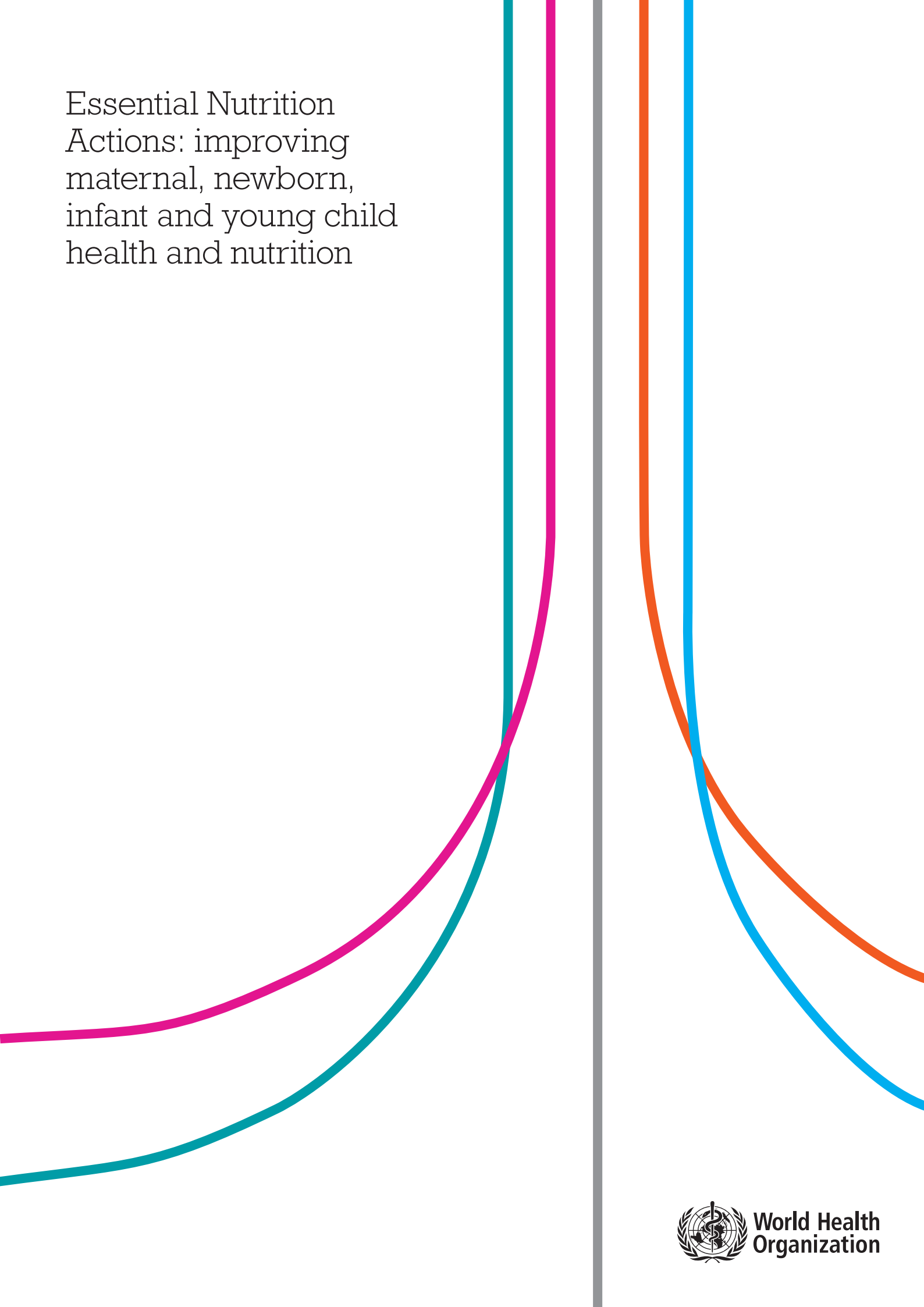
Essential Nutrition Actions: improving maternal, newborn, infant and young child health and nutrition



World Health Organization

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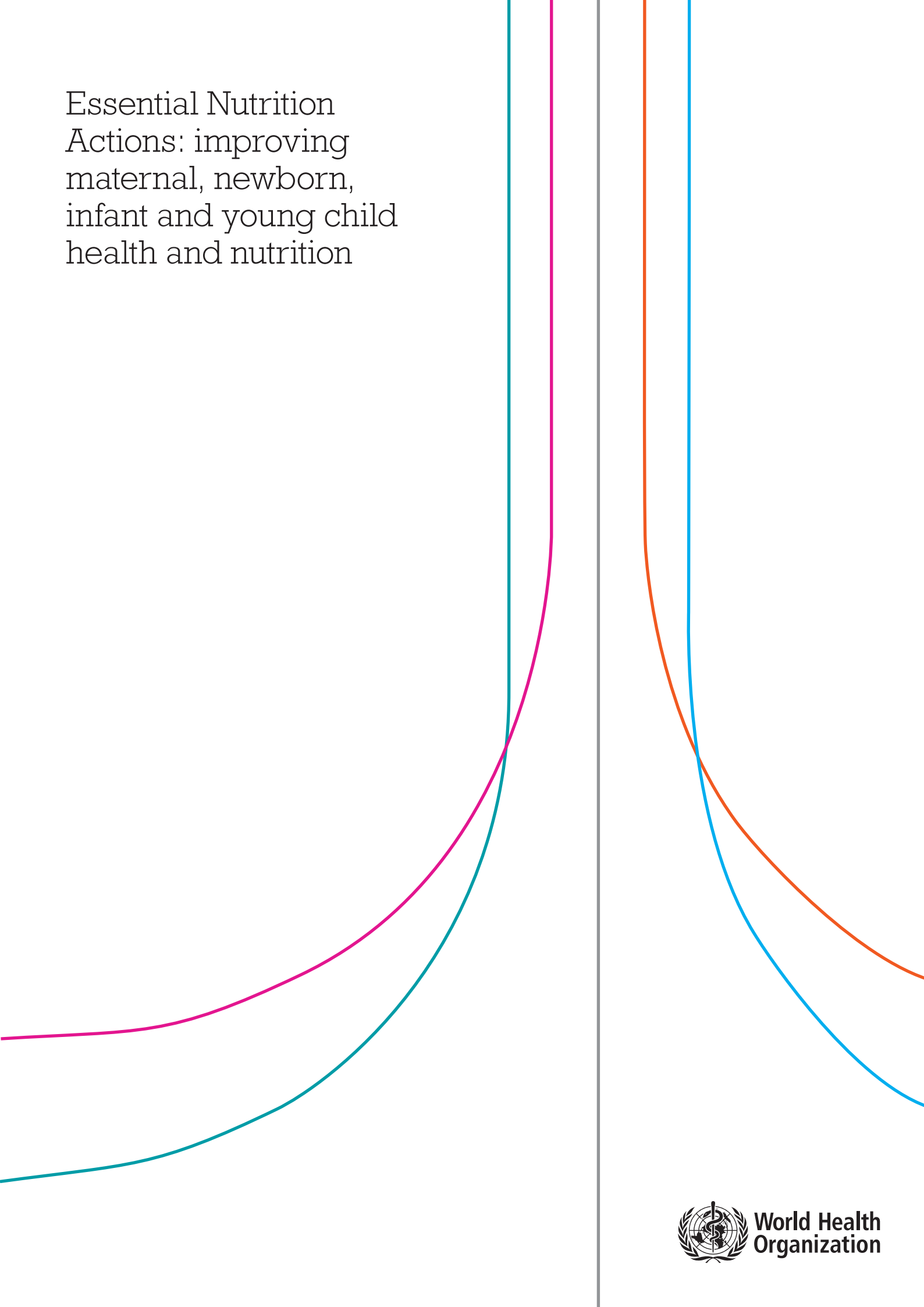

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Abbreviations

ACC	Administrative Committee on Coordination
ADB	Asian Development Bank
AGETIP	*Agence d'Exécution des Travaux d'Intérêt Public contre le Sous-emploi*
AIDS	Acquired immunodeficiency syndrome
AIN-C	*Atención Integral a la Niñez en la Comunidad*
ANW	*Anganwadi* worker
ARV	Antiretroviral
BA	*Bolsa Alimentacão*
BFHI	Baby-friendly Hospital Initiative
BFP	*Bolsa Familia* Programme
BIDANI	Barangay Integrated Development Approach for Nutrition Improvement
BINP	Bangladesh Integrated Nutrition Programme
BMI	Body-mass index
BRAC	Bangladesh Rural Advancement Committee
CBN	Community-based nutrition
CCT	Conditional cash transfer
CHD	Child health day
CHN	Community Health and Nutrition Project
CHNW	Community health and nutrition worker
CHW	Community health worker
CI	Confidence interval
cm	centimetre
CNC	Community nutrition centre
CNP	Community nutrition promoter (Bangladesh)
CNP	Community Nutrition Programme (Senegal)
Code	International Code of Marketing of Breast-milk Substitutes
CPP	Child Pastorate Programme
CSD	Child Survival and Development Programme
CSG	Child Support Grant
CT	Cash transfer
dL	decilitre
DRMFSS	Disaster Risk Management and Food Security Sector
EBF	Exclusive breastfeeding
ECD	Early childhood development
EEOS	Extended Enhanced Outreach Strategy
eLENA	electronic library of evidence for nutrition actions
ENA	Essential nutrition action
EOS	Enhanced Outreach Strategy
FA	*Familias en Acción*
FAO	Food and Agriculture Organization
FHP	Family Health Programme
FTE	Full-time equivalent
g	Gramme
GDP	Gross domestic product
GNI	Gross national income
GoE	Government of Ethiopia

GoI	Government of India
HAZ	Height-for-age z score
HC	*Hogares comunitarios*
HEP	Health Extension Programme
HEW	Health extension worker
HH	Household
HIV	Human immunodeficiency virus
HNPSP	Health and Nutrition Population Sector Programme
HSDP	Health Sector Development Project
HSSP	Health Sector Strategic Plan
ICDS	Integrated Child Development Scheme Project
IDA	Iron deficiency anaemia
IDB	International Development Bank
IFE	Infant feeding in emergencies
ILO	International Labour Organization
IMCI	Integrated management of childhood illness
IU	International unit
IVACG	International vitamin A Consultative Group
JNSP	Joint Nutrition Support Programme
Kcal	Kilocalorie
Kg	Kilogramme
l	Litre
LBW	Low birth weight
LHW	Lady health worker
m	Metre
mg	Milligramme
MICS	*micro-enterprises*
mL	Millilitre
MNP	Micronutrient powder
MoH	Ministry of Health
MUAC	Mid upper-arm circumference
NCHS	National Center for Health Statistics
NEC	Necrotizing enterocolitis
NGO	Nongovenmental organization
NHD	Department of Nutrition for Health and Development
NNMB	National Nutrition Monitoring Bureau
NNP	National Nutrition Programme
OR	Odds ratio
ORS	Oral rehydration salts
OTP	Outpatient Therapeutic Programmes
PAHO	Pan American Health Organization
PEM	Protein-energy malnutrition
PLW	Pregnant and lactating women
ppm	Parts per million
ppt	Percentage points change
PSNP	Productive Safety Net Programme

RE	Retinol equivalent
RNI	Recommended nutrient intake
RPS	*Red de Protección Social* Programme
RR	Relative risk
RUTF	Ready to use therapeutic food
SAM	Severe acute malnutrition
SCN	Standing Committee on Nutrition
SD	Standard deviation
SECALINE	Surveillance and Education for Schools and Communities on Food and General Nutrition
SEECALINE	Second Surveillance and Education for Schools and Communities on Food and General Nutrition Project
TFP	Therapeutic Feeding Programme
TINP	Tamil Nadu Integrated Nutrition Programme
TSF	Targeted Supplementary Feeding
UK	United Kingdom
UNHCR	United Nations Refugee Agency
UNICEF	United Nations Children's Fund
UNU	United Nations University
UPGK	Family Nutrition Improvement Programme
USI	Universal salt iodization
VAD	Vitamin A deficiency
VHC	Village health communicator
VHV	Village health volunteer
VLBW	Very low birth weight
WAZ	Weight-for-age z score
WB	World Bank
WHA	World Health Assembly
WHO	World Health Organization

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Preface

This report has been developed to inform the discussion at the World Health Assembly on the Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition[1] and is a compendium of the World Health Organization (WHO) guidance on effective nutrition programmes.

The document covers different aspects of infant feeding in normal or exceptional circumstances, such as emergencies, HIV infections and diarrhoea, as well as nutrition of women of reproductive age in different physiological status. It also discusses the value of implementing such programmes in an integrated fashion and with the adequate quality and intensity. It is the first time that WHO provides such a summary, organized by stage of the life course.

Most of the guidelines mentioned in the document (14 out of 24) have been recently developed or updated following the new WHO guideline process, i.e. in ways consistent with best practice, emphasizing the appropriate use of evidence. Systematic reviews of evidence are prepared to address critical outcomes for decision-making with consideration of the overall balance of risks and benefits, values and preferences, and costs. Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology is used for assessing the quality of the evidence and the strength of the recommendations. The whole process is implemented by WHO together with experts of a high professional standard and devoid of conflict of interest, with oversight by the WHO Guidelines Review Committee.

In order to provide real time updates, WHO launched in 2011 the electronic Library of Evidence on Nutrition Actions (eLENA[2]). eLENA is a simple web-based tool for academics, policy-makers, health workers, and development partners containing links to WHO evidence-informed nutrition recommendations and the underlying evidence. eLENA also includes topics on which evidence has started to accumulate but are still not the object of WHO guidance.

The guideline process does not end with the publication of a document, but continues with dissemination and assistance to policy-makers to adapt the guidance to the country context. Additional operational tools are often required, including analysis of cost and cost-effectiveness. Costing is addressed by the OneHealth software, developed jointly by various United Nations agencies and the World Bank.[3]

The importance of implementing at scale only interventions that have established evidence has been stressed by the first series on maternal and child undernutrition published by the *Lancet*.[4] This document is published simultaneously with a second *Lancet* series, providing an update of the evidence base of programmes. WHO is pleased to note that there is now full alignment in the nutrition community on programme priorities.

Broad agreement on “what to do” has been one of the factors of the success of the Scaling-up Nutrition movement, that has generated unprecedented broader commitment of governments, donors and development actors to improve nutrition, towards the achievement, in 2025, of the global nutrition targets established by the World Health Assembly.

Oleg Chestnov
Assistant Director General
Noncommunicable Diseases and Mental Health

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1 http://www.who.int/entity/nutrition/topics/WHA65.6_annex2_en.pdf
2 http://www.who.int/elena/en/index.html
3 http://www.futuresinstitute.org/onehealth.aspx
4 Horton R. Maternal and child undernutrition: an urgent opportunity *The Lancet*, 2008; 371(9608): 179.

Executive Summary

Malnutrition in all its forms is closely linked, either directly or indirectly, to major causes of death and disability worldwide. Worldwide, in 2011 about 101 million children under 5 years of age were underweight and 165 million stunted. At the same time, about 43 million children under 5 were overweight or obese.

The causes of malnutrition are directly related to inadequate dietary intake as well as disease, but indirectly to many factors, among others household food security, maternal and child care, health services and the environment. While most nutrition interventions are delivered through the health sector, non-health interventions can also be critical. Actions should target the different causes to reach sustainable change, which requires a multisectoral approach.

This document provides a compact summary of WHO guidance on nutrition interventions targeting the first 1000 days of life. Focusing on this package of essential nutrition actions, policy-makers could reduce infant and child mortality, improve physical and mental growth and development, and improve productivity.

Part I presents the interventions currently recommended by WHO (see table on pages 8 to 9), summarizes the rationale and the evidence for each, and describes the actions required to implement them. The document uses a life-course approach, from pre-conception throughout the first two years of life.

Some interventions require adequate behaviours, such as initiating breastfeeding soon after delivery, breastfeeding exclusively for six months and then continuing breastfeeding until two years and beyond. In order for those interventions to be successfully established action is needed to promote healthy behaviors; to create a supportive environment, such as a conducive hospital environment, skilled health workers, support in the community and the workplace; and protection from commercial and other negative influences.

Other interventions require the provision of supplies in adequate amounts for all those in need of them: iron and folic acid supplements, vitamin A supplements, multiple micronutrient powders and ready-to-use therapeutic foods.

The document highlights the circumstances in which the interventions have to be delivered, such as the prevalence of different nutrition conditions, or the occurrence of special situations, such as the presence of underlying disease (HIV infection, measles, diarrhoea) and emergency circumstances

The document deals with interventions delivered through the health sector, while recognizing that other interventions delivered through a variety of sectors (agriculture, water and sanitation, education, etc.) also have important impacts on nutrition. A special mention is made of food fortification, an intervention that requires the involvement of the health sector and actors in the food system.

