



The prevention of wasting with interventions that address food and feeding-related needs

An evidence synthesis

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Executive summary

“This rapid review summarises the evidence base for interventions to prevent wasting that address food and feeding-related needs.”

Executive summary

Introduction: This rapid review summarises the evidence base for interventions to prevent wasting that address food and feeding-related needs, including interventions that provide nutritionally adequate household food assistance, as well as targeted nutrition support to prevent wasting. A review of reviews approach was adopted, with the addition of any individual studies that were noteworthy, added specific learning of value and/or had not been included in any of the reviews.

Summary of evidence on wasting and the cost-effectiveness of preventing wasting		
Intervention type	Evidence on wasting*	Evidence on cost-effectiveness of preventing wasting**
Household assistance		
Home food production	Rarely measured	No evidence
Cash, vouchers, in-kind assistance	Measured, but evidence of an impact is inconclusive (and context-specific).	Rarely measured (one study in Pakistan found a higher cash amount to be more cost-effective than a lower cash amount and vouchers of the same amount – in a humanitarian setting).
Targeted assistance		
Complementary feeding and nutrition supplementation for children	Measured and largely found to have an impact.	Rarely measured (one study in Burkina Faso found corn-soy blend plus (CSB+) with oil to be more cost-effective than ready-to-use therapeutic food (RUTF) in reducing wasting – in a resource-poor setting with high prevalence of wasting; one study used modelled data from Uganda, Madagascar and Niger to suggest that small-quantity lipid-based nutrient supplements (SQ-LNS) may be a cost-effective intervention in terms of costs per disability-adjusted life year).
Nutrition supplementation and breastfeeding support for pregnant and breastfeeding women	Rarely measured – most evidence relates to preventing poor birth outcomes, such as low birth weight (LBW).	No evidence
Nutrition education and social behaviour change communication (SBC)	Measured and largely found to have no impact (unless added to other interventions).	No evidence
Packages of support	Measured and largely found to have an impact.	No evidence

*Where measured evidence comes from a mix of humanitarian and non-humanitarian setting

**There has been limited application of cost-effectiveness analysis of interventions to prevent wasting; this is possibly due to ethical concerns (particularly in humanitarian settings), including resistance to assessing the cost-effectiveness of humanitarian aid, as well as a lack of clarity among the wider humanitarian community about how to apply economic methods, especially given the challenges faced in humanitarian settings (Puett, 2019).

This table summarise evidence from studies on the prevention of wasting as an outcome specifically. Evidence relating to other key outcomes on the food/feeding pathway to wasting (diet diversity and birth outcomes, such as LBW) is also discussed in the narrative below.

The evidence base for interventions to prevent wasting that address food and feeding-related needs is summarised below by intervention type.

Household assistance – home food production:

Home food production has a significant impact on household and child dietary diversity, although the translation of this into improvements in child nutrition status is not supported by the current evidence. Also, the pathways through which home food production may have an impact on child nutrition outcomes are not well-defined. While home food production with a nutrition SBC component is probably more effective than the agriculture intervention alone, the evidence for home food production interventions in humanitarian settings is weak. Most evidence comes from non-humanitarian settings and it is not clear how appropriate it is to apply this evidence to humanitarian settings.

Household assistance – cash, vouchers and in-kind assistance:

'Social assistance mechanisms can play a positive role in increased uptake of and access to nutrition services and improved diet quality' (Technical Assistance to Strengthen Capabilities (TASC), 2021). However, the evidence is mixed and inconclusive because of the heterogeneity of programmes and study designs. Generally, there is some agreement that in-kind food assistance has shown some positive impacts on women's and children's dietary intakes, and on children's nutrition status (stunting and anaemia), but this is dependent on the duration of the programme and the type and quantity of food given. In-kind food assistance has also showed more positive impacts when combined with other interventions; e.g., targeted individual responses for nutritionally vulnerable household members, SBC and referral to health services. Household-level cash and voucher assistance (CVAs) can have some positive impacts on women and children's dietary diversity, and on stunting in younger children, although this is context- and modality-specific. The impact on stunting is dependent on the modality of CVA and how it is programmed, including transfer size, conditionality and CVA+ component, especially CVA+ food transfers, SBC (nutrition counselling) and/or a water, sanitation and hygiene (WASH) component.

CVAs may improve nutrition outcomes by increasing preventive health-seeking behaviours and adherence to malnutrition treatment programmes, and by addressing the indirect costs of accessing malnutrition treatment; e.g., related to transportation, as well as food and accommodation if in-patient care is needed or the caregiver needs to stay at the treatment centre. CVAs have also been shown to be more effective when they form part of a multi-sectoral programme. Household-level CVAs may improve wasting, but there is less evidence here, and this, as for other impacts, is programme design- and context-specific. General food assistance programmes (CVAs and in-kind assistance) can potentially have a positive impact on birth weight and neonatal mortality. Heterogeneity between studies, and mixed and inclusive results, has led to consistent calls for better-designed and better-implemented programmes and evaluations.

Targeted assistance – complementary feeding and nutrition supplementation for children:

Well-designed randomised controlled trials (RCTs) and systematic reviews over the past six years have demonstrated a significant effect of supplementation with specialised foods in preventing wasting, but questions around their cost-effectiveness and sustainability remain. While there is evidence of a small but significant impact of complementary feeding interventions with a food component on weight gain and weight-for-length Z-score (WLZ), particularly in food insecure contexts, intervention studies that provide specialised foods, such as SQ-LNS, appear to be more likely to show an impact on one or more wasting outcomes compared with fortified complementary foods or household- or child-specific staple foods. Micronutrient supplementation interventions alone have demonstrated good impacts on micronutrient deficiency, such as anaemia, among children but not on stunting and wasting.

Targeted assistance – nutrition supplementation and breastfeeding support for pregnant and breastfeeding women: There is increasingly strong evidence for the positive impacts of both balanced energy and protein (BEP) supplementation and multiple micronutrient supplements (MMS) on birth outcomes. Evidence is emerging to suggest that a targeted approach of providing BEP supplementation plus MMS (or BEP that is fortified with multiple micronutrients) for underweight women, and providing only MMS to women with an adequate body mass index (BMI), is more cost-effective than supplying MMS alone. Interventions designed to promote early-initiation, exclusive and continued breastfeeding can be effective in improving feeding practice, have some effect on preventing growth faltering, but have no measured effect on the prevalence of child stunting and wasting. The effectiveness of these interventions is improved if interventions are delivered by health care professionals and continue postnatally.

Nutrition education and SBC: Current evidence suggests that caregiver education or counselling about appropriate complementary feeding practices can improve food consumption, knowledge and dietary practices in settings where households have sufficient resources and access to healthy diets to put the recommendations into practice, but not where they do not. In all settings (i.e., food secure or food insecure), SBC has limited to no impact on child anthropometry. Similarly, education interventions designed to promote early-initiation, exclusive and continued breastfeeding can be effective in improving feeding practice but have no measured effect on the prevalence of child stunting and wasting.

When SBC is added to other interventions it can help to significantly improve the impact on nutrition outcomes. For example, SBC added to agriculture interventions for home food production can support larger improvements in diet diversity than agricultural interventions alone and reviews suggest that a nutrition-focused SBC strategy is one way to effectively prioritise diet-related objectives. Similarly, evidence on CVAs and child nutrition outcomes shows that the addition of SBC can improve nutrition impacts by increasing preventive health-seeking behaviours, purchase of nutritious foods (diet diversity) and adherence to malnutrition treatment programmes. Evidence also shows that the content and quality of education components in packages of support matter for effectiveness (i.e., impacts on nutrition outcomes).

Packages of support: Packages of support are defined as interventions where more than one intervention is provided to the same population simultaneously, and which address more than one driver of wasting or which address the same driver using complementary interventions. While designing trials to measure the impact of packages of interventions is difficult, there are a growing number of good, high-quality studies and evaluations in this area. There is growing evidence to suggest that a combination of interventions may be more effective at preventing wasting than separately implemented interventions, particularly when they are targeted to the same population. This is particularly true of the combination of CVAs, food supplementation and/or agricultural/food production, and of the addition of nutrition SBC to any of these interventions/intervention packages. Evidence is less strong for packages that provide broader support across multiple sectors, such as nutrition, health and WASH. Few studies, because of their cross-sectional nature, are able to identify and quantify the pathways of impact. However, some studies provide plausible evidence that effects on wasting operate through improvements in child diets and reductions in morbidity. As with single interventions, there are many factors that modify impact, including whether the intervention design is based on an understanding of the major drivers of wasting in the specific context, the coverage/uptake of the different intervention components, and the quality and content of the education provided.

“There is increasingly strong evidence for the positive impacts of both balanced energy and protein (BEP) supplementation and multiple micronutrient supplements (MMS) on birth outcomes.”



Introduction

“Delivering household assistance to address food insecurity, alongside targeted nutrition support to prevent and treat wasting, should have a significant impact on protecting vulnerable populations.”

Introduction

The United Nations World Food Programme (WFP) plays a key role in addressing the diet-related drivers of poor nutrition in the contexts where it operates. Delivering household assistance to address food insecurity (including nutritionally adequate household food assistance), alongside targeted nutrition support to prevent and treat wasting, should have a significant impact on protecting vulnerable populations in the immediate and longer term.

Given the challenging funding landscape, where donor nutrition financing and national budgets are stretched, and humanitarian needs are increasing, WFP and Emergency Nutrition Network (ENN) have agreed to enter into a partnership to achieve the following: 1) be able to demonstrate why investing in assistance that supports the nutritional adequacy of households is important for the prevention of malnutrition; and 2) to demonstrate the value of investing in evidence-based packages to prevent wasting. Ultimately, the aim is to develop an investment case for nutritionally adequate household food assistance and prevention of wasting that address food-related needs. The work is planned under two phases: the first phase of this work will involve defining the scope and feasibility of developing an investment case; the second phase will be to either develop the investment case or to outline a research strategy that would enable WFP to address gaps in evidence that limit evidence-based decision-making.

An evidence synthesis is the first step in the first phase of this work. To this end, this review has identified the evidence base for single-sector, bi-sectoral and multi-sectoral interventions to prevent wasting that address food and feeding-related needs in humanitarian contexts (i.e., contexts with food insecurity or where there is a high risk of food insecurity) and has highlighted knowledge gaps where further research is needed.

Objectives of the evidence synthesis

- Summarise the evidence base for interventions to prevent wasting that address food and feeding-related needs. This will include interventions that provide nutritionally adequate household food assistance, as well as targeted nutrition support to prevent wasting, and that focus on contexts of food insecurity or where there is a high risk of food insecurity. Sub-areas of investigation may include the following:
 - a. The value of approaches that combine food security and preventive interventions (versus standalone interventions).
 - b. The value of approaches that offer a continuum of service for pregnant and breastfeeding women and adolescent girls, and efforts to prevent malnutrition in children.
 - c. The role of SBC in preventing wasting as part of interventions that address food-related needs.
 - d. Considerations linked to seasonality (its role and effects) in preventing wasting through interventions that address food-related needs.
- Summarise existing information on the impact pathways and determinants of acute malnutrition and food insecurity that could inform the development of rapid causal analysis and decision-making tools for preventing wasting.

“The United Nations World Food Programme (WFP) plays a key role in addressing the diet-related drivers of poor nutrition in the contexts where it operates.”



