4), '*cross-political party working to address the drivers of poverty*' (66.9%, Round 3 and 61.1%, Round 4), and *'implementing flexible and targeted policy interventions for vulnerable groups'* (65.5%, Round 3 and 63.9%, Round 4). UK respondents had significantly higher average scores for '*cross-political party working to address the drivers of poverty*' and '*assessing the economic impact of investing in reducing food insecurity*' than respondents from the US and Canada (Supplementary Material 3). No recommendations differed by sector in Round 4.

Free-text responses were received from 13 respondents in Round 2 (43.3%) and 14 respondents in Round 3 (26.4%); Round 4 offered no free-text option. A recurring theme was the difficulty in prioritising when all recommendations were regarded as important, at times compounded by ambiguous wording: one participant noted that some items "*may have scored higher if they were [explicitly framed about food insecurity], but also all are important and tried to prioritise" (policy recommendations, Round 2)* while another reported, *"All are important, it was difficult to order" (practice recommendations, Round 3)*. Comments also underscored that priorities are context-dependent, varying across national settings; one respondent ranked funding for regular monitoring of household food insecurity low because it *"is currently done in [named country]"* while noting that *"it is important for other countries to follow suit" (policy recommendations, Round 3)*.

## 4. Discussion

This study sought to identify priority actions across sectors to prevent and mitigate FI during preconception, pregnancy and early childhood in high-income countries. Although panellists broadly agreed on the importance of a range of recommendations ranking them by priority yielded markedly less consensus, with none reaching the pre-specified agreement threshold. This divergence underscores the complex, multidimensional nature of FI, which is shaped by intersecting social, economic, and political factors. It also suggests that priorities for action cannot be reduced to a single, universally applicable hierarchy; instead, the breadth of perspectives on the priorities for action highlights the need for integrated, context-specific, cross-sectoral strategies to address FI in these life-course stages.

Recommendations prioritised by panellists emphasised the need for actions that enable timely, holistic maternal and early childhood care, and that improve management and support for those at risk of or experiencing FI. These include practice and VCFSEs -sector recommendations that have previously been called for to support pregnant and post-partum individuals, such as providing accessible infant feeding and breastfeeding support (Tomori, 2023), screening for FI (Allen et al., 2023; Chehab et al., 2025), and offering food assistance (Chehab et al., 2025). Panellists further emphasised the importance of

**Table 2**
Round 3 recommendations and scoring from a modified Delphi study on priority actions to address food insecurity during preconception, pregnancy, and early childhood.

