



Eleanor Crook
Foundation

A literature review and proposed learning agenda on Immunisation- Nutrition Integration

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Acronyms

BCG	Bacille Calmette–Guérin (vaccine)	MMS	Multiple micronutrient supplements
CBIO	Census-based, impact-oriented	MNP	Micronutrient powder
CHDs	Child health days	MOH	Ministry of Health
CHWs	Community health workers	MOVs	Missed opportunities for vaccination
CMAM	Community management of acute malnutrition	MUAC	Mid-upper arm circumference
c-RCT	Cluster Randomised Controlled Trial	NGO	Non-governmental organisation
CSHGP	Child Survival and Health Grants Programme	OPV	Oral polio vaccine
CSO	Civil society organisation	ORS	Oral rehydration salts
DPT	Diphtheria, pertussis and tetanus-containing (vaccine)	OTP	Outpatient therapeutic programme
EBF	Exclusive breastfeeding	PCV1/2/3:	Pneumococcal conjugate vaccine, first, second and third dose
ECF	Eleanor Crook Foundation	Penta1/2/3	Pentavalent vaccine, first, second, and third (final) dose (includes diphtheria, pertussis, tetanus, hepatitis B and Hib vaccines)
GMP	Growth monitoring and promotion	PLA	Participatory learning and action
Hib	Haemophilus influenzae type b (vaccine)	pp	Percentage point
HIV	Human immunodeficiency virus	PHC	Primary health care
HPV	Human papillomavirus (vaccine)	PHCCs	Primary health care centres
HSS	Health system strengthening	RCT	Randomised controlled trial
HWs	Health workers	Rota1/2/3	Rotavirus (vaccine), first, second and third dose
IBF	Immediate breastfeeding	RUTF	Ready-to-use therapeutic food
iCCM	Integrated community case management	SAM	Severe acute malnutrition
IDP	Internally displaced persons	SBC	Social and behaviour change
IFAS	Iron and folic acid supplementation	SQ-LNS	Small-quantity lipid-based nutrient supplements
IMCI	Integrated management of childhood illness	SUN	Scaling Up Nutrition
INI	Immunisation-nutrition integration	SIA	Supplementary immunisation activities
IPV	Inactivated polio vaccine	TT2	Tetanus toxoid vaccine
IYCF	Infant and young child feeding	VAS	Vitamin A supplementation
MAM	Moderate acute malnutrition	WHO	World Health Organization
MAMI	Management of at-risk mothers and infants	WDA	Women's Development Army (also known as the HDA, Health Development Army)
MCV	Measles-containing vaccine		
MenA	Meningococcal A (vaccine)		

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Executive summary

Infection and malnutrition form a vicious cycle, in which diseases deplete a body's nutrients and increase risk of malnutrition, while malnutrition reduces immune response and increases risk of serious infection and death. Immunisation and nutrition programmes are among the most cost-effective approaches to help children survive and thrive, but despite some successes in scaling these programmes, too many children still do not have access to the services they need – and in many cases, the children with the greatest risk of malnutrition are the same children who are under-immunised. Integrated Nutrition Immunisation (INI) programming is one approach to closing these gaps. For this reason, Gavi and the Eleanor Crook Foundation (ECF) worked together to explore what the literature can teach us about pairing nutrition interventions with vaccine delivery to save more lives.

Many stakeholders have called for greater integration of these sometimes-vertical programmes, including in the WHO/UNICEF *Global Immunisation Vision and Strategy 2006-2015 (GIVS)*, WHO's *Immunisation Agenda 2030*, UNICEF's *Immunisation Roadmap 2018-2030*, and the Gavi five-year strategy, *Gavi 5.0*. Despite the high-level political commitments and strong theoretical benefits of integration, there is limited consensus on “what works” in INI programming. This review attempts to fill this gap by consolidating the latest evidence on the effectiveness of INI programmes and the operational factors that influence their success. It recommends a path forward for programming and further evidence generation.

INI can take many forms. This review distinguishes between two main types of INI (which sometimes intersect) with slightly different rationales and operational requirements or enablers:

1. *Combined service provision*, where both immunisation and nutrition interventions are delivered in the same high-coverage health system touchpoint (i.e. “Supply-INI”). These approaches generate value primarily through efficiency, co-delivering compatible interventions that have overlapping target populations.
2. *Enhanced demand generation and case finding* through a wider range of integrated approaches (i.e. “Demand-INI”), including joint demand generation, incentive approaches, and cross-referral. These approaches can increase programme reach by leveraging complementary strengths of immunisation and nutrition programmes.

While the promise of INI is high and integration is taking place in many contexts, the formal evidence base as detailed in this document is still limited. Stakeholders should therefore deploy the most proven approaches, but also proactively build the evidence base on opportunities for effective INI. This review suggests three major paths forward:

On Supply-INI, stakeholders should deploy INI approaches that bundle interventions with similar delivery modalities, human resource requirements, logistical requirements, and other factors that allow for efficient co-delivery. The best documented of these approaches is integration of immunisation with vitamin A supplementation (VAS). Given the critical importance of reaching zero-dose children (defined for Gavi 5.0 as children who have not received a DTP1 or Penta1 dose), but limited evidence base on how INI can achieve this, we recommend proactive exploration and evidence generation on how Supply-INI can specifically target expanded coverage to zero-dose children.

On Demand-INI, stakeholders should deploy proven community-based integrated demand generation approaches, such as the care group approach, where appropriate. Given strong theoretical benefits, but limited evidence, further proactive exploration of demand-side incentive approaches and a broader set of screening/referral approaches should be explored to take advantage of immunisation and nutrition programmes reaching different families.

Across both INI types, emphasis should be placed on capturing cost data for INI approaches. While cost savings and cost-effectiveness are potentially powerful arguments for adopting INI, only a few studies have captured benefits of INI to nutrition and immunisation outcomes alongside associated costs.

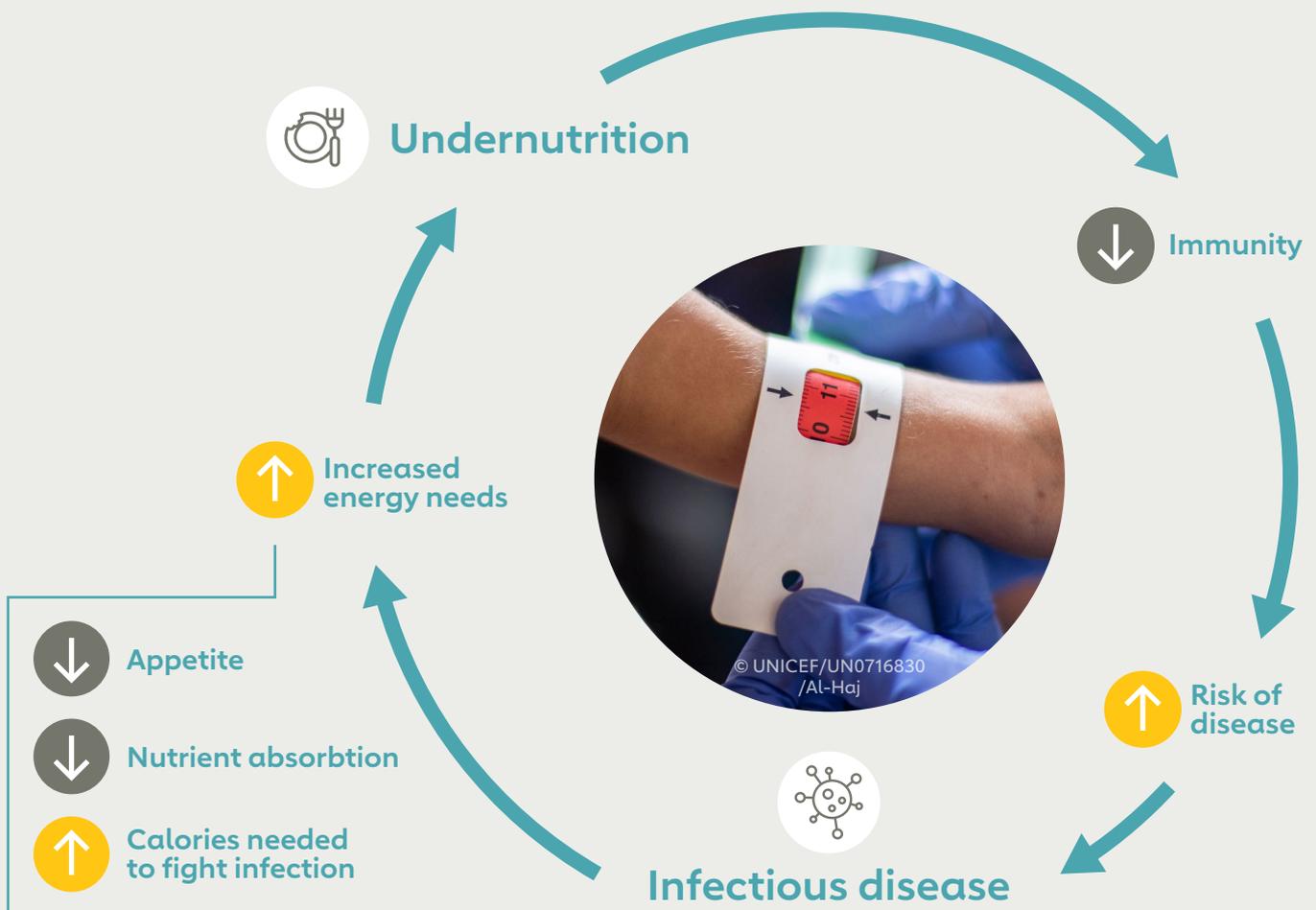
1 Introduction and background

The infection-malnutrition cycle

Despite enormous progress over the last decade in delivering routine vaccinations to children everywhere, in 2022, 14.3 million infants did not receive an initial dose of DTP vaccine, pointing to a lack of access to immunisation and other health services. An additional 6.2 million children were only partially vaccinated.¹ COVID-19 has further complicated coverage of routine immunisation, creating a growing cohort of unimmunised and under-immunised children, and undermining years of progress against infectious disease. At the same time, more children are malnourished due to the global food crisis, exacerbated by the conflict in Ukraine and climate shocks. Without access to essential nutrition or vaccine catch-up services, vulnerable children are at substantially elevated risk of death from a host of preventable causes.