Part II provides an analysis of community-based interventions aimed at improving nutrition and indicates how effective interventions can be delivered in an integrated fashion. It shows how the ENAs described in the first part have been implemented in large-scale programmes in various settings, what the outcomes have been, and to examine the evidence for attribution of changes in nutritional outcomes to programme activities. Some background on the evolution of programmatic evidence is given, and implications for the future are drawn.

Global nutrition challenges

Malnutrition in all its forms is closely linked, either directly or indirectly, to major causes of death and disability worldwide. This situation applies to perinatal and infectious diseases as well as chronic ones.

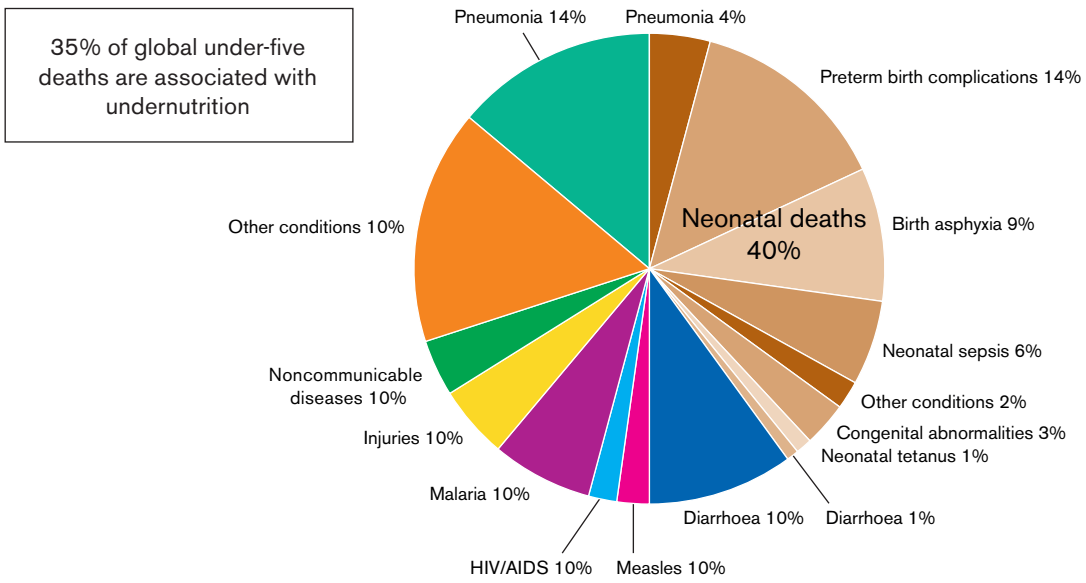
Globally, in 2011 about 101 million children under 5 years of age were underweight and 165 million stunted. At the same time, about 43 million children under 5 were overweight or obese (*1*). About 90% of stunted children live in only 36 countries, and children under 2 years of age are most affected by undernutrition (*2*).[1] Nearly 20 million children under 5 suffer from severe acute malnutrition, a life-threatening condition requiring urgent treatment.

In 2011, 6.9 million children under 5 died, mostly from preventable causes such as pneumonia, diarrhoea, malaria and neonatal conditions (*3, 4*) (**Figure 1**); about 90% of these deaths occurred in 42 countries, with half the worldwide deaths occurring in only 6 countries (*5*). Undernutrition is associated with more than one third of those deaths (*2, 6*).

Improvement of exclusive breastfeeding practices, adequate and timely complementary feeding, along with continued breastfeeding for up to 2 years or beyond, could save the lives of 1.5 million children under 5 years of age annually (*7*). Growth failure during intrauterine life and poor nutrition in the first two years of life have critical consequences throughout the life-course. Appropriate breastfeeding and complementary feeding practices not only play a significant role in improving the health and nutrition of young children, they also confer significant long-term benefits during adolescence and adulthood. An estimated 13 million children are born with intrauterine growth restriction every year (*2*).[1]

The World Health Organization (WHO) estimates that about 190 million children under five (33.3% of the preschool age population) are vitamin A deficient, with about 5.2 million affected by night blindness (*9*). Infants as well as young children have increased vitamin A requirements to

Figure 1. Global distribution of deaths among children under 5 by cause, 2010 (*2, 4, 8*)



[1] These figures will be updated as this report is published.

support rapid growth and combat infections. Severe vitamin A deficiency (VAD) at this age can cause visual impairments, anaemia and weakened immunity, with an increased risk of morbidity and mortality from measles or diarrhoea (*10*).

VAD is also an issue for women. WHO estimates that 9.8 million women are affected by night blindness, a problem related with insufficient vitamin A (*11*).

Iron is the most common nutritional deficiency, with approximately 2 billion people worldwide affected (*12*). WHO estimates that there are 469 million women of reproductive age and about 600 million preschool and school-age children worldwide anaemic, with at least half of these cases attributable to iron deficiency (iron deficiency anaemia) (*13*).

Infants and children under the age of five are at risk of developing iron deficiency anaemia because of their increased requirements for rapid growth and diets that are often lacking in sufficient absorbable iron (*14, 15*). Iron deficiency, with or without anaemia, may have important health consequences for young children, including increased perinatal mortality, delayed mental and physical development, negative behavioural consequences, reduced auditory and visual function, and impaired physical performance (*16*). Some of the negative effects of iron deficiency during early childhood are irreversible and can lead to poor school performance, reduced physical work capacity and decreased productivity later in life (*3, 11, 17, 18, 19*).

Maternal short stature and iron deficiency anaemia, which can increase the risk of death of the mother at delivery, contribute to at least 18% of maternal deaths in low- and middle-income countries (*20*). Anaemia rates have not improved appreciably over the past two decades (*21*). Maternal undernutrition also increases the probability of low birth weight, which in turn increases the probability of neonatal deaths due to infections and asphyxia (*22*). Anaemia is also associated with an increased risk of maternal mortality (*23*). Globally, almost 50% of pregnant women (56 million) are anaemic (*4*). Because adolescent girls and women of reproductive age lose iron through monthly menstruation, and because their diets are often lacking in iron, they are particularly vulnerable to iron deficiency (*10, 23, 24*).

In 2008, 35% of adults aged 20 years and older were overweight (body-mass index [BMI] ≥ 25 kg/m^2) (34% of men and 35% of women). The worldwide prevalence of obesity has nearly doubled between 1980 and 2008. In 2008, 14% of women in the world were obese (BMI ≥30 kg/m^2) (297 million over the age of 20), compared with 8% in 1980 (*25, 26*).

Causes of malnutrition

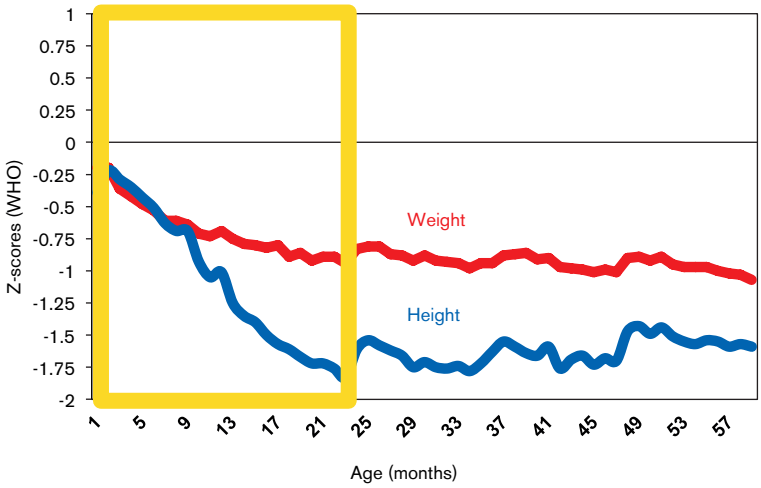
The causes of malnutrition are directly related to inadequate dietary intake as well as disease, but indirectly to many factors, among others household food security, maternal and child care, health services and the environment. While most nutrition interventions are delivered through the health sector, non-health interventions can also be critical. Actions should target the different causes to reach sustainable change, which requires a multisectoral approach.

Timing of interventions

New analyses, using the WHO Growth Standards (*27*), confirm the importance of the first two years of life as a window of opportunity for growth promotion (**Figure 2**). An important feature of the WHO standards is that they reveal a much greater problem of undernutrition during the first six months of life than previously believed, bringing coherence between the rates of undernutrition observed in young infants and the prevalence of low birth weight and early abandonment of exclusive breastfeeding. These findings highlight the need for prenatal and early-life interventions to prevent the growth failure that primarily happens during the first two years of life, including the promotion of appropriate infant feeding practices (*28*). The deficits acquired by this age are difficult to reverse later.

Strategies to improve nutritional status and growth in children should include interventions to improve nutrition of pregnant and lactating women; early initiation of breastfeeding with exclusive breastfeeding for six months; promotion, protection, and support of continued breastfeeding

Figure 2. Timing of growth faltering, data from 54 surveys, 1994–2007 (*27*)



along with appropriate complementary feeding from six months up to two years and beyond; and micronutrient supplementation, targeted fortification and food supplementation, when needed.

Recommended nutrition practices targeting women, infants and young children

In 1999 WHO, in collaboration with UNICEF and BASICS, proposed effective, feasible, available and affordable interventions (*29*). These interventions worked best when combined with interventions to reduce infections, such as water, sanitation and hygiene.

Focusing on a package of essential nutrition actions (ENAs), health programmes could reduce infant and child mortality, improve physical and mental growth and development, and improve productivity. These essential actions protect, promote and support priority nutrition outcomes:

- exclusive breastfeeding for six months;
- adequate complementary feeding starting at six months with continued breastfeeding for two years;
- appropriate nutritional care of sick and malnourished children;
- adequate intake of vitamin A for women and children;
- adequate intake of iron for women and children; and
- adequate intake of iodine by all members of the household.

The actions proposed to obtain the priority nutrition outcomes included ones that health workers could implement, such as complementary feeding counselling and active feeding, growth monitoring and promotion, and supplementary feeding or food-based interventions. At the same time, health managers aiming for adequate intake of vitamin A for women and children could encourage daily intake of vitamin A-rich foods and adequate breastfeeding, give high-dose vitamin A supplements to children with infections, train staff to detect and treat clinical VAD, and design a plan for preventive supplementation of vitamin A for children and postpartum women in populations at risk of VAD.

Improving nutrition involves actions at health facility and population levels. At district level, these could include monitoring nutrition, identifying sub-populations at risk of nutrition problems, updating nutrition policies and protocols, and providing resources and tools to implement nutrition activities at health facilities and at community venues.

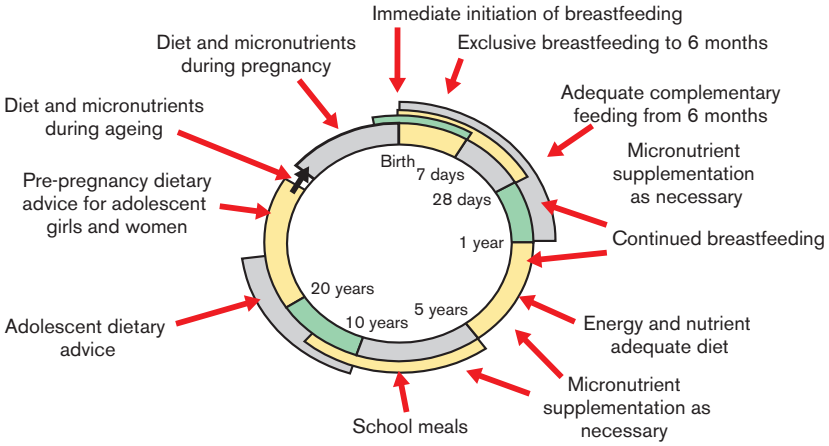
At health facilities, ENAs should be carried out at all contacts with pregnant and lactating women and their children. Outside facilities in the community, follow-up of mothers and children and support to community workers and groups are key.

Much experience has been gained since the ENAs were disseminated, thanks to the implementation of these and other actions for supporting priority nutrition outcomes. This has led to the acknowledgement that nutrition actions targeting women, infants and young children can help improve health and reduce mortality among these groups. The experience gained has benefited the preparation of this document. More recently, a series on nutrition in the *Lancet* in 2008/9 helped to provide a strong evidence base for programmes implementing priority actions.

WHO's electronic Library of Evidence for Nutrition Actions (eLENA) makes information accessible with the aim to plan programmes to protect, promote and support priority nutrition practices.

The content of this document is divided into two parts. **Part I** is organized around the life-course, and presents existing WHO recommendations for priority conditions and explains the rationale behind them. Evidence is provided on direct nutrition interventions and health-related and other interventions with an effect on nutrition, including those in **Figure 3** targeting women, infants and young children.

Figure 3. Improving nutrition around the life-course



Part II provides an analysis of community-based interventions aimed at improving nutrition and indicates how effective interventions can be delivered in an integrated fashion.

WHO work on evidence for nutrition actions

WHO recognizes the need to improve the process by which health-related recommendations are developed using the best available evidence. WHO established the Guidelines Review Committee in 2007 which has developed and implemented procedures to ensure that WHO guidelines are produced in ways consistent with best practice, emphasizing the appropriate use of evidence (*30*). In strengthening its commitment to providing relevant guidance for programmes that support and develop capacity in evidence-informed policy-making to Member States, the WHO Department of Nutrition for Health and Development recently established the WHO Nutrition Guidance Expert Advisory Group with experts from WHO Advisory Panels and other experts in the fields of epidemiology, nutrition, public health, paediatric medicine, and programme implementation. The members are from all over the world and represent a wide variety of backgrounds and expertise. Building on the recent focus on the increased need for evidence-informed guidelines to support Member States to implement and expand nutrition actions, the Nutrition Guidance Expert Advisory Group has developed and updated guidelines in the nutrition field.

For these guidelines to be effective in supporting Member States, they must be widely disseminated so that country decision-makers and donor agencies will have the information to make appropriate choices for each country. WHO's eLENA (*31*) has been developed to provide

an on-line platform to house and disseminate evidence-based recommendations, as well as other scientific information and tools for implementing and/or expanding nutrition actions in Member States. Policy options informed by scientific evidence and accompanied with best practices can help countries make appropriate choices for their context and improve the achievement of significant public health outcomes. Low- and middle-income countries have scarce resources to address their health and nutrition challenges. They need to make decisions informed by evidence to prioritize the use of those resources efficiently in actions proven to be effective in other contexts yet adapted to their specific needs. An understanding of the biological rationale for different actions and the behavioural and contextual factors which could affect, either positively or negatively, an action's success, combined with the use of relevant nutrition guidelines, provides end users easy access to evidence-informed options that are clear and concise and can be used in nutrition programme development, implementation and scale-up.

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Evidence-based nutrition actions over the life-course

Target group	Intervention areas	Evidence-based actions	Context/criteria
Infants (0–5 months)	Early initiation of breastfeeding	Counselling and support at facility and community level	All countries
	Exclusive breastfeeding	Implementation of the Baby-friendly Hospital Initiative Implementation of International Code of Marketing of Breast-milk Substitutes Maternity protection	All countries
	Feeding of low-birth-weight infants	Counselling and support	All countries, children born with weight <2500 g
	Infant feeding in the context of HIV	Counselling and support to HIV-positive mothers	All countries, children born to HIV-positive mothers
Young children (6–23 months)	Continued breastfeeding	Counselling and support at facility and community level	All countries
		Implementation of International Code of Marketing of Breast-milk Substitutes	
	Appropriate complementary feeding	Counselling and support for appropriate complementary feeding	All countries
		Use of multiple micronutrient powders for home fortification of foods consumed by infants and young children 6–23 months of age	Populations where the prevalence of anaemia in children under 2 years is 20% or more
	Vitamin A status	Vitamin A supplementation in infants and children 6–59 months of age	Populations where the prevalence of night blindness is 1% or higher in children 24–59 months of age or where the prevalence of vitamin A deficiency (serum retinol 0.70 µmol/l or lower) is 20% or higher in infants and children 6–59 months of age
		Vitamin A supplementation to children with measles	All countries, all children with measles
	Iron deficiency	Daily iron supplementation for children 6–23 months of age	Countries where the diet does not include foods fortified with iron or where anaemia prevalence is above 40%
	Zinc status	Zinc supplementation to children with diarrhoea	All countries, children with diarrhoea
	Iodine deficiency	Iodine supplementation to children	Countries where less than 20% of households have access to iodized salt, until the salt iodization programme is scaled-up
	Severe acute malnutrition	Out-patient and in-patient management of severe acute malnutrition	All countries, children with severe acute malnutrition

Target group	Intervention areas	Evidence-based actions	Context/criteria
	Moderate acute malnutrition	Management of children with moderate acute malnutrition	All countries, children with moderate acute malnutrition
	Nutrition of children living with HIV	Nutritional care and support of children 6 months to 14 years old living with HIV	All countries, children living with HIV
	Nutrition in the context of emergencies	Nutritional care and support for children living in emergency situations	Countries in emergency situations
Women in reproductive age	Iron and folic acid deficiency	Intermittent iron and folic acid supplementation in menstruating women	Countries where the prevalence of anaemia among non-pregnant women of reproductive age is 20% or higher
Pregnant women	Iron and folic acid deficiency	Daily supplementation with iron and folic acid for women during pregnancy	Countries where anaemia in pregnant women is 40% or higher
		Intermittent iron and folic acid supplementation for non-anaemic pregnant women	Countries where prevalence of anaemia among pregnant women is lower than 20%.
	Vitamin A deficiency	Vitamin A supplementation in pregnant women	Populations where the prevalence of night blindness is 5% or higher in pregnant women or 5% or higher in children 24–59 months of age
	Calcium status	Calcium supplementation in pregnant women	All countries. All pregnant women, particularly those at higher risk of hypertension
	Iodine deficiency	Iodine supplementation to pregnant and lactating women	Countries where less than 20% of households have access to iodized salt, until the salt iodization programme is scaled-up
	Nutrition in the context of emergencies	Nutritional care and support for pregnant and lactating women living in emergency situations	Countries in emergency situations
Global	Micronutrient status	Wheat and maize flour fortification	Countries where industrially produced flour is regularly consumed by large population groups

Part I

Recommendations, rationale and evidence for nutrition actions

This section aims to present current WHO recommendations relevant to nutrition of mothers and children through the life-course, as well as their underlying evidence. It deals with direct nutrition interventions delivered through the health sector, while recognizing that other interventions delivered through a variety of sectors (agriculture, water and sanitation, education, etc.) also have important impacts on nutrition.