| Rank | Research Recommendation | Median | IQR | % of total score | % ranking highly[a] |
|---|---|---|---|---|---|
| 1 | Generate current, regular, and accurate food insecurity prevalence data among pregnant women, breastfeeding women, infants and young children that is representative at national level, with detail at regional and local levels. | 6.0 | 5.0 | 64.5 | 63.3 |
| 2 | Working with policymakers, political scientists and other stakeholders to identify the research that is needed to create system level change. | 7.0 | 6.0 | 62.4 | 65.3 |
| 3 | Identify the social, contextual, and intersecting factors that contribute to food insecurity and how they interact with other forms of material security, such as housing and energy. Use this information to create targeted interventions that meet the population's needs and ensure fair access to resources and support. | 6.0 | 4.0 | 60.0 | 63.3 |
| 4 | Understanding the lived experience and exploring factors that mitigate food insecurity during each life-course stage. | 6.0 | 5.0 | 58.8 | 55.1 |
| 5 | Assess the economic impact of investing in reducing food insecurity during these life stages to help make informed resource allocation decisions. | 6.0 | 4.0 | 58.4 | 57.1 |
| 6 | Co-produce innovative solutions at both local and population levels to tackle the triple burden of food insecurity, which includes financial, nutritional, and psychological aspects. | 5.0 | 4.0 | 58.0 | 49.0 |
| 7 | Investigate effective methods for screening food insecurity during pregnancy and the most appropriate, non-stigmatizing wording and language based on the preferences of women and clinicians. | 5.0 | 6.0 | 51.6 | 44.9 |
| 8 | Map existing local and national programmes and policies that support pregnant and post-partum people and evaluate of the impact of these policies on food insecurity, with particular emphasis on understanding the differential impact on marginalised groups. | 5.0 | 5.0 | 50.6 | 40.8 |
| 9 | Ensure programme/intervention/services are evaluated to further the evidence base for what works, for whom, and in what context. | 4.0 | 4.0 | 46.9 | 32.7 |
| 10 | Research investigating the influence of food insecurity on breastfeeding initiation and continuation, lactation physiology, and breastmilk composition. | 4.0 | 5.0 | 38.8 | 28.6 |
| Rank | Practice Recommendation | Median | IQR | % of total score | % ranking highly[a] |
| 1 | Ensure there is universal, accessible prenatal, infant feeding, and breastfeeding support (including lactation counselling). | 8.0 | 5.0 | 72.7 | 70.0 |
| 2 | Ensure women, families and communities are involved in the design and implementation of interventions to improve food security. | 5.0 | 4.0 | 62.4 | 58.0 |
| 3 | Establish routine brief screening at key points in these life-course stages to promote early identification and timely referral to support services/interventions. | 6.0 | 3.0 | 61.1 | 60.0 |
| 4 | Ensure access to community-based nutrition support in the perinatal period. | 6.0 | 5.0 | 59.6 | 56.0 |
| 5 | Advocate for evidence-based solutions to food insecurity to improve maternal and child health. | 5.0 | 4.0 | 56.7 | 38.0 |
| 6 | Design, implement, and evaluate multi-sectoral interventions that are culturally sensitive and act on the potential barriers/challenges to accessing nutrition support of food insecure women and young children. | 4.0 | 4.0 | 51.8 | 38.0 |
| 7 | Develop and implement mechanisms for maximising enrolment to national and local nutritional safety nets (e.g. through health campaigns, promotion at existing healthcare visits, application support). | 4.0 | 3.0 | 50.7 | 34.0 |
| 8 | Develop multi-sectoral training for those working in preconception, maternity, postnatal care, and early years settings focusing on the importance of nutrition in these life-course stages, the challenges faced by those experiencing food insecurity, and how they can best communicate/care. | 4.0 | 4.0 | 46.4 | 32.0 |
| 9 | Build evaluation from the start of any change that is implemented in practice so that interventions that are not working or are widening health inequalities can be stopped in a timely manner. | 3.0 | 4.0 | 38.7 | 24.0 |
| Rank | Policy recommendations | Median | IQR | % of total score | % ranking highly[a] |
| 1 | Improve access to nutritional and financial safety nets (e.g., auto-enrolment/simplifying the enrolment process, widening approved retailers, expanding outreach efforts) | 10.0 | 5.0 | 67.5 | 69.8 |
| 2 | Cross-political party working to address the drivers of poverty. | 10.0 | 7.0 | 66.9 | 54.7 |
| 3 | Implement flexible and targeted policy interventions for vulnerable groups (e.g., young families, single parents, households with long-term conditions/disabilities (parental or child), rural families, those with no recourse to public funds etc.). | 9.0 | 5.0 | 65.5 | 66.0 |
| 4 | Review parental leave policies to enable adequate pay (in line with the minimum/living wage) and enhance leave entitlements for both mothers and other caregivers. | 9.0 | 6.0 | 61.5 | 66.0 |
| 5 | Ensure strategic, long-term, protected investment in the maternal and early years workforce (including, but not limited to, community midwifery, health visiting, breastfeeding support and early years settings). | 8.0 | 6.0 | 58.8 | 52.8 |
| 6 | Develop, implement and monitor the value and eligibility criteria for any financial support to address food insecurity to ensure it is sufficient to meet people's needs. | 8.0 | 6.0 | 55.6 | 52.8 |
| 7 | Cross-political party working to enhance income support policies. | 7.0 | 8.0 | 55.3 | 45.3 |
| 8 | Offer universal free lunch in early years childcare settings. | 7.0 | 6.0 | 52.2 | 41.5 |
| 9 | Develop, implement and monitor multi-agency sustainable pathways for supporting those experiencing food insecurity. | 6.0 | 6.0 | 51.5 | 39.6 |
| 10 | Fund and implement access to non-term-time childcare/clubs for families with young children (under 5 years). | 6.0 | 7.0 | 46.3 | 34.0 |
| 11 | Fund regular, national government-level monitoring of food insecurity prevalence. | 5.0 | 5.0 | 43.5 | 34.0 |
| 12 | Develop, implement and monitor a range of short term and long-term solutions. | 5.0 | 4.0 | 41.1 | 24.5 |
| 13 | Commission research on the long-term impacts and solutions to food insecurity. | 4.0 | 5.0 | 34.3 | 18.9 |
| Rank | VCFSE recommendations | Median | IQR | % of total score | % ranking highly[a] |
| 1 | Offer emergency and temporary relief to those facing food insecurity during preconception, pregnancy, and the first 2001 days. This includes providing nutritious food and beverages tailored to their needs, such as pregnancy support and infant/toddler foods. | 6.5 | 3.0 | 69.6 | 72.0 |
| 2 | Provide comprehensive support to women and families by offering guidance, referrals, and access to multisector partnerships and services | 6.0 | 4.0 | 66.0 | 64.0 |