Methods

“This rapid evidence review used a review of reviews approach with the addition of individual studies that contributed more learning.”

Methods

The rapid evidence review was conducted using systematic searching and data selection techniques guided by the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews ([PRISMA-ScR](#)) (see the separate methods document in Annex 1). While the proposed methods were followed as much as possible the team uncovered more papers than expected and also noted that many of the individual studies identified had already been included as part of several recent systematic reviews that were included in our Population, Intervention, Comparison, Outcome (PICO) framework. Rather than examine the evidence from each of these individual studies, a joint decision was made with WFP to carry out a review of reviews, but also then to include any individual studies that were noteworthy, added specific learning of value and/or had not been included in any of the reviews.

“The review drew on both academic and grey literature, with priority given to existing systematic and high-quality reviews.”

Information sources

The review drew on both academic and grey literature, with priority given to existing systematic and high-quality reviews, including particularly the reviews and technical brief on the prevention of wasting developed by ENN in 2018 and 2021 (Emergency Nutrition Network, 2018; Sadler, Sessions, N. and Khara, T., 2021). A rapid literature search using the online libraries of Google Scholar,¹ MEDLINE (through PubMed), CENTRAL (through Cochrane Library), and the World Health Organization (WHO) library database, as well as WFP, the World Bank, the United Nations Children's Fund (UNICEF), the United States Agency for International Development (USAID) Advancing Nutrition, ENN, International Food Policy Research Institute (IFPRI) and the global nutrition cluster, supplemented the literature sourced through existing reviews and stakeholder networks. A manual search of some bibliographies to identify potentially relevant published studies was also conducted. We also used a snowball-type approach, whereby we reviewed relevant citations in the articles identified in our online search; this was especially useful for finding newer articles within our search timeframe.

Key stakeholders and contacts known to be actively working on the prevention of wasting were contacted to support the identification of relevant key published, ongoing and yet to be published, and grey literature, including some country experiences of wasting prevention programming (see Annex 2, which lists the stakeholders who provided materials).

Both the search strategy and the eligibility criteria were guided by the PICO framework to delineate the question of focus for the review and to define inclusion and exclusion criteria. The PICO is presented below.

P	Population	Households targeted for food assistance, children aged zero to five years, pregnant and breastfeeding women, women of reproductive age. Those living in low- and middle-income countries.
I	Intervention	Prevention of wasting interventions that address food-related needs in humanitarian/food insecure contexts.
C	Comparison	Any or no comparison.
O	Outcome	Incidence and/or prevalence of wasting, dietary diversity.

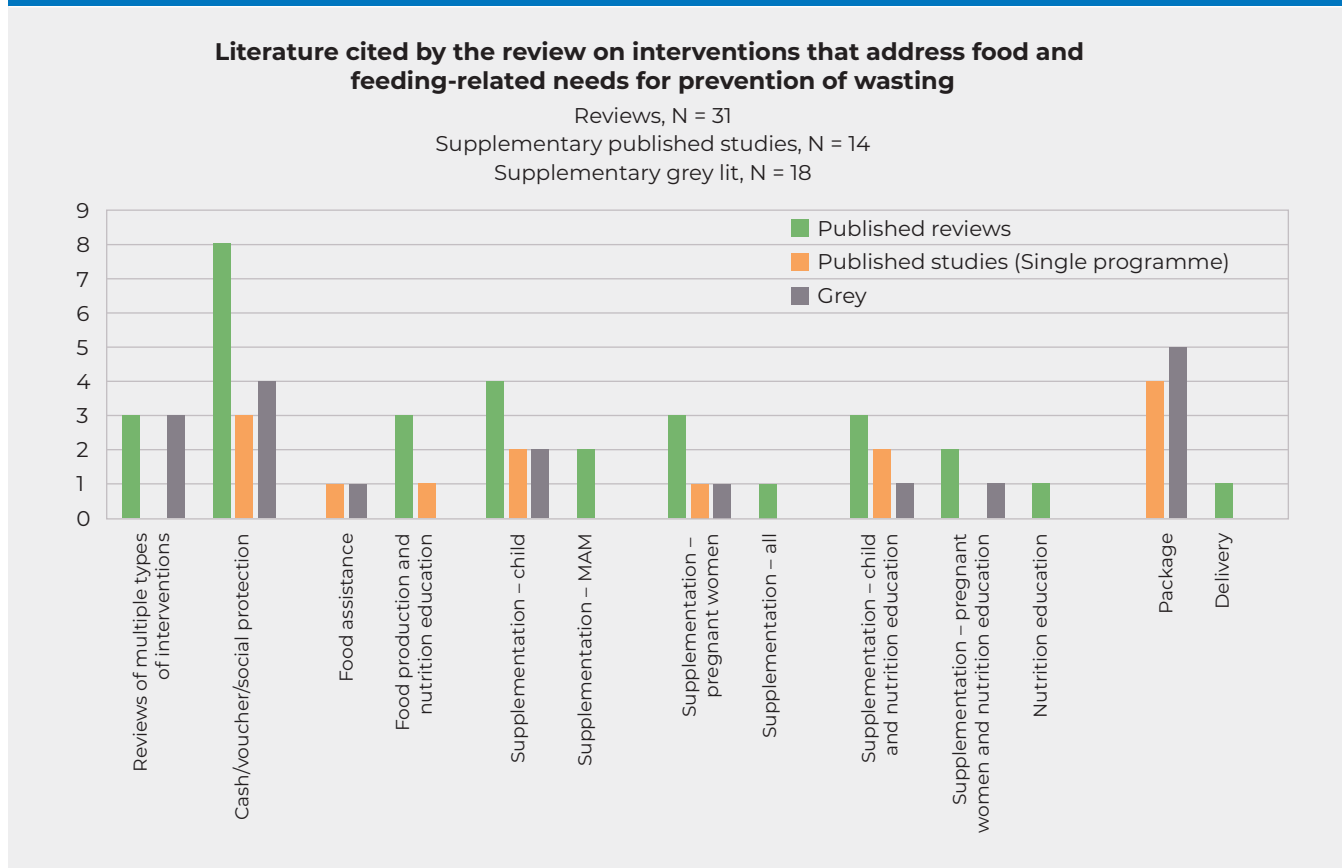
¹ Google Scholar is now the biggest academic database and search engine, and has been shown to have similar recall to PubMed for both overall search results (71% vs 69%) and full-text results (43% vs 51%). Importantly, it has also been shown to return the most complete search results, covering a breadth of literature, including that found in the grey literature. Accessing this literature was considered to be important for this review.

Search strategy

First, a broad search strategy was performed in PubMed without time or other restrictions, using index terms; e.g., [(prevention OR determinants) OR (assistance OR intervention) AND (wast* OR food insecurity) AND (adolescent OR maternal OR child OR pregnant OR breastfeeding OR lactating OR infant) AND (food assistance OR nutrition OR social protection OR food security) AND (low- and middle-income countries)]. This was an iterative process that was designed to capture as many relevant papers as possible. The first iteration returned over 700 papers, including irrelevant ones. To refine and reduce this number, we decided to apply a filter whereby we only included papers published in the last 10 years (443 papers) and then to only include RCTs, reviews and systematic reviews and meta-analyses (110 papers). This search strategy was then used in a Google Scholar search. A review of the first 10 pages of each paper was deemed sufficient to maximise relevance and reduce repetition. This search identified a further 31 papers. References from other, mostly grey, sources added a further 60 papers/reports.

Following screening of titles and abstracts and the exclusion of irrelevant papers and duplicates, we ended up with 140 papers. During the data extraction process the full text was examined in more detail, allowing for further exclusion of some papers, including studies that were well-covered by systematic review papers. We ended up with 63 papers to cite in the review, plus three WHO guidance documents. Figure 1 below presents the literature cited by type of study. Annex 3 summarises data from the core publications drawn on for the review. The reference list for this review is split into those papers that are cited in this review and those additional papers that we looked at for information but have not cited.

Figure 1: Literature cited by type of paper





Results

“A child living in a household that is described as being food insecure is at risk of one or more forms of malnutrition.”

Results

Household-level assistance

A child living in a household that is described as being food insecure is at risk of one or more forms of malnutrition (depending on the context) (FAO *et al.*, 2022). Household-level assistance programmes, such as those aimed at increasing home food production (e.g., kitchen gardens) or those aimed at protecting assets and livelihoods, such as general food assistance programmes (e.g., CVAs and in-kind assistance), are often targeted at crisis-affected and vulnerable households and individuals to address food needs. However, these programmes on their own may not be enough to prevent wasting, either because the causes of wasting are not linked only to food insecurity at the household level and/or because these programmes do not tackle food insecurity sufficiently; i.e., they do not address important barriers, such as the causes of food insecurity, as well as intra-household dynamics and sharing, inequalities in decision-making, lack of cooking facilities, lack of knowledge on food storage and safety, and competing non-food expenses (e.g., on health).

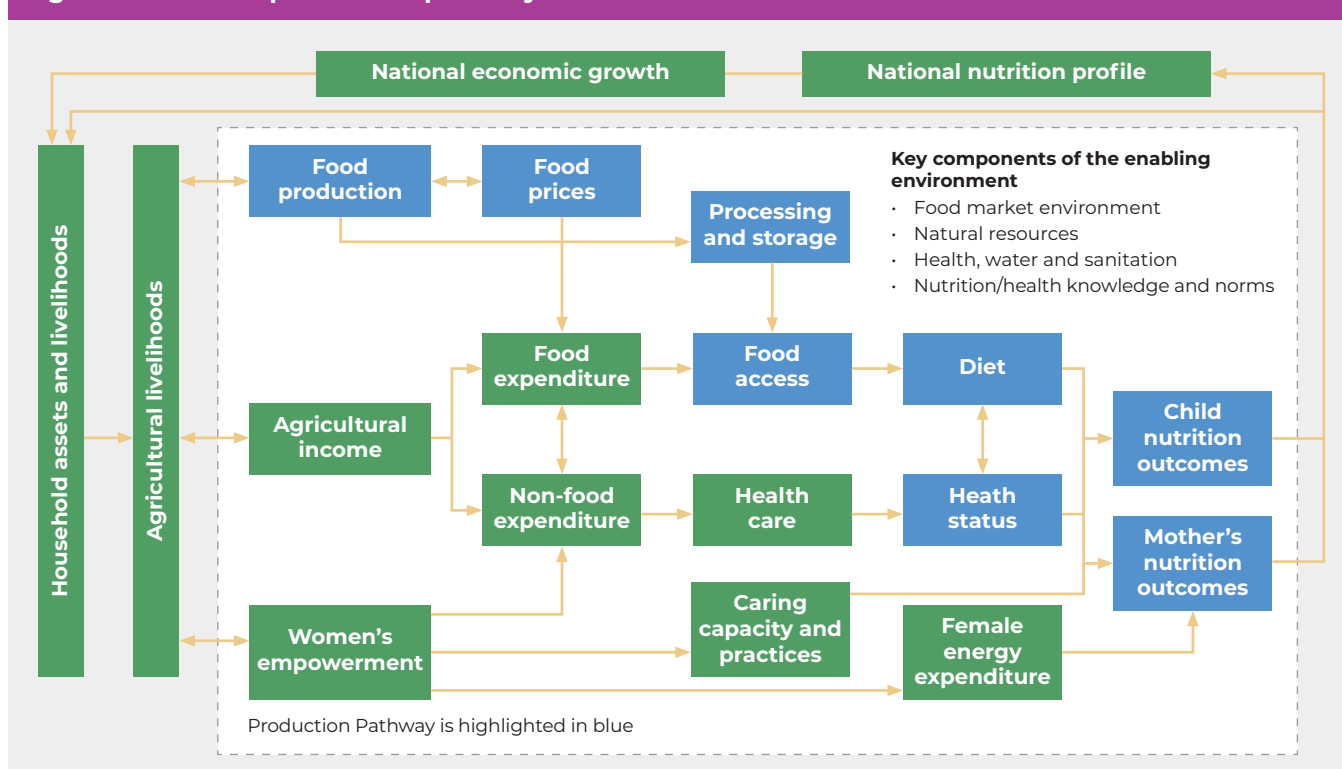
While the main objectives of household-level assistance often focus on addressing household food insecurity and are not primarily designed to address malnutrition at the individual level, there can be spill-over effects onto nutrition outcomes. This review of the evidence specifically examines the impact of household-level assistance programmes that have a nutrition objective, on the nutrition outcomes of women and children.

i. Home food production

Introduction and impact pathway

The main pathways from home food production to delivering nutrition outcomes are directly through 'own production' (for own consumption) to increase the household supply of nutrient-dense food, or more indirectly through 'income' from sales of produce, and women's empowerment, through caring and her own nutrition (see Fig 2).