1. Interventions targeted at young infants (0–5 months)[1]

1.1 Early initiation of breastfeeding

WHO RECOMMENDATION

Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour and encourage mothers to recognize when their babies are ready to breastfeed, offering help if needed. (*1*)

Rationale and evidence

WHO and UNICEF provided recommendations on early initiation of breastfeeding in 1989, and the evidence was updated in 1998. Evidence for the importance of early initiation was systematically reviewed again in 2007, in the context of early skin-to-skin contact. The review found a positive effect on both the likelihood of exclusive breastfeeding (EBF) for one to four months of life, and the overall duration of breastfeeding, when mothers put the infant to the breast soon after birth. The review also showed that babies interacted more with their mothers, stayed warmer and cried less (*2*). A Cochrane review on community-based integrated packages to improve maternal and neonatal health found that community-based programming had a positive impact on the initiation of breastfeeding within one hour of birth (*3*).

Early initiation promotes exclusiveness and duration of breastfeeding, but the relationship between early initiation of breastfeeding and improved health has not been so well established. However, a recent study in Ghana (*4*) showed evidence of a causal association between early breastfeeding and reduced infection-specific neonatal mortality in young human infants.

The recommendation for early initiation of breastfeeding stems from the 1989 WHO/UNICEF Joint Statement *Protecting, promoting and supporting breast-feeding: the special role of maternity services* (*5*). An updated 1998 statement includes the ten steps for successful breastfeeding, with Step 4 indicating "Help mothers initiate breastfeeding within a half-hour of birth". The updated review concluded that early contact increases breastfeeding both soon after delivery and two to three months later. Spontaneous suckling may not occur until between 45 minutes to 2 hours after birth, but skin-to-skin contact should start as soon as possible after delivery. Provided the infant is in close contact with his/her mother and can suckle when it shows signs of readiness, there is no justification for forcing him/her to take the breast (*6*).

A Cochrane systematic review (*2*) suggested that in industrialized societies, hospital routines may significantly disrupt early mother-infant interactions with harmful effects. It also showed that babies interacted more with their mothers, stayed warmer and cried less with early skin-to-skin contact. Babies were more likely to be breastfed, and to breastfeed for longer.

(For a summary of systematic reviews on early initiation of breastfeeding, see **Table I-1**.)

[1] 0–5 months refers to the period up to 180 days of life.

Table I-1 Systematic reviews on early initiation of breastfeeding

Cochrane Review: Early skin-to-skin contact for mothers and their healthy newborn infants concluded (*2*):

- Mothers were more likely to be breastfeeding 1 to 4 months post-birth than those in control groups (OR=1.82; 10 studies)
- Mothers using skin-to-skin contact breastfeed for a longer duration (by an average of 42.55 days) than mothers in control groups (7 studies).

Cochrane Review: Community-based intervention packages for reducing maternal and neonatal morbidity and mortality and improving neonatal outcomes concluded (*3*):

- Community-based intervention packages had a "statistically significant impact on the initiation of breastfeeding within 1 hour of birth (average RR=1.94; 6 studies).

WHO: Evidence for the ten steps to successful breastfeeding concluded (*6*):

- Early contact increases breastfeeding both soon after delivery and 2–3 months later (11 studies)

1.2 Exclusive breastfeeding

WHO RECOMMENDATION

As a global public health recommendation, infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health. ..... ." (*7*)

Rationale and evidence

One of the most effective and rewarding preventable interventions is breastfeeding, which together with appropriate complementary feeding has the potential to reduce mortality among children under five by 19% (*8*). Six months of EBF is recommended for improved infant, child, and maternal health. EBF from birth is possible except for a few medical conditions, and unrestricted EBF results in ample milk production. The evidence stems from a systematic review in 2001 on the effects of EBF for six (versus three to four) months on infant and maternal health. The review found evidence of decreased gastrointestinal illnesses in infants who were exclusively breastfed for six months (compared to those who were mixed breastfed – receiving breast milk and other milk – at three to four months), and also that mothers who exclusively breastfed for six months experience prolonged lactational amenorrhea (*9*).

An expert consultation in 2001 served to analyse the systematic review as well as to review the nutrient adequacy of EBF (*10*) for six months (*7*). Based on the results, WHO recommended "exclusive breastfeeding for six months, with introduction of complementary foods and continued breastfeeding thereafter" (*11*).

The 2001 systematic review was updated to include six additional studies and was published in 2009 (*12*). The nearly identical results to those found previously reinforced WHO's recommendation of six months of EBF for improved health.

(For a summary of systematic reviews on EBF, see **Table I-2**.)

Actions to protect, promote and support breastfeeding

The *Global strategy for infant and young child feeding*, adopted by the World Health Assembly (WHA) and the UNICEF Executive Board in 2002, provides the framework for action to protect, promote and support breastfeeding. It builds on key global instruments including:

- the International Code of Marketing of Breast-milk Substitutes and subsequent relevant World Health Assembly Resolutions (referred to as the Code);
- the Baby-friendly Hospital Initiative (BFHI); and
- the International Labour Organization's (ILO) Maternity Protection Convention No. 183.

The *Global strategy* reaffirms the four operational targets of the 1990 *Innocenti Declaration* on the protection, promotion and support of breastfeeding and includes additional targets for feeding infants and young children:

Table I-2 Systematic reviews on exclusive breastfeeding

Kramer & Kakuma. The optimal duration of exclusive breastfeeding: a systematic review concluded (*9*): • "Infants exclusively breastfed for 6 months experience less morbidity from gastrointestinal infection than those who are mixed breastfed as of 3 or 4 months." [16 studies]
WHO Report of the expert consultation on the optimal duration of exclusive breastfeeding recommended (7): • "…[E]xclusive breastfeeding for 6 months, with introduction of complementary foods and continued breastfeeding thereafter." (as shown below)
Global strategy for infant and young child feeding: the optimal duration of exclusive breastfeeding (based on Expert Consultation) noted (in paragraph 9) (*11*): • "…[R]educed risks of gastrointestinal infection and of all-cause mortality for exclusively breastfed children compared with partially breastfed infants from 4 to 6 months, regardless of when the latter stopped breastfeeding."
Cochrane Review: Optimal duration of exclusive breastfeeding (Review), concluded (*12*): • "Infants exclusively breastfed for 6 months experience less morbidity from gastrointestinal infection than those who are mixed breastfed as of 3 or 4 months." (6 additional studies added since review in 2001) (22 studies)
Lancet Breastfeeding promotion strategies and feeding practices (web appendix 1) concluded (*13*): • Group counselling increased EBF during the neonatal period (OR=3.88; 6 studies) and at 6 months of age (OR=5.19; 5 studies). • Individual counselling increased EBF during the neonatal period (OR=3.45; 15 studies) and at 6 months of age (OR=1.93; 9 studies). • Mass media increased EBF at 1 month of age from 48–70%, at 4 months of age from 24–31%, and at 6 months of age from 7–12 % in exposed population (1 study).
Cochrane Review Support to breastfeeding mothers (Review) concluded (*14*): • Any form of breastfeeding support to mothers (professional or lay) had a larger impact on EBF than all other forms of breastfeeding (e.g. mixed) (20 studies). [Studies with interventions occurring only during the antenatal period not included] • Programmes using WHO/UNICEF breastfeeding training "showed significant benefit in prolonging exclusive breastfeeding" (6 studies).
Spiby et al. A systematic review of education and evidence-based practice interventions with health professionals and breast-feeding counsellors on duration of breast feeding concluded (*15*): • "From studies reviewed, no single approach consistently positively affected breastfeeding duration" (9 studies).

1. appointing a national breastfeeding coordinator;
2. ensuring that every facility providing maternity services fully practises all the "Ten steps to successful breastfeeding";
3. giving effect to the Code;
4. enacting legislation to protect the breastfeeding rights of working women;
5. developing, implementing, monitoring and evaluating a comprehensive policy on infant and young child feeding;
6. ensuring that health and other relevant sectors protect, promote and support exclusive breastfeeding for six months and continued breastfeeding up to two years of age or beyond;
7. promoting timely, adequate, safe and appropriate complementary feeding with continued breastfeeding;
8. providing guidance on feeding infants and young children in exceptionally difficult circumstances;
9. considering new legislation or other measures as part of a comprehensive policy on infant and young child feeding to give effect to the Code and subsequent WHA resolutions.

For a comprehensive approach to appropriate infant and young child feeding, countries are recommended to undertake actions in the areas of policy, health systems and community.

International Code of Marketing of Breast-milk Substitutes (16)

The aim of the Code is to contribute to the provision of safe and adequate nutrition for infants, by the protection and promotion of breastfeeding, and by ensuring the proper use of breast-milk substitutes, when these are necessary, on the basis of adequate information and through appropriate marketing and distribution. The main elements of the Code deal with information and education; advertising and promotions to mothers and health workers; labelling; quality; and implementation and monitoring.

To maximize the contribution that the Code can make to improved breastfeeding, given the many examples of non-compliance, in-country monitoring of its implementation should be carried out (*17, 18*). Companies found to be committing violations should be sanctioned by the government entity charged with Code enforcement. Having all companies that produce infant formula compete for market share in a manner consistent with the Code will benefit these companies by ensuring that no company is given an unfair advantage (*19*).

Improving maternity protection and health through the workplace

Maternity protection at work is essential for safe-guarding the health and economic security of women and their children. This consensus is reflected in the international labour standards of the ILO, which set out basic requirements for maternity protection at work. Many countries have ratified Maternity Protection Convention No. 183, and others have adopted some of its provisions (*20*). Health professionals have an important role to play in advocating for good legislation on maternity protection, and hospitals and other health facilities should offer maternity leave and breastfeeding support for their own personnel. All working women should be supported to sustain breastfeeding when they return to work, and in the workplace they should be granted a minimum of one daily break with pay, to breastfeed their infant or express and store breast milk (*21, 22, 23, 24*).

Baby-friendly Hospital Initiative (1, 25, 26)

WHO conducted a review of the evidence to support the implementation of the *Ten steps for successful breastfeeding* (*27*) and an update is underway. A review on interventions to promote breastfeeding found that BFHI is effective in increasing EBF rates (*28*). The BFHI has a systematic recertification process to ensure that its rigorous standards are upheld. Many hospitals that were certified in the past no longer meet the criteria and require recertification. Revitalization of the BFHI also requires capacity building in breastfeeding counselling and clinical aspects of lactation management. To enforce the monitoring of the BFHI criteria on a routine basis, consideration should be given to making fulfilment of the criteria a part of the overall system of quality certification of hospitals (*29*).

Counselling and support for appropriate breastfeeding at community and facility level

One-on-one breastfeeding counselling is particularly effective in promoting EBF. Maternal counselling during pregnancy, immediately after child birth and at key moments in the postnatal period has large and significant effects on EBF rates. The evidence of the effect of interventions on breastfeeding practices is less clear than the biological and behavioural effects of breastfeeding on health effects. Best practices to increase EBF, and thus improve health, were reviewed in a *Lancet* series on maternal and child undernutrition (*30*). The review showed counselling is particularly effective in promoting EBF. As compared to control groups, EBF increased among mothers during the neonatal period (OR 3.45, 95% CI 2.20–5.42) and at 6 months of age (OR 1.39, CI 1.18–3.15) when exposed to individual, one-on-one counselling. Group counselling was shown to increase EBF during the neonatal period (OR 3.88, CI 2.09–7.22) and at 6 months of age (OR 5.19, CI 1.90–14.15) compared to control groups. Maternal counselling during pregnancy, immediately after childbirth and at key moments in the postnatal period had large and significant effects on EBF. Promotion of breastfeeding through mass media was shown effective at increasing EBF during the 6-month postnatal period by between 7% and 70% in the exposed population, with the largest impact seen in mothers with infants 1 to 4 months of age (*13*). Studies specifically looking at the impact of education or counselling on child weight

showed that children whose mothers were exposed to breastfeeding education were on average heavier at four months of age than control children (*31*).

A Cochrane review on community-based intervention packages for preventing maternal and newborn illness and death offers encouraging evidence of the value of integrating maternal and newborn care in community settings through a range of strategies, many of which can be packaged effectively for delivery through a range of community health workers (CHWs) (*3*). The key public health challenge is how to integrate high-quality breastfeeding counselling and support into primary health care in a way that will ensure universal coverage, including home visits, during the critical first week and month of life when mothers are most likely to abandon EBF.

A more recent Cochrane review on support given to breastfeeding mothers (*32*) found a positive effect on duration of EBF when mothers received any form of support (professional or lay) on breastfeeding and in programmes that used WHO/UNICEF breastfeeding training. The report emphasized that the strongest effects can be achieved when health care providers work in synergy with community members, providing consistent messages and practical support, as well as ensuring adequate referral for mothers with breastfeeding problems when needed. However, a systematic review of randomized controlled trials, non-randomized controlled trials with concurrent controls and before-after studies (cohort or cross-sectional) (total of nine studies) on the effect of training health professionals and lay educators on breastfeeding practices concluded that "[f]rom the studies reviewed, no single approach consistently positively affected breastfeeding duration" (*15*).

1.3 Counselling and support for appropriate feeding of low-birth-weight infants

WHO RECOMMENDATION

1. **Low-birth-weight (LBW) infants, including those with very low birth weight (VLBW), should be fed mother's own milk.**
2. **LBW infants, including those with VLBW, who cannot be fed mother's own milk should be fed donor human milk.**[1]
3. **LBW infants, including those with VLBW, who cannot be fed mother's own milk or donor human milk, should be fed standard infant formula. VLBW infants who cannot be fed mother's own milk or donor human milk should be given preterm infant formula if they fail to gain weight despite adequate feeding with standard infant formula.**
4. **LBW infants, including those with VLBW, who cannot be fed mother's own milk or donor human milk should be fed standard infant formula from the time of discharge until six months of age**
5. **VLBW infants who are fed mother's own milk or donor human milk should not routinely be given bovine milk-based human-milk fortifier. VLBW infants who fail to gain weight despite adequate breast-milk feeding should be given human-milk fortifiers, preferably those that are human-milk based. (*33*)**

WHO recommendations refer also to supplements (vitamin D, calcium, iron, vitamin A, zinc); when and how to initiate feeding (soon after birth when infant is clinically stable); optimal duration of EBF (six months); how to feed (cup or tube if needed): frequency of feeding (usually on demand) (*33*).

LBW infants who are able to breastfeed should be put to the breast as soon as possible after birth when they are clinically stable, and should be exclusively breastfed until six months of age. LBW infants who need to be fed by an alternative oral feeding method should be fed by cup or

[1] In settings where safe and affordable milk-banking facilities are available or can be set up.

spoon and should be fed based on the infants' hunger cues, except when the infant remains asleep beyond three hours of the last feed.

Implementation of these recommendations will help to reduce mortality and severe morbidity among these infants while helping in their growth and neurodevelopment.

Rationale and evidence

Important benefits were found for mortality (18% reduction), severe infections or necrotizing enterocolitis (NEC) (60% reduction), and mental development scores (5.2 points higher) associated with feeding mother's own milk compared with formula. The only apparent harm was lower length at nine months in one study.