(*continued on next page*)

**Table 2** (*continued*)

| Rank | VCFSE recommendations | Median | IQR | % of total score | % ranking highly[a] |
|---|---|---|---|---|---|
| 3 | Advocate for national policy changes, including a focus on tackling child poverty and reforming discriminatory statutory systems affecting this life stage. | 6.0 | 5.0 | 60.9 | 52.0 |
| 4 | Establish food hubs and social enterprises aimed at holistically supporting women during preconception, pregnancy, and early life. | 6.0 | 3.0 | 58.7 | 52.0 |
| 5 | Develop a network of national and international organisations working with those experiencing food insecurity in preconception, pregnancy and the early years, aiming to increase the sustainability of projects, share resources and expertise, and work together as a powerful voice for advocacy and change. | 5.0 | 4.0 | 57.3 | 44.0 |
| 6 | Ensure food provision is culturally sensitive and meets the needs of local community. | 5.0 | 4.0 | 54.0 | 34.0 |
| 7 | Advocate for local practice change, for example streamlined referral pathways, continuation for local crisis funding etc. | 4.0 | 3.0 | 48.9 | 34.0 |
| 8 | Share best practice and learning with other organisations to improve the quality, efficiency, and efficacy of interventions/services targeted towards this population. | 3.5 | 3.0 | 46.0 | 26.0 |
| 9 | Engage in research at all stages. This includes applying for grants, helping underrepresented groups participate, and evaluating services and projects to show their impact on reducing food insecurity for pregnant women, infants, and young children. | 3.0 | 3.0 | 38.7 | 22.0 |

[a] More than 50% of participants ranked the recommendation in the top 5 research, 4, practice, 6 policy and 4 VCFSE recommendations.

**Table 3**
Round 4 recommendations and scoring from a modified Delphi study on priority actions to address food insecurity during preconception, pregnancy, and early childhood.