Figure 2: The food production pathway



Source: Source: SPRING, 2014.²

2 SPRING (2014) 'Understanding the Food Production Pathway. Brief #2'. *Improving Nutrition through Agriculture Technical Brief Series*. Arlington, VA: USAID/ Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) Project.

All three pathways are interrelated and are expected to impact dietary diversity and access to health and care practices to drive improvements in nutritional status. Increasing the supply of home food production – e.g., through nutrition-sensitive agricultural interventions, such as providing seeds, and training in and use of bio/fortified crops – is therefore warranted. However, the assumption that the same theories and impact pathways will apply in regard to the needs and practices of nutritionally vulnerable populations as apply for non-nutritionally vulnerable settings needs to be further examined (Baliki *et al.*, 2023).

Evidence summary

While the evidence for the impact of household food production on nutritional status is mixed, the six reviews identified all highlighted significant improvements in dietary diversity in children (Girard *et al.*, 2012; Olney *et al.*, 2021, 2022; TASC, 2021; Bassey *et al.*, 2022; Margolies *et al.*, 2022) and also in women, including an increase in vitamin A intake (Girard *et al.*, 2012; Olney *et al.*, 2021, 2022; TASC, 2021). Overall, the evidence supports a limited impact on child nutrition status, although there may be a small effect on stunting (Bassey *et al.*, 2022), and while the impact on nutrition status in children from the meta-analysis by Girard came back as 'no overall effect', some individual studies did show significant improvements in child malnutrition (Girard *et al.*, 2012). In these studies, the focus was on the production of foods that were rich in both macronutrients and micronutrients and the interventions included strategies that promoted orange-flesh sweet potatoes and legumes or included animal production. However, it was not clear as to the pathways through which these improvements operated; i.e., either own production (and consumption) and/or income (Girard *et al.*, 2012).

Two of the reviews further illustrated the importance of having a nutrition-focused home food production strategy, whereby a nutrition SBC component had an impact on dietary diversity (Olney *et al.*, 2021; Margolies *et al.*, 2022) and on child wasting (marginal) and anaemia (Olney *et al.*, 2021). This is covered in the 'packages' section below.

Research gaps

There are significant gaps in the evidence between existing research and the needs and current practices in humanitarian settings. Non-crisis theories and impact pathways of own food production (e.g., home garden programmes) might not hold in crises-affected settings. More evidence is needed from wider settings to be able to provide information on the pathways through which these home garden interventions may have the greatest impact on nutrition results.

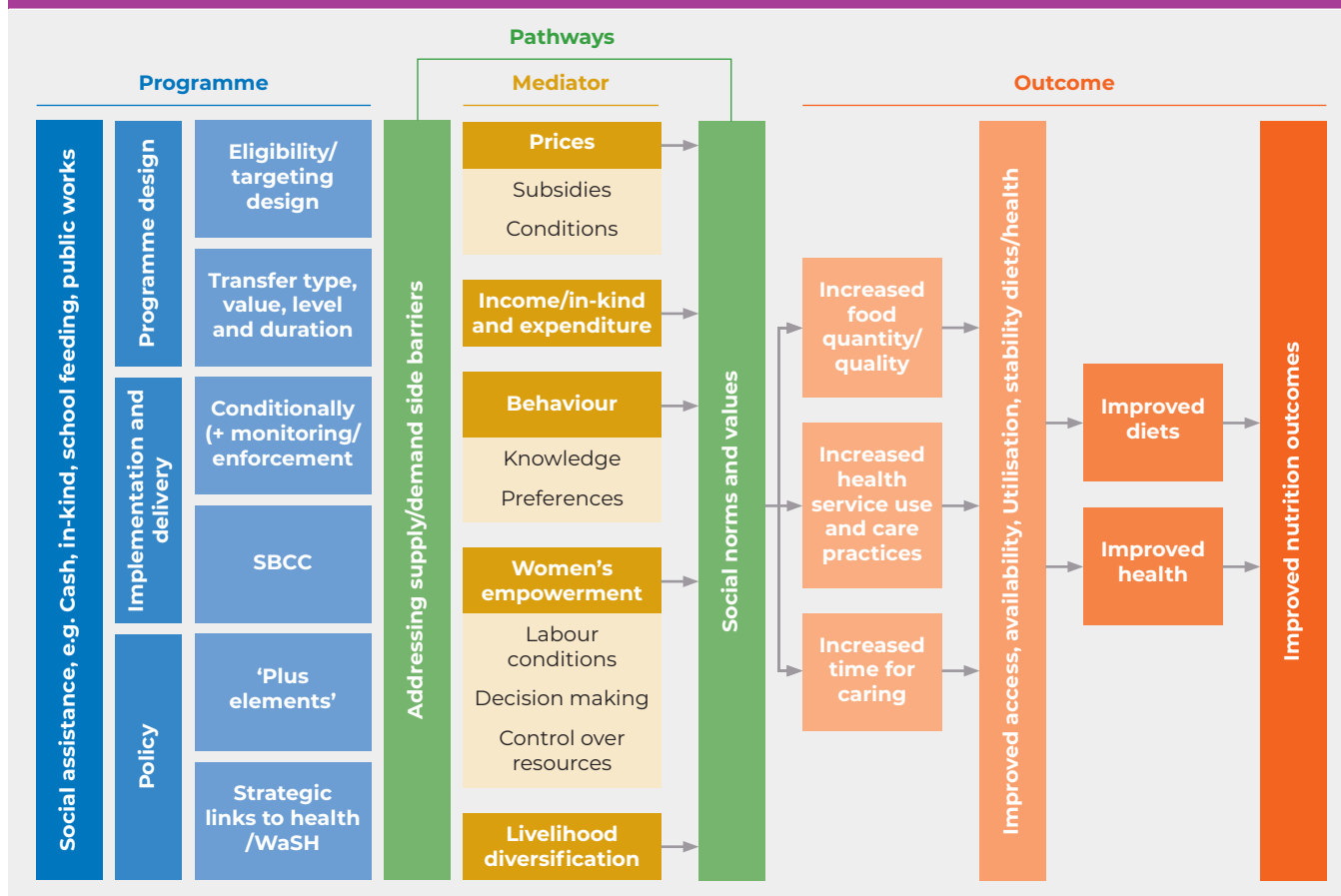
ii. Food assistance (cash, vouchers and in-kind assistance)

Introduction and impact pathway

Social protection in the form of food assistance is intrinsically nutrition-sensitive as it targets food insecure and nutritionally vulnerable households, mainly addressing the underlying determinants of malnutrition. Depending on the type of programme, the immediate determinants of malnutrition are sometimes addressed; e.g., through nutrition SBC as a component of a food assistance programme. This section is particularly concerned with household food assistance in the form of in-kind food and CVAs as platforms to support the nutrition status of mothers and young children who are at risk of becoming malnourished, as well as sustaining nutritional status after successful recovery from severe acute malnutrition (SAM) or moderate acute malnutrition (MAM).

Household in-kind food assistance (e.g., general food distribution) is where a vulnerable household affected by a crisis is provided with a food ration or basket (including fortified staples in some cases). This may be blanket or targeted, depending on the situation and context. While they are originally meant to be for short-term emergency relief, more often these programmes are extended due to protracted situations where needs continue post-crisis, especially in areas where child malnutrition is persistently high, and where there is no social protection scheme available. CVA is the general term for programmes that provide cash as unconditional cash transfers (UCTs) or conditional cash transfers (CCTs), or as food vouchers that are exchangeable for goods and services, directly to household recipients, and which may be part of a wider social protection programme (often either as an extension to a larger section of the population or an augmentation of the transfer value).

Figure 3: Indicative pathways from social assistance to nutrition outcomes



Source: TASC, 2021; adapted from Alderman, 2016.

The pathways through which food assistance impacts nutrition outcomes are well captured in Figure 3 below ((TASC, 2021) adapted from (Alderman, 2016)) and can lead to improvements to household food security, access to health services and time available for care. However, the evidence available is not sufficient to capture all these pathways in detail: for example, how food assistance affects all the different mediators identified, which themselves are not the objectives of food assistance, but which can be important barriers to improving nutrition outcomes.

Evidence summary

In-kind food assistance

The evidence on the impact of household in-kind food assistance on nutrition, including in regard to preventing malnutrition and sustaining the recovery of treated children, remains very limited (Olney *et al.*, 2021). While the aim behind providing in-kind food assistance is to address food insecurity, preventing childhood malnutrition is generally not a main objective. Some evidence that does

exist includes examples where there have been unprecedented cuts to household food rations. In one such case, the reduction in household food rations was compensated for by the provision of SQ-LNS to children aged six to 23 months. However, this intervention was deemed insufficient since the same positive progress in the growth of children witnessed before the ration cut was not seen after the cut (Fenn *et al.*, 2021; Haider, 2022). A review by Olney showed that the provision of in-kind transfers led to improvements in household diets, women's dietary outcomes and children's dietary intake, but not in their anthropometric outcomes, except for stunting and anaemia in children where interventions had included pregnant women and lasted the full 1,000 days from conception to the child reaching 2 years old and where in-kind food transfers were given alongside other nutrition interventions³ (Olney *et al.*, 2021).

³ SPRING (2014) 'Understanding the Food Production Pathway. Brief #2'. *Improving Nutrition through Agriculture Technical Brief Series*. Arlington, VA: USAID/Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) Project.

A further review evaluating the impact of targeted food distribution (in various forms and with added programme components, such as protein and micronutrient supplementation, with or without SBC) to pregnant women on maternal, neonatal and child outcomes saw a reduction of small for gestational age (SGA), stunting and wasting, and an increase in birth weight and birth length (Lassi, Padhani, *et al.*, 2020). The other few examples come from grey literature (e.g., from Mali and Niger (Kaul, 2018)) that reinforces the message around the provision of multiple forms of assistance – e.g., nutrition-sensitive combined with nutrition-specific approaches – being better than a singular intervention alone. The evidence for the nutrition impacts of packages of interventions is explored further below.