Feeding donor human milk to LBW infants is associated with lower incidence of infections and NEC during the initial hospital stay after birth. There was no significant effect on mortality, mental development scores and anthropometric status at 18 months of age.

Actions to protect, promote and support appropriate feeding of low-birth-weight infants

The actions summarized in the section on exclusive breastfeeding (pages 12–15) also apply to feeding of LBW infants.

1.4 Infant feeding in the context of human immunodeficiency virus (HIV)

WHO RECOMMENDATION

1. **Mothers known to be HIV-infected should be provided with lifelong antiretroviral (ARV) therapy or ARV prophylaxis interventions to reduce HIV transmission through breastfeeding.**

   In settings where national authorities have decided that the maternal and child health services will principally promote and support breastfeeding and ARV interventions as the strategy that will most likely give infants born to mothers known to be HIV-infected the greatest chance of HIV-free survival:

2. **Mothers known to be HIV infected (and whose infants are HIV uninfected or of unknown HIV status) should exclusively breastfeed their infants for the first 6 months of life, introducing appropriate complementary foods thereafter, and continue breastfeeding for the first 12 months of life. Breastfeeding should then only stop once a nutritionally adequate and safe diet without breast milk can be provided.**

3. **Mothers known to be HIV infected who decide to stop breastfeeding at any time should stop gradually within one month. Mothers or infants who have been receiving ARV prophylaxis should continue prophylaxis for one week after breastfeeding is fully stopped. Stopping breastfeeding abruptly is not advisable.**

4. **When mothers known to be HIV infected decide to stop breastfeeding at any time, infants should be provided with safe and adequate replacement feeds to enable normal growth and development.**

5. **Mothers known to be HIV infected should only give commercial infant formula milk as a replacement feed to their HIV-uninfected infants or infants who are of unknown HIV status when specific conditions are met.**

6. **Mothers known to be HIV infected may consider expressing and heat-treating breast milk as an interim feeding strategy.**

7. **If infants and young children are known to be HIV infected, mothers are strongly encouraged to exclusively breastfeed for the first six months of life and continue breastfeeding as per the recommendations for the general population, that is, up to two years or beyond. (*34*)**

Rationale and evidence (*34*)

Guidelines on HIV and infant feeding were incorporated into the 2001 WHO publication *New data on the prevention of mother-to-child transmission of HIV and their policy implications: conclusions and recommendations*. In 2006, WHO updated the guidance on HIV and infant feeding. Significant programmatic experience and research evidence regarding HIV and infant feeding have accumulated since then; in particular, it is now known that ARV interventions to either the HIV-infected mother or the HIV-exposed infant significantly reduce the risk of postnatal transmission of HIV through breastfeeding. This evidence has had major implications for how women living with HIV should feed their infants and how health workers should counsel and support them.

Nine key principles underlie the seven evidence-based recommendations above. The principles reflect a set of values that contextualize the provision of care in programmatic settings. The key principles are directed towards policy-makers, academics and health workers.

KEY PRINCIPLES ON HIV AND INFANT FEEDING

1. Balancing HIV prevention with protection from other causes of child mortality.
2. Integrating HIV interventions into maternal and child health services.
3. Setting national or sub-national recommendations for infant feeding in the context of HIV.
4. When ARVs are not (immediately) available, breastfeeding may still provide infants born to HIV-infected mothers with a greater chance of HIV-free survival.
5. Informing mothers known to be HIV infected about infant feeding alternatives.
6. Providing services to specifically support mothers to appropriately feed their infants.
7. Avoiding harm to infant feeding practices in the general population.
8. Advising mothers who are HIV uninfected or whose HIV status is unknown.
9. Investing in improvement in infant feeding practices in the context of HIV.

Recommendation 1 is based on the revised WHO recommendations for ARV therapy or prophylaxis to reduce HIV transmission, including through breastfeeding (*35*).

Recommendation 2 is based on a systematic review of the effect of different infant feeding practices, in the absence of ARVs, on HIV-free survival and other mortality. Decreased HIV transmission in the first six months of infant life was associated with EBF compared to mixed feeding. EBF in the first six months of life was also associated with reduced mortality over the first year of life in HIV-exposed infants. The risk of HIV transmission continues for as long as breastfeeding continues; despite this, HIV-free survival of HIV-exposed infants who breastfed beyond six months of age was better than of infants who were started on replacement feeds.

Recommendation 3 is based on research and programmatic experience reporting that rapid and abrupt cessation of breastfeeding was very difficult for mothers to achieve and was associated with adverse consequences for the infant; breast-milk viral load is also known to spike with rapid cessation of breastfeeding.

For Recommendation 4, the very considerable evidence from non HIV-exposed populations was relevant and justifiable to use to inform how HIV-infected mothers should feed their infants in the absence of breast milk. Alternatives to breastfeeding include:

For infants less than six months of age:

- commercial infant formula milk as long as home conditions outlined in Recommendation 5 are fulfilled;
- expressed, heat-treated breast milk.

For children six months of age and older:

- commercial infant formula milk as long as home conditions outlined in Recommendation 5 are fulfilled;
- animal milk as part of a diet providing adequate micronutrient intake;
- meals, including milk-only feeds.

Home-modified animal milk is not recommended as a replacement food in the first six months of life.

Recommendation 5 indicates that HIV-infected mothers should only give commercial infant formula when all the following specific conditions are met: clean water and sanitation are assured; the mother or other caregiver can reliably provide sufficient infant formula milk; the mother or caregiver can prepare it cleanly and frequently enough; the mother or caregiver can exclusively give infant formula milk in the first six months; the family is supportive of this practice; and the mother or caregiver can access health care that offers comprehensive child health services.

Recommendation 6 is based on laboratory evidence which demonstrated that heat treatment of expressed breast milk from HIV-infected mothers, if correctly done, inactivates HIV. This option is recommended in special circumstances (i.e. infant born with low birth weight or otherwise ill in the neonatal period and unable to breastfeed); when the mother is unwell and temporarily unable to breastfeed; to assist mothers to stop breastfeeding; or if ARVs are temporarily not available.

Actions to protect, promote and support appropriate infant feeding in the context of HIV

Integrate HIV interventions into maternal and child health services

National authorities should aim to integrate HIV testing, care and treatment interventions for all women into maternal and child health services, including access to CD4 count testing and appropriate ARV therapy or prophylaxis for the woman's health and to prevent mother-to-child transmission of HIV. While this does not directly refer to infant feeding, it is considered important to emphasize the importance of other essential HIV-specific services.

Integrate HIV and infant feeding into a comprehensive infant and young child feeding policy

National authorities should decide whether health services will principally counsel and support mothers known to be HIV infected to either breastfeed and receive ARV interventions or avoid all breastfeeding.[1]

This decision should be based on considerations of the socioeconomic and cultural contexts of the populations served by maternal, newborn and child health services; availability and quality of health services; local epidemiology including HIV prevalence among pregnant women; main causes of maternal and child undernutrition; main causes of infant and child mortality.

Adapt infant and young child feeding policies and programmes to the context of HIV

National authorities should review infant and young child feeding policies and programmes to adapt them to the context of HIV. This adaptation should include measures to enforce the implementation and monitoring of the Code; integration of the section on HIV into BFHI (*1*); and establishing a procurement and distribution system that ensures availability of ARVs. Policies and programmes should also be developed and implemented to avoid undermining optimal breastfeeding practices among the general population.

[1] WHO is developing guidance to assist countries in this decision-making process.

Counselling and support for mothers at health services and community level

Health care providers and community-level service providers should be trained to provide counselling and support to HIV-infected women during pregnancy, delivery, and the postpartum period, up to the moment their children are about two years of age (*36, 37*).

Good counselling and support, as well as family, community and policy environments conducive to breastfeeding, benefit women. In one study where trained peer counsellors were available and good follow-up provided, 45% of HIV-infected women exclusively breastfed for a full 6 months, while 66.7% did so for a full 5 months and 72.5% for 3 months (*34*).

2. Interventions targeted at infants and young children (6–23 months of age)

2.1 Continued breastfeeding

WHO RECOMMENDATION

Infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health (*7*). Thereafter, to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe complementary foods while breastfeeding continues for up to two years of age or beyond (*38*).

Rationale and evidence

Guidelines for continued breastfeeding stem from the Pan American Health Organization (PAHO)/WHO *Guiding principles on complementary feeding of the breastfed child* which recommend "continued frequent, on-demand breastfeeding until two years of age or beyond" (*38*). Breastfeeding continues to make an important nutritional contribution well beyond the first year of life. Breastfed children at 12–23 months of age receive on average 35% to 40% of total energy needs from breast milk (*39*) with the remaining 60% to 65% covered by complementary foods. Breast milk is a key source of energy and essential fatty acids and provides substantial amounts of certain micronutrients. The nutritional impact of breastfeeding is most evident during periods of illness, when the child's appetite for other foods decreases but breast-milk intake is maintained (*40*). Continued, frequent breastfeeding also protects child health by delaying maternal fertility postpartum and reducing the child's risk of morbidity and mortality in disadvantaged populations (*41, 42*). Longitudinal studies demonstrate that in developing countries, a longer duration of breastfeeding is associated with greater linear growth (*43, 44*). It is also linked to reduced risk of childhood chronic illnesses (*45*) and obesity (*46*) and to improved cognitive outcomes (*47*), although the causal relationship underlying these associations remains controversial. Breastfeeding in the first 6 months of life provides greater protection against diarrhoea than against acute respiratory illness (OR=6.1 vs. OR=2.4), but breastfeeding between 6–11 months shows "similar levels of protection" against both acute respiratory illness and diarrhoea (OR=1.9 vs. OR=2.5) (3 studies) (*42*). However, few studies have specifically examined the effect of breastfeeding beyond 12 months on these outcomes.

Actions to protect, promote and support continued breastfeeding

The actions summarized in the section on EBF (pages 12–15) also apply to continued breastfeeding, especially the implementation of the Code and counselling and support for appropriate breastfeeding at community and facility level.

2.2 Complementary feeding

WHO RECOMMENDATION

Infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health.[1] Thereafter, to meet their evolving nutritional requirements, *infants should receive nutritionally adequate and safe complementary foods while breastfeeding continues for up to two years of age or beyond* (*38*).

[1] As formulated in the conclusions and recommendations of the expert consultation (Geneva, 28–30 March 2001) that completed the systematic review of the optimal duration of exclusive breastfeeding (see document A54/INF. DOC./4). See also resolution WHA454.2.

Guiding principles

Studies synthesized along these lines progressively led to the currently applicable guidelines, as described in Guiding principles for complementary feeding of the breastfed child (*38*) and for feeding non-breastfed children from 6 to 24 months (*48*).

GUIDING PRINCIPLES FOR COMPLEMENTARY FEEDING OF THE BREASTFED CHILD

1. Practise exclusive breastfeeding from birth to 6 months of age, and introduce complementary foods at 6 months of age (180 days) while continuing to breastfeed.
2. Continue frequent, on-demand breastfeeding until two years of age or beyond.
3. Practise responsive feeding, applying the principles of psychosocial care.
4. Practise good hygiene and proper food handling.
5. Start at six months of age with small amounts of food and increase the quantity as the child gets older, while maintaining frequent breastfeeding.
6. Gradually increase food consistency and variety as the infant gets older, adapting to the infant's requirements and abilities.
7. Increase the number of times that the child is fed complementary foods as he/she gets older.
8. Feed a variety of foods to ensure that nutrient needs are met.
9. Use fortified complementary foods or vitamin-mineral supplements for the infant, as needed.
10. Increase fluid intake during illness, including more frequent breastfeeding, and encourage the child to eat soft, varied, appetizing, favourite foods. After illness, give food more often than usual and encourage the child to eat more.

GUIDING PRINCIPLES FOR FEEDING NON-BREASTFED CHILDREN 6–24 MONTHS OF AGE

1. Ensure that energy needs are met.
2. Gradually increase food consistency and variety as the infant gets older, adapting to the infant's requirements and abilities.
3. For the average healthy infant, meals should be provided four to five times per day, with additional nutritious snacks offered one or two times per day, as desired.
4. Feed a variety of foods to ensure that nutrient needs are met.
5. As needed, use fortified foods or vitamin-mineral supplements (preferably mixed with or fed with food) that contain iron.
6. Non-breastfed infants and young children need at least 400–600 mL/day of extra fluids in a temperate climate, and 800–1200 mL/day in a hot climate.
7. Practise good hygiene and proper food handling.
8. Practise responsive feeding, applying the principles of psychosocial care.
9. Increase fluid intake during illness and encourage the child to eat soft, varied, appetizing, favourite foods. After illness, give food more often than usual and encourage the child to eat more.

Rationale and evidence

Following key guiding principles is recommended to ensure children are appropriately fed between 6 and 23 months. Complementary feeding, referring to appropriate feeding starting at six months of age, means that the infant receives breast milk (including milk expressed or from a wet-nurse) or a breast-milk substitute and solid or semi-solid food.

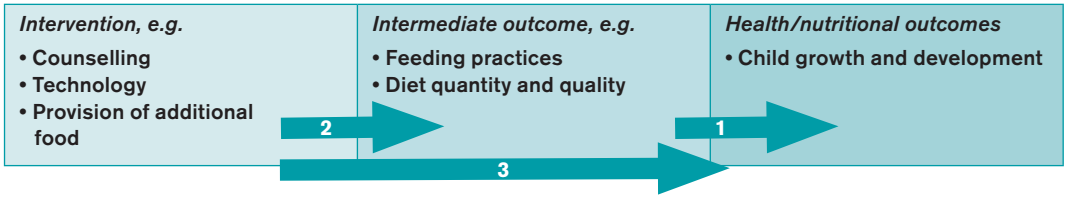
Complementary foods include those that are manufactured or locally prepared, suitable as a complement to breast milk or to a breast-milk substitute when either becomes insufficient to

satisfy the nutritional requirements of the infant. A working definition refers to complementary feeding as the process starting when breast milk or infant formula alone is no longer sufficient to meet the nutritional requirements of infants, and therefore other foods and liquids are needed, along with breast milk or a breast-milk substitute. The target range for complementary feeding is generally taken to be 6 to 23 months (*16, 49, 50*).

A critical window of opportunity to ensure optimal child growth and development covers the period of pregnancy up to the second year of life (*51, 52*). Successful complementary feeding is critical for preventing malnutrition. Growth faltering is most evident during this time period, particularly between 6 and 12 months when foods of low nutrient density begin to replace breast milk and rates of diarrhoeal illness caused by food contamination are at their highest. After about two years of age, it is very difficult to reverse stunting that occurred at earlier ages.

The evidence that feeding practices and diet affect growth and development of children (sequence 1 in **Figure I-1**) is summarized by WHO (*53*) and others, especially Dewey and Brown (39). The relationship of nutrient requirements, feeding frequency, energy density and feeding practices to adequate growth and development is considered well supported by the available evidence, which includes clearly understood mechanisms.

Figure I-1 How feeding practices and diet affect growth and development[1]



The main issues have become how to optimize these practices (intermediate outcomes) with interventions (sequence 2 in **Figure I-1**). Since these intermediate outcomes are particularly difficult to quantify accurately, most studies have tried to link interventions directly with health or nutritional outcomes (sequence 3 in **Figure I-1**). Variable effects had previously been found (*39*). Literature reviews (*54*), especially by Dewey and Adu-Afarwuah (*51*), and a *Lancet* series (*55*) examined the effects of education or counselling and certain technologies (increasing energy density, nutrient bioavailability), with and without provision of additional food, on growth and other outcomes.

Education, with or without provision of complementary foods, had only small effects on growth and other outcomes (*51*). The *Lancet* series distinguished food secure and insecure situations in evaluating the effect of providing food, with the effect size increasing by 0.25 HAZ for populations with sufficient food and by 0.41 in populations with insufficient food (*30*). (Fortification is dealt with in the section on micronutrients.)

(For a summary of systematic reviews on complementary feeding, see **Table I-3**.)

Actions to promote appropriate complementary feeding

Counselling and support for appropriate complementary feeding at facility and community level

Quality counselling of mothers and caregivers, and appropriate behavioural change communication (*56*) to other family and community decision-makers, are essential for improving feeding of children 6 to 23 months old; trained health workers will be able to provide appropriate counselling (*57*). Educational approaches can be effective without food provision, improving height-

[1] Source: John Mason, personal communication, 2012.

for-age (as measured by z-scores, weighted mean difference 0.25) in exposed groups. A greater impact was seen when food or food supplements were provided as well, improving height-for-age (weighted mean difference 0.41) (*55*).

Maximize the utilization of locally produced foods in any given setting, and consider the promotion of additional products only if they can fill a critical gap in nutrients in an acceptable, feasible, affordable, sustainable and safe way, as a complement to continued breastfeeding and the local diet, not as a replacement. The use of nutrient-rich, animal-source foods has beneficial effects on growth and developmental outcomes.