Malnutrition and infectious disease drive each other. As highlighted in Figure 1, undernutrition weakens the body's immunity and is associated with higher prevalence and severity of infectious diseases. Undernourished children are significantly more likely to die from diseases like diarrhoea, measles, meningitis, and tuberculosis.^{2,3} Severe acute malnutrition (SAM) is also the leading risk factor for childhood pneumonia deaths. At the same time, infectious diseases deplete the body of resources and can cause undernutrition. The risk of mortality and other damaging health effects increases markedly when a child is undernourished and has contracted an infectious disease. Integrated efforts to reach vulnerable children with essential nutrition and immunisation services would therefore be catalytic in breaking the vicious cycle of malnutrition and preventable diseases.⁴

Figure 1 The vicious infection-malnutrition cycle



Why INI?

In a context of limited resources, it is crucial to ensure a more cost-effective approach to service delivery to achieve greater coverage and improved outcomes across both nutrition and immunisation. Not surprisingly, there is broad institutional support for the concept of INI, most notably as part of primary health care provision.⁵ WHO, UNICEF and Gavi have all recommended increasing INI, both in routine and campaign settings, as part of the

WHO/UNICEF *Global Immunisation Vision and Strategy 2006-2015 (GIVS)*,⁶ WHO's *Immunisation Agenda 2030*,⁷ UNICEF's *Immunisation Roadmap 2018-2030*,⁸ and the Gavi five-year strategy, *Gavi 5.0*.⁹ The implementation of integration, however, has been a longstanding challenge, in part stemming from concerns about accountability, coordination, and measurable impact.^{10 11 12 13} Therefore, while there is strong potential for impact, several risks and potential negative effects also merit consideration, as briefly elaborated in the boxes below.

Box 1: Potential advantages of INI include:

Immunisation and nutrition interventions have mutually reinforcing benefits. Nutrition interventions can improve a child's micronutrient and anthropometric status, which in turn can boost a child's response to vaccines and immune response more generally. For example, vitamin A plays a critical role in enhancing immune function and in reducing complications and improving recovery from measles.¹⁴ Likewise, breastfeeding can improve response to vaccines in the still maturing immunologic and enterohepatic systems of infants.¹⁵ Like nutrition, immunisation can confer protective benefits starting from birth. For instance, the maternal influenza vaccine has shown to lead to 15% reduction in low birth weight. In general, poor immunisation can lead to increased incidence of infectious disease and result in high rates of child malnutrition in high-risk populations.¹⁶ A review of DHS data from 16 countries suggests that poor vaccination status is associated with an 18% higher

likelihood of a child being wasted and a 7% higher likelihood of a child being stunted.¹⁷

INI may increase coverage and equity for immunisation and nutrition services. As shown in Figure 2 below, nutrition and immunisation have overlapping target populations with multiple opportunities for services to be co-delivered. INI could especially help in joint outreach to zero-dose children who are more likely to be malnourished and live in families facing multiple deprivations. A recent paper that examined nationally representative data from 80 countries found that stunted children are 32% more likely to be zero-dose than to have received at least one vaccine.¹⁸ By undertaking an integrated approach, countries may gain efficiencies and multiply their strengths to identify and reach missed communities and vulnerable populations, making it more convenient and less costly for families and children to access these services.

Figure 2 **Potential opportunities to integrate nutrition at various immunisation contacts from preconception through the fifth year of life**

	Preconception (including pre-adolescence)	Prenatal	Time of delivery / newborn	6 weeks	10 weeks	14 weeks	6-9 months	1-5 years ¹³
Immunisation (WHO recommended schedule)	Human papillomavirus (HPV)	Tetanus toxoid-containing vaccine	BCG Hep B birth dose Oral polio vaccine 0 (OPV-0)	Pentavalent vaccine 1 (Penta1) OPV1 Pneumococcal conjugate vaccine 1 (PCV1) Rotavirus 1 (Rota1)	Penta2 OPV2 PCV2 Rota2	Penta3 OPV3 PCV3 Inactivated polio vaccine (IPV) Rota3 (where indicated)	Measles-containing vaccine (MCV) Catch-up of any missed doses MenA (some regions) Malaria 1-3 (1st dose at 5 months)	MCV2 DTP-containing booster PCV3 Meningococcal A (MenA) (some regions) Malaria4
Nutrition	Promotion of adolescent nutrition	IFAS MMS* IYCF/EBF	IYCF/EBF	Growth monitoring-promotion/nutritional screening (GMP/NS) Infant and young child feeding (including exclusive breastfeeding <6m)		Management of At-risk Mothers and Infants <6m (MAMI)	Iron and folic acid supplementation (IFAS)	VAS MNP SQ-LNS CMAM

*MMS can be used in the context of rigorous research or in emergency settings

Abbr: CMAM = Community-based management of acute malnutrition; EBF = Exclusive breastfeeding; IFAS = Iron folic acid supplementation; IYCF = Infant and young child feeding; MMS = Multiple micronutrient supplementation; MNP = Micronutrient powder; SQ-LNS = Small quantity lipid nutrient supplement; VAS = Vitamin A supplementation



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Box 2: Potential risks of INI

While there is limited literature on the negative effects of integrating immunisation and nutrition services specifically,^{19 20} studies on integrating health services in general have noted several risks. For instance, INI requires health workers (HWs) to be trained on both immunisation and nutrition, as well as on how to deliver these services in an integrated manner. Lack of training in any one of these areas could affect quality of care (for both integrated and non-integrated services),

patient waiting time, and uptake from caregivers.^{21 22 23 24 25 26 27} Poor coordination between donors and partners, including weak chains of responsibility and unclear roles, can cause ineffective implementation.^{28 29 30} Logistical difficulties with procurement, quality, and timely delivery of interventions may hinder success.^{31 32 33} Additionally, data collection systems not adapted for integration prevent stakeholders from understanding programme reach and impact.^{34 35}

This review considers the following key questions:

- 1. What is the evidence on effectiveness and cost-effectiveness of the different types of INI for improved immunisation and nutrition outcomes?**
- 2. What are the operational considerations for effective INI?**

The report is structured in four sections: Section 1 provides an introduction and background to

INI, explaining the purpose of the review and the importance of examining evidence for INI. Section 2 outlines the review methodology. Section 3 details the findings, including a summary of the evidence base for INI and lessons learned around operational considerations for effective integrated delivery. Lastly, Section 4 discusses key takeaways from the review and proposes an emerging learning agenda for moving forward. This review builds on integration work and questions at country level and the SUN-Gavi Policy Brief, *Equity from Birth*.

2 Literature review methodology

2.1 Scope

For the purposes of this review, INI is defined as: *collaboration or coordination between immunisation and nutrition programmes with or without co-delivery of interventions at the same point of service.*³⁶ The review

focuses both on service provision and on stimulation of demand for services from pregnancy until a child reaches five years of age.

2.2 Process

A five-step process was followed to conduct this desk review:

1. A search was conducted for published literature within a timeframe of 1980–2022 using Google Scholar and PubMed online databases and employing search terms including (but not limited to): integration, immunisation, vaccination, antigen names (e.g. diphtheria, pertussis and tetanus-containing vaccine [DPT1], measles, polio), and key nutrition interventions including: multiple micronutrient supplementation (MMS), iron and folic acid supplementation (IFAS), promotion of infant and young child feeding (IYCF)/exclusive breastfeeding (EBF), growth monitoring and promotion (GMP)/nutritional screening, community management of acute malnutrition (CMAM), and management of at-risk mothers and infants (MAMI). Additional searches were performed based on specific terms for larger integrated packages of services (e.g. integrated management of childhood illness [IMCI], integrated community case management [iCCM]) and methods arising during the primary search (e.g. child health days [CHDs], participatory learning and

action [PLA], care groups). Additional input from the CORE Group general listserv was also received. As a result, more than 175 publications in the peer-reviewed and grey literature were identified for review.

2. All studies conducted in lower- and middle-income countries (LMICs) were screened for assessment of impact on nutrition and/or immunisation outcomes. Nutrition outcomes included changes in (a) nutritional status (e.g. wasting), (b) nutrition-related behaviour change (e.g. changes in immediate/exclusive breastfeeding), or (c) coverage of nutrition interventions (e.g. VAS). Immunisation outcomes included changes in the coverage of any antigen used in routine child immunisation (e.g. BCG, DPT1, DPT3, measles, human papillomavirus vaccine [HPV]) and changes in the drop-out rate from first to final doses of vaccines (e.g. DPT1 to DPT3 drop-out).
3. Following the selection of studies for inclusion, they were classified according to the strength of the evidence as elaborated in the table below.

Table 1 **Classification of evidence quality**

Established evidence	Emerging evidence	Limited evidence
Multiple studies (randomised controlled trial [RCT], before-after)/reports in multiple (6+) countries that found impact/lack of impact in both immunisation and nutrition outcomes.	Multiple studies or reports in one or two countries that found impact/lack of impact in both immunisation and nutrition outcomes.	A single study in only one country that found impact/lack of impact in immunisation, nutrition, or both.

4. An analysis of operational conditions for INI within the available studies and grey literature was undertaken. Two publications were of particular importance in informing this step: WHO's *Working Together: An integration resource guide for immunisation services throughout the life course*, and Linksbridge's *Research Brief, A Survey of Country Campaign Manager Perspectives on Integration: A Snapshot in 2022*. In addition, the review sought to identify country case studies profiling innovative approaches to INI not mentioned in the published literature. Such studies were solicited from primary health care (PHC) practitioners via the CORE Group's extensive general, health system strengthening (HSS), and nutrition listservs, with a request for documented experiences where there had been an improvement in at least one nutritional outcome and one immunisation outcome in co-delivered nutrition and immunisation services. Ten organisations/individuals responded and following initial calls with each, two studies were selected. These were then developed into case studies to document their INI experience. (Please see **Annex 2** for these case studies).
5. Findings were synthesised and are presented below primarily by the two research questions identified. **Section 3.1** summarises the evidence of effective integrated programming and **Section 3.2** speaks to the lessons learned and best practices for programme integration identified in the literature. The INI Steering Committee provided feedback on this report and on a presentation of the main results. (Please see *Acknowledgements* for further details).