The quality and safety of in-kind assistance is crucial to meet the minimum nutrient requirements of a vulnerable population. Regulations exist to ensure food is fit-for-purpose to achieve the intended outcomes in a cost-effective manner (Webb, Caiafa and Walton, 2017). The fortification of staple foods has been used in many countries as a cost-effective measure to reduce micronutrient deficiencies, while increasing the availability and lowering the cost of nutritious foods. Successful large-scale strategies at the population level include the universal iodisation of salt, and staple food fortification of rice, wheat flour and maize flour with iron, folic acid and other micronutrients in countries where these foods are major staples. Iron fortification is an effective strategy for reducing maternal anaemia, which contributes to 12% and 19% of LBW and preterm births, respectively – both causally linked with wasting (Keats, Charbonneau, *et al.*, 2021). A Cochrane review found that food fortified with multiple micronutrients, when compared to no intervention, may reduce iron-deficiency anaemia and vitamin A deficiency by 72% and 58%, respectively, and may also contribute to reducing wasting (Das *et al.*, 2019). While fortification has been shown to be effective, more recent evidence has emerged that questions the effectiveness of biofortified crops. The study by van Ginkel concluded that 'biofortification has not delivered on its promises and that an associated yield penalty means that it may never be able to' (van Ginkel and Cherfas, 2023).

CVAs

There is a growing body of published evidence on nutrition outcomes relating to household CVAs, although often with conflicting or inconclusive results (UNICEF, 2020a). There are also important gaps in the evidence, which makes it difficult to establish pathways and causal links and, therefore, to identify the best way to implement CVAs for nutrition in specific contexts. A review in 2017 concluded that 'the evidence on the relative effectiveness of UCTs and CCTs remains very uncertain' (Pega *et al.*, 2017). However, since this review, several other systematic reviews have been carried out (n=7), somewhat reinforcing the quality of the evidence (Durao *et al.*, 2020; Leroy, Koch, *et al.*, 2021; Little *et al.*, 2021; Olney *et al.*, 2021, 2022; Manley, Alderman and Gentilini, 2022; van Daalen *et al.*, 2022), as well as a narrative review (UNICEF, 2020a) and a literature review on social protection policies and programming (TASC, 2021). Other papers discussing interventions that have included CVAs as part of a nutrition intervention package are covered in the section below on packages; e.g., (Guyatt, H *et al.*, 2020; Salmuth *et al.*, 2021; McWay, Prabhakar and Ellis, 2022).

Despite the persistent calls for stronger evidence from better-designed CVA evaluations only a few patterns are emerging. There is evidence that household-level CVAs, in general, can lead to an improvement in the dietary diversity of both women and children (Durao *et al.*, 2020; TASC, 2021; van Daalen *et al.*, 2022) (UNICEF, 2020a), through increased household incomes, and with transfer size and type being an important consideration (Trenouth *et al.*, 2018; TASC, 2021; Manley, Alderman and Gentilini, 2022). Some evidence exists on the greater impact of UCTs, compared to CCTs, on household food security (Durao *et al.*, 2020). However, the evidence of the impact of CVAs on anthropometric outcomes (women and children) and growth in children is not as cohesive, except perhaps for stunting in children. For example, the use of UCTs and food vouchers, but not CCTs, and 'CVA+ food transfers', but not 'CVA+ SBC' programmes, led to reductions in childhood stunting (Durao *et al.*, 2020; Little *et al.*, 2021).

Surprisingly, there is less evidence of an impact on wasting, especially given that CVAs have become increasingly popular as a food assistance approach in humanitarian settings. Four of the reviews pointed towards a (small) positive impact of CVAs on wasting (Little *et al.*, 2021; Olney *et al.*, 2021; Manley, Alderman and Gentilini, 2022; van Daalen *et al.*, 2022) (van Daalen CCT only). However, the heterogeneity of studies in the reviews has been highlighted by several authors (Little *et al.*, 2021; Olney *et al.*, 2021), which leads to questions around whether or not the results of different studies should be pooled, given the possibility of producing misleading conclusions. The combining of quality research studies to create meaningful evidence from systematic reviews is an important consideration for policy and programming decision-makers as the effectiveness of general food assistance programmes (CVAs and in-kind assistance) may differ by modality type, implementation and outcome assessed. For example, one review highlighted the lack of impact of a UCT on acute malnutrition in humanitarian settings (van Daalen *et al.*, 2022), whereas another suggested that 'CVA+ food transfer' could potentially prevent wasting in a crisis situation (Little *et al.*, 2021). Another showed that providing in-kind transfers (with fortified foods) was more effective in regard to children's WLZ/weight-to-height Z-score (WHZ), and women's and children's haemoglobin concentration, and decreasing anaemia prevalence, than CVAs (Olney *et al.*, 2022). And yet another review pointed out that CVA given together with specialised nutrition foods was identified as 'a promising strategy' for preventing malnutrition (UNICEF, 2020a). This can be compared to the TASC review, which found that food assistance programmes were not consistently effective in reducing anaemia and improving micronutrient status, even when the programme was distributing micronutrient-fortified food for children (TASC, 2021).



Finally, one review assessed the impact of general food assistance programmes on birth outcomes, although also noting that the quality of these studies was questionable. This review concluded that general food assistance programmes have a positive impact on birth weight and neonatal mortality (Leroy, Koch, *et al.*, 2021). However, they concluded that more data is needed to address the underlying mechanisms of impact to have a better understanding of the pathways through which food assistance programmes work, as well as the need to assess any negative impacts, such as excess weight gain in pregnancy and reduced birth spacing (Leroy, Koch, *et al.*, 2021).

Research gaps

Overall, there is a consensus that appropriate programme design, targeting and implementation is crucial for the success of a food assistance programme. If policy and programming are to be well-informed then evidence is extremely important, especially in deciding which modality (e.g., type, value, level and duration) of food assistance; e.g., CVAs versus in-kind food transfers, or CVAs only versus CVA+. However, knowing the best way to implement a CVA in any given context is difficult when one is faced with mixed and inconclusive context-specific evidence. In fact, it is the heterogeneity between studies, including modality, programme design features, implementation fidelity, and objectives, that makes syntheses and meta-analyses of the data on food assistance programmes and nutrition results difficult. One thing the above reviews do share in common is a call for more evidence generation, with better-designed evaluations and consistency in programme and evaluation designs across different programmes and contexts.

Targeted nutrition support

Complementary feeding and nutrition supplementation for children

Introduction and impact pathway

In the period when children are between six and 23 months of age, they are no longer sufficiently nourished by breast milk alone and require nutrient-dense complementary foods.⁴ In settings where food insecurity is common, complementary foods are typically inadequate in quantity and quality so children in this age group often experience growth faltering. The most recent data on the quality of complementary foods and feeding practices indicate that, globally, two in every three children aged six to 23 months (72%) are not fed even the minimum diverse diet needed for healthy growth (UNICEF, 2020b). In addition, wasting among these children commonly increases at specific times of the year, often coinciding with pre-harvest depletion of food stocks, rises in food prices and/or increased disease transmission as a result of the rainy season (Young and Marshak, 2018). Interventions that improve the availability and consumption of high-quality complementary foods by young children are therefore central to the prevention of both wasting and stunting (Keats, Das, *et al.*, 2021). Here, we refer to support for malnourished children as supplementation and the addition of foods/specialised foods to improve the quality of young children's diets generally as complementary feeding interventions.

“Globally, two in every three children aged 6 to 23 months are not fed even the minimum diverse diet needed for healthy growth.”

⁴ Complementary foods are foods or drinks (e.g., infant cereals, fruits, vegetables, water) given to young children in addition to breast milk or infant formula. WHO recommends their introduction from six months of age.

Evidence summary

SQ-LNS

The 2021 Lancet nutrition series stated that evidence in support of the use of SQ-LNS among at-risk children is strong and, in contrast to micronutrient powders alone, the benefits on growth and anaemia are advantageous (Keats, Das, *et al.*, 2021).

This recommendation was based on data from earlier trials such as that reported by a 2019 systematic review (Das *et al.*, 2019) that found that SQ-LNS given with complementary foods (i.e., those provided through the normal home diet) to infants and young children aged six to 23 months of age reduced the prevalence of moderate stunting by 7%, severe stunting by 15%, moderate wasting by 18%, moderate underweight by 15%, and anaemia by 21% versus no intervention. The review also found that the effects of using SQ-LNS were probably better than those supported by interventions using other fortified blended foods (FBFs): of the 2,290 participants (two studies) used for this comparison there was a relative risk reduction for moderate wasting of 21% and for severe wasting of 36% with SQ-LNS versus FBFs. In addition, SQ-LNS was found to be more effective in reducing stunting if it was provided for a duration longer than 12 months but showed no difference on the prevalence of moderate wasting when provided for a duration of six to 12 months and more than 12 months.

More recently, a participant data meta-analysis of 14 RCTs of SQ-LNS provided to children aged six to 24 months of age ($n > 37,000$) confirmed many of these findings (Dewey *et al.*, 2022). It found that children who received SQ-LNS for at least three months had a 12–14% lower prevalence of stunting, wasting and underweight; had a 16% lower prevalence of anaemia; and had a 64% lower prevalence of iron-deficiency anaemia compared with control group children who received no intervention (Dewey *et al.*, 2022). The effects of SQ-LNS generally did not differ by study-level characteristics, including region, stunting burden, malaria prevalence, sanitation, water quality, duration of supplementation, frequency of contact, or average compliance with SQ-LNS, although trials with higher-than-average reported compliance ($\geq 80\%$) with consumption of SQ-LNS and that provided SQ-LNS for durations of longer than 12 months tended to have greater relative reductions in wasting (17% versus 7% for compliance and 18% versus 11% for duration) (Dewey, Wessells, *et al.*, 2021).

Coverage also appears to be an important modifier of impact in a recent evaluation of integrated prevention and treatment programmes to reduce child wasting in Mali and Burkina Faso (Huybregts, L. *et al.*, 2022). In Mali, the distribution of preventive SQ-LNS within an integrated package of services to strengthen the continuum of care for child wasting did not lead to a significant impact on the longitudinal prevalence of child wasting but did reduce the incidence of child wasting by 20% ($p < 0.05$), SAM by 19% ($p < 0.05$) and MAM by 21% ($p < 0.05$) (Huybregts *et al.*, 2019). In Burkina Faso, a similar programme did not see the same impacts on the incidence of acute malnutrition, most likely due to important differences in the delivery strategy (Becquey *et al.*, 2019). In Mali, community distribution of SQ-LNS rapidly achieved 60% coverage such that the majority of infants from six months onward were receiving SQ-LNS every month over the intervention period. In Burkina Faso, coverage for delivery via growth monitoring at health centres only surpassed 50% for children at nine months of age and hovered around 40% for the remaining nine months. The study authors suggested that as acute malnutrition incidence reaches its peak between nine and 13 months of age it is crucial to reach infants early in the weaning period to avert episodes of wasting.

Effects of SQ-LNS on stunting, wasting, low mid-upper arm circumference (MUAC), and small head size were greater among girls than among boys; effects on stunting, underweight, and low MUAC were greater among later-born (than among firstborn) children; and effects on wasting and acute malnutrition were greater among children in households with improved (as opposed to unimproved) sanitation (Dewey, Wessells, *et al.*, 2021).