Where locally available foods alone will not satisfy nutritional requirements, consider alternative products such as:

- centrally-produced fortified foods
- micronutrient powders for point-of-use fortification (see below)
- lipid-based nutrient supplements.

Further research and carefully monitored applications at large scale are needed to generate more evidence on which product is best for which circumstances, how best to promote their correct utilization, and their contribution to improving nutritional, developmental and health status in different settings.

Table I-3 Systematic reviews on complementary feeding

Dewey & Adu-Afarwuah Systematic review of the efficacy and effectiveness of complementary feeding interventions in developing countries concluded (*51*):

- Education-only interventions on complementary feeding had a modest effect on child growth with a mean effect size of 0.28 on weight and 0.20 on linear growth (11 studies).
- Provision of complementary food-only interventions had an overall mean effect of 0.60 on weight and 0.47 on linear growth (8 studies). Removing one possible outlier study (in Nigeria), the effect shrinks to 0.26 for weight and 0.28 for linear growth (7 studies).
- Provision of complementary foods and education interventions, overall mean effect was 0.35 on weight and 0.17 on growth (8 studies).
- Interventions with complementary food fortified with micronutrients, the average effect was 0.11 on weight and 0.12 on length (6 studies).
- Interventions targeting increased energy density of food only had mixed results, only 2 of 5 studies showed impact on growth. Average effect size on weight was 0.35 and linear growth was 0.23 (5 studies).

Lancet *Meta analysis of complementary feeding strategies and linear growth (web appendix 4) concluded* (*55*):

- Educational interventions without provision of complementary foods (in food secure areas) improved HAZ by a weighted mean difference of 0.25 (3 studies).
- Provision of food with or without education (in food insecure areas) improved HAZ by a weighted mean difference of 0.41 (7 studies).

2.3 Use of multiple micronutrient powders (MNPs) for home fortification of foods consumed by infants and young children 6–23 months of age

WHO RECOMMENDATION

Home fortification of foods with MNPs containing at least iron, vitamin A and zinc is recommended to improve iron status and reduce anaemia among infants and children 6–23 months of age.

A suggested scheme for home fortification with MNPs of foods consumed by infants and children aged 6–23 months is presented in Table I-4 (*58*).

Table I-4 Suggested scheme for home fortification with multiple micronutrient powders of foods consumed by infants and young children 6–23 months

Composition per sachet[a]	• Iron: 12.5 mg of elemental iron, preferably as encapsulated ferrous fumarate[b] • Vitamin A: 300 µg of retinol • Zinc: 5 mg of elemental zinc, preferably as zinc gluconate
Frequency	One sachet per day
Duration and time interval between periods of intervention	At minimum, for a period of 2 months, followed by a period of 3–4 months off supplementation, so that use of micronutrient powders is started every 6 months
Target group	Infants and children 6–23 months of age, starting at the same time as weaning foods are introduced into the diet
Settings	Populations where the prevalence of anaemia in children under 2 years or under 5 years of age is 20% or higher

[a] The recommendation for the composition of the powder is based on the doses and nutrients included in the systematic review (*59*). In addition to iron, vitamin A and zinc, multiple micronutrient powders may contain other vitamins and minerals at currently recommended nutrient intake (RNI) doses for the target population (*60*).

[b] 12.5 mg of elemental iron equals 37.5 mg of ferrous fumarate, 62.5 mg of ferrous sulfate heptahydrate or 105 mg of ferrous gluconate.

Rationale and evidence

In lower-income settings, children's diets may also be primarily plant-based. A lack of animal-source foods in these settings results in insufficient amounts of key micronutrients such as vitamin A, zinc, and iron, to meet the recommended intakes for children less than 24 months of age. WHO estimates globally that 190 million preschool children are vitamin A deficient (*61*) and more than two thirds of children are anaemic in Africa and south-east Asia. Infants and young children are also most susceptible to the harmful consequences of these deficiencies. A compromised immune status resulting from poor nutritional status can directly lead to an increased risk of infectious diseases and potentially elevated rates of infant morbidity and mortality (*62*).

Supplementation has been proposed as one of the best available nutrition interventions to address these vitamin and mineral deficiencies, as it can be targeted to some of the most vulnerable population groups, such as those living in remote regions, as well as young children (*63*). The MNPs were developed as an alternative to supplementation and have shown to be successful in reducing anaemia and iron deficiency in young children in a variety of contexts as they can be added directly to food (*64, 65*). MNPs are frequently packaged in small sachets which are temperature and moisture resistant (*66*), giving them a long shelf-life and easing transportation and storage problems (*67*). These characteristics reduce the frequency of distribution necessary to maintain a supply of micronutrients (*68*).

Mild side effects can occur with supplementation, such as darkened stools, gastrointestinal pain, diarrhoea, constipation and vomiting (*69*). Though MNPs do not eliminate these side effects, they do appear to reduce their frequency and severity and are highly acceptable (*70*). Iron is covered in a fat-based protective coating so that the taste, colour and aroma of food change minimally without greatly affecting children's dietary habits.The fortification of foods using MNPs can be done at home or any other locations where meals are prepared and consumed, such as schools or hospitals. This method of fortification is thus referred to as point-of-use (*71*).

A Cochrane systematic review assessed the effects and safety of home fortification of foods with MNPs for children under two years of age to improve health outcomes. The review compared the provision of MNPs with at minimum iron, zinc and vitamin A, versus no intervention or placebo and versus regular supplementation practice such as iron supplementation. In total eight trials including children living in a variety of settings were evaluated. When compared to no intervention, home fortification with MNPs was found to reduce anaemia by 32% and iron deficiency by 50% in infants and young children. The intervention seemed as effective as daily iron supplementation for anaemia and improving haemoglobin concentrations, although the evidence is limited. The effects of MNPs did not significantly vary among populations with anaemia rates ranging from 25% to 100% or in settings where malaria is endemic.

Actions to promote home fortification of foods with MNPs for children

- An evaluation of the nutritional status of children under five should take place prior to initiating a supplementation programme with MNPs, along with any other existing measures in place to control anaemia and VAD, such as the provision of other fortified complementary foods or deworming.
- In malaria-endemic areas, the provision of iron should be implemented in conjunction with adequate measures to prevent, diagnose and treat malaria.
- Home fortification with MNPs should also include a behavioural change strategy to promote an awareness of the product along with its correct use and hygienic practices in the preparation of complementary foods and recommended breastfeeding practices, as well as steps to manage diarrhoea (*72*). This intervention may also serve to promote breastfeeding practices after six months of age and age-appropriate preparation of complementary foods in terms of frequency, amounts, consistency and variety.
- Home fortification with MNPs provides a single delivery of multiple micronutrients as a cost-effective approach to achieve multiple goals; however, as MNPs are a relatively new approach, programmes including home fortification with MNPs may require high-level coordination and commitment, as well as a communication component to raise awareness (*73, 74*).

2.4 Vitamin A supplementation for children under five years of age

WHO RECOMMENDATION

In settings where vitamin A deficiency is a public health problem, vitamin A supplementation is recommended in infants and children 6–59 months of age as a public health intervention to reduce child morbidity and mortality. A suggested vitamin A supplementation scheme for infants and children 6–59 months of age is presented in Table I-5 (*75*).

Table I-5 Suggested vitamin A supplementation scheme for infants and children 6–59 months of age

Target group	Infants 6–11 months of age (including HIV+)	Children 12–59 months of age (including HIV+)
Dose	100 000 IU (30 mg RE) vitamin A	200 000 IU (60 mg RE) vitamin A
Frequency	Once	Every 4–6 months
Route of administration	Oral liquid, oil-based preparation of retinyl palmitate or retinyl acetate[a]	
Settings	Populations where the prevalence of night blindness is 1% or higher in children 24–59 months of age or where the prevalence of VAD (serum retinol 0.70 µmol/l or lower) is 20% or higher in infants and children 6–59 months of age	

IU, international units; RE, retinol equivalent.

[a] An oil-based vitamin A solution can be delivered using soft gelatin capsules, as a single-dose dispenser or a graduated spoon (*76*). Consensus among manufacturers to use consistent colour coding for the different doses in soft gelatin capsules, namely red for the 200 000 IU capsules and blue for the 100 000 IU capsules, has led to much improved training and operational efficiencies in the field.

Rationale and evidence

Recent studies suggest that providing vitamin A supplements to children 6–59 months of age from developing countries is associated with a reduced risk of mortality and diarrhoea incidence (*77*). The mechanisms by which vitamin A saves lives are not fully understood, and it is not clear whether its action is mediated through the correction of underlying deficiencies or through adjuvant therapeutic effects. Vitamin A supplements may improve gut integrity and therefore decrease the severity of some cases of diarrhoea (*78*). The role of vitamin A in immunity may also affect the susceptibility and/or severity of other infections (*79, 80*).

Many countries have integrated vitamin A supplementation for infants and children into national health policies and routine health services, for example through biannual "special days" where supplementation is combined with other child survival interventions such as deworming or nutrition education (*81, 82*). Vitamin A supplements are also commonly distributed as part of the Expanded Programme on Immunization, particularly at nine months with measles vaccinations. In 2009, approximately 77% of preschool children were estimated to have received two doses of supplements per year in more than 103 priority countries (*83*).

Provision of a high dose of vitamin A every six months until the age of five years has been based on the principle that a single high dose of vitamin A is highly absorbed, stored as a fat-soluble vitamin in the liver and mobilized over an extended period of time as needed. In infants 6–11 months of age doses of 100 000 IU and in children 12–59 months of age 200 000 IU have been considered to provide adequate protection for 4 to 6 months (*84*). Most children in this age group tolerate these doses of vitamin A well, though temporary side effects such as headache, nausea or vomiting and diarrhoea have been reported in a small percentage of cases (*85*). On a per-child basis, the cost of vitamin A supplementation is considered inexpensive. Most of the vitamin A used during supplementation campaigns is supplied in gelatin capsules, which cost approximately US$ 0.02 each (*86*), with an estimated cost of US$ 1 to US$ 2 for delivery per child per year. The total cost of supplementation per death averted is estimated at US$ 200 to US$ 250 (*87*).

Two Cochrane reviews were recently updated to systematically evaluate the most recent evidence on vitamin A supplementation in children (*77, 88*). The first examined the effects and safety of vitamin A supplementation for the prevention of morbidity and mortality among children 6–59 months of age (*77*). Results of the review showed that supplementation with vitamin A can reduce mortality and the prevalence rates of communicable diseases such as diarrhoea. The meta-analysis included 17 clinical trials and indicated that vitamin A supplementation reduces the risk of all-cause mortality by 24%. Another review assessed the effects and safety of a number of micronutrients, including vitamin A, in reducing morbidity and mortality for children and adults with HIV. This review included five trials on vitamin A supplementation in children and only three (all in Africa) contributed data on all-cause mortality. The data suggest that periodic vitamin A supplementation of HIV-infected children over six months of age is beneficial in reducing overall mortality risk.

Actions to promote vitamin A supplementation for children

In 1997, WHO recommended universal vitamin A distribution, involving periodic administration of supplemental doses to all preschool-age children, with priority given to age groups (usually six months to three years) or regions at greatest risk of VAD, xerophthalmia, and nutritional blindness (*81*).

Vitamin A supplements should be delivered to children 6–59 months of age twice yearly, during health system contacts. Where appropriate, supplements should be integrated into other public health programmes aimed at improving child survival, such as polio or measles national immunization days, or biannual child health days delivering a package of interventions such as deworming, distribution of insecticide-treated mosquito nets and immunizations (*82*). The dose should be marked on the child health card.

Prior to implementation, a vitamin A supplementation programme should include well-defined objectives that take into account available resources, existing policies, appropriate delivery and communication channels, and potential stakeholders and suppliers. Ideally, interventions should be implemented as part of an integrated strategy that includes control of nutritional deficiencies; the programme should begin as a pilot and be scaled up as the evidence grows and resources allow (*81*).

2.5 Vitamin A supplementation in children with measles

WHO RECOMMENDATION

All children diagnosed with measles should receive one dose of a vitamin A supplement.[1] Children from areas of known vitamin A deficiency or where measles case fatality is likely to be more than 1% should receive 2 doses of vitamin A supplements, given 24 hours apart, to help prevent eye damage and blindness. Vitamin A supplements have been shown to reduce the number of deaths from measles by 50%.

The recommended age-specific doses are:

- **50 000 IU for infants aged less than 6 months**
- **100 000 IU for infants aged 6 to 11 months**
- **200 000 IU for children ≥ 12 months.**

If the child has clinical signs of vitamin A deficiency (such as Bitot's spots), a third dose should be given 4–6 weeks later (*81*).

Rationale and evidence

VAD contributes to delayed recovery and to the high rate of post-measles complications. In addition, measles infection may precipitate acute VAD and xerophtalmia. As a result, measles accounts for a large proportion of preventable childhood blindness, particularly in Africa.

The beneficial impact of two doses of vitamin A during treatment of measles is well established. WHO's current policy advocates administering vitamin A to all acute cases. A high dose of vitamin A is given immediately on diagnosis and repeated the next day.

Even in countries where measles is not usually severe, vitamin A should be given to all cases of severe measles.

2.6 Daily iron supplementation for children 6 to 23 months old

WHO RECOMMENDATION

Infants have higher iron requirements in comparison with other age groups because they grow very rapidly. They are normally born with good iron stores. However, beyond six months of age the iron content of milk is not sufficient to meet many infants' requirements, and unfortified complementary foods are usually low in iron, making this age group susceptible to iron deficiency. LBW infants are born with fewer iron stores and thus are at higher risk of developing iron deficiency at a younger age. Where the diet does not include fortified foods, or prevalence of anaemia in children at approximately 1 year of age is severe (above 40%), supplements of iron at a dosage of 2 mg/kg of body weight per day should be given to all children between 6 and 23 months of age. (See Table I-6.) (*89*)

[1] See also newly released *Pocketbook of hospital care for children: guidelines for the management of common childhood illnesses*. 2nd edition, Geneva, WHO, 2013,

Table I-6 Guidelines for iron supplementation for children 6-23 months of age

Age group	Indication of supplementation	Dosage schedule	Duration
Children from 6 to 23 months of age	Where the diet does not include foods fortified with iron or where anaemia prevalence is above 40%	Iron 2 mg/kg of body weight/day	From 6 to 23 months of age, for 3 months duration

Rationale and evidence

Iron supplementation has traditionally been given on a daily basis. However, several studies suggest that it can be consumed at a low dose on a regular basis to be effective as there is a limit to the iron absorption capacity of the intestine. Intermittent doses once, twice or three times per week (*90*) on non-consecutive days may be an alternative to daily supplementation to improve iron stores and prevent anaemia (*91*).

A Cochrane systematic review assessed the benefits and safety of intermittent iron supplementation with iron, or iron combined with other micronutrients for children up to the age of 12 years (*90*). A total of 23 randomized controlled trials were included in the review that compared providing iron supplements to either no intervention, receiving a placebo or daily iron supplementation with the same nutrients among children living in various geographical settings, including malaria-endemic regions. Intermittent iron supplementation in this age group effectively increased haemoglobin concentrations and prevented anaemia when compared with a placebo or no intervention. However, children receiving intermittent iron supplementation were more likely to be anaemic at the end of their supplementation regimen than those supplemented daily. Adherence rates tended to be higher among children receiving intermittent compared to daily supplementation.

For guidelines on intermittent supplementation of children 24 to 59 months, see (*92*).

Actions to promote iron supplementation for children (93)

- Children under two years of age who are diagnosed with anaemia should be targeted and treated with 3 mg of iron per kg of body weight daily supplementation until haemoglobin concentrations return to normal (89).
- In malaria-endemic areas, the provision of iron supplements should be implemented in conjunction with adequate measures to prevent, diagnose and treat malaria (94).
- In areas where hookworm prevalence is 20% or greater, iron supplementation may be more effective when combined with anthelminthic treatment on an annual basis (95).
- A behavioural communication change strategy promoting awareness and the correct use of intermittent supplements should be promoted in combination with other behavioural interventions, such as handwashing and diarrhoea case management (96).
- The current WHO recommendations for iron supplementation of young children are based on the known physiology of iron metabolism as well as clinical practices at the time the recommendations were formulated, and apply to otherwise healthy children.
- Numerous efficacy trials have demonstrated that it is possible to significantly reduce the prevalence of iron deficiency with iron supplementation or food fortification.
- In cases of severe undernutrition, iron supplementation should be delivered in accordance with WHO guidelines which state that supplementation be withheld until the acute problems related to infection have been effectively treated, and growth has resumed.
- While iron deficiency is frequently the primary factor contributing to anaemia, it is important to recognize that the control of anaemia requires a multisectoral approach.