| Round 3 rank | Round 4 rank | Research recommendations | Median | IQR | % of total score |
|---|---|---|---|---|---|
| 1 | 1 | Generate current, regular, and accurate food insecurity prevalence data among pregnant women, breastfeeding women, infants and young children that is representative at national level, with detail at regional and local levels. | 3.0 | 2.0 | 65.5 |
| 2 | 2 | Working with policymakers, political scientists and other stakeholders to identify the research that is needed to create system level change. | 2.0 | 4.0 | 64.3 |
| 5 | 3 | Assess the economic impact of investing in reducing food insecurity during these life stages to help make informed resource allocation decisions. | 3.0 | 2.0 | 59.6 |
| 3 | 4 | Identify the social, contextual, and intersecting factors that contribute to food insecurity and how they interact with other forms of material security, such as housing and energy. Use this information to create targeted interventions that meet the population's needs and ensure fair access to resources and support. | 3.0 | 2.0 | 56.6 |
| 4 | 5 | Understanding the lived experience and exploring factors that mitigate food insecurity during each life-course stage. | 3.0 | 2.0 | 54.0 |
| **Round rank** | **Round 4 rank** | **Practice recommendations** | **Median** | **IQR** | **% of total score** |
| 4 | 1 | Ensure access to community-based nutrition support in the perinatal period. | 3.0 | 2.0 | 67.2 |
| 1 | 2 | Ensure there is universal, accessible prenatal, infant feeding, and breastfeeding support (including lactation counselling). | 2.0 | 2.0 | 67.2 |
| 2 | 3 | Ensure women, families and communities are involved in the design and implementation of interventions to improve food security. | 2.0 | 3.0 | 62.5 |
| 3 | 4 | Establish routine brief screening at key points in these life-course stages to promote early identification and timely referral to support services/interventions. | 2.0 | 2.0 | 53.1 |
| **Round 3 rank** | **Round 4 rank** | **Policy recommendations** | **Median** | **IQR** | **% of total score** |
| 1 | 1 | Improve access to nutritional and financial safety nets (e.g., auto-enrolment/simplifying the enrolment process, widening approved retailers, expanding outreach efforts) | 3.0 | 2.0 | 64.9 |
| 3 | 2 | Implement flexible and targeted policy interventions for vulnerable groups (e.g., young families, single parents, households with long-term conditions/disabilities (parental or child), rural families, those with no recourse to public funds etc.). | 3.0 | 2.0 | 63.9 |
| 2 | 3 | Cross-political party working to address the drivers of poverty. | 3.0 | 4.5 | 61.1 |
| 5 | 4 | Ensure strategic, long-term, protected investment in the maternal and early years workforce (including, but not limited to, community midwifery, health visiting, breastfeeding support and early years settings). | 3.0 | 3.0 | 58.3 |
| 6 | 5 | Develop, implement and monitor the value and eligibility criteria for any financial support to address food insecurity to ensure it is sufficient to meet people's needs. | 4.0 | 2.5 | 54.2 |
| 4 | 6 | Review parental leave policies to enable adequate pay (in line with the minimum/living wage) and enhance leave entitlements for both mothers and other caregivers. | 4.0 | 3.5 | 47.6 |
| **Round 3 rank** | **Round 4 rank** | **VCFSE recommendations** | **Median** | **IQR** | **% of total score** |
| 2 | 1 | Provide comprehensive support to women and families by offering guidance, referrals, and access to multisector partnerships and services | 3.0 | 2.0 | 68.1 |
| 1 | 2 | Offer emergency and temporary relief to those facing food insecurity during preconception, pregnancy, and the early years. This includes providing nutritious food and beverages tailored to their needs, such as pregnancy support and infant/toddler foods. | 3.0 | 1.0 | 64.4 |
| 4 | 3 | Establish food hubs and social enterprises aimed at holistically supporting women during preconception, pregnancy, and early life. | 2.0 | 1.0 | 63.3 |
| 3 | 4 | Advocate for national policy changes, including a focus on tackling child poverty and reforming discriminatory statutory systems affecting this life stage. | 2.0 | 3.0 | 54.3 |

involving women, families and communities in designing these interventions and support services. Embedding this participatory approach could help to overcome some of the shame and perceived stigma associated with FI during these life-course stages, which are

consistently reported across contexts (Bell et al., 2024; Ivancic and Dooling, 2023; Marshall et al., 2026; Pineau et al., 2021).

The prioritised recommendations reflect the structural, organisational, and relational aspects of food insecurity. Consequently, we interpret the findings through three complementary lenses that highlight why change is needed at multiple levels (socioecological theory; Bronfenbrenner, 1989; Dahlgren and Whitehead, 2021), why upstream action was prominent in the prioritisations (the cycle of social violence framework; Price and McGowan, 2025), and why structural reform must be accompanied by efforts to address lived experiences and social relationships (stigma and shame scholarship; Bell et al., 2024; Ivancic and Dooling, 2023; Marshall et al., 2026; Pineau et al., 2021).

The results suggest that panellists viewed FI during preconception, pregnancy, and early childhood as a complex, multi-level challenge requiring co-ordinated action across policy, organisational, community, and individual domains (Bronfenbrenner, 1989; Dahlgren and Whitehead, 2021). This is reflected in the breadth of priorities identified, spanning structural actions and community-level support systems. Both previous consensus studies and the current study prioritised policy- and community-level structures and systems as channels through which to alleviate FI (Gallegos et al., 2023; McKay et al., 2022a,b), actions intended to disrupt the structural conditions that produce FI in high-income contexts (Gallegos et al., 2023; Lindberg et al., 2023; Price and McGowan, 2025). The absence of agreement in the ranking rounds, and feedback from free-text fields, further reinforces this interpretation: FI is produced and sustained through interactions between multiple determinants, making it difficult to prioritise any single intervention in isolation. Collectively, the findings suggest a shared understanding that meaningful reductions in FI during these life-course stages requires action across interconnected levels of influence rather than reliance on any one sector or solution.