Photo credit: ©WFP/Evelyn Fey

It is of value to note that researchers designing trials to evaluate SQ-LNS have recognised that the provision of supplements needs to be accompanied by appropriate messages. These include not just information about the use and storage of SQ-LNS, but also messages that emphasise recommended infant and young child feeding (IYCF) practices. These messages have typically included the promotion of breastfeeding, the introduction of complementary foods at six months of age, and recommendations regarding dietary diversity and feeding nutrient-rich complementary foods. These messages have usually been provided to both intervention and control groups, to reinforce the normal IYCF messages already promoted in the study location. Some studies have gone further by providing expanded SBC communication on IYCF. Thus, provision of SQ-LNS generally occurs within an overall context of a package of services aimed at improving IYCF, not as an isolated intervention solely focused on delivering a product (Dewey, Stewart, *et al.*, 2021).

Other complementary feeding interventions

A recent review (Ickes, Craig and Heidkamp, 2022) found that while complementary feeding intervention studies that provided SQ-LNS were most likely to show an impact on one or more wasting outcomes (66.6% of these studies included in the review indicated reduced wasting), other intervention types, such as those supporting fortified complementary foods or household/child-specific staple foods, also had a positive impact on wasting (27.3% and 37.5% of studies, respectively).

The cost-effectiveness of four specialised nutritious foods (ready-to-use supplementary foods (RUSF), corn-soy-whey blend (a new formulation) with oil, SuperCereal Plus, CSB Plus (or supercereal) with separate fortified vegetable oil) to prevent stunting and wasting in children aged six to 23 months was examined in Burkina Faso (Cliffer *et al.*, 2020). Overall, the results of this study indicated that RUSF used in this setting were not significantly more effective in preventing stunting and wasting than commonly programmed CSB+ with oil (standard of care), and they were considerably more costly. It is unlikely, however, that RUSF would be recommended for prevention except in very food insecure situations where medium-quantity lipid-based nutrient supplements are sometimes used in blanket programmes.

Other systematic reviews have also concluded that complementary feeding interventions that included the provision of food or a nutritional supplement with or without an education component, and in the absence of household assistance, had a small but significant impact on length-for-age Z-score (i.e., height-for-age Z-score but for children under age two) and WLZ, particularly in food insecure contexts, but that nutrition education alone only impacted the former (Panjwani and Heidkamp, 2017). Caregiver education or counselling about appropriate complementary feeding practices was found to be an effective strategy to improve food and nutrient consumption, knowledge and dietary practices in complementary feeding in settings where households had sufficient resources and access to healthy diets to put the recommendations into practice (Panjwani and Heidkamp, 2017; Lassi, Rind, *et al.*, 2020) but had limited impacts on child anthropometry (Jardí, Casanova and Arija, 2021).

Treating moderate wasting with specialised foods

The treatment of moderate wasting can be an effective strategy for addressing the burden of wasting and reducing the incidence of severe wasting. A 2019 review found that the provision of supplementary foods supported the recovery from moderate wasting and that these foods were more effective at promoting anthropometric recovery than nutrition counselling, with or without the addition of micronutrient supplements (Lelijveld *et al.*, 2019). The type, quality and duration of supplementary food provided is important, however. The effectiveness of dietary management for moderate wasting among children over six months of age has recently been examined by a systematic review and meta-analysis (Cichon *et al.*, 2023). It found that LNS (such as RUSF and RUTF) improved recovery compared to non-enhanced FBF, but were comparable to enhanced FBF (improved with micronutrients and/or milk). This aligns with recently released WHO guidance that recommends that where children with MAM are identified as needing specially formulated foods they are provided with the following 1) LNS, as the preferred type; 2) when LNS are not available, with FBF with added sugar, oil and/or milk (improved FBF); and 3) FBF with no added sugar, oil and/or milk (WHO, 2023b).

Micronutrient supplementation

A recent systematic review of micronutrient supplementation and fortification interventions for young children compared the effect of micronutrient supplementation with that of an inactive (i.e., placebo, no intervention, or standard of care) or active (i.e., a different composition of micronutrients or comparison of multiple micronutrient supplementation (MMN) supplementation with LNS) control intervention (Tam *et al.*, 2020). While certain outcomes, such as anaemia, responded to several intervention types, stunting and underweight were improved only among children who were provided with LNS, though MMN supplementation also slightly increased LAZ.

Research gaps

While evidence suggests that effects on wasting for vulnerable populations with interventions using SQ-LNS in food insecure areas are generally more consistent, and more substantial, compared with other nutrition interventions (such as nutrition education, micronutrient supplementation or fortification, FBF) for children under two years of age, there remain important questions linked to the targeting of, and maximising the benefit of, SQ-LNS. Effects on wasting appear to be greater where the potential to benefit is greater; i.e. populations have greater nutritional deficits and where other constraints on response are alleviated. For this reason, evidence suggests that a greater impact of SQ-LNS might be obtained by co-packaging them with interventions that alleviate these constraints, such as the prevention and control of prenatal and child infections and inflammation; improving access to health care, including mental health care for women; and promoting early child development interventions that promote responsive caregiving. There is a need for better understanding, and better definitions, of this across different programming contexts.

There also is limited evidence on the cost and cost-effectiveness of providing SQ-LNS to young children. Recent work estimated the cost of SQ-LNS at USD 0.07–0.14 per day (not including distribution costs, which can be substantial), depending on the scale and the location of production (Dewey, Stewart, *et al.*, 2021). There is emerging evidence from Uganda, Madagascar and Niger that suggests that when included in existing platforms for promoting healthy growth and development, such as community health worker programmes, SQ-LNS may be a cost-effective intervention in terms of costs per disability-adjusted life year (Adams, K.P., 2022). In this context, SQ-LNS may be more cost-effective for the prevention of wasting than other options, such as micronutrient powder (MNP) or the provision of complementary food, although the total cost for a programme including all age-eligible children would be high. The authors suggested that strategies to reduce costs, such as targeting to the most vulnerable populations and the elimination of taxes on SQ-LNS, may enhance financial feasibility but this is all yet to be evaluated.

Nutrition supplementation and breastfeeding support for pregnant and breastfeeding women

Introduction and impact pathway

Maternal nutritional status at the time of conception, during pregnancy and through breastfeeding is an established determinant of child survival, growth and development. A high prevalence of wasting (being wasted) and stunting (being stunted) is present in infants at birth – recent estimates suggest that 30% of wasting and 20% of stunting occurs during pregnancy (Mertens, Benjamin-Chung, Colford, Hubbard, *et al.*, 2023). Mothers' characteristics and experiences going into and during pregnancy are therefore critical predictors of wasting and stunting in infants. Wasting in early life leads to an increased risk of wasting in later life.

Recent data from South Asia and sub-Saharan Africa have shown that wasting occurs most frequently in the first three months of life, is closely associated with birth outcomes, such as LBW and SGA, which are common across Africa and Asia, and that being wasted during the first six months of life leads to an increased risk of subsequent wasting and stunting during later childhood (Harding, Aguayo and Webb, 2018; Mertens, Benjamin-Chung, Colford, Coyle, *et al.*, 2023). As a result, actions to prevent LBW, SGA, wasting and stunting during pregnancy and early infancy are likely to have impacts that extend throughout childhood.

Evidence summary

BEP and LNS supplementation

Currently, WHO recommends BEP food supplements in settings with high prevalence of undernourished pregnant women (over 20%) (World Health Organization, 2016). BEP food supplements are foods in which protein provides less than 25% of the total energy content. They can come in several forms, such as fortified cereals, biscuits, beverages, or sachets, and can be made using locally sourced ingredients. A systematic review of trials conducted in Asia, Africa, the Middle East, and South America showed that BEP supplementation during pregnancy reduced the rates of stillbirth, LBW and SGA by 61%, 40%, and 29%, respectively, and increased mean birth weight (Lassi, Padhani, *et al.*, 2020).

BEP supplementation is a context-specific recommendation for food insecure populations and settings with a high prevalence of undernourishment among women of reproductive age (15–49 years). The Lancet (2021) Series on Maternal and Child Undernutrition Progress stated that although food distribution programmes appear to have benefits for women, BEP supplements are more likely to have greater effects; thus The Series recommended that 'food supplements for women in food insecure households should be tailored to provide a reasonable balanced energy and daily protein balance' (Keats, Das, *et al.*, 2021). In contrast, evidence for any positive impact on infant growth of postnatal supplementation is limited (Salmuth *et al.*, 2021).

Some LNS products qualify as BEP and some do not; however, BEP are not always fortified with micronutrients. A recent Cochrane review that analysed the impact of LNS irrespective of composition, dose or duration of supplementation, found that LNS in pregnancy had positive impacts on birth weight, length and risk of SGA neonates when compared to iron and folic acid (IFA) supplementation, but no benefit for maternal or birth outcomes when compared to MMS (see next section) (Das *et al.*, 2018).

A more recent analysis in India, Pakistan, Mali and Tanzania showed that, while supplying BEP supplementation (containing MMS) universally to women at ante-natal care has the greatest impact on child health and nutrition outcomes, a targeted approach of providing BEP supplementation for underweight women and providing MMS to women with an adequate BMI was more cost-effective than supplying MMS alone (Young *et al.*, 2022).

Multiple micronutrients versus IFA

Prenatal MMS provide a variety of vitamins and minerals to fill the gap between the typically low micronutrient intakes observed in low-resource settings and the higher requirements imposed by pregnancy. There is now strong evidence that demonstrates that MMS containing IFA results in a consistent relative risk (RR) reduction for several outcomes, including LBW (RR reduction of 12–14%), SGA births (RR reduction of 2–9%), preterm births (RR reduction of 6–8%) and stillbirths (RR reduction of 8%), over and above the benefits provided by IFA supplements (Keats *et al.*, 2019; Gomes *et al.*, 2023).

The benefits of MMS (when compared to IFA) are even greater among anaemic and underweight pregnant women, those who initiate supplementation earlier, and those with higher adherence. Several studies have demonstrated the cost-effectiveness of MMS compared to IFA: in three South Asian countries (Pakistan, India and Bangladesh), in Bangladesh and Burkina Faso, and also in a cost-effectiveness analysis for WHO across 12 countries. The results were consistent across all the modelled scenarios, demonstrating that even with a small incremental cost for MMS compared with IFA, because of the additional micronutrients, it was highly cost-effective, with positive health outcomes for both infants and pregnant women (Sight and Life, 2023).

Breastfeeding and other support

Interventions designed to promote early-initiation, exclusive and continued breastfeeding, such as education on and support for early and exclusive breastfeeding practices, are widely supported as a cornerstone for ensuring good long-term child nutrition (WHO, 2023a).

A recent systematic review and meta-analysis (Lassi, Rind, *et al.*, 2020; Keats, Das, *et al.*, 2021) found breastfeeding education interventions supported a 20% increase in rates of early initiation of breastfeeding, a 102% increase in exclusive breastfeeding at three months and a 53% increase in exclusive breastfeeding at six months. These interventions had no effect on the prevalence of child stunting and wasting, but did lead to a 24% decrease in diarrhoeal diseases. Educational strategies were effective when delivered in all settings, including in facilities, communities and homes, although the strategies were more effective when done by health care professionals and tailored to a specific context. For notable effects, it has been found that prenatal education should continue after birth, as ongoing scheduled visits can ensure continuous support that is tailored to the setting and the needs of the population group (Keats, Das, *et al.*, 2021).