2.7 Zinc supplementation for diarrhoea management

WHO RECOMMENDATION

Mothers and other caregivers should provide children with 20 mg per day of zinc supplementation for 10–14 days (10 mg per day for infants under 6 months of age) (*97, 98, 99*).

Rationale and evidence

A continuing lack of safe water and sanitation in many parts of the world means that diarrhoea remains a leading cause of death among infants and young children in low- and middle-income countries (*100*). Every year more than one million children under five years of age succumb to the fluid loss and dehydration associated with the majority of diarrhoea-related deaths. It is estimated that 13% of all years lost due to ill-health, disability, or early death are caused by diarrhoea (*101, 102, 103, 104*).

Oral rehydration is a well-known and relatively simple treatment approach (*105, 106, 107, 108, 109, 110, 111*). Oral rehydration salts (ORS), and particularly the low osmolarity formula, are a proven life-saving commodity for the treatment of children with diarrhoea. Use of zinc supplements with ORS to treat children with diarrhoea reduces deaths in children less than five years of age (*112*). Zinc for the treatment of diarrhoea reduces diarrhoea mortality by 23% (*113*) and is associated with a 14–15% reduction in incidence of pneumonia or diarrhoea (*114*). Use of zinc supplements has been found to reduce the duration and severity of diarrhoeal episodes and the likelihood of subsequent infections for two to three months (*115, 116, 117, 118*). At the recommended dose zinc supplements are generally accepted by both children and caregivers and are effective regardless of the type of zinc salt used (*119, 120*). Supplementary zinc benefits children with diarrhoea because it is a vital micronutrient essential for protein synthesis, cell growth and differentiation, immune function and intestinal transport of water and electrolytes (*121, 122, 123, 124*). Zinc is an essential micronutrient and protects cell membranes from oxidative damage (*125*). It is also important for normal growth and development of children both with and without diarrhoea (*126, 127, 128*). Zinc deficiency is associated with an increased risk of gastrointestinal infections, adverse effects on the structure and function of the gastrointestinal tract, and impaired immune function (*125, 129, 130, 131*). Dietary deficiency of zinc is especially common in lower-income countries because of a low dietary intake of zinc-rich foods (mainly foods of animal origin) or inadequate absorption caused by its binding to dietary fibre and phytates often found in cereals, nuts and legumes (*132, 133*).

Actions to promote use of zinc as part of diarrhoea treatment (134)

Policy issues will need to be resolved in order to remove barriers to scaling-up. These include:

- empowering community level workers to manage pneumonia with antibiotics as well as use of zinc in diarrhoea case management;
- improving outreach and service linkages with communities to raise immunization coverage; and
- considering use of new vaccine delivery devices or use of more heat-stable vaccines.

Although the benefits of zinc supplementation in the management of diarrhoea have been established (*135*), a number of barriers to the widespread implementation of this strategy remain (*136*) and have to be addressed, for example:

- dissemination of information and advocacy with physicians and health workers in developing countries;
- integration of the use of zinc for diarrhoea treatment in national policies;
- ensuring availability of zinc for diarrhoea in sufficient quantities or as an appropriate formulation for children;

- regulation for appropriate marketing and distribution of drugs by private sector retailers, to avoid distribution of drugs through the private market, where more expensive and ineffective treatments may be provided (e.g. antibiotics or anti-motility agents for diarrhoea rather than ORS and zinc);
- reaching private practitioners through their associations, for them to be strong allies for appropriate care when included in awareness-raising and educational activities.

At implementation level a comprehensive package of interventions should be promoted to prevent and treat diarrhoea and pneumonia, including preventive water, sanitation and hygiene practices, zinc, ORS, exclusive breastfeeding and vaccines.

2.8 Reaching optimal iodine nutrition in young children

WHO RECOMMENDATION

WHO and UNICEF recommend iodine supplementation for young children in countries where less than 20% of households have access to iodized salt, until the salt iodization programme is scaled up. Countries with household access to iodized salt between 20% and 90% should make efforts to accelerate salt iodization or assess the feasibility of increasing iodine intake in the form of a supplement or iodine-fortified foods by the most susceptible groups.

The doses recommended for children 6 to 23 months of age are 90 µg/d as a daily supplement or 200 mg/year in a single annual dose of iodized oil.

For children 0 to 6 months of age, iodine supplementation should be given through breast milk. This implies that the child is exclusively breastfed and that the lactating mother received iodine supplementation as recommended (*137*).

Rationale and evidence

Based on new evidence and lessons learned within the last decade, it appears that the groups most susceptible to iodine deficiency, including children less than two years of age, might not be adequately covered by iodized salt where Universal Salt Iodization (USI) is not fully implemented. This situation may jeopardize the optimal brain development of the fetus and young child.

Irrespective of where countries, or areas within countries, are categorized with regard to USI, there are specific situations, such as in emergencies, among displaced people and geographically remote areas, where iodized salt may not be accessible. In these specific situations, increasing iodine intake should be provided in the form of iodine supplements for pregnant and lactating women, and a supplement or complementary food fortified with iodine for children 6–23 months of age.

The figures for iodine supplements are for situations where complementary food fortified with iodine is not available.

Actions to promote optimal iodine nutrition in young children

Countries in this group will need to assess the feasibility of increasing iodine intake in the form of a supplement or iodine-fortified foods by the most susceptible groups, as described in the following programmatic steps.

- Assess population iodine nutrition status, household iodized salt coverage (preferably disaggregated) and salt iodization programmes in order to identify a national or sub-national problem.
- Develop new plans to strengthen salt iodization that include increasing political commitment, advocacy, capacity-building of the salt industry for production and quality assurance, adoption and enforcement of appropriate regulations/legislation, and an effective iodized salt monitoring system at production (or importation), retail and community levels.

- If a country does not succeed in scaling-up its salt iodization programme within two years, the feasibility of increasing the iodine intake of susceptible groups by means of supplements or iodine-fortified foods will need to be explored as a temporary measure while strengthening the salt iodization programme in areas of moderate and severe iodine deficiency.
- Assessing the feasibility of providing additional iodine should include: (i) costing of supplementation, (ii) existing channels for distribution to reach the target groups, (iii) likely duration of supplementation, and (iv) potential compliance.

2.9 Management of children with severe acute malnutrition (SAM)

WHO RECOMMENDATION FOR IDENTIFICATION OF SAM

WHO and UNICEF recommend the use of a cut-off for weight-for-height of below -3 standard deviations (SD) of the WHO standards to identify infants and children as having SAM. Children with bilateral pitting oedema are also considered as having SAM.

Mid-upper arm circumference (MUAC) can be used as an independent criterion for identification of children 6–60 months old with SAM, with the cut-off point of 115 mm (*138*).

Rationale and evidence

Children below -3 SD of the WHO standards for weight-for-height have a highly elevated risk of death compared to those who are above. These children have a higher weight gain when receiving a therapeutic diet compared to other diets, which results in faster recovery. There are no known risks or negative effects associated with therapeutic feeding of these children applying recommended protocols and appropriate therapeutic foods.

WHO standards for MUAC-for-age show that in a well-nourished population there are very few children aged 6–60 months with a MUAC less than 115 mm. Children with a MUAC less than 115 mm have a highly elevated risk of death compared to those who are above.

WHO RECOMMENDATION FOR OUTPATIENT MANAGEMENT OF CHILDREN WITH SAM

Children 6 months or older with SAM, appetite and no medical complications can be managed in the community with regular visits to a health centre. (*138, 139*)

Rationale and evidence

New evidence suggests that large numbers of children with SAM can be treated in their communities without being admitted to a health facility or a therapeutic feeding centre.

The community-based approach involves timely detection of SAM in the community and provision of treatment for those without medical complications with ready-to-use therapeutic foods (RUTF) or other nutrient-dense foods at home and regular medical monitoring at a health facility. If properly combined with a facility-based approach for those malnourished children with medical complications or below six months of age and implemented on a large scale, community-based management of SAM could prevent the deaths of hundreds of thousands of children (*139*).

SAM in children can be identified in the community before the onset of complications by CHWs or volunteers using simple coloured plastic strips that are designed to measure MUAC. They can also be trained to recognize bilateral oedema of the feet, another sign of this condition.

Uncomplicated forms of SAM should be treated in the community using an RUTF until adequate weight has been gained. In some settings it may be possible to construct an appropriate therapeutic diet using locally available nutrient-dense foods with added micronutrient supplements. In addition to the provision of RUTF, children need to receive a short course of basic oral medication to treat infections and need to be regularly monitored for danger signs of deterioration (*140*).

Children with SAM need safe, palatable foods with high energy content and adequate amounts of vitamins and minerals. RUTF are soft or crushable foods that can be consumed easily by children from the age of six months. RUTF have a similar nutrient composition to F100, which is the therapeutic diet used in hospital settings, except for its iron content. Unlike F100, RUTF are not water-based, meaning that bacteria cannot grow in them. Therefore these foods can be used safely at home without refrigeration, even in areas where hygiene conditions are not optimal. As a result, more opportunities now exist for severely malnourished children to be discharged early from hospital for continuing care in the community.

Evidence shows that RUTF home/outpatient therapy is successful (*141, 142, 143*), and that the production of RUTF spreads is easy and safe in most settings worldwide (*144*). For this reason, WHO developed international standards for the manufacturing of RUTF which give guidance for local production; these include detailed nutrition composition and safety measures.

WHO RECOMMENDATION FOR INPATIENT MANAGEMENT OF CHILDREN WITH SAM

Children 6 months or older with SAM, no appetite or with medical complications should be hospitalized for inpatient management (*138*).

Rationale and evidence

While the figures on SAM show worrying trends, the implementation of the developed WHO protocol for facility-based management of SAM has improved the quality of hospital care.

The establishment of community-based management of severe malnutrition within routine health systems is strongly justified in the literature. Indeed, malnourished children, their families and health systems could benefit from this type of management. When treated in the community, children are less at risk of acquiring hospital infections. Family members caring for the malnourished child can spend less time away from home, and thus the opportunity cost of treatment is reduced. Health systems could reduce costs since hospitals would admit fewer cases and keep them for shorter stays, and potentially increase coverage rates (*145, 146, 147*). Evidence suggests that with capacity built for inpatient, outpatient care and follow-up after discharge, case fatality rates can be as low as 5%, both in the community and in health facilities.

The implementation of the WHO guidelines has the potential to save many of the lives currently being lost through severe malnutrition and to contribute substantially to achieving the Millennium Development Goal of reducing child mortality.

Actions for appropriate inpatient management of children with SAM

Appropriate therapy

A manual was developed by WHO in 1999 (*148*) to provide practical guidelines for the management of patients – mainly children below five years of age – with severe malnutrition in hospitals and health centres.[1] It seeks to promote the best available therapy so as to reduce the risk of death, shorten the length of time spent in hospital, and facilitate rehabilitation and full recovery.

The management of the child with severe malnutrition is divided into four phases:

- *Stabilization phase:* for children with SAM and medical complications, life-threatening problems are identified and treated in a hospital or a residential care facility, specific deficiencies are corrected, metabolic abnormalities are reversed and therapeutic feeding is begun (F75).[2] The protocol includes treatment of hypoglycaemia, hypothermia, dehydration with or without septic shock, and severe anaemia, as well as the correction of electrolyte imbalances, treatment of infection and the correction of micronutrient deficiencies (while excluding iron).[3]

[1] This manual is currently being updated.
[2] A special formula for treatment of malnourished children (as is F100).
[3] Iron may be dangerous because transferrin levels are reduced and can become toxic because of reduced capacity of the liver to metabolize.

- *Transition phase:* with the return of the child's appetite and reduced oedema, therapeutic feeding is moved from F75 to F100 or RUTF. Additionally, routine antibiotic therapy is continued during this phase.
- *Rehabilitation phase:* when a child is ready for rehabilitation, he can be referred for outpatient care if available, otherwise rehabilitation should be done as inpatient. The correction of the electrolyte imbalance is continued, iron is included in the correction of micronutrient deficiencies, therapeutic feeding (F100 or RUTF) is given to recover most of the lost weight, emotional and physical stimulation are increased, the mother or caregiver is trained to continue care at home, and preparations are made for discharge of the child and for prevention of relapse.
- *Follow-up:* after discharge, the child and the child's family should be seen regularly to prevent relapse and assure catch up growth, and sustained mental, emotional and physical development of the child. The latter consists of continued support to the mother for appropriate infant and young child feeding practices and for home-based play activities. When this is done, the risk of death can be substantially reduced and the opportunity for full recovery greatly improved. Follow-up should also be an opportunity to assure appropriate feeding practices and mental and physical stimulation for other children in the family.

Training of health staff

A training course on hospital-based care of severely malnourished children was developed based on the WHO manual cited above (*148*) and is currently being updated. It responds to the urgent need to reduce paediatric deaths related to severe acute malnutrition in many developing countries and is intended for health personnel working at central and district levels, including physicians, nurses and nutritionists (*149*).

The training course for health staff incorporates instructions on medical and nutritional care for children with SAM in a hospital setting, but also instructions for group counselling sessions and for emotional and physical stimulation activities intended for mothers whose malnourished children have reached the rehabilitation phase. The counselling provides recommendations on the preparation of locally-produced foods in order to meet the needs of the discharged child.

2.10 Management of children with moderate acute malnutrition

WHO RECOMMENDATION

A technical note has been developed that summarizes existing knowledge and presents principles on the dietary management of children with moderate acute malnutrition (*150*).

- **Management of moderate acute malnutrition in children 6–59 months of age should include ENAs such as breastfeeding promotion and support, education and nutrition counselling for families, and other activities that identify and prevent the underlying causes of malnutrition, including nutrition insecurity. Interventions to improve food security include the provision of conditional or non-conditional cash transfers and support to agriculture, such as crop diversification.**
- **Children 6–59 months of age with moderate acute malnutrition need to receive nutrient-dense foods to meet their extra needs for weight and height gain and functional recovery.**

Rationale and evidence

Moderate acute malnutrition in children is defined as a weight-for-height between -3 and -2 z-scores of the median of the WHO child growth standards without oedema. Globally, about 40 million preschool-age children meet these criteria.

The dietary management of children with moderate acute malnutrition is based on the optimal use of locally available foods to improve nutritional status and prevent SAM. Nutrient-dense foods enable children to consume and maximize the absorption of nutrients in order to fulfill their

requirements for energy and all essential nutrients. Animal-source foods are more likely to meet the amino acid and other nutrient needs of recovering children. Plant-source foods, in particular legumes or a combination of cereals and legumes, also have high-quality proteins, although they also contain some anti-nutrients such as phytates, tannins or inhibitors of digestive enzymes, which may limit the absorption of some micronutrients, particularly minerals.

In situations of food shortage, or where some nutrients are not sufficiently available through local foods, supplementary foods have been used to treat children with moderate acute malnutrition.

Currently there are no evidence-informed recommendations on the composition of supplementary foods used to treat children with moderate acute malnutrition (*150*). Further research is required on the composition, acceptability and use of supplementary foods for the treatment of moderate acute malnutrition for the future development of WHO guidelines.

2.11 Nutritional care and support of HIV-infected children 6 months to 14 years old

WHO RECOMMENDATION

Children living with HIV should be assessed, classified and managed according to a nutrition care plan to cover their nutrient needs associated with the presence of HIV and nutritional status and to ensure appropriate growth and development (*151*).

Rationale and evidence (*151*)

Although the severe nutritional consequences of HIV infection in adults and children have been recognized for many years, gaps remain in the evidence base for defining effective interventions to prevent and treat HIV-associated malnutrition in resource-constrained settings. As a result, the development and implementation of guidelines on how best to offer nutritional care to HIV-infected children has lagged. The delivery of such care has also been compromised by service provider's heavy work burden and need for training, recurring staff losses and weakened health care systems in HIV-affected settings.

In 2004 WHO commissioned a technical review of the nutritional requirements of adults and children infected with HIV as an evidence-base for the development of nutritional care guidelines. These were presented at the WHO technical consultation on Nutrition and HIV/Acquired immunodeficiency syndrome (AIDS) held in Durban in April 2005, where participants called for urgent action to "*Develop practical nutrition assessment tools and guidelines for home, community, health facility-based and emergency progammes*".

HIV-infected children deserve special attention because of their additional needs to ensure growth and development and their dependency on adults for adequate care, including nutrition care and support for treatment. This is of particular importance in light of the recommendation to start treatment as soon as possible in infected children and the fact that nutrition plays an important role in support to ARV treatment.

Actions for an integrated approach to the nutritional care of HIV-infected children

The guidelines for an integrated approach to the nutritional care of HIV-infected children provide orientation on how to integrate nutritional care into the integrated care of the HIV-infected child; that orientation is summarized in three sections and ten steps:

Section 1. Assess, classify and decide a nutrition care plan.