3 Findings

3.1 Evidence of effectiveness and cost-effectiveness of INI

Integration of nutrition and immunisation can take several forms. For the purpose of this review, evidence is presented on two categories of integration that reflect slightly different rationales for integration and come with different operational considerations: (1) combined service provision, where both immunisation and nutrition interventions are delivered in the same health touchpoint (i.e. “Supply-side INI”) and (2) enhanced demand generation and case finding through integrated approaches (i.e. “Demand-side INI”).

In the *combined service provision* category, immunisation and nutrition services are co-located, and delivered in close succession, potentially by the same health worker. The rationale for this category stems from efficiency: it is possible to use time and resources more efficiently for the health system and the families it serves by delivering the two services together. For health systems, this may lead to cost savings or increased impact by allowing more children to be reached for the same combined budget. For families, reduced time costs to access health services may increase overall utilisation or reduce drop-out from multi-step series. This category can include nutrition interventions (including screening) being integrated into an immunisation delivery platform, immunisation being integrated into a nutrition delivery platform, or both being delivered in a combined platform. Operationally, the supply-side integration depends on the integrated services being highly compatible (e.g. overlapping target age groups, high acceptability, similar skill levels to administer, similar time to administer). If the services are less compatible, this would undermine the rationale for integration and may erode any potential gains.

In the *enhanced demand generation and case finding* category, the key rationale is about reach: by having the same health worker promoting immunisation and nutrition behaviours together (and by doing joint case finding), demand and utilisation for both immunisation and nutrition services can be increased more efficiently and effectively than if they were conducted separately (and vertically) and by different workers. One option is through joint demand generation efforts that bring about changes in both immunisation and nutrition demand and behaviours. An alternative approach uses a strength of one intervention/programme to drive utilisation of the other: for example, using the wide reach of an

immunisation campaign to screen children for wasting and refer them to treatment, or by offering well-liked food supplements as an incentive to bring families to routine vaccination sites. Operationally, the demand-side integration category does not require such close matching of compatible services to integrate. However, efforts to increase demand may fall flat if there is not a robust care pathway linking to high quality services. If robust services are not available, this would undermine the rationale for integrated demand-side efforts.

3.1.1 Combined service provision

Effectiveness of integrating nutrition interventions into immunisation services

In general, there has been much interest in using immunisation as a platform to integrate other interventions (including nutrition) due to its high coverage compared to other health interventions. A literature review published in 2012 found that the most successful integration efforts with immunisation included “an easy-to-administer intervention, such as malaria treatment, vitamin A, and deworming tablets, which were added to existing immunisation services with little additional effort.” This review noted that this type of integration checks off a number of considerations such as overlapping age groups, similar time to administer, and similar skill level to administer.³⁷ With regard to nutrition interventions, there is established evidence supporting the integration of vitamin A supplementation with immunisation programmes in routine care and campaigns including polio campaigns and supplementary immunisation activities.^{38 39 40 41 42} In addition, studies have found that combining the delivery of vitamin A supplements with immunisation is safe and does not have a negative effect on seroconversion of childhood vaccines.⁴³

Other than Vitamin A supplementation, there appears to be limited evidence of the effectiveness of nutrition interventions integrated with immunisation programmes. Two more recently published studies have looked at the feasibility of integration, but have not assessed impacts. Kanagat et al. (2022) conducted a pilot study to assess the feasibility of integrating IYCF counselling and IFA supplement distribution into immunisation service



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delivery in Ethiopia. There were mixed findings: while health workers appreciated being able to offer multiple services in one visit, they also felt that additional resources and training were needed.⁴⁴ Another study by Alive and Thrive piloted the delivery of nutrition-specific social and behaviour change (SBC) interventions by polio community mobilisation coordinators (CMCs) in Uttar Pradesh, India. The study concluded that integrating nutrition into the polio eradication platform was feasible and did not negatively impact polio immunisation rates. However, the study did not report on nutrition outcomes or cost savings from this approach.⁴⁵

One modelling study examined the potential impact of adding six high-impact nutrition interventions to the measles immunisation campaign in India. Based on a literature review and expert consultations, the study narrowed the interventions to the following, based on technical feasibility and policy relevance: (i) nutritional screening of children linked to services for complementary feeding; (ii) vitamin A supplementation for children; (iii) preventive zinc supplementation for children; (iv) free distribution of insecticide-treated bed nets; (v) multiple micronutrient supplementation for pregnant women (iron, folic acid, vitamin A); and (vi) calcium supplementation for pregnant women. The study concluded that a potential supplementary immunisation package delivering measles vaccine and the additional interventions mentioned above could increase the impact on mortality of the mass measles vaccination

campaign more than threefold (with some interventions – such as zinc and bed nets – contributing much more to that impact than others). While the results are promising, the study acknowledged that implementation research is needed to assess the feasibility and impact on health systems as well as cost-effectiveness.⁴⁶

Effectiveness of integration of immunisation into nutrition services

The existence of missed opportunities for vaccination (MOVs), reaching a prevalence of 89% in some settings, demonstrates that immunisation may also benefit from increased integration.⁴⁷ For instance, sick child visits provide an opportunity to check children's vaccination status and to either provide vaccines or to refer to immunisation services. The review identified only two studies where immunisation services were integrated into nutrition platforms aimed at reducing MOVs. These studies demonstrated some positive impact on immunisation outcomes but did not capture the impact on nutrition outcomes.

A study by Idris et al. (2021) found that co-delivering immunisation in nutrition service units (and to a lesser degree, into paediatric outpatient departments) of Primary Health Care Centres (PHCCs) increased coverage of pentavalent vaccines (Penta1, Penta2, Penta3) and reduced the immunisation drop-out rate.⁴⁸ When children aged 0–23 months visited nutrition service

units in Rumbek East and Rumbek Centre counties of South Sudan, they were screened for missed vaccinations and then provided with nutrition and immunisation services. Although improved nutrition outcomes or service quality changes were not reported, this study found intake of Penta1, Penta2, and Penta3 increased (by 35, 32, and 26 percentage points respectively) and vaccination drop-out decreased by 17 points. Vaccination equity also improved: Children were 23% more likely to have been immunised with Penta1 when immunisation was integrated into the nutrition programmes of PHCCs. The authors reasoned that the uptake in vaccination was likely due to the co-location of immunisation and nutrition services, and that nutrition services function as an incentive for caregivers. In addition, mothers reported not having to queue in line for multiple services.

Another study evaluated the effect of integrating immunisation services in an outpatient therapeutic programme (OTP) for the management of severe acute malnutrition (SAM) in camps for internally displaced persons (IDP).⁴⁹ Vaccinators in South Sudan were recruited to join staff and trained community volunteers providing nutrition services in OTP centres and during outreach campaigns in IDP camps. During mass mid-upper arm circumference (MUAC) screening for acute malnutrition, screening for missed vaccination doses, promotion of IYCF and immunisation were

conducted. This resulted in large increases in BCG, measles-containing vaccine (MCV) and Penta3 coverage. Additionally, children who were vaccinated at the OTP centres were 27–45% less likely to miss vaccination than those vaccinated at the primary health care centre (PHCC). Impact on nutrition outcomes was not reported, but the authors noted that this integration of interventions may have contributed to cure rates of more than 80% reported in the two OTP sites.

Effectiveness of integrated health service delivery platforms where both immunisation and nutrition are delivered

Combined service provision of nutrition and immunisation interventions also occur in established health service platforms that provide preventive and curative health services in general. The review included three major integrated platforms (IMCI, iCCM, and CHDs), since these are implemented across several countries on a large scale and often include both nutrition and immunisation interventions. *Integrated management of childhood illness (IMCI)* was developed in the mid-1990s to deliver treatment for the main causes of under-five mortality among children using a case management approach. *Integrated community case management (iCCM)* is a more focused extension of IMCI, in which treatment is provided at community level by community health



workers (CHWs). *Child health days* (CHDs) usually target hard-to-reach and under-served areas using the form of semi-annual campaign-style events (sometimes conducted jointly with supplementary immunisation activities [SIAs]), delivered through existing health sector personnel and infrastructure with financial and technical support from development partners.⁵⁰

Overall, there is no evidence for the impact of IMCI/iCCM programmes on nutrition and immunisation outcomes. A 2016 Cochrane review found that IMCI programmes may reduce both child and infant mortality, but they had little or no effect on nutrition outcomes and immunisation coverage.⁵¹ Another Cochrane review in 2021 specifically on iCCM concluded that – compared to services provided at health facilities – iCCM may increase care-seeking behaviours of parents, but there was low certainty evidence on whether children received the right treatment for their illnesses.⁵² The findings of

these reviews, especially for their assessment of nutrition impacts, are further validated by a 2018 review that examined nutrition integrated into iCCM/ IMCI versus a control group and found no statistically significant differences in health outcomes.⁵³ A more recent 2021 review likewise found that integration of nutrition in IMCI/iCCM could enhance complementary feeding practices by 5%, but had limited impact on exclusive breastfeeding, stunting or wasting.⁵⁴

One study specifically examined the impact of Growth Monitoring and Promotion Plus (GMP+), a community-based, integrated approach based on the concepts of PHC and IMCI, in urban areas of Lusaka, Zambia. A GMP+ session was conducted monthly in each administrative zone in the study areas and provided essential child health services such as growth monitoring, immunisation, VAS, deworming, nutrition counselling, family planning, community referral, oral



rehydration salts (ORS) distribution, and the promotion of key child health behaviours. In GMP+ sessions, the vaccine administration service was provided by medical personnel dispatched from a Public Health Centre in the catchment areas, and nutrition services were provided by MOH-trained volunteers. Using a time lag design, the study found that vaccination rates for DTP1, DTP3, full immunisation, and timeliness of immunisation improved in both the primary intervention and lagged intervention areas and that frequency of the children’s GMP+ attendance was associated with an improvement.⁵⁵ No impact on nutrition outcomes was measured or reported.