Increasing attention is being given to the needs of infants that are 'small or nutritionally at risk'. This term includes infants who are at increased risk of morbidity, mortality and/or wasting/stunting due to LBW and/or anthropometric deficit. A recent review of reviews (Salmuth *et al.*, 2021) highlighted the importance of breastfeeding interventions (as described above) for improving the growth outcomes of these infants but also some evidence for a positive impact of other interventions that improve maternal mental health and women's empowerment. Effectiveness was seen to increase when implemented as part of a multi-sectoral programme. However, there is consensus on the need for better understanding of the impact of interventions for managing at-risk mothers and infants less than six months of age in preventing future episodes of wasting/acute malnutrition in children above six months.

Research gaps

While the use of BEP and MMS has been shown to improve birth outcomes, such as LBW, there remains a need to better understand how and to what degree this can reduce the subsequent risk of wasting among children across different contexts.

Research needs in regard to maternal supplementation and breastfeeding support are now largely focused on implementation research that explores the most effective platforms and mechanisms for the delivery of interventions, particularly across different humanitarian contexts, which support accessibility and high coverage. There is also a need for more understanding of the monitoring that is appropriate and feasible for ongoing monitoring of intervention effectiveness, and evaluation of impacts for pregnant and breastfeeding women and adolescent girls themselves, and for their children.

The recent Sight and Life special report (Sight and Life, 2023) focusing on MMS has challenged WHO's proposed agenda of research needed ahead of scale-up of MMS. With regard to the need for more evidence on the effects of switching from IFA with 60 milligrams (mg) of iron to MMS containing 30 mg of iron it presents research that shows that, when compared to IFA, MMS results in comparable haemoglobin concentration and protection against anaemia during pregnancy, independently of iron dose. With regard to the need for further assessment of gestational age with ultrasound, a comprehensive analysis of 16 trials that contributed to the estimates of LBW, preterm and SGA in the 2020 WHO update of the MMS recommendation showed that most trials used high-quality methods for gestational age assessment, and effect estimates on birth outcomes were generally consistent across methods.

There is still a dearth of evidence on effective interventions to prevent wasting among at-risk mothers – the focus continues to be on impacting the outcomes of the infant at birth and beyond. There is also a need for more understanding of the support needed for breastfeeding among working women, especially in underprivileged settings (Keats, Das, *et al.*, 2021).

Packages of support

Introduction and impact pathway

The drivers of wasting are known to be diverse and interconnected, and any one child and/or community will experience a mix of the potential pathways to wasting discussed above under single intervention areas. In addition, single pathways can themselves be complex and multiple actions may be required to effectively address them. As such, a common and logical perception is that combinations of single interventions can supplement and intensify the impact of the different interventions. Packages of support are defined as where more than one intervention is provided to the same population simultaneously and that address more than one driver of wasting or that address the same driver using complementary interventions (e.g., through the addition of SBC to projects that are aiming to improve diet quality through CVAs). Combinations of interventions delivered in packages of support to address wasting can include those that address food/feeding-related and those that address non-food-related (e.g. WASH-related) pathways.

Evidence summary

Some published reviews have noted the improved impact of combining interventions on child growth. A systematic review by McWay examined the impact of early childhood development interventions on children's health in developing countries and found that combining two or more interventions in a comprehensive package can lead to considerable and statistically significant impacts on child growth outcomes including wasting and stunting (McWay, Prabhakar and Ellis, 2022). Examples of this include CCTs plus nutrition supplementation (in the case of PROGRESA); cash plus maternal education; and early stimulation curriculum and nutrition supplementation. Meta-analysis by (Dewey *et al.*, 2022) suggested that co-packaging SQ-LNS with interventions that reduce constraints on response, such as the prevention and control of prenatal and child infections, improving health care access, and promotion of early childhood development, may lead to greater impact.

This meta-analysis also found that combining SQ-LNS with IYCF behaviour change improved growth, haemoglobin and motor development scores compared with children receiving only IYCF behaviour change. Salmuth *et al.* found that while breastfeeding promotion, education, support and counselling interventions were able to show small effects on improving infant growth (i.e., preventing growth faltering) or feeding outcomes, effectiveness was increased when they were implemented as part of a multi-sectoral programme (Salmuth *et al.*, 2021). In the area of CVAs, there is some narrative synthesis that suggests that in crisis contexts cash plus food transfers (for preventing wasting) (Kerac and Seal, 2014) and cash plus primary health care (for preventing mortality) may have greater benefit than cash alone (Little *et al.*, 2021).

While standalone interventions aiming to provide SBC and to train caregivers on child health, nutrition and sanitation practices are observed – in some (mostly food secure) contexts – to have some limited impact on improving practices, there is very little to no effect observed on child growth indicators (Panjwani and Heidkamp, 2017; Lelijveld *et al.*, 2019; Ickes, Craig and Heidkamp, 2022; McWay, Prabhakar and Ellis, 2022), particularly in food insecure contexts. However, the evidence suggests that the addition of SBC to other interventions can considerably improve their impact on various nutrition outcomes.

As mentioned briefly under the discussion of food production above, a recent review and meta-analysis of nutrition-sensitive agriculture programmes (Margolies *et al.*, 2022) found that while many studies showed positive impacts on nutrition outcomes, no studies suggested a benefit in diet diversity from agriculture-only interventions (without a nutrition SBC component). Moreover, the results of the sub-group comparisons were suggestive of the additive benefit of nutrition SBC. These results suggest that the SBC components were potentially driving the effect on diets. Evidence on cash transfers and child nutrition outcomes mirrors findings above and shows that the addition of SBC can improve impacts on stunting, wasting and diet diversity, and that the content and quality of the education provided matters for programme effectiveness (Manley, Alderman and Gentilini, 2022).

For example, CVA+ SBC programmes have seen positive impacts on stunting, especially those focusing on nutrition education (TASC, 2021) and on household nutrition and WASH (Manley, Alderman and Gentilini, 2022). A UNICEF review reported that CVA+ SBC interventions can potentially be an effective strategy for preventing child malnutrition (UNICEF, 2020a). The type and intensity of SBC have been shown to be important, especially where the size of the transfer is large enough, often with a conditionality, and have encouraged preventive health-seeking behaviours in women and children (Duraõ *et al.*, 2020; UNICEF, 2020a; TASC, 2021). However, the review by UNICEF also saw no impact of CVAs on care behaviours (UNICEF, 2020).

Further evidence on the prevention of wasting is emerging from some individual studies/evaluations in some contexts as regards the value of delivering interventions that address multiple causes, but results are mixed and the heterogeneity of the combination of interventions delivered and of programme contexts make drawing broad conclusions very difficult.

An integrated prevention package in Cameroon (Ngwenyi, Jenkins and Patricia, 2019) that used the blanket supplementary feeding programme as an operational platform to deliver multiple services, including household food assistance, specialised nutritious food, SBC, and health and WASH services, improved the coverage of assistance and showed a reduction in the prevalence of wasting in all target regions. In Niger, preventive distributions combining a supplementary food and cash transfer had a better preventive effect on MAM and SAM than strategies relying on cash transfers or supplementary food alone (Langendorf *et al.*, 2014) and an evaluation in Mali of the delivery of a package of multi-sector nutrition interventions found that households living close to areas of conflict and receiving at least two forms of assistance – particularly general food distribution and school feeding – experienced statistically positive effects on nutrition outcomes, whereas the effects were not significant for households that received only one form of food assistance (Kaul, 2018).

In Chad, a package of integrated and multi-sectoral services to reduce child wasting improved maternal knowledge on nutrition and health practices, including some increased daily consumption of supercereal plus among children (Becquey, E. *et al.*, 2022). However, the coverage of the intervention was limited and this may have contributed to the absence of any impact on the prevalence of wasting or morbidity (Becquey, E. *et al.*, 2022).

In a pastoralist community in Chad, children in communities that received a multi-sectoral intervention (including nutrition, health, WASH, and food, income and markets (FIM)) were less likely to be severely wasted and underweight, and had a higher WHZ compared with control communities that received only food aid (Marshak *et al.*, 2017). In addition, this study may help to highlight the value of having a good understanding of the causes of wasting for intervention design: severe wasting in Chad has been explained by diarrhoea and fever, poor treatment-seeking behaviour, late initiation of breastfeeding, poor food security, and having an unprotected water source. In intervention communities, households who reported not regularly cleaning the container used for transporting water for household consumption were almost twice as likely to have a malnourished child. Households living in villages with larger concentrations of cattle and having more livestock sharing the same water source as for human consumption were significantly more likely to have a malnourished child. However, cleaning the water container mediated the negative impact on wasting of living in a village with a large cattle concentration.

Few studies, because of their cross-sectional nature, are able to identify and quantify the pathways of impact. However, some provide plausible evidence that effects on wasting operated through improvements in child diet and reductions in morbidity. Tubaramure, for example, a food-assisted integrated health and nutrition programme in Burundi, showed a significant protective effect on wasting and on WLZ, and increased the likelihood of children aged six to 24 months achieving the minimum recommended dietary diversity and meal frequency (Leroy, Olney, *et al.*, 2021).

The programme also improved the percentage of food secure households, and increased household energy and micronutrient consumption. The effects on many of these outcomes were attributable to the food rations (a monthly family and individual ration of CSB and micronutrient-fortified vegetable oil). Tubaramure also lowered the prevalence of symptoms of illness and fever, as reported by mothers.

Research gaps

Unpacking the complex and locally specific causes of wasting is necessary to develop appropriate and effective prevention packages. While causal analysis tools exist, there has not been wide uptake of these, due to the complexities of their implementation, and limitations in their ability to determine causality and produce results that can be used to prioritise interventions (Chalimbaud J., 2017). There is a real need for improved tools for causal pathway analysis and for gap analyses of known effective preventive measures that are feasible to implement in all settings and that better profile context-specific risks for undernutrition, as well as actions to address them.

There is a broad need for more data on the impact and cost-effectiveness of different combinations of interventions across different contexts that take into account a range of impacts and implementation modalities. For example, more research is needed on identifying effective CVA+ components and effective models of how these CVA+ programmes are designed and implemented. For SQ-LNS, an important next step is additional cost-effectiveness analyses of incorporating SQ-LNS within integrated programmes to prevent and treat wasting, taking into account the potential for reducing the number of cases of both moderate and severe wasting that would need treatment with supplemental or therapeutic foods, as well as reduced numbers of children requiring hospitalisation.

While there is growing evidence on packages of interventions for nutrition from research and evaluations, the heterogeneity of those intervention packages that have been evaluated and the different contexts in which they have been programmed make it very difficult to draw any broad conclusions.



Conclusions

“This review found there to be high-quality studies and a growing body of evidence for the prevention of wasting in nearly all of the intervention areas investigated.”

Conclusions

State of evidence on wasting prevention

In general, when looking at the state of evidence on wasting prevention with interventions that address food and feeding-related needs, this review found there to be high-quality studies and a growing body of evidence for the prevention of wasting (that includes reduction of wasting prevalence/incidence, reducing the risk of LBW, and/or improving diet diversity) in nearly all of the intervention areas investigated. Box 1 presents a summary of the evidence for each intervention area examined by this review.

Box 1: Summary of the evidence by intervention area

Household-level assistance

Home food production: This has a significant impact on women and child dietary diversity but not on child nutrition status. The pathway through which home food production may have an impact is not clear. Home food production with a nutrition SBC component is more effective than an agriculture intervention alone.