Many of the highest-ranked recommendations focused on addressing the structural conditions that create FI, including reducing poverty, improving parental leave, and investing in the maternal and early years workforce. This aligns with Price and McGowan's (2025) Cycle of Social Violence framework, which highlights how social, economic, and political structures can produce and sustain health inequalities. Through this lens, the priorities identified by panellists can be understood as attempts to address the upstream drivers of FI and can help to prevent the drift in responsibility for the management of FI from central government to the local level (Bijlani et al., 2025). Some of the variation observed between countries may also reflect differences in welfare and social protection systems. For example, Daly (2025) highlights substantial variation across European countries in social protection models and family support policies, ranging from the more universal and generous provision characteristic of Sweden to the more conditional and selective approaches observed in the UK. Such variation is likely to shape both how FI is understood and which solutions are viewed as appropriate. Consequently, panellists may have reflected on perceived gaps in their own national systems that influenced FI in this life-course stage, rather than universally applicable priorities, as was highlighted by one panellist in the free-text comments.

The continued prioritisation of community and service-level supports suggests recognition that immediate assistance remains necessary while broader structural reforms are pursued. The prioritisation of co-design, culturally sensitive provision, and non-stigmatizing approaches highlights the importance of considering the stigma and shame often associated with FI during these life-course stages in the design of relational food support services. Bell et al. (2022) highlighted that the provision of food for a family is often inextricably linked with the notion of being a 'good mother', leading to feelings of failure, stigma and shame that arise with experiences of food insecurity (Bell et al., 2022). Participatory co-design offers a critical strategy to counter the barriers of stigma and shame by actively involving women, families, and communities in designing interventions that reflect their needs, preferences, cultural norms, and lived realities (Petresin et al., 2025). In this context, addressing stigma is not an optional enhancement but a foundational requirement for equitable policy and practice. These recommendations were prioritised despite panellists also emphasising structural reforms, suggesting a recognition that barriers to accessing support are not solely material. Even where services are available, anticipated stigma may reduce disclosure and engagement, making relational and participatory approaches central rather than peripheral to effective interventions.

However, while panellists made the important recommendation of ensuring women and families during these life-course stages are able to access food assistance, it is important to consider the models of food assistance to manage hunger. Much of the food assistance sector relies on donated and rescued food (Lai et al., 2022), and as such, we must first question the reliability and ethical implications of this model of food provision. A right to food recognises that dignity comes from feeding oneself, not from being fed (Raponi, 2017), and that the right to food is only realised when an individual can achieve food security (McKay et al., 2025). Long-term reliance and dependence on food charity is not sustainable and it cannot solve FI by acting as a form of 'shadow welfare' plugging gaps in welfare systems (Bazerghi et al., 2016; May et al., 2019). Panellists are right to identify food assistance as an important emergency response to immediate need; however, it does not take the place of whole-system responses to the drivers of FI.

Together, these lenses help explain the difficulty of reaching agreement on priorities in contextually diverse high-incomes settings, where multiple constraints operate simultaneously and where lack of attention to the problem has resulted in context-specific oversights such that the most urgent interventions in any one country vary. Nonetheless, the set of recommendations developed in this study offers a scaffold to help researchers, practitioners, policymakers, and VCFSE organisations determine where to focus efforts when addressing FI during preconception, pregnancy, and early childhood.

These findings are intended for decision-makers working in health services, early years care, public health, social policy, and community/VCFSE settings, as well as researchers designing future studies. The next steps include meaningfully engaging women, families, and communities to co-design the specific approaches that reflect local needs and translate these priorities into context-specific implementation plans. Ongoing monitoring and evaluation will also be essential to strengthen the evidence base and ensure that interventions remain equitable, effective, and responsive to changing conditions over time.