With regards to CHDs, immunisation and VAS have most commonly been integrated and therefore evaluated. A multi-country assessment of the CHD approach in Africa found impressive coverage gains for immunisation (measles and DTP3), VAS, and mixed results in terms of exclusive breastfeeding.⁵⁶ Since their evolution, CHDs are increasingly being used to deliver more health and nutrition interventions. Palmer et al. (2013) examined 474 CHDs and found that immunisation was carried out as part of CHDs 80% of the time. The most commonly integrated nutrition interventions in these CHDs were VAS (99.6%), behaviour change communication (>25%), GMP (>20%), and



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nutrition screening (>15%). Yet these increasingly integrated packages have not been evaluated in terms of their impact on coverage or service quality. In general, studies acknowledge the important role that CHDs can play when routine primary health care is weak, but also raise concerns around the lack of predictable funding and the tendency to use them to deliver a large package of care.⁵⁷

Cost-effectiveness of combined service provision approaches

Integrated service delivery may help increase efficiency, because operational costs are shared across programmes and can therefore contribute to long-term sustainability. However, additional data on cost is required to assess this.⁵⁸ Across all three platforms discussed so far, there were studies reporting improvements in some outcomes, but no reports on cost information comparing integrated versus non-integrated programmes. An exception is a review by Levin et al. (2013), which estimated the incremental delivery costs of HPV vaccination of young adolescent girls in Peru, Uganda, and Viet Nam. The authors found that the cost per HPV dose was lower when vaccine delivery was integrated into existing health services. For example, the integration of HPV vaccination with vitamin A delivery during a Child Days Plus campaign in Uganda resulted in just under 1,000 additional young women vaccinated for US\$ 1 million less than vaccination without integration.⁵⁹

3.1.2 Enhanced demand generation, health promotion, and case finding

Joint health promotion and demand generation

In addition to a combined approach to deliver services, INI may also consider generating demand and promoting health behaviours through broader, community-based platforms that are not solely designed for nutrition or immunisation. One such approach is the care group approach, in which social and behaviour changes are promoted through peer-to-peer (mostly mother-to-mother) knowledge sharing. In this approach, a lead volunteer (usually a mother) is trained to promote a single health behaviour every two weeks, after which she shares this information with a small cohort of caregivers in her immediate neighbourhood. This approach has been implemented in more than 40 countries to date⁶⁰ and the approach and outcomes associated with the approach have been fully described in the literature.^{61 62 63 64}

The review found established evidence that using the care group approach to integrate health promotion and create demand for vaccination, nutrition services, and behaviour change positively impacts nutrition outcomes while simultaneously increasing coverage of DPT1, MCV, and tetanus toxoid vaccine (TT2). A study by George

et al. (2015) compared the baseline to endline coverage change for 15 high-impact coverage indicators in ten USAID Child Survival and Health Grants Programme (CSHGP) funded projects that used the care group approach and nine non-care group CSHGP projects conducted in the same countries during approximately similar timeframes.⁶⁵ Of the 15 indicators compared, four were related to nutrition (VAS, IFAS, EBF, and complementary feeding) and three were related to immunisation (TT2, measles, and full vaccination with EPI vaccines). Coverage improvements for all 15 of the high-impact coverage indicators were better in care group projects than in non-care group projects, and some of the differences were large. For example, there was a 36 percentage point (pp) better increase (baseline to final) in IFA coverage in the care group projects as compared to the non-care group projects. For immunisation outcomes, there was a 16 pp larger increase in population coverage of TT2 vaccination and a 9 pp larger increase in population coverage of measles vaccination when compared to these outcomes in the non-care group projects.

There is limited evidence that this integrated approach may have even larger effects when coupled with food supplements. Four published studies from a recent (but single) four-year c-RCT study found that use of the care group approach with food supplements for vaccination and nutrition service demand and behaviour change may also decrease child wasting, stunting, child and maternal anaemia, and increase VAS coverage and full vaccination. Among children with a vaccination card, full immunisation increased six percentage points, and VAS increased almost 18 percentage points.^{66 67 68 69}

Other behaviour change platforms where volunteers run women's groups and peers conduct home visits may also be effective ways to boost gains in nutrition and immunisation in an integrated manner. For example, a population-based trial in Malawi was conducted on the use of volunteer peer counselling and women's groups. Exclusive breastfeeding was highest (adjusted OR=3.7) in clusters that had both peer counselling and women's groups, and BCG rates were the highest (aOR= 1.07) in the peer counselling clusters.⁷⁰ In Bolivia, use of the census-based, impact-oriented (CBIO) approach, which uses systematic home visits to target selected high-impact services to those at highest risk of death, led to a considerable increase in full immunisation and GMP coverage compared to control areas.⁷¹ In Ethiopia, the Women's Development Army (WDA), which is a group of volunteer women health workers, has been

deployed in communities to support better maternal and child health. Studies have found that caregivers who participated in WDA groups were more likely to have better child immunisation service use.^{72 73 74} Assessments of WDA's impact on nutrition have been limited to only one cluster randomised controlled trial (c-RCT) but found that dietary practices of pregnant women improved considerably.⁷⁵

Referrals

As mentioned previously, an alternative approach to increase utilisation is by leveraging complementary features of immunisation and nutrition programmes to benefit the other programme. For instance, the wide reach of an immunisation programme can be used to screen and refer children for wasting treatment. While documenting the evolution of CHDs, Palmer et al. (2013) noted that countries in sub-Saharan Africa, specifically those with a high burden of SAM, are increasingly implementing and testing the integration of nutrition screening in CHDs. However, the authors did not comment on the quality of screening or the strength of the referral system linking screening and treatment services.⁷⁶

Incentives can also function as a demand side lever to motivate parents to receive health services. There is a growing body of literature examining the potential of using incentives such as cash, mobile credit, food, etc., to increase participation in health service programmes and improve health outcomes.⁷⁷ In the case of INI, one example was found in which small-quantity lipid-based nutrient supplements (SQ-LNS) could serve as an effective incentive to raise immunisation coverage while also preventing malnutrition. SQ-LNS are food-based supplements designed for the prevention of malnutrition in children 6–24 months of age. In settings where children are likely to have nutrient gaps in their typical diets and multiple micronutrient deficiencies, these supplements can optimise health and growth in children. The potential of SQ-LNS functioning as an incentive is based on publications and field experience. For instance, a randomised control trial in India found that “offering modest [food] incentives to families in resource poor settings can significantly increase uptake of immunisation services.”⁷⁸ More recently, a modelling simulation found that increasing vaccine coverage through mass nutritional supplementation with SQ-LNS should lead to a strong reduction in morbidity and mortality, especially from measles.⁷⁹ While this approach is promising, more rigorous research on real-world outcomes, cost-effectiveness, and implementation modalities are needed to inform future scale-up.

3.1.3 Cross-cutting areas

Gender

Increasing gender equality can improve the uptake of child immunisations and nutrition status, as women are usually the primary caregivers of young children who seek and utilise services and are often the target of service promotion. Integration approaches should identify opportunities to improve gender equality, for example by reducing the overall burden on caregivers, particularly for mothers who bear a disproportionate level of responsibility, and by employing strategies to better engage other influential family members, including men. To this end, a few studies (e.g. Idris et al. [2021] in South Sudan) note integrated services reduce opportunity costs for mothers when vaccinators are present at the point of service delivery in the nutrition and paediatric outpatient departments and mothers don't have to queue separately for two services. However, none of the reviewed studies quantitatively assessed whether INI increased gender equity or helped address gender related barriers of caregivers and health workers.

In Mali – where GMP, food supplementation, and VAS (plus other health services) were integrated with immunisation – the majority of mothers interviewed saw the integration of services with routine vaccinations as time-saving. However, urban focus group participants expressed a preference for separate services since they

were concerned with increased waiting times, as well as the ability of health workers to manage additional services efficiently. These mothers preferred services that were brief with high impact (e.g. distribution of vitamin A and ITNs) to ones that might take more time. In Cameroon, there was ambivalence about time savings with integration. On the one hand, mothers there reported the benefit of saving time when services were integrated. On the other hand, providers and parents also mentioned concern about longer wait times when receiving multiple services in an integrated way.⁸⁰

Fragile contexts

Only a few studies have examined INI in a fragile context. Two studies that integrated immunisation services into nutrition services in South Sudan have been described earlier. Habib et al. (2017) assessed the impact of integrating community engagement and counselling into a polio immunisation campaign in conflict-affected areas of Pakistan where there was vaccine hesitancy.⁸¹ This RCT study included three arms: Arm A (control arm) included routine polio programme activities; Arm B included routine immunisation, special community engagement activities, and provision of short-term maternal and child health preventive services (e.g. counselling on hygiene and nutrition, general maternal and child health assessments) through low-cost health camps; and Arm C received the same intervention



package as Arm B but also included inactivated polio vaccine (IPV). Improvements in full immunisation and in reductions in zero-dose children were seen in the arms that included the additional health and nutrition activities compared to the arm that only received routine polio activities. While VAS was reported at baseline, no results were reported on vitamin A or other nutrition gains at the end of the trial; therefore, the nutrition benefits were not captured. Overall, the authors suggest that in high risk and insecure populations experiencing vaccine hesitancy, it is possible to gain community trust and achieve improved immunisation coverage through an integrated approach.

3.1.4 Summary of evidence base

Overall, while the promise for INI is high and integration is taking place in many contexts, the formal evidence is surprisingly slim. First, most studies that have evaluated INI have examined either nutrition or immunisation outcomes but not both, even though a goal of integration is to ideally improve coverage rates of both programmes. Second, assessments of costs are necessary when deciding whether to pursue integration, yet there is a paucity of data in this area. The table below summarises what has been learnt from the review so far.