Household food assistance: In-kind food assistance can support good impacts for women's and children's dietary intakes, and also stunting and anaemia, especially when combined with other interventions. CVAs can also impact women and children's dietary diversity. CVAs may improve wasting, but there is less evidence in this regard, and impacts are dependent on programme design and context. Food assistance programmes (CVA and in-kind assistance) can potentially have a positive impact on birthweight and neonatal mortality.

Targeted assistance

Complementary feeding and nutrition supplementation for children: The use of SQ-LNS among at-risk children (< two years) reduces the prevalence of stunting, wasting and underweight. However, compliance, duration of supplementation and coverage are important modifiers. Studies that provide specialised foods, such as SQ-LNS, to young children appear to be more likely to show an impact, and more likely to show larger impacts, on one or more wasting outcomes, compared with fortified complementary foods or household or child-specific staple foods. Caregiver education/counselling can improve food consumption, knowledge and dietary practices only in settings where households have sufficient resources and access to healthy diets, but have limited impact on child anthropometry in any setting. Micronutrient supplementation interventions alone demonstrate good impacts on micronutrient deficiency, such as anaemia, but not on stunting and wasting.

Nutrition supplementation and breastfeeding support for pregnant and breastfeeding women: BEP supplementation and MMS have good impacts on birth outcomes such as LBW. Cost-effectiveness data exist for the use of MMS to improve birth outcomes and, to a lesser degree, for the use of BEP supplementation versus MMS to improve birth outcomes. Evidence is emerging to suggest a targeted approach of providing BEP supplementation plus MMS (or BEP that is fortified with multiple micronutrients) for underweight women, and that providing only MMS to women with an adequate BMI is more cost-effective than supplying MMS alone. Interventions designed to promote early-initiation, exclusive and continued breastfeeding can be effective in improving feeding practice and may improve growth, but have no measured effect on the prevalence of child stunting and wasting.

Packages of support

There is growing evidence to suggest that a combination of interventions is more effective at preventing wasting than separately implemented interventions, particularly when targeted to the same population. This is particularly true of the combination of CVAs, food supplementation and/or agricultural/food production, and of the addition of nutrition SBC to any of these interventions/intervention packages. Evidence is less strong for packages that provide broader support across multiple sectors, such as nutrition, health and WASH. Identifying and quantifying pathways of impact is challenging but there is emerging plausible evidence that effects on wasting operate through improvements in child diet and reductions in morbidity in some contexts.

Table 1 provides a visual overview of the findings from the literature review. It highlights the view of the authors on three areas: the strength of the body of evidence, evidence of an effect on wasting prevention, and the availability of cost-effectiveness data. Given the fact that this review was a rapid synthesis, this table gives a broad indication of the state of evidence, rather than a precise representation.

Table 1: State of evidence on wasting prevention by intervention area			
Assessment criteria	Body of evidence 1*	Evidence of effect on wasting prevention 2*	Cost effectiveness data 3*
Intervention area			
Home food production	■	■	■
Household assistance (in kind and CVA)	■	■	■
Complementary feeding and nutrition supplementation for children	■	■	■
Nutrition supplementation and breastfeeding support for PBW	■	■	■
Packages of support	■	■	■

1* ■ = several quality studies (including systematic reviews, RCTs);

■ = medium/limited number of quality studies;

■ = very few or no quality studies.

2* Additional work is planned to get a more accurate picture of the effect size. A rapid summary is given here.

■ = significant effects observed on wasting prevention and in several studies;

■ = modest effects observed in some trials and on outcomes along the pathway to wasting prevention (e.g., diet diversity and LBW), or effects found but in poor-quality trials;

■ = no significant effects found on any of the outcomes examined.

3* ■ = some cost-effectiveness data exist on the prevention of wasting or key outcomes on pathways to wasting (diet diversity, LBW);

■ = no cost-effectiveness data exist.

Operationalising the evidence

Critical considerations for the size of, and modifiers of, impacts on wasting outcomes include the following:

- Intervention modality of household assistance.** Careful attention is needed to decide on the most appropriate modality for household assistance (i.e., in-kind and/or CVAs), depending on the context; e.g., market functioning, supply chains, community and individual needs and preferences. The evidence around the best way to implement CVAs, considering, for example, the type, value, duration, conditionality, and targeting, is context-specific and does not fit a 'one size fits all solution'. The evidence that is clear is that household assistance on its own can impact dietary diversity. To then also address nutrition status, a combination of household assistance with other interventions, especially with a nutrition-focused SBC component, is recommended.
- Intervention coverage/uptake and convergence.** This has the potential to significantly affect population-level outcomes, such as change in the prevalence and incidence of wasting. Differences in coverage between the PROMIS trials in Mali and Burkina Faso (discussed above) are likely to have been an important contributor to the differences in impact on wasting seen between these two trials. Maximising intervention coverage requires a programme design that focuses on reducing barriers to access, including those linked to culture, geography/distance and programme quality. Similarly, and as discussed under the logic of providing packages of support, addressing multiple pathways to wasting simultaneously could improve impacts. A growth response to nutritional supplementation, for example, may be constrained by infection, foetal growth restriction, or suboptimal caregiving (Dewey, Wessells, *et al.*, 2021). Hence, integrated programmes that combine supplementation with interventions to prevent and control prenatal and postnatal infection and inflammation, optimise foetal growth via improved maternal nutrition and other strategies, and support care for women and children should be further evaluated.
- Delivery platforms and mechanisms.** Maximising coverage can be achieved through the use of various delivery strategies and platforms that have been found to improve the reach of nutrition actions. These delivery platforms include community-based platforms, financial incentives platforms, mHealth, and the use of mass media and social media (Janmohamed *et al.*, 2020) (Keats, Das, *et al.*, 2021).
- Ration size, choice of supplement and timing of supplementation.** In food insecure populations, providing larger rations, that fill a larger proportion of the nutrient gap, is likely to support better effects on nutrition outcomes. Tubaramure, a food-assisted integrated health and nutrition programme in Burundi, for example, reduced child wasting by approximately half – a much larger effect size than that seen in many other trials using supplementation (Leroy, Olney, *et al.*, 2021). This could be related, at least in part, to the larger ration targeted to children (458 kcal per day) and the supplementation during pregnancy, and suggests that an understanding of the nutrient gap among children is important for programme design. In children, timing or age of supplementation is also likely to be important, with impacts on wasting prevalence likely to be higher if supplementation targets the period of highest wasting incidence. This can vary somewhat between populations but has been found by some to peak between nine and 13 months of age, which suggests the importance of reaching infants early in the weaning period to avert episodes of wasting. Finally, choice of supplement was discussed above, with recent work suggesting that LNS may support more consistent and larger impacts than either FBF or household- or child-specific staple foods. However, consideration of programme objective and costs versus impacts will be important when choosing the supplement.
- Targeting.** To maximise impacts and cost-effectiveness, research suggests that it is important to consider the potential to benefit. This can include targeting and maximising coverage of interventions to coincide with the peak incidence of wasting, particularly linked to season and age, and by food security status (in some settings): for example, greater impacts of SQ-LNS have been seen among children with moderate to severe food insecurity than among those in households with less food insecurity.

In Burundi (Leroy, Olney, *et al.*, 2021), effects on wasting and WLZ were limited to children who had illiterate mothers or mothers who had received no education and to children in the worst-off households, defined as those that had fewer assets or had a household head without any education.

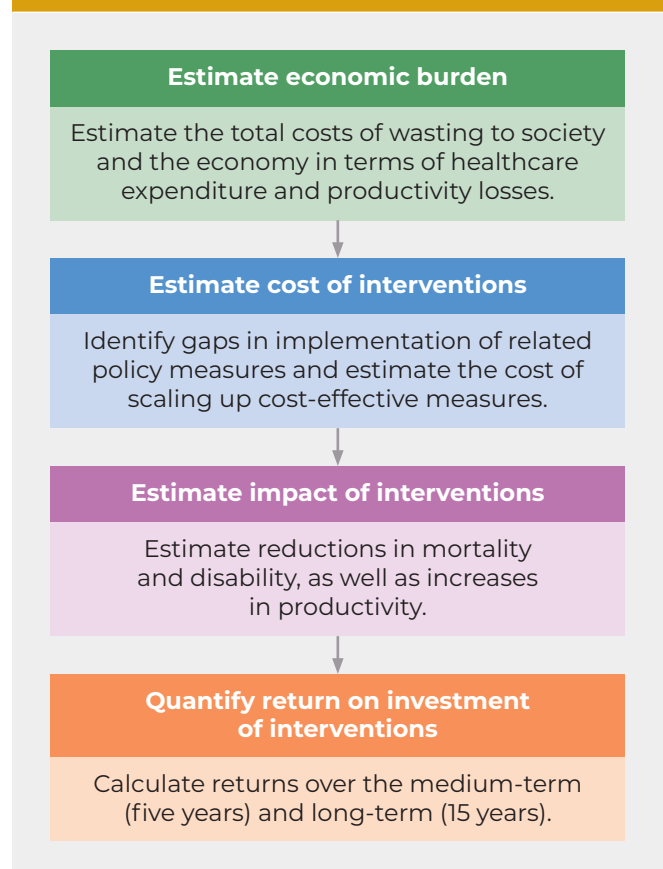
- The quality and content of the nutrition education provided.** Quality SBC is key to achieving nutrition outcomes. The evidence reviewed does not go into great detail around the content of SBC that was offered in interventions, or how it was done. There is some evidence that a longer duration of SBC is more effective than shorter sessions. In order to prioritise high-quality SBC, further understanding of the context, including current behaviours, and the factors that influence these behaviours, is necessary
- Approach to measurement of impact on wasting.** A more complete assessment of the impact on wasting burden than prevalence of low WLZ at a single time point may be the incidence rate. For example, the PROMIS Mali and Burkina Faso studies saw no difference in the prevalence of wasting between the intervention and controls arms in either study (Becquey *et al.*, 2019; Huybregts *et al.*, 2019). In Mali, however, longitudinal results indicated that the SQ-LNS intervention reduced the incidence rate of wasting by 29% compared to children in the comparison arm, and the overall risk of acute malnutrition (longitudinal prevalence) for intervention children was 30% lower, and was 37% lower for SAM.

This illustrates the degree to which prevalence can underestimate the true burden. To better measure incidence, we need to find innovative solutions that allow for regular monitoring of the primary outcomes of stunting and wasting among children under five years of age, in order to reduce the reliance on small-scale impact evaluation surveys or infrequent Demographic and Health Surveys. The resulting timely and more granular data could help to strengthen the course correction of programmes and thereby accelerate the rate of both wasting and stunting reductions among children. It could also help to better assess the impact and cost-effectiveness of interventions (Isanaka *et al.*, 2021).

Evidence gaps

This evidence analysis was carried out as an initial step to inform some of the data requirements that are set out in Figure 4, especially estimating the impact of interventions, to determine the feasibility of developing an investment case. Where it is identified that data are missing, this may lead to the need for further evidence to be acquired to develop the investment case. As such, informed decisions need to be taken on whether there are enough data of sufficient quality to develop an investment case. Our analysis presented in Table 1 above suggests that there is sufficient evidence in the key intervention areas to move ahead with a broad case for investment,⁵ with caveats to acknowledge that more evidence in some areas would help to strengthen the case.

Figure 4: The information needed to carry out the quantitative analysis for the investment case



⁵ The opinion of an economist, with experience of developing investment cases, would be important to verify this.