### 4.1. Limitations

Although high-income countries are not homogeneous, they share several characteristics relevant to the present study, including established healthcare systems, formal welfare and social protection structures, and food systems where FI is more commonly associated with economic access and social inequalities than with food availability. Restricting the study to high-income countries therefore provided a broadly similar structural context for examining priorities related to research, practice, policy, and community responses to FI during preconception, pregnancy, and early childhood. However, important differences remain between countries in welfare systems, eligibility for social protection, healthcare organisation, and policy and community-based responses to FI (Oncini, 2026), and these differences should be considered when interpreting the findings.

Panellists self-selected into the study through their interest in the topic; however, their specific level of expertise with women and people in this life-course stage at risk of or experiencing FI was not known. There was a lower number of responses in Rounds 1 and 2 than in Rounds 3 and 4. As such, when considering representation of the panellists, the researchers used a modified Delphi design, inviting new participants in later rounds, as well as utilising snowball sampling to increase international and sectoral representation. Although this approach broadened representation and increased the number of participants, particularly from Round 2 to Round 3, it departs from the

traditional Delphi principle of maintaining a stable panel throughout the consensus-building process (Nasa et al., 2021). As a result, variation between rounds may reflect differences in participant composition as well as the effects of feedback and deliberation. The results should therefore be interpreted as priorities developed with an evolving panel of experts rather than a stable cohort engaged in progressive consensus development. This pragmatic approach was considered acceptable given the study's aim of capturing diverse perspectives across multiple countries and sectors.

Involvement of panellists with recent lived experience of FI during these life-course stages was not included in the sample. The absence of participants with lived experience of FI during preconception, pregnancy, or early childhood represents an important epistemological limitation. Although experts can identify system-level challenges and opportunities for action, experiential knowledge may result in different understandings of priority needs, acceptable interventions, and barriers to support. Given that many of the highly ranked recommendations emphasised co-design, participation, and stigma-sensitive practice, the lack of lived experience involvement presents a tension within the study design. Consequently, the findings should be interpreted as professional expert-derived priorities that require further refinement and validation through engagement with women, families, and communities who are experts by experience and directly affected by FI. Finally, the sample sizes across rounds were generally small for a multidisciplinary survey (Manyara et al., 2024). Taken together, these considerations may limit the replicability of the Delphi results.

Although participants from multiple high-income countries were represented, the sample was heavily weighted towards the UK, which contributed more than half of responses in most rounds. Furthermore, respondents were predominantly from academic backgrounds, with comparatively fewer participants from policy, practice, and VCFSE sectors. As a result, the priorities identified may reflect the perspectives and interests of these more highly represented groups. While the findings offer valuable insights from an international and multisectoral panel, they should not be interpreted as representative of all high-income countries, sectors, or perspectives. These factors may impact the transferability of the findings; however, the mid-point review and refinement of wording by an international, multi-sector sub-group sought to maintain the flexibility of recommendations such that they could be applied in various contexts. For example, 'Develop, implement and monitor … ' could be applied in contexts that were already implementing this recommendation and in those needing to develop it.

## 5. Conclusions

This study contributes an international, cross-sector-informed assessment of priorities for action to address FI during preconception, pregnancy and early life. The findings reflect the complexity of addressing issues that are shaped by diverse social, service, and policy contexts and structural, symbolic, and slow forms of social violence that continue to shape families' material conditions and access to care. These findings extend prior consensus work in this field by identifying priorities that act on the determinants of FI while also highlighting the importance of practice- and community-level responses that provide timely, holistic, and culturally sensitive support for women and families. Many of the structural factors rated as highly important by participants extend beyond the influence of individual practitioners or services and may therefore be most relevant to local and national policymakers. Given the diversity of policy approaches across countries, the findings provide insight into the relative importance that cross-sector experts place on different areas for action, which may help inform priority-setting within specific national and local contexts. The recommendations may also be useful to service providers, commissioners, and researchers when considering future service development and research directions. High-income countries can use this prioritised set of actions as an informative scaffold, adapting them to national systems, existing safety nets, and local community structures, to prevent and mitigate FI during these critical life-course stages.

## CRediT authorship contribution statement

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## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.gfs.2026.100947.

## Data availability

The datasets generated and analysed during the current study are not publicly available as consent was not provided by participants to share their data with third parties.

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