Table 2 **Summary of evidence**

	Evidence	Strength of evidence
Combined service provision	Vitamin A is a natural fit for efficient co-delivery with immunisation in terms of target population overlaps, similar delivery modalities, human resource requirements, logistics requirements, etc.	established
	There are opportunities for reducing MOVs by integrating immunisation into nutrition platforms (for instance, co-delivery of nutrition services by volunteers at routine outreach sites, co-delivering immunisation in nutrition services of PHCCs, and co-delivery of immunisation at CMAM sites in IDP camps). However, the cost benefits of these approaches and potential impact on nutrition services (negative or positive) are currently less well documented.	emerging
	While IMCI/iCCM may increase care-seeking behaviours of parents, systematic reviews have not shown impact on improving immunisation or nutrition outcomes.	established
	CHDs have impressive coverage gains for immunisation (measles and DPT3) and VAS.	established
Demand side levers	The care group approach can create demand for both vaccination and nutrition services and positively impact both nutrition and immunisation outcomes.	established
	The reach of one (immunisation or nutrition) platform can be used to identify and refer children for the other platform, yet there are limited studies that have examined this synergy.	limited
	Lipid-based supplements (specifically SQ-LNS) could serve as an effective incentive to raise immunisation coverage while also preventing malnutrition. However, its cost-effectiveness needs to be tested in real-life settings.	limited

3.2 Operational conditions for effective INI

Although there is limited evidence on the factors that enable successful integration of nutrition and immunisation programmes specifically, there are known strategies and conditions to facilitate the integration of health services more generally. If not well managed, enablers can become obstacles to successful integration.

Related to the intervention

As mentioned previously, nutrition interventions are best integrated with immunisation programmes if they include the following characteristics.

- Overlapping intervention age groups (i.e. where the target age group for the vaccine matches or overlaps considerably with the target age group for the nutrition intervention);
- Similar timing, duration, or frequency;
- Similar logistical requirements;
- High acceptability by beneficiaries and providers; and
- A similar skill level from health workers, or intervention is delivered through trained volunteers.

Figure 3 Median time (minutes and seconds) to deliver health care interventions⁸²





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In addition to deciding what intervention(s) to integrate, it is also important to keep in mind that the number of interventions to be included in INI will impact cost-effectiveness. A study that directly observed delivery of 11 maternal and child health interventions in Cameroon, Ethiopia, and Mali found that vaccinations generally take a shorter amount of time compared to other interventions (see Figure 3) and therefore adding more services without additional health workers might increase patient waiting times, decrease satisfaction, and reduce perceived quality of care.⁸³

Related to the integration context

Throughout the literature, there were consistent themes that emerged relating to successful and unsuccessful integration efforts. Where stakeholders got these elements right, success was more likely.

Effective planning and coordination: After the selection of interventions, donors, governments, and implementing partners must coordinate to ensure all entities have defined roles and responsibilities and an effective management mechanism is in place. For instance, a study that tested the feasibility of integrating IYCF counselling and IFA supplement distribution into immunisation service delivery in Ethiopia found that collaborative planning and target setting were

key to ensuring the feasibility of INI. Microplans were developed using a participatory approach which ensured diverse viewpoints were included in the planning phase.⁸⁴ In addition to planning, health care workers, supply chains for relevant interventions (e.g. immunisations, nutrition supplements), and the delivery platform must all be prepared well in advance and function properly throughout the intervention implementation.^{85 86 87 88 89}

Enhanced health worker training: INI can be delivered through combined service provision or through single service provision plus referral. In either of these cases, special attention should be paid to ensure health workers have the needed skills to deliver or provide referrals to the integrated package of care.^{90 91 92 93 94 95} For instance, a recent evaluation that examined the integration of nutrition-specific social and behaviour change (SBC) into Uttar Pradesh’s polio eradication programme found that training and routine supportive supervision visits were essential for enhancing community mobilisation workers’ nutrition knowledge and counselling skills.⁹⁶ Regular supervision, mentorship, and coaching may also help in increasing confidence in providing integrated services.

In the case of combined service provision, it is especially important to have health workers who are multi-purpose and who are allowed by policy to intervene in both intervention areas, quality improvement officers who can

help health facilities work through INI challenges, and having staff with a willingness to adopt new evidence-based practices.^{97 98}

Staffing for sustainable workloads: Adding more services without additional health workers may increase patient waiting times and result in decreased satisfaction for both providers and beneficiaries.^{99 100 101} In a pilot INI programme in Ethiopia that combined IYCF and IFA with immunisation services, HWs reorganised their workflow by offering counselling before vaccinations, because caregivers would focus on soothing their child after vaccinations. However, when integrated sessions got busy, they required additional assistance to provide services. In addition to the potential for increased workloads, HWs may also need to spend extra time learning how to use new data recording tools or carrying supplies to mobile sites.¹⁰²

Stakeholder buy-in and engagement: Buy in from the government, communities, and influential community members is important to foster support and participation from target populations.^{103 104 105 106 107 108} A study that included a combination of health worker interviews and community focus groups assessed community and health worker acceptability of integration in four African countries – Cameroon, Ethiopia, Kenya, and Mali. It found that integration was generally well-accepted by both community members and health workers, although

perceptions around socially sensitive services (such as family planning and human immunodeficiency virus [HIV]) differed by country. The study concluded that “when considering integrating activities, decision makers should evaluate community-level preferences and demands for integrated services in their countries, determine the additional staff and training needed, and consider how to organise services to provide privacy and confidentiality without reducing service quality or increasing wait times.”¹⁰⁹

Monitoring and accountability: When implementing integrated services, it is important to routinely monitor and manage any increase or decrease in service delivery, coverage, and changes to equity or quality of care. For this reason, it is critical to have proper systems for data collection to conduct routine monitoring and evaluation of INI activities. The absence of integrated management systems with data collection forms for tracking immunisation and nutrition services together may also make integration more difficult.¹¹⁰ A survey of country immunisation campaign manager perspectives in 26 countries in four WHO regions specifically suggested the use of digital tools to harmonise inter-sectoral plans, social media strategies, and data collection efforts.¹¹¹

The text boxes on the following two pages present two brief case studies of INI that elaborate their enablers and barriers for successful integration.



Box 3: Lessons learned: implementing INI programming in humanitarian settings

In October 2022, **Action Against Hunger and partners in Somalia, including the South West Ministry of Health (MOH)**, launched an integrated immunisation-nutrition campaign in three districts composed primarily of agro-pastoral communities and IDPs. The integrated campaign had five objectives: (1) district-wide measles vaccination for children <15 years; (2) medical management of complicated cases of acute malnutrition; (3) VAS of children 6 months to 5 years; (4) deworming of children 1–5 years; and (5) screening for wasting and referral for treatment to the nearest mobile or fixed treatment site.

According to the programmers, the context lends itself particularly well to INI. The regular influx of IDPs made regular mass screening an essential activity, and the demands on the government made the South West MOH very determined to reach as many people as possible with life-saving services. The fact that the targeted districts have challenges with security also supported the decision to offer integrated services, and the excellent collaboration

with the South West MOH made it easier to include screening and referral for wasting.

Programmatic partners found that being present in different geographic areas increased the reach of the campaign and working with the MOH through the health system presented an opportunity for capacity-building of the staff who participated in the campaign. Other key enablers included joint supervision by partners and South West MOH during the implementation, having partners with integrated service delivery experience and having an excellent relationship among partners and the government.

Key challenges included the need for more advanced planning and preparation between the MOH and relevant partners. Additionally, there was initial reluctance to start the campaign because of a national vaccination campaign that was planned to occur at the same time.

See full case study in Annex 2.



Box 4: Lessons learned: INI programming in health facilities and community outreach sites

The **USAID Maternal Child Health and Nutrition (MCHN) Activity is a five-year programme (January 2020 to December 2024) funded by USAID and the government of Uganda in partnership with FHI360** to improve maternal, newborn, and child health, and nutrition outcomes in Uganda. There are INI activities at three public, high-volume health facilities that provide services to a predominantly urban lower income population. At the community level, the USAID MCHN Activity carried out integrated MCH-nutrition community outreach in the Kawempe Division of Kampala, purposefully including multiple health services to attract clients and reduce missed opportunities.

The results of the integration were mixed both in health facilities and community outreach sites. In health facilities, there were increases in DPT3 coverage, full immunisation coverage by one year, maternal nutrition counselling and IYCF counselling. In community outreach sites, there were increases in some vaccinations (BCG and measles) and first and second dose of vitamin A. However, in health facilities, there was a decrease in immediate breastfeeding and nutrition assessments. The MCHN staff attribute this to challenges with data collection in the case of breastfeeding and wait times for the

nutritional assessments. Implementation of INI was most successful when it was able to better leverage resources and provide a “one-stop shop” for mothers and children. It was found that clients prefer spending one day at the clinic to get multiple services at once rather than spending time and money on transportation to and from the health facility multiple times when services are not integrated. Additionally, integrated data collection tools, government support, division and facility level support, community acceptance, sufficient health workers, MCHN quality improvement officers, and adequate supplies all helped to enable the programming.

An inadequate number of immunisation days and dedicated working hours posed a challenge to INI implementation, and health facilities were not willing to offer immunisation on other, non-immunisation days. Seasonal shortages of materials used in the integrated services (e.g. vitamin A and vaccines), and poor coverage of tools to support health facilities were additional challenges. Supervision of private health facilities was also problematic and staff turnover was high.

See full case study in Annex 2.



4 Discussion and ways forward



Vulnerable children, including zero-dose children, are likely to suffer from malnutrition and multiple deprivations. There is potential for nutrition and immunisation interventions to complement each other and increase coverage and equity of both nutrition and immunisation services. Moreover, the need for cost efficiencies will continue to drive countries to explore effective integration. Therefore, this review suggests the following next steps for integrated nutrition and immunisation programming.