Gaps in evidence highlighted by this review are summarised in Box 2 below.

Box 2: A summary of the gaps in evidence

Household assistance

There is a lack of well-documented examples of programming at scale, which are required to improve our understanding of how agriculture can best contribute to improved nutrition in humanitarian settings. More evidence would be needed from well-defined studies with specific nutrition objectives to garner **clarity on the pathways** through which agriculture can operate best to achieve nutrition results.

The evidence for social assistance programmes (CVAs/in-kind assistance) is difficult to summarise because of **mixed and inconclusive results**. The heterogeneity between studies makes syntheses and meta-analyses of the data difficult. More evidence generation, with better-designed evaluations and consistency in programme and evaluation designs across different programmes and contexts, is needed.

Complementary feeding and nutrition supplementation for children

There remain important questions linked to the **targeting of, and maximising the benefits of, SQ LNS**.

There is limited evidence on the cost and cost-effectiveness of providing SQ-LNS to young children. While the evidence that exists is positive in term of cost-effectiveness (compared to other programmes), the total cost for a programme including all age-eligible children would be high. Strategies to reduce costs, such as targeting to the most vulnerable populations, may enhance financial feasibility.

Evidence suggests greater impact of SQ-LNS might be obtained by **co-packaging them with interventions that alleviate constraints to response**, including relating to health, mental health for women, and early childhood development. More evidence is needed to define these packages across different programming contexts.

More evidence is needed on the impact of SQ-LNS programmes on children over two years; i.e., between the ages of 24 and 59 months.

Nutrition supplementation for pregnant and breastfeeding women and adolescent girls

While the use of BEP and MMS has been shown to improve birth outcomes such as LBW, there remains a need to better understand how and to what degree this can reduce the **subsequent risk of wasting among children across different contexts**.

More research is needed on **effective platforms and mechanisms for the delivery of interventions** to women, particularly across different humanitarian contexts, which support accessibility and high coverage.

Greater efforts are needed to **increase appropriate, feasible and ongoing monitoring of intervention performance, and evaluation** of impact for pregnant and breastfeeding women and adolescent girls, and for their children.

Packages

The **heterogeneity of intervention packages**, as well as different programming contexts, makes it very difficult to draw any broad conclusions around different packages.

More data are needed on the impact and cost-effectiveness of different combinations of interventions across different contexts, that take into account a range of impacts and implementation modalities.

There is a lack of feasible tools to help with understanding the specific causes, pathways and gaps in wasting prevention to support the appropriate and effective programme design of packages for nutrition support.

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Annexes

Annex 1: Methods document

WFP: Investment case on the prevention of wasting and household nutrition adequacy

Methods for Phase 1: Evidence synthesis

Introduction

WFP plays a key role in addressing the diet-related drivers of poor nutrition in the contexts where it operates. Delivering nutritionally adequate household assistance, alongside targeted support to prevent and treat wasting, should have a significant impact on protecting vulnerable populations in the immediate and longer term.

Given the challenging funding landscape, where donor nutrition financing and national budgets are stretched, and humanitarian needs are increasing, WFP and ENN agree to a partnership to do the following: 1) be able to demonstrate why investing in the nutritional adequacy of household assistance is important to the prevention of malnutrition; and 2) to demonstrate the value of investing in evidence-based packages to prevent wasting. Ultimately, the aim is to develop investment cases for nutritionally adequate household food assistance and prevention of wasting that address food-related needs. The work is planned under two phases: the first phase of this work will be to define the scope of the investment cases and to assess the feasibility of developing an investment case. The second phase will be to either develop the investment cases or to outline a research strategy that would enable WFP to address gaps in evidence that limit evidence-based decision-making.

An evidence synthesis is the first step in the first phase of this work. Guided by the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews ([PRISMA-ScR](#)), this review will aim to map the evidence base for single-sector, bi-sector and multi-sectoral interventions to prevent wasting that address food-related needs in humanitarian contexts (i.e., contexts of food insecurity or where there is a high risk of food insecurity). From the literature identified, the review will also explore the available information (or lack of it) on impact pathways and determinants of wasting in these contexts. It will synthesise the state of knowledge, and highlight knowledge gaps that need further research.

The populations covered by this review will include households targeted for food assistance, children and pregnant and lactating women in humanitarian settings.

The sectors covered by this review will include those that are relevant to wasting prevention interventions that address food-related needs. These include primarily nutrition, food assistance (including direct and indirect (cash) transfers), nutrition-sensitive social protection, education (school feeding) and food security (i.e., availability and access to an adequate diet through markets and agriculture/livestock production). It will also include multi-sectoral interventions with a component of addressing food-related needs

Objectives (based on terms of reference)

- Map past and existing initiatives related to interventions to prevent wasting that **address food and feeding-related needs**. This will include interventions that provide nutritionally adequate household food assistance and targeted support to prevent wasting.
- Summarise the evidence base for interventions to prevent wasting that address food and feeding-related needs. This will include interventions that provide nutritionally adequate household food assistance, as well as targeted support to prevent wasting, and will focus on contexts of food insecurity or where there is a high risk of food insecurity. Sub-areas of investigation will include the following:
 - a. Considerations linked to seasonality (its role and effects) in preventing wasting through interventions that address food-related needs.
 - b. The role of SBC in preventing wasting through interventions that address food-related needs.
 - c. The value of approaches that offer a continuum of service for maternal and child wasting prevention efforts (versus standalone)
 - d. The value of approaches that combine food security and preventive interventions (versus standalone)
- Map existing information on the impact pathways and determinants of acute malnutrition and food insecurity (classified in relation to context) that could inform the development of rapid causal analysis and decision-making tools for wasting prevention

Methods

1. Eligibility criteria (for including studies in this review)

Category	Inclusion criteria	Exclusion criteria
Types of studies	Experimental studies; e.g., RCTs, quasi-experimental <ul style="list-style-type: none"> Observational studies; e.g., cohort, cross-sectional, case-control Systematic reviews Meta-analyses Narrative reviews 	
Intervention/exposure	<ul style="list-style-type: none"> Household assistance programmes that address food-related needs Any wasting prevention intervention in children (under five years) or pregnant and lactating women that address food/feeding-related needs 	<ul style="list-style-type: none"> Wasting prevention interventions that address non-food/feeding-related needs
Outcome: wasting incidence/prevalence/dietary diversity	<ul style="list-style-type: none"> WHZ of those under two MUAC MDD-W/HHDD/Child DD 	
Date of publication⁶	2013–current	<ul style="list-style-type: none"> Pre-2013
Publication status	<ul style="list-style-type: none"> Articles that have been peer-reviewed Articles that have not been peer-reviewed but that are considered relevant and of good quality 	<ul style="list-style-type: none"> Articles that have not been peer-reviewed and are not deemed to be of good quality
Language of publication	<ul style="list-style-type: none"> Articles published in English and French 	<ul style="list-style-type: none"> Articles published in languages other than English and French
Country	<ul style="list-style-type: none"> Low- and middle-income countries (as per World Bank classification of 2022) 	
Study participants	<ul style="list-style-type: none"> Human participants 	<ul style="list-style-type: none"> Non-human participants (e.g., animal or in-vitro models)

2. Information sources

The review will draw on both the academic and grey literature. We will prioritise building upon existing systematic and high-quality reviews, including particularly the literature review and technical brief on the prevention of wasting developed by ENN in 2021.⁷ Key stakeholders and contacts known to be actively working on the prevention of wasting will be contacted early on in the review process to support the identification of relevant key published and grey literature, including some country experience of wasting prevention programming. A rapid literature search using the online libraries of Google Scholar, MEDLINE (through PubMed), CENTRAL (through Cochrane Library), and the WHO library database, as well as WFP, the World Bank, WHO, UNICEF, ENN, IFPRI and the global nutrition cluster will supplement the literature sourced through existing reviews and stakeholder networks.

A manual search of bibliographies to identify potentially relevant published studies will also be conducted. We will also use a snowball approach, reviewing the citations of the articles identified in our online search, to find any relevant newer articles within our search timeframe.

Both the search strategy and the eligibility criteria will be guided by the PICO framework in order to delineate the question of focus for the review and to define inclusion and exclusion criteria. The PICO is presented on page 10.

⁶ There may be some older work of relevance, particularly in relation to household assistance that addresses food-related needs. Reviews included in the timeframe will likely cover some of this. In addition, we can ask some key stakeholders (with knowledge of this) which work (pre-2013) is most valuable here.

⁷ Sadler, K., Sessions, N., and Khara, T. (2021) *Best Practice in Preventing Child Wasting within the Wider Context of Undernutrition* [Internet]. Oxford, UK: ENN [cited 13 Feb 2023]. Available from: <https://www.enonline.net/www.enonline.net/bestpracticeinpreventingchildwasting>

3. Search strategy

The search will use indexing terms, including MeSH terms, keywords, and free text words. First, a broad search strategy will be performed in PubMed without time restrictions; for example, (prevention OR impact OR determinants) AND (wast* OR food insecurity) AND (adolescent OR maternal OR child OR pregnant OR lactating OR infant) AND (food assistance OR nutrition OR social protection OR food security) AND (low- and middle-income countries). The PubMed strategy will be adapted to suit other databases.

4. Study selection

Studies for the title and abstract screening and full-text screening will be managed using Zotero. We will assess all the search results (i.e., titles and abstracts) based on the inclusion and exclusion criteria to eliminate irrelevant studies. This will be followed by a full-text screening – conducted according to the same inclusion/exclusion criteria – to determine studies that meet the criteria and to eliminate duplicates.

5. Data management

Zotero software will be used to file and organise the literature retrieved. An analytical framework will be developed as part of this protocol to support the analysis and compilation of data extracted from the literature in order that it answers the specific objectives of the review. This will use standardised data extraction forms incorporating a numerical summary and qualitative thematic analysis organised by themed ‘tags’ used in the literature database. Data will be extracted from papers included in the evidence review using a data extraction form developed by the reviewers.

6. Data extraction

The data extracted will be extracted and entered by the two reviewers. A data extraction form will be produced for this purpose and pilot tested after five randomly selected studies to assess replicability and applicability. The data extracted will include specific details, including the title, authors, year of publication, year of intervention, country (and context), source of funding, study characteristics, intervention (including type, timing, duration, what was planned versus what was delivered/standards met), outcomes assessed, and main findings. The more we can capture (such as design, product) at the initial extraction phase the better (but keeping in mind scope/time available for review). This will be useful going forward (both for identifying research/knowledge needs and for developing an investment case), even if it is not used for the evidence synthesis report.

7. Quality assessment

Where a reviewer is uncertain about the quality of any of the studies extracted, the second reviewer will be consulted for a second opinion. Disputes will be resolved through discussion or by a third person, if necessary.

8. Data synthesis

A narrative and systematic summary of all the studies included in this review will be presented in the evidence synthesis.

Annex 2: Key stakeholders that supported the review

ENN thank key stakeholders from the following organisations who contributed to this report: WFP, UNICEF, FAO, GNC Technical Alliance, WHO, World Bank, AAH, World Vision, Concern, Goal, Tufts/FIC, IFPRI, JHU, ECHO, USAID, Exemplars in Global Health, CALP, MoH Malawi, MoH Pakistan. The ideas and options within this report are the sole responsibility of the report's authors, and do not necessarily reflect the opinions of any of the organisations listed.



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