Step 1. Assess and classify the child's growth, observing and measuring the child, using MUAC for classification of severe malnutrition and referral, weight-for-height z-score or weight-for-age z-score, according to the WHO growth standards (up to five years) and WHO growth references (from five years onward).

Step 2. Assess the child's nutritional needs to decide nutritional care plan (A when child is growing appropriately, B when there is poor weight gain or a condition with increased nutritional needs, and C in severe malnutrition).

Step 3. Decide a nutrition care plan.

Section 2. Implement the nutrition care plan.

Step 4. What does the child eat and drink? With the information the child is classified as serious poor food intake, poor food intake or food intake adequate.

Step 5. Discuss who gives the child his/her food and how the child eats, classifying the child as with caregiving not stable or caregiving stable.

Step 6. Assess if there is food and income at home, leading to the following classifications: financially supported, no financial support, serious food shortage, food shortage.

Step 7. Discuss exercise and avoiding risk factors for malnutrition.

Step 8. Decide if to refer and when to review.

Section 3. Children with special needs.

Step 9. The HIV-infected child with special needs (for example poor appetite, diarrhoea, anaemia).

Step 10. Children on ARV treatment.

2.12 Nutritional care and support during emergencies

SUMMARY OF WHO RECOMMENDATIONS FOR EMERGENCIES

Unless indicated otherwise, WHO recommendations in stable situations apply also to emergencies. In exceptionally difficult circumstances, the focus needs to be on creating conditions that will facilitate breastfeeding, such as establishing safe 'corners' for mothers and infants, one-to-one counselling and mother-to-mother support. Traumatized and depressed women may have difficulty responding to their infants and require particular mental and emotional support. Every effort should be made to identify ways to breastfeed infants and young children who are separated from their mothers. Breast-milk substitutes, milk products, bottles and teats should never be part of a general or blanket distribution. Dried milk products should be distributed only when pre-mixed with a milled staple food and should not be distributed as a single commodity. A general food basket should provide 2100 kcal per person per day and include products fortified with vitamins and minerals. Special focus should also be on early identification and management of infants and children with acute malnutrition to prevent serious illness and death (*152, 153*).

Rationale and evidence

Disruption and displacement of populations in emergency situations greatly impacts on the health and nutrition status of infants and young children. Adequate nutrition and care of children has been identified as one of the key factors to promote child health and stability. Malnutrition is a major threat to child survival during an emergency and for those who survive; it can also have tremendous consequences on their cognitive, social, motor skill, physical and emotional development. The best way to prevent malnutrition is to ensure optimal feeding and care for children. In the emergency context, displaced or devastated communities are often dependent on the provision of food aid to meet their basic nutritional requirements. When food aid is provided, issues around food handling, preparation and storage are highlighted because the normal food systems, including cooking facilities and access to fuel and water, are often disrupted and yet food must continue to be prepared and eaten.

During emergencies, the risk of diarrhoea is exacerbated (*154*) and transmission rates soar. Poor access to clean water, poor food hygiene practices, introduction to new or unusual foods,

disrupted eating patterns and high rates of infectious illness due to overcrowded/insufficient living conditions and moving populations create a perfect environment for diarrhoeal disease. Providing ORS with zinc in emergencies is a simple and cost-effective intervention which can greatly reduce the length and severity of diarrhoea, preventing severe dehydration, malnutrition and death (see section on zinc).

Vitamin A intake is often limited in emergency situations where the food supply is either inadequate or inappropriate and access to vitamin A-rich foods is reduced. Without proper food support, body reserves of vitamin A become severely depleted. In the emergency context, there is an increase in communicable and infectious diseases due to over-crowded shelter conditions and disruption due to population displacement and the demise of health infrastructure. Transmission of illnesses such as diarrhoea, measles and pneumonia are exacerbated and lead to increased childhood mortality. Measles is especially common in emergencies and can trigger acute malnutrition and aggravate VAD to dangerous levels.

Acute malnutrition needs to be addressed in the emergency context both to support a child's right to sufficient food, growth and well-being and to prevent more serious illness and death (*138, 139, 152*). From a cost perspective per child, moderate malnutrition is significantly cheaper to treat than severe malnutrition. Additionally, in emergencies there is generally disruption of access to basic food needs, health services and water and sanitation, and the effects will be felt more quickly and may have a more deleterious impact on families affected by HIV and AIDS (*152*). Emergencies can also provoke and aggravate cases of chronic or acute malnutrition and micronutrient deficiencies through the impact they have on psychosocial well-being (*154*).

In emergency situations there is an increased risk of death among the affected population and in particular among vulnerable groups, such as orphans, children and pregnant and lactating women. Needs of these groups must be taken into consideration to undertake effective nutrition programming.

Actions for appropriate infant and young child feeding in emergencies (*155*)

Early emergency response

The infant feeding in emergencies (IFE) operational guidance gives full details on IFE implementation. In the first few days of an emergency, immediate links with other sectors should be established, such as with reproductive health to provide 'safe havens' for pregnant and lactating women. These 'safe havens' should be easily-accessible areas where privacy, security and shelter are provided with access to water and food. Basic supportive care of breastfeeding mothers and their infants can be offered and peer-to-peer support nurtured.

Minimum level of response

A minimum response to support IFE is indicated in all emergencies. This should include nutritional adequacy and suitability of the general food ration for older infants and young children; consideration of supplementary feeding of pregnant and lactating women; ensuring and easing access to basic water and sanitation facilities, cooking, food and non-food items; ensuring rest areas for populations in transit, including private areas for breastfeeding if culturally indicated; and establishing timely registration of newborns to support early initiation and exclusive breastfeeding.

Preventing and controlling micronutrient deficiencies: Multiple vitamin and mineral supplements

The groups most vulnerable to micronutrient deficiencies are pregnant women, lactating women and young children, mainly because they have a relatively greater need for vitamins and minerals and are more susceptible to the harmful consequences of deficiencies.

When fortified rations are not being given, children aged 6 to 59 months should be given one dose each day of the micronutrient supplement shown in **Table I-7**; when fortified rations are being given, children aged 6 to 59 months should be given two doses each week of the same micronutrient supplement.

Table I-7 The composition of multiple micronutrient supplements for children from 6 to 59 months of age, designed to provide the daily recommended intake of each nutrient (one RNI)

Micronutrient	Content[a]
Vitamin A µg	400
Vitamin D µg	5
Vitamin E mg	5
Vitamin C mg	30
Thiamine (vitamin B1) mg	0.5
Riboflavin (vitamin B2) mg	0.5
Niacin (vitamin B3) mg	6.0
Vitamin B6 mg	0.5
Vitamin B12 µg	0.9
Folic acid µg	150.0
Iron mg	10.0
Zinc mg	4.1
Copper mg	0.56[b]
Selenium µg	17.0
Iodine µg	90.0

[a] (*156*)
[b] (*157*)

Furthermore, vitamin A supplements should continue to be given to young children and mothers post-partum according to existing recommendations. Vitamin A provides an essential part of the treatment protocol for children already infected with measles, and supplementation during mass measles vaccination campaigns provides protection against further VAD and the severity of potential measles infection (see section on vitamin A).

Breastfeeding and appropriate complementary feeding should also continue to be promoted actively. The multiple micronutrient supplements should be given until the emergency is over and access to nutrient-rich foods is restored.

Artificial feeding in emergencies

Any support of artificial feeding in an emergency should be based on a needs assessment by skilled technical staff, including a risk analysis. This applies both in the context of HIV where replacement feeding may have been established pre-crisis or in any population where infants may be artificially fed. Interventions that support artificial feeding should meet key criteria on targeting, use, procurement, distribution and management of breast-milk substitutes, as detailed in the operational guidance on IFE.

Infant feeding and HIV in emergencies

In the interest of overall child survival, introducing replacement feeding or early cessation of breastfeeding is unlikely to be a safe option in most emergency situations. In countries that recommend EBF with ARVs for HIV-infected mothers, the recommendation should remain unchanged, even if ARVs are temporarily not available. Where the HIV status of the mother is unknown or if she is known to be HIV negative, early initiation and EBF for the first 6 months, continuation of breastfeeding into the second year of life or beyond, and nutritionally adequate and safe complementary feeding for children 6–23 months is recommended, as for the general population.

In countries that recommend formula feeding for the infants of HIV-infected mothers, great care should be taken to ensure that Code-compliant infant formula is available only for those infants who need it. National authorities and/or the authority managing the emergency should establish whether the recommendation for formula feeding is still appropriate given the circumstances. For further guidance, consult the latest WHO recommendations and United Nations guidelines (*158*).

3. Intervention targeted at women of reproductive age

3.1 Intermittent iron and folic acid supplementation in menstruating women

WHO RECOMMENDATION

Intermittent iron and folic acid supplementation is recommended as a public health intervention in menstruating women living in settings where anaemia is highly prevalent, to improve their haemoglobin concentrations and iron status and reduce the risk of anaemia.

A suggested scheme for intermittent iron and folic acid supplementation in menstruating women is presented in Table I-8 (*159*).

Table I-8 Suggested scheme for intermittent iron and folic acid supplementation in menstruating women

Supplement composition	Iron: 60 mg of elemental iron; Folic acid: 2800 µg (2.8 mg)
Frequency	One supplement per week
Duration and time interval between periods of supplementation	3 months of supplementation followed by 3 months of no supplementation after which the provision of supplements should restart If feasible, intermittent supplements could be given throughout the school or calendar year
Target group	All menstruating adolescent girls and adult women
Settings	Populations where the prevalence of anaemia among non-pregnant women of reproductive age is 20% or higher

[a] 60 mg of elemental iron equals 300 mg of ferrous sulfate heptahydrate, 180 mg of ferrous fumarate or 500 mg of ferrous gluconate.

Rationale and evidence

Daily supplementation with iron and folic acid for three months has been the standard approach for preventing and treating iron deficiency anaemia (IDA) among women (*89, 160*). Despite its proven efficacy, supply and distribution of daily systems can be costly and logistically complicated. Lack of supply of affordable supplements may limit the success of many supplementation programmes (*161, 162, 163*). Another challenge is the occurrence of mild side effects, such as darkened stools, gastrointestinal pain, diarrhoea, constipation and vomiting (*69*).

Intermittent supplementation, though not eliminating side effects, reduces their frequency and possibly their severity compared to daily supplementation (*68, 164, 165, 166, 167*). Intermittent iron supplementation is the provision of iron supplements once, twice or three times a week on non-consecutive days (*168*). The rationale behind the intervention is that there is a limit to the iron absorption capacity of the intestine. Intermittent dosing may be as effective as daily supplementation because similar amounts of iron would reach the blood and tissues under both strategies (*169, 170, 171*). Intermittent supplementation has been shown to improve iron status more than no supplementation and, in many cases, it is as effective at improving iron status as daily supplementation (*172, 173*).

A Cochrane systematic review assessed the evidence behind the benefits and safety of intermittent iron supplementation on anaemia and other health outcomes (*168*). The review compared the intermittent use of iron supplements alone, or in combination with folic acid or other micronutrients, versus no intervention or placebo, and versus the same supplements given daily to women after menarche. The results showed that women who were taking intermittent iron supplements, alone or combined with other micronutrients, had higher haemoglobin and ferritin concentrations and were less likely to develop anaemia than those not receiving the supplement.

However, in comparison with daily supplementation, women receiving supplements intermittently presented anaemia more frequently.

Actions to promote iron supplementation for menstruating women

- Intermittent iron and folic acid supplementation is a preventive strategy for implementation at population level. If a woman is diagnosed as having anaemia in a clinical setting, she should be treated with daily iron (120 mg of elemental iron) and folic acid (400 µg or 0.4 mg) supplementation until her haemoglobin concentration rises to normal. She can then switch to an intermittent regimen to prevent recurrence of anaemia (*159*).
- Providing iron intermittently can be integrated into national programmes for adolescent and reproductive health, ideally preceded by an assessment of nutritional status to ensure daily needs are being met (*174, 175*).
- Once pregnancy is confirmed, women should be encouraged to attend antenatal care including either daily or intermittent iron supplementation, depending on anaemia status.
- Acceptability and adherence to supplementation regimens may be improved by implementing a behavioural change communication strategy to promote the benefits of the intervention and dietary diversity aimed at improved iron absorption.
- Working with both industry and government can improve availability and ensure accessibility to high-quality, low-cost supplements in resource-limited settings where the greatest number of at-risk women and girls are found (*63*).
- Adherence can be improved with well-conducted social marketing and educational campaigns focusing on the harmful effects of anaemia, the benefits of supplement consumption and appropriate responses to eliminate or ameliorate side effects.

4. Interventions targeted at pregnant women

4.1 Daily supplementation with iron and folic acid for women during pregnancy

WHO RECOMMENDATION

Daily oral iron and folic acid supplementation is recommended as part of antenatal care to reduce the risk of low birth weight, maternal anaemia and iron deficiency (*176*).

A suggested scheme for daily iron and folic acid supplementation in pregnant women is presented in Table I-9.

Table I-9 Suggested scheme for daily iron and folic acid supplementation in pregnant women

Supplement composition	Iron: 30–60 mg of elemental iron[a]
	Folic acid: 400 µg (0.4 mg)
Frequency	One supplement daily
Duration	Throughout pregnancy. Iron and folic acid supplementation should begin as early as possible
Target group	All pregnant adolescents and adult women
Settings	All settings

[a] 30 mg of elemental iron equals 150 mg of ferrous sulfate heptahydrate, 90 mg of ferrous fumarate or 250 mg of ferrous gluconate.

Rationale and evidence

It is estimated that 41.8% of pregnant women worldwide are anaemic (*177*). At least half of this anaemia burden is assumed to be due to iron deficiency (*178*), with the rest due to other conditions such as folate, vitamin B12 or vitamin A deficiencies, chronic inflammation, parasitic infections and inherited disorders. A pregnant woman is considered to be anaemic if her haemoglobin concentration during the first and third trimester of gestation is lower than 110 g/l, at sea level.

Low haemoglobin concentrations indicative of moderate or severe anaemia during pregnancy have been associated with an increased risk of premature delivery, maternal and child mortality, and infectious diseases. Growth and development may also be affected, both in utero and in the long term. Conversely, haemoglobin concentrations greater than 130 g/l at sea level may also be associated with negative pregnancy outcomes such as premature delivery and low birth weight.

Interventions aimed at preventing iron deficiency and IDA in pregnancy include iron supplementation, fortification of staple foods with iron, health and nutrition education, control of parasitic infections, and improvements in sanitation. During pregnancy, women need to consume additional iron to ensure they have sufficient iron stores to prevent iron deficiency. Therefore, in most low- and middle-income countries, iron supplements are used extensively by pregnant women to prevent and correct iron deficiency and anaemia during gestation.

An existing Cochrane systematic review assessing the benefits and harms of iron supplementation in healthy pregnant women was updated to arrive at this recommendation (*179*). Overall, women taking daily iron supplements were less likely to have LBW babies compared with controls and the mean birth weight was 30.81 g greater for those infants whose mothers received iron during pregnancy. There was no significant effect on preterm birth or neonatal death.

Daily iron supplementation reduced the risk of maternal anaemia at term by 70% and iron deficiency at term by 57%, but it had no significant effect on the risk of infections during pregnancy.

4.2 Intermittent iron and folic acid supplementation for non-anaemic pregnant women

WHO RECOMMENDATION[1]

Intermittent use of iron and folic acid supplements by non-anaemic pregnant women is recommended to prevent anaemia and improve gestational outcomes (*180*).

A suggested scheme for intermittent iron and folic acid supplementation in non-anaemic pregnant women is presented in Table I-10.

Table I-10 Suggested scheme for intermittent iron and folic acid supplementation in non-anaemic pregnant women

Supplement composition	Iron: 120 mg of elemental iron[a]
	Folic acid: 2800 µg (2.8 mg)
Frequency	One supplement once per week
Duration	Throughout pregnancy. Iron and folic acid supplementation should begin as early as possible
Target group	Non-anaemic[b] pregnant adolescents and adult women
Settings	Countries where prevalence of anaemia among pregnant women is lower than 20%.

[a] 120 mg of elemental iron equals 600 mg of ferrous sulfate heptahydrate, 360 mg of ferrous fumarate or 1000 mg of ferrous gluconate.
[b] Haemoglobin concentrations should be measured prior to the start of supplementation to confirm non-anaemic status (*181*).

Rationale and evidence

As mentioned in the previous section, iron requirements are increased during pregnancy to support maternal need and fetal growth. The use of daily iron and folic acid supplements throughout pregnancy has been the standard approach to cover this gap and in turn prevent and treat IDA. Despite its proven efficacy, the use of daily iron supplementation has been limited in some settings, possibly due to a lack of compliance because of common side-effects (e.g. nausea, constipation, dark stools or metallic taste), concerns about the safety of this intervention among women with an adequate iron intake, and variable availability of the supplements at community level.