Co-deliver highly compatible nutrition and immunisation interventions, building on the well-documented example of integrating VAS into immunisation platforms. Some programmes naturally complement each other in terms of target populations, delivery methods, human resources, and logistics. VAS integration with immunisation is the most well documented of these approaches. Delivering both programmes together in the same setting can be more efficient than delivering them separately. The nutrition and immunisation communities should ensure sustainable VAS supplementation through routine child health visits, supported by campaigns and CHD events where appropriate, and build upon this co-delivery approach with similarly compatible interventions.

Continue to support proven joint demand generation efforts at community level, such as the use of the care group approach. Effective service delivery, whether integrated or not, requires strong demand from communities and caregivers. Integrated demand promotion can improve immunisation and nutrition outcomes. The care group approach has been well-documented in this regard, and new opportunities to implement it within a primary health care (PHC) approach should be explored.

Explore high-potential INI opportunities when the logic for integration is strong – and simultaneously build the evidence base. In particular, we recommend adopting a proactive learning agenda that includes the following priorities for reaching malnourished, under-immunised or zero-dose children.

- *Test approaches where one programme's touchpoint is used to screen and refer children for the other programme.* These approaches are usually low-cost and have various potential applications, maximising the opportunity from any contact a child has with the health system. However, challenges exist in ensuring a robust care pathway when services are not

co-delivered and when they rely solely on referrals. Further research is needed to optimise effectiveness and assess any unintended impacts on the core service.

- *Test approaches using nutrition services as an incentive for attending routine immunisation.* Incentives can increase service utilisation by hard-to-reach families and promote a shift from campaigns to sustainable routine immunisation. Investigating the use of specialised nutritious foods (such as SQ-LNS) as an incentive for immunisation in food-insecure areas holds promise, especially considering the evidence of their impact on preventing malnutrition and child mortality. The practical value of these approaches will depend on how effective the incentive is, how popular the primary service is, how feasible co-delivery is, and how much it costs relative to other approaches to generate demand for both types of interventions.
- *Explore a broader learning agenda for reaching communities with high numbers of zero-dose children and high rates of malnutrition through an increased supply of integrated services combined with improved demand generation using evidence-based approaches.* Zero-dose children are often highly vulnerable, with few connections to routine health services, and costly to reach with vertical immunisation or nutrition programmes. Integrated efforts could reduce the average cost of reaching vulnerable populations, but existing studies have not focused on how integration can enhance efforts to reduce the number of zero-dose children.

Across all settings, generate evidence on the dual impact and cost-benefit of integration. This evidence would be crucial for guiding future policy and investment, and for addressing concerns from programme stakeholders focused on potential disruption to existing (often siloed) services. Currently, there is often a lack of evidence regarding the dual impact of integration on outcomes for both types of interventions. Problems with how and why evaluations are done may underlie the limited evidence concerning integration. Many donors focus on, fund, and evaluate vertical programmes, so even when a secondary intervention (e.g. a nutrition one) is integrated with a primary intervention of concern (e.g. immunisation), researchers often only measure or report on the effect of the integration on the primary intervention. Donors should collaborate to generate this evidence. Additionally, the financial and non-financial costs of integration should be better documented.

In summary, under certain conditions, INI programming holds significant promise, and some successful cases of integration have been documented. While the evidence is limited, the potential benefits justify further exploration.

Next steps will demand engagement with country PHC duty-bearers, technical Gavi Alliance partners, WHO, UNICEF, the World Bank, Scaling up Nutrition (SUN), the Health Campaign Effectiveness Coalition, non-governmental organisations (NGOs) already engaged in INI notably in fragile settings, and global and national nutrition stakeholders.



Annex 1: Additional information on immunisation services and nutrition interventions included in the review

Immunisation

This review largely refers to immunisation that is done **in fixed sites, during outreach, by mobile teams, and during campaigns**. While country-level definitions may vary, immunisation outreach usually refers to immunisations that are done outside of fixed sites (e.g., PHC Centres, other clinics) but within 5 km of the health facility. Mobile teams generally serve areas that are 5-10 km from a health facility, and campaigns focus on hard-to-reach areas that are 10+ km from a health facility. WHO describes these different strategies as a continuum of approaches.¹¹²

In terms of **childhood vaccines that have been integrated with nutrition services**, studies were identified on integration of nutrition with BCG, DPT, polio, measles, pentavalent vaccine and human papillomavirus vaccine (HPV). No studies were found on rotavirus, yellow fever, typhoid, cholera, meningococcal, or hepatitis A, perhaps because (a) some of these vaccines are only used in certain regions or during outbreaks, and (b) some are not supported by Gavi (e.g. hepatitis A).

Nutrition

For this review, high-impact nutrition interventions outlined in the latest Lancet series were included that have either been trialled or modelled for their potential for integration with immunisation.¹¹³

Nutrition Preventive and Treatment commodities. The immunisation contact can be an opportunity to identify children (or mothers) needing a nutrition service, to provide a portion of the nutrition commodities needed (e.g. the first month's supply of specialised nutritious foods such as ready-to-use therapeutic food [RUTF]) or to enrol them in a nutrition service. However, not all nutrition commodities have similar frequencies (e.g. one dose versus a daily regimen over a period of time) so other points of contact may be needed to deliver the intervention with the frequency needed for impact.

- **Vitamin A supplementation (VAS):** VAS is administered once every six months to children 6–59 months of age to prevent child mortality, severe infections in children, and night blindness.¹¹⁴

- **Prenatal vitamins (iron folic acid supplementation [IFAS] and multiple micronutrient supplementation [MMS]).** WHO recommends that pregnant women take a daily dose of IFAS throughout the duration of their pregnancy for both maternal nutrition and foetal development.¹¹⁵ More recently, WHO has updated its antenatal care guidelines to include multiple micronutrient supplements (MMS) in the context of rigorous research and in emergency settings based on new evidence showing improved birth outcomes.¹¹⁶
- **Small-quantity lipid-based nutrient supplements (SQ-LNS):** SQ-LNS are nutrition supplements embedded in a small amount of food paste designed to be given to children 6–23 months of age once a day for six months to prevent early childhood malnutrition.¹¹⁷
- **Ready to Use Therapeutic Foods (RUTF) and Ready to Use Supplementary Foods (RUSF):** RUTF and RUSF are energy dense, micronutrient pastes used to treat children with SAM and MAM respectively, as part of a community-based management of acute malnutrition (CMAM) programme.¹¹⁸
- **Micronutrient Powders (MNP):** WHO recommends 90 doses over a six-month period of iron-containing MNP for infants and young children aged 6–23 months and children aged 2–12 years in populations where anaemia is a public health problem, to improve iron status and reduce anaemia.¹¹⁹

Screening and monitoring: Screening for different forms of malnutrition and monitoring of changes in nutritional status can be a useful intervention to co-deliver with immunisation, given it can be done fairly quickly and that at-risk children can be quickly identified. However, its potential of impact on nutrition outcomes is contingent on an effective referral to high-quality treatment.

- **Growth monitoring and promotion (GMP):** During GMP, a child's weight and/or height are measured, the child's growth pattern is assessed, and the caregiver is counselled on ways to help the child grow.

- **Nutritional screening:** Screening for malnutrition is commonly done by measuring mid-upper-arm circumference (MUAC). A MUAC < 11.5 cm indicates severe wasting in children aged 6-60 months.¹²⁰

Nutrition counselling and behaviour promotion:

Integration of nutrition counselling and behaviour promotion with immunisation provides an opportunity to assess nutrition behaviours and to remind the caregiver of their importance. However, effective counselling often takes time. Additional training of health personnel or engagement of trained volunteers may be

required to provide the level of counselling needed for effective nutrition behaviour change.

- **Promotion of infant and young child feeding (IYCF) and exclusive breastfeeding (EBF):** Promotion of IYCF includes promoting early initiation of breastfeeding within one hour of birth, exclusive breastfeeding (EBF) for the first six months of life, and introduction of nutritionally-adequate and safe complementary (solid) foods at six months together with continued breastfeeding up to two years of age or beyond.

Annex 2: INI Case Studies

INI case history #1: Action Against Hunger and partners in Somalia

Partners: South West MOH, UNICEF, ECHO (the donor), and the Caafimaad Plus consortium (initiated in 2019): Action Against Hunger, Concern Worldwide, International Medical Corps, and SOS Children's Village.

1. Introduction and Context

A recent UN Office for the Coordination of Human Affairs (OCHA) report estimated that there were 7.8 million people affected by the protracted drought in Somalia, with 6.7 million people expected to be food insecure as of December 2022. Only 11% of Somali children are fully vaccinated, and only 41% of the population is covered by any part of the Essential Package of Health Services (EPHS).¹²¹ Childhood measles cases increased to 12,055 in 2022¹²² – largely attributed to drops in vaccination coverage – and cholera outbreaks also devastated many families and burdened the Somalia health system. South West state is the worst affected with a likelihood of famine in Baidoa and Burhakaba districts (classified as Operational Priority Area 1²³), and more than half of the three million inhabitants needing life-saving assistance. The Nutrition & Mortality Monitoring System (NMS) reports demonstrated high deaths among preschool children (e.g. 3.0/10,000 population) especially among the newly arriving to IDP camps. The findings from two mass screening assessments done in June/July 2022 and September 2022 showed a deteriorating condition with Global Acute Malnutrition (GAM) in June/July at 28.6% and 59% in September.¹²⁴ An integrated immunisation-nutrition campaign was undertaken in three districts of South West State in two rounds, from 2-6 October 2022 in Baidoa and Afgoye

districts, and from 5-9 October in Burhakaba district. These districts have agro-pastoral and IDP populations. Action Against Hunger has worked closely with the South West MOH to support the implementation of a holistic approach aligned with the EPHS and the basic nutrition services package.

2. Designing and implementing the integration of immunisation and nutrition

The integrated campaign had five objectives: (1) district-wide measles vaccination in the three districts for children <15 years; (2) medical management of complicated cases of acute malnutrition; (3) vitamin A supplementation (VAS) of children 6 months to 5 years; (4) deworming of children 1–5 years; and (5) screening for wasting and referral for treatment to the nearest mobile or fixed treatment site. **The dire need of the population and the measles outbreak created a window of opportunity to carry out immunisation-nutrition integration (INI).** European Commission Humanitarian Aid (ECHO) was the primary donor, and UNICEF donated measles vaccine, VAS and deworming tablets, while the South West MOH provided staff, refresher training, data tools and supervision. Community engagement was done through leaders and use of radio messaging.

3. Prioritisation of nutrition interventions for integration with immunisation

The policy environment in Somalia encourages nutrition and immunisation integration (INI) via the EPHS 2020. Given the needs of the target population, an overwhelmed routine health system, and the five campaign objectives, **immunisation, screening for**

wasting and referral, VAS and deworming were included in this integrated campaign. In addition, the regular influx of IDPs made regular mass screening an essential activity, and the demands on the government made the South West MoH determined to reach as many people as possible with life-saving services. The fact that the targeted districts have challenges with security also supported the decision to offer integrated services, and excellent collaboration with the South West MOH made it easier to include screening and referral for wasting.

4. Changes made in the health system to support immunisation-nutrition integration

Caafimaad Plus partners, UNICEF, and the South West MOH made a minor change in planning and leading of the campaign compared to business as usual. In addition to the usual demand creation methods used by partners, mass media campaigns were used to sensitise the community about the upcoming integrated campaign. Concerning changes in supervision, management oversight and control, the South West MOH in South West State led on creating new teams (with a total of 321 members) for the campaign, providing refresher training and data collection tools. Joint supervision was conducted by partners and the South West MOH throughout the campaign. Co-funding was provided by UNICEF (all supplies except MUAC tapes, which were provided by Action Against Hunger and SOS), and ECHO. There were no changes in high-level management, planning, policy or governance, or supply chains.

5. Changes in nutrition and immunisation outcomes and other impact-level learning

Some 224,406 children under 15 years (with most 12–59 months) were reached through the campaign, achieving 99%, 87%, and 111% of all eligible children with measles vaccination in the three districts. Dose wastage was low (<10%). Twenty-two percent of children vaccinated were 6–11 months, 42% were 12–59 months, and 36% were 5–15 years. Monitoring done in July/August and November/December 2022 in sentinel IDP sites found that **vaccine coverage for measles increased from 43.7% to 63% when comparing data before and after the campaign**. Sixty-eight children with measles were referred (objective #2), and 214,268 children received VAS during the INI campaign (objective #3), helping to boost the low VAS coverage rates in rural areas (39% at baseline) and among nomadic children (14% at baseline). A total of 149,373 children 6–59 months were dewormed (objective #4), boosting coverage rates that were only 8% in 2020. Most importantly, 187,699 under-five children

were screened for wasting using MUAC strips in the three districts (objective #5) and many were referred. Of these children, 30% to 51% had global acute malnutrition (GAM), and 0.9% to 2.7% had SAM (depending on the district). A significant portion of the children (17% to 28%, depending on the district) with SAM were not already on treatment and were referred. The average SAM cure rate in the referral sites was 83% (100% in OTPs and 67% in stabilisation centres), and the MAM programme achieved a 100% cure rate. Data from the FSNAU post-MUAC screening during June/July, September, and October found remarkable increases from June/July to September in both GAM (28.6% to 59%) and SAM (10.2% to 24%), and then a decrease in October (to 31.2% and 2.7%, respectively). **These reductions in the GAM and SAM rate may be due in part to the 2-9 October INI campaign, but also due to other factors.**

6. Advantages and disadvantages, enablers and barriers to INI

There are **advantages** of using the INI approach, especially for emergency situations. **Using the INI approach helped address two important factors causing a deterioration in health among children in South West State (malnutrition and measles)**. Action Against Hunger and its partners were present in different geographic areas, which increased the reach of the campaign. Working with the South West MOH through the health system presented an opportunity for capacity-building of staff who participated in the campaign as well. The referral system for measles cases and nutrition treatment programmes was also mapped with the South West MOH, which contributed to the strengthening of referral systems. Other key **enablers** included the joint supervision by partners and South West MOH during the implementation, having partners with experience in providing integrated service through the health system, and having an excellent relationship among partners and the government.

The main **disadvantages** of doing INI was combining several activities which posed challenges for the team and required more advanced planning. The treatment protocol and referral system for MAM children created a **challenge**: Somalia had drafted the simplified protocol for CMAM, but it was never implemented due to the SOP's delayed approval. There was also initial reluctance to launch the campaign due to a planned national vaccination campaign. However, the consortium was able to persuade all parties involved to begin implementation of this approach, allowing the national campaign to focus on other areas.

7. Planned next steps

Action Against Hunger will continue to monitor the situation with the South West MOH to conduct similar campaigns based on need, will continue to provide integrated services in all its implementation areas (given their positive effect), and will strengthen the integrated approach by capacity building, working through existing systems and advocating at different coordination meetings for expansion of the integrated approach.

INI Case history #2: FHI 360 maternal child health and nutrition activity in Uganda

Partners: MOH, Kampala Capital City Authority, USAID (donor), FHI 360 (prime of consortium), Save the Children, Makerere School of Public Health, Encompass, Uganda Health Federation

1. Introduction and context

The USAID Maternal Child Health and Nutrition (MCHN) Activity is a five-year programme (January 2020 to December 2024) funded by USAID and the government of Uganda to improve maternal, newborn, and child health, and nutrition outcomes in Uganda. This is being achieved through the provision of targeted technical support at national and subnational levels to (1) develop and roll out MCHN policies, guidelines, and tools along high-impact practices and interventions; (2) strengthen coordination and linkages within and between Government of Uganda sectors; and (3) increase the use of data for planning, decision making, and learning. The Activity also supports improved delivery of MCHN services in the five divisions of Kampala city, particularly for the urban poor and through strengthened service delivery systems at public and private health care facilities (HFs) at all levels of the health system.

As part of this programme, MCHN has promoted immunisation-nutrition integration (INI) in Kampala at selected high-volume public health facilities and through community outreach in the city. This is done to (1) reduce missed opportunities for offering essential services at each client-provider contact point; (2) to improve service delivery performance; and (3) to better leverage programme costs. This is especially pertinent since 60% of the total population in Kampala live in informal settlements and work as casual labourers, and many of these residents cite high transport costs and long clinic waiting times as barriers to access to health services. As the INI work was centred on the HF and community levels, USAID MCHN Activity did not need to engage national level stakeholders to promote INI. However, programme

staff acknowledged that INI is supported by existing national guidelines, including the integrated community case management (iCCM) strategy, the maternal, infant, young child, and adolescent nutrition (MIYCAN) strategy, integrated management of acute malnutrition (IMAM) guidelines, and the integrated management of neonatal and childhood illness (IMNCI) strategy.

2. Designing and implementing the integration of immunisation and nutrition

There are INI activities at three public, high-volume health facilities (Kawempe National Referral Hospital, Kisenyi HC IV, and Kawaala HC III) that provide services to a predominantly urban lower income population. The interventions involved mentoring service providers at all contact points for children to identify gaps for immunisation and nutrition regardless of the presenting complaint and encouraging caregivers to carry the Child Health Card at all health visits to promote regular monitoring of children's growth and immunisation schedule. At the **community level**, the USAID MCHN Activity carried out integrated MCH-nutrition community outreach in the Kawempe Division of Kampala, purposefully including multiple health services to attract clients and reduce missed opportunities. Integrated outreaches were especially important to improving nutrition service delivery at the community level since previous experience has shown that clients are less likely to come if one mobilises for nutrition assessments alone. Availability of childhood immunisations and services for the mother (e.g., antenatal care and family planning) improved child health access since mothers typically come with a young child.

3. Prioritisation of nutrition interventions for integration with immunisation

The prioritised nutrition interventions were:

- **Nutrition assessments using colour-coded MUAC tapes with referral to OTPs for children with SAM and specialised counselling on childcare and feeding practices** at the household level for children with MAM. This was supplemented with follow-up visits by village health teams (paid transport and lunch allowance by FHI 360) to ensure that malnourished children received the appropriate nutrition care and support until full recovery;
- **Vitamin A supplementation (VAS)**; and
- **Other health services** (e.g. deworming, antenatal care, family planning).

These interventions were chosen given the priority indicators for the project and based on the project's baseline assessments in the year 2020. The USAID MCHN Activity staff coordinate facility and community teams to jointly identify areas with below-threshold coverage for outreach points, focusing on underserved communities and informed by routine service delivery data. Staff also coordinate multiple facilities within a catchment area to provide health workers for the outreach, assuring that every facility can keep static services running even during the outreaches. They also provide logistics support for health workers and the venue.

4. Changes made in the health system to support immunisation-nutrition integration service delivery:

Nutrition has now been embedded in MCHN services as part of the INI efforts. Health care workers (HCWs) are now actively ensuring children are breastfed in the first hour of birth, and nutrition assessments are done for children who come for immunisation. HCWs are incorporating nutrition in group health promotion during MCHN services and are now filling in the nutrition columns of maternal and child health registers. Equipment for nutrition assessments is now procured to reduce missed opportunities for nutrition assessment across all relevant contact points. In terms of changes in supervision, management, oversight and control, routine targeted monthly coaching checks are done by MCHN Activity and the division teams with special attention on those HFs that are underperforming. A government nutritionist supports the team during these mentorship exercises, looking for issues leading to performance gaps and sitting with the HF team to generate action points, and using quality improvement (QI) approaches to address gaps. Routine departmental and facility-level continuous medical education (CME) sessions are conducted to build INI capacity among health facility staff. Each HF has one nutrition and one immunisation focal person who work together, with the support of respective department in-charges, to ensure integration.

Funding and staffing: The Kampala Capital City Authority (KCCA) hired a nutritionist that supports in supervision of these integration activities. The MOH provides vaccines and supplies, and the KCCA pays for public staffing at KCCA facilities. The MCHN Activity covers costs for technical assistance, coordination, performance reviews, and facilitation (HCW transport and meals allowances) for outreaches. The Activity further collaborates with other partners during national campaigns such as integrated child health days (ICHDs) conducted in April and October every year to enhance coverage and documentation of INI.

Support Systems: Changes in support systems include creation of an improved tool to document the contribution of outreach to overall immunisation performance, and to better track consumption of vaccines and other commodities for planning. Previously, nutrition supplies such as ready-to-use-therapeutic foods (RUTF), ReSoMal, F75 and F100 were provided through partner support and used parallel supply chain mechanisms. With UNICEF support, the Government of Uganda is now planning to shift from a parallel supply chain for nutrition to use of the national medical supply change for integrated provision managed by Uganda National Medical Stores (NMS). HFs that qualify will receive direct delivery from NMS.

5. Changes in Nutrition and Immunisation Outcomes and Other Impact-level Learning

HF data at Kawempe National Referral Hospital, Kisenyi HC IV, and Kawaala HC III showed important changes in immunisation and nutrition service coverage and behaviours from the six months before INI implementation (July to December 2021) to the six months after INI implementation (January to June 2022):

- **Increase of 9% in DPT3 coverage** (*from 3,339 in the six-month period before intervention to 3,653 children vaccinated in the six month period during intervention with the DPT3 antigen*)
- **Increase of 116% in full immunisation by one year of age** (*from 2,660 to 5,747 fully-immunised children*)
- **Increase of 27% in maternal nutrition counselling** (*from 15,309 to 19,435 mothers receiving nutritional counselling*)
- **Increase of 22% in infant and young child feeding (IYCF) counselling coverage** (*from 14,364 to 17,511 mothers receiving IYCF counselling*)
- **Decrease of 8% in immediate breastfeeding (IBF)** (*from 17,765 to 16,398 mothers who initiated breastfeeding within the first hour after delivery*); IBF, within the first hour of delivery). Staff attributed this decrease in part to poor documentation of IBF (which is supposed to be documented in the maternity register, but often is not). Also, IBF is an outcome indicator for which changes over time have been difficult to document in this urban context: Many of the women counselled go back to their village to give birth and hence are not included in the health information systems in these Kampala HFs. Likewise, Kampala HFs see many women at delivery who never attended ANC (and counselling) in Kampala.

- **Decrease of 12% in children 6-23m who received nutrition assessments (from 11,298 to 9,895 children 6 to 23 months assessed with MUAC tapes):** MCHN staff attributed this drop to sometimes having longer queues in health facilities, and caregivers foregoing nutrition assessments due to the additional time requirements. Additionally, nutrition assessments are not written into the HW job descriptions, and often depend on the availability of HF volunteers. These volunteers are not typically available at night or on weekends, when a substantial proportion of child-related OPD visits occur. Sometimes these assessments are not documented, as well. Another challenge in capturing nutrition assessment data is that the Child Health Card only captures assessment data at entry (at birth or at first visit) and at nine months.

Community outreach data from Kawempe division showed these changes from the 12 months before INI implementation (January to December 2021) to the 12 months after INI implementation (January to December 2022):

- **Mixed results in community outreach of childhood vaccinations (2021-2022):** increase in BCG by 10% (from 860 vaccinated in the 12 month period prior to intervention to 942 in the 12 month period during intervention); decrease in Polio3 by 3% (from 1,551 to 1,498); decrease in DPT3 by 7% (from 1,588 to 1,476); and increase in Measles2 by 161% (from 28 to 73). The interpretation of immunisation results is complex: Overall, immunisation across static sites and community outreach sites in most of the Divisions decreased from 2021 to 2022, mostly due to prioritisation of COVID-19 vaccination efforts, and there were stockouts of polio and DPT antigens in early 2022. Part of the jump in Measles 2 can be attributed to a measles campaign in 2022. In sites where nutrition was better integrated with immunisation, staff observed increases in immunisation rates.
- **Increase in the proportion of vaccinations conducted through community outreach** (in relation to all vaccinations, be they in static health facilities or outreach): BCG increased by one pp (from 4% to 5%), polio3 by two points (from 16% to 18%), and Measles2 by six points (from 5% to 11%).
- **Increase of 52% in the first dose** (from 5838 to 8889) and 44% in the second dose of Vitamin A (from 5864 to 8428).

6. Advantages, disadvantages, enablers and barriers to immunisation-nutrition integration (INI)

Advantages:

- INI better leverages resources
- INI provides a “one-stop shop” for mothers and children: Through FHI360’s experiences implementing integrated outreaches in Kampala, Uganda, it was found that – in general – clients prefer to get multiple services (e.g., services for both mother and child, or multiple services for the child). While caregivers do not want to sit in a clinic all day awaiting services, nor do they wish to spend transport money for multiple trips to the health facility (when services are offered in a non-integrated way).

Disadvantages:

- When food is not distributed (e.g., in other settings of Uganda – refugee camps), immunisation is often the draw for integrated outreaches, and nutrition is often less prioritised by clients and service providers in INI. In an integrated outreach, many clients will still want to be immunised and then leave. (Most nutrition procedures take significantly more time, and thus can be less convenient for clients.)
- Integration requires more resources in terms of health workforce and planning (time), and integrated outreaches require pooling of HWs from 2-3 facilities, and thus a lot more coordination.
- If there is a shortage of a commodity for one service, the rest of the integrated services can lose meaning. The appeal for INI is the availability of various services at one point.

Enablers:

- In both HFs and community outreach, enablers include the presence of integrated data collection tools; government support; adequate HWs – including dedicated staff for immunisation – and supplies. In HFs, enablers include adoption of new evidence-based practices by staff, having MCHN QI officers (who discussed challenges and worked with HFs to understand the issues and how to improve services, enabling better acceptance of INI), and having data and performance reviews to motivate staff.

- In community outreach, community acceptance is an important enabler.
- Redistribution of vaccines and nutrition supplies among public to private sites.
- Integrated tools are now available (e.g., OPD register and the Integrated Child Health Register, which is still imperfect since they only capture nutrition data at birth and at 9 months of age).
- Supportive environment at the Division level and among facility leadership who allow staff to go out for community outreaches and for QI integration activities at the health facility level.
- Communities often expect the project to pay for outreach venues (e.g., schools, churches).
- Private sector HF's do not have designated catchments and thus do not have targets or performance goals regarding service delivery. This can lead to vaccine wastage, difficulty in assessing their performance, and increased vaccination drop-outs.
- High staff turnover, especially in the private HF's.
- It is often unclear as to who should provide guidance (e.g., Ministry of Health or Ministry of Education?) on who needs to provide consent when offering MMR campaign services to school children. This affects integrated service provision during outreaches since many children can come by themselves for non-invasive services (e.g., deworming and Vitamin A), but this is more complicated if vaccines are provided.

Barriers:

- In HF's, barriers include inadequate staffing levels (e.g. nurses & midwives); HF's that are not willing to offer immunisation on days that are not established immunisation days); lack of supplies (e.g. stockouts of vaccines [seasonal], VAS and deworming drugs); lack of supervision by public facility staff with private HF's (that they are supposed to supervise); and inadequate data tools to support concurrent community and HF activities.
- In community outreach, barriers include inadequate supplies; unwillingness to take staff from static HF's to conduct outreaches when there are few staff (especially since 98% of HF's in Kampala are private); and inadequate supervision by Division staff due to low facilitation rates (incentives).

7. Planned next steps

Health facilities will continue to offer integrated immunisation-nutrition services across departments and are considering scaling of this approach. Integrated outreach to communities will be continued while focusing on improving documentation on the contribution of integrated outreach to immunisation improvements. FHI360 and partners are hoping to scale this integrated outreach from three to all five divisions of Kampala through sub-grantee community CSOs. The use of tally sheets during this outreach will be discontinued given the poor data quality, poor use of these, and frequent data loss, and replaced with better methods for tracking data.

Annex 3: Suggested INI programme learning questions

Note: Questions are stated in a retrospective lens, but could be used prospectively too.

How was integration designed and implemented?

- Who are/were the main protagonists of immunisation-nutrition integration at the country level? What arguments, policy levers, or documents did they use to move INI forward? What were the motivations of ministry staff that were tapped to promote INI?
- What were the enablers, constraints and leveraged opportunities of this integration? What were the health system support factors that helped make integration possible?
- What were the unanticipated or unwanted policy or programme operations constraints?
- What was the donor and government resourcing/financing environment? What were the funding political economy constraints, and how were they addressed to deliver on INI programming?
- Was integration designed at the level of service provider (e.g. having one provider co-delivering both immunisation and nutrition interventions),

at the level of the service delivery point (e.g. having different providers providing both types of interventions in the same site), through cross-referral, through integrated demand generation, or through some integration in system support (e.g. sharing supply chains)?

- What types of assistance, guidance, or tools were used by ministry staff and other stakeholders for achieving INI? Which were most useful?

How were interventions prioritised for integration? Which characteristics of the nutrition intervention(s) were most important in deciding to integrate it with immunisation, or vice-versa?

- How robust was the prior evidence, or theoretical grounding for the INI design?
- Was there a strong monitoring, evaluation, and learning plan to inform implementation?

What health system strengthening or support elements were included to support INI?

- How were the increased time demands, incentives, and disincentives on service providers at all levels considered? What was the fit of human resources mobilised to the objectives of the programme?

What changes were made in:

- Service delivery (including microplanning, health promotion and demand creation)?
- Supervision, management, oversight, and control?
- Funding of the interventions (e.g. co-funding)?
- High-level management/planning, and policy and governance?
- Support systems (e.g. supply chains, information system)?

How was impact measured?

- What changes occurred in both nutrition and immunisation service results?
- What changes occurred in both nutrition and immunisation outcomes?
- Which changes were most significant?
- What advantages and disadvantages of INI were identified?

How were scale and sustainability considered?

- Were there plans to continue/scale the integrated activities? Why/why not?
- How was programme learning used for adaptation and policy advocacy?

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