Intermittent iron supplementation, that is, the provision of iron supplements once, twice or three times a week on non-consecutive days, has thus been proposed as an alternative to daily supplementation.

A Cochrane systematic review (*182*) assessing the benefits and harms of intermittent supplements of iron alone or in combination with folic acid or other vitamins and minerals in pregnant women on neonatal and pregnancy outcomes found that there was no detectable difference between women taking iron supplements intermittently and those receiving daily supplements with regard to maternal anaemia at term, the risk of having a low–birth-weight or preterm baby or mortality.

Fewer side-effects were reported in women receiving intermittent rather than daily iron and folic acid supplements. High haemoglobin concentrations (more than 130 g/l) during the second and third trimester of pregnancy were also less frequent among women using supplements intermittently. The intervention seems to be equally effective among populations with different prevalences of anaemia, and in settings described as malaria endemic, and regardless of whether the supplementation was initiated earlier or later than 20 weeks of gestation or whether the dose of elemental iron per week was lower or higher than 120 mg.

If a woman is diagnosed with anaemia at any time during pregnancy, she should be given daily iron (120 mg of elemental iron) and folic acid (400 µg or 0.4 mg) until her haemoglobin concentration

[1] Note that this recommendation is for settings with lower prevalence of anaemia than the recommendation for daily supplementation.

rises to normal. She can then switch to the standard antenatal dose to prevent recurrence of anaemia.

Actions to promote the use of iron supplementation in pregnant women

In settings where anaemia in pregnant women is a severe public health problem (40% or higher), a daily dose of 60 mg of elemental iron is preferred over a lower dose.

If a woman is diagnosed with anaemia at any time during pregnancy, she should be given daily iron (120 mg of elemental iron) and folic acid (400 µg or 0.4 mg) until her haemoglobin concentration rises to normal. She can then switch to the standard antenatal dose to prevent recurrence of anaemia.

The implementation of intermittent supplementation among non-anaemic pregnant women may require a strong health system to facilitate confirmation of non-anaemic status prior to the start of supplementation and to monitor anaemia status throughout pregnancy.

In malaria-endemic areas, iron and folic acid supplementation programmes should be implemented in conjunction with measures to prevent, diagnose and treat malaria during pregnancy

An iron supplementation programme may form part of an integrated programme of antenatal and neonatal care that promotes adequate gestational weight gain, screening of all women for anaemia at antenatal and postpartum visits, use of complementary measures to control and prevent anaemia (e.g. hookworm control), and a referral system to manage cases of severe anaemia.

4.3 Vitamin A supplementation in pregnant women

WHO RECOMMENDATION

In areas where there is a severe public health problem related to VAD,[1] vitamin A supplementation during pregnancy is recommended for the prevention of night blindness (*183*).

A suggested vitamin A supplementation scheme is presented in Table I-11.

Table I-11 Suggested vitamin A supplementation scheme in pregnant women for the prevention of night blindness in areas with a severe public health problem related to vitamin A

Target group	Pregnant women
Dose	Up to 10 000 IU vitamin A (daily dose) OR
	Up to 25 000 IU vitamin A (weekly dose)
Frequency	Daily or weekly
Route of administration	Oral liquid, oil-based preparation or retinyl palmitate or retinyl acetate
Duration	A minimum of 12 weeks during pregnancy until delivery
Settings	Populations where the prevalence of night blindness is 5% or higher in pregnant women or 5% or higher in children 24–59 months of age

IU, international unit

Rationale and evidence

Worldwide, approximately 1000 women die every day from complications related to pregnancy or childbirth (*185*). VAD also remains a public health problem among women, affecting an estimated 19 million pregnant women (*184*), with the highest burden found in the WHO regions of Africa and South-East Asia. During pregnancy, vitamin A is essential for the health of the mother as

[1] Determination of vitamin A deficiency as a public health problem involves estimating the prevalence of deficiency in a population by using specific biochemical and clinical indicators of vitgamin A status. Classification of countries based on the most recent estimates is available in (*184*).

well as for the health and development of the fetus. This is because vitamin A is important for cell division, fetal organ and skeletal growth and maturation, maintenance of the immune system to strengthen defences against infections, and development of vision in the fetus as well as maintenance of maternal eye health and night vision. Thus, there is an increased need for vitamin A during pregnancy, although the additional amount required is small and the increased requirement is limited to the third trimester. The prevalence of night blindness (as a consequence of VAD) is more common in the third trimester of pregnancy, and populations with a prevalence ≥5% are considered to have a significant public health problem. It is currently estimated that 9.8 million pregnant women are affected by night blindness worldwide.

According to two Cochrane systematic reviews, assessing the effects and safety of vitamin A supplementation in pregnant women (*186, 187*), it reduced the risk of maternal night blindness (one trial) and there was no difference in total fetal loss, rates of stillbirth and neonatal deaths between women given vitamin A compared with controls.

After an analysis of currently available evidence, WHO published a guideline indicating that vitamin A supplementation is not recommended during pregnancy as part of routine antenatal care for the prevention of maternal and infant morbidity and mortality. The use of a supplement is only recommended for the prevention of night blindness when there is a severe public health problem related to vitamin A, as indicted in the recommendation quoted above.

Other interventions such as dietary diversification and food fortification can be used along with vitamin A supplementation to improve vitamin A intakes. Pregnant women should be encouraged to receive adequate nutrition, which is best achieved through consumption of a healthy balanced diet.

4.4 Calcium supplements in pregnant women

WHO RECOMMENDATION

Supplementation of pregnant women with 1.5 to 2.0 grams of elemental calcium per day is recommended in areas where dietary calcium intake is low and for women at high risk of developing hypertensive disorders during pregnancy (*188, 189*).[1]

The recommended dose is of three tablets three times per day, preferably with meals, for the duration of the pregnancy to achieve daily intake of 1.5 grams of elemental calcium.

Rationale and evidence

Pre-eclampsia is a hypertensive disorder that develops in approximately 5% of all pregnancies, usually after about 20 weeks gestation (*190*). In pre-eclampsia there are often problems with the placenta, along with increased blood pressure, that can reduce blood flow and therefore oxygen and nutrient supply to the baby. These conditions may result in intra-uterine growth retardation and possibly early delivery. Especially in lower-income settings, hypertensive disorders are the leading cause of infant mortality (*191*). Pre-eclampsia may also cause serious outcomes for the mother, such as kidney and liver problems, even progressing to stroke or seizures (eclampsia) if not treated. Hypertensive disorders such as pre-eclampsia are thought to account for up to 40 000 maternal deaths per year.

Most women are monitored for increasing blood pressure during antenatal visits. Preventive measures may assist in the prevention of prenatal complications and adverse outcomes for women at increased risk of hypertensive disorders, such as those with multiple pregnancies, older age or increased BMI (*192*). Calcium supplements may reduce the chance of developing pre-eclampsia, especially in high-risk women, as well as those who do not consume sufficient

[1] Women are regarded as being at high risk of developing hypertension and pre-eclampsia if they have one or more of the following risk factors: obesity, previous pre-eclampsia, diabetes, chronic hypertension, renal disease, autoimmune disease, multiple pregnancy, and either adolescent or late pregnancy. This is not an exhaustive list, but can be adapted/complemented based on the local epidemiology of pre-eclampsia (see (*189*).

quantities of calcium in their diet (*193, 194, 195, 196, 197*). Recent studies have supported this hypothesis, although there have been some inconsistencies in the strength and public health applications of the associations (*198, 199*). In addition, the possible biological actions of prenatal calcium supplementation are not completely understood.

Calcium is an essential mineral that assists with many of the body's processes, such as maintaining cell membranes in nerve as well as muscle contraction (*200*). Low calcium intake is thought to cause high blood pressure by increasing the amount of calcium released in the cells of blood vessels, possibly leading to the constriction of these tissues. By supplementing with calcium during pregnancy, the amount of cellular calcium released is lessened, as is smooth muscle tissue contractility. These mechanisms could prevent preterm labour and delivery by reducing uterine muscle contractions, and perhaps improving utero-placental blood flow (*201*).

During pregnancy and lactation calcium supplementation is often recommended to meet the body's demands to benefit the overall health of mother and child. Dietary reference intakes for pregnant women range from 1000 to 1300 mg per day, according to age group, with an upper limit set at 2500 mg/day (*202*). Although providing extra calcium supplements to prevent hypertensive disorders is relatively inexpensive and accessible, large doses of > 500 mg/day are less efficiently absorbed and may inhibit the absorption of other necessary micronutrients such as iron, zinc, magnesium and phosphorus (*203, 204*).

According to a recent Cochrane systematic review, supplementation with at least 1 g of calcium is associated with significantly lower risk of pregnant women developing pre-eclampsia and preterm birth among women with low calcium intakes. However, the public health implications for this intervention are not completely clear. Another recent study determined that calcium supplementation in pregnant women with low calcium intakes may not necessarily benefit maternal bone health (*205*). Conflicting evidence exists on the benefits of maternal calcium supplementation on the blood pressure of their offspring (*206, 207, 208*).

In summary, as indicated in the most recent WHO guidelines, there is clear evidence to show that daily supplementation with 1.5 to 2 g of elemental calcium is beneficial to reduce the risks of gestational hypertension, pre-eclampsia and preterm birth (*189*).

4.5 Reaching optimal iodine nutrition in pregnant and lactating women

WHO RECOMMENDATION

WHO and UNICEF recommend iodine supplementation for pregnant and lactating women in countries where less than 20% of households have access to iodized salt, until the salt iodization programme is scaled up. Countries with a household access to iodized salt between 20% and 90% should make efforts to accelerate salt iodization or assess the feasibility of increasing iodine intake in the form of a supplement or iodine fortified foods by the most susceptible groups (*137*).

Table I-12 shows the recommended daily or annual doses of iodine when supplementation is needed.

Table I-12 WHO-recommended dosages of daily and annual iodine supplementation

Population Group	Daily dose of iodine supplement (µg/day)	Single annual dose of iodized oil supplement (mg/year)
Pregnant women	250	400
Lactating women	250	400
Women of reproductive age (15–49 years)	150	400

Rationale and evidence

Based on new evidence and lessons learned within the last decade, it appears that pregnant and lactating women might not be adequately covered by iodized salt where USI is not fully implemented. This situation may jeopardize the optimal brain development of the fetus and young child.

Irrespective of where countries, or areas within countries, are categorized with regard to USI, there are specific situations, such as in emergencies, among displaced people and geographically remote areas, where iodized salt may not be accessible. In these specific situations, increasing iodine intake should be provided in the form of iodine supplements for pregnant and lactating women, and a supplement or complementary food fortified with iodine for children 6–23 months of age.

In cases where it is difficult to reach pregnant women, supplementation to all women of reproductive age is advised.

Actions to promote optimal iodine nutrition in pregnant and lactating women

The actions summarized in the section on iodine in young children, pages 30–31, apply to pregnant and lactating women.

4.6 Nutrition care and support for pregnant women during emergencies[1] (*152*)

WHO RECOMMENDATION

See page 36 for recommendation.

Rationale and evidence

During pregnancy and lactation, women's nutritional needs for energy, protein and micronutrients significantly increase. Pregnant women require an additional 285 kcals/day, and lactating women require an additional 500 kcals/day. Both pregnant and lactating women have increased needs for micronutrients. Adequate intake of iron, folate, vitamin A and iodine are particularly important for the health of both women and their infants.

Intra-household food distribution practices in many situations result in pregnant and lactating women consuming less than their minimum requirements. The consequences of poor nutritional status and inadequate nutritional intake for women during pregnancy and lactation not only directly affects the women's health status but may have a negative impact on infant birth weight and early development. Therefore, to meet the additional requirements of pregnancy and lactation, complementary interventions may be undertaken in addition to the provision of a basic food ration.

Appropriate complementary actions to meet the additional needs of pregnant and lactating women in emergencies (*152*)

Fortified food commodities[2]

Fortified blended food commodities are designed to provide 10%–12% (up to 15%) of energy from protein and 20%–25% energy from fat. The blended food must be fortified to meet two thirds of daily requirements for all micronutrients, particularly iron, folic acid and vitamin A. The food commodities can be provided through maternal and child health structures (in conjunction with other health services) or through blanket supplementary feeding programmes.

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[1] The earlier section on infant and young child feeding in emergencies includes actions that also apply to pregnant and lactating women, including the recommendation.

[2] The food should be provided in addition to the basic general ration, either through the same mechanism as the general ration distribution or through maternal and child health facilities as a blanket supplementary feeding ration. The food should be targeted to women in their second and third trimesters of pregnancy and during the first six months of the lactating period (i.e. for a total period of 12 months).

Preventing and controlling micronutrient deficiencies: multiple vitamin and mineral supplements

The groups most vulnerable to micronutrient deficiencies are pregnant and lactating women and young children, mainly because they have a relatively greater need for vitamins and minerals and are more susceptible to the harmful consequences of deficiencies. For a pregnant woman these include a greater risk of dying during childbirth, or of giving birth to an underweight or mentally-impaired baby. For a lactating mother, her micronutrient status determines the health and development of her breastfed infant, especially during the first six months of life.

One way to meet the recommended daily intake of micronutrients is to provide foods fortified with micronutrients. Fortified foods, such as corn-soya blend, biscuits, vegetable oil enriched with vitamin A and iodized salt, are usually provided as part of food rations during emergencies. The aim is to avert micronutrient deficiencies or prevent them from getting worse among the affected population. Such foods must be appropriately fortified, taking into account the fact that other unfortified foods will meet a share of micronutrient needs. However, foods fortified with micronutrients may not meet fully the needs of certain nutritionally vulnerable subgroups such as pregnant and lactating women. For this reason UNICEF and the WHO have developed the daily multiple micronutrient formula shown in **Table I-13** to meet the RNI of these vulnerable groups during emergencies.

Table I-13 Composition of multiple micronutrient supplements for pregnant and lactating women, designed to provide the daily recommended intake of each nutrient (one RNI)

Micronutrient	Content[a]
Vitamin A µg	800.0
Vitamin D µg	5.0
Vitamin E mg	15.0
Vitamin C mg	55.0
Thiamine (vitamin B1) mg	1.4
Riboflavin (vitamin B2) mg	1.4
Niacin (vitamin B3) mg	18.0
Vitamin B6 mg	1.9
Vitamin B12 µg	2.6
Folic acid µg	600.0
Iron mg	27.0[b]
Zinc mg	10.0
Copper mg	1.15[c]
Selenium µg	30.0
Iodine µg	250.0[d]

a (*156*)
b (*209*)
c (*157*)
d (*137*)

Pregnant and lactating women should be given this supplement providing one RNI of micronutrients daily, whether they receive fortified rations or not. Iron and folic acid supplements, when already provided, should be continued.

Drinking water

Women are ensured access to sufficient drinking water (extra 1 litre of clean water per day).

Malaria management in pregnancy

In areas where malaria is endemic, sulphadoxine-pyrimethamine can be administered through clinics at the beginning of the second and third trimesters. Encourage women to use an impregnated bed net during pregnancy. Advise women that they must seek immediate medical attention for episodes of fever.

Prophylaxis for management of intestinal parasites

Give each affected woman 500 g mebendazole in the second and the third trimester.

Nutrition education/counselling for women and communities

Nutrition education and counselling services should be established, such as with reproductive health to provide 'safe havens' for pregnant and lactating women. These 'safe havens' should be easily-accessible areas where privacy, security and shelter are provided with access to water and food. Basic supportive care of breastfeeding mothers and their infants can be offered and peer-to-peer support nurtured.

5. Global intervention

5.1 Wheat and maize flour fortification

WHO RECOMMENDATION

Wheat and maize flour fortification is a preventive food-based approach to improve micronutrient status of populations over time that can be integrated with other interventions in efforts to reduce vitamin and mineral deficiencies when identified as public health problems (*210*).

Table I-14 gives guidance on the amount of micronutrients to be added.

Table I-14 Average levels of nutrients to consider adding to fortified wheat flour based on extraction, fortificant compound and estimated per capita flour availability

Nutrient	Flour Extraction Rate	Compound	Level of nutrient to be added in parts per million (ppm) by estimated average per capita wheat flour availability (g/day)[a]			
			<75[b] g/day	75–149 g/day	150–300 g/day	>300 g/day
Iron	Low	NaFeEDTA	40	40	20	15
		Ferrous Sulfate	60	60	30	20
		Ferrous Fumarate	60	60	30	20
		Electrolytic Iron	NR[c]	NR[c]	60	40
	High	NaFeEDTA	40	40	20	15
Folic Acid	Low or High	Folic Acid	5.0	2.6	1.3	1.0
Vitamin B_{12}	Low or High	Cyanocobalamin	0.04	0.02	0.01	0.008
Vitamin A	Low or High	Vitamin A Palmitate	5.9	3	1.5	1
Zinc[d]	Low	Zinc Oxide	95	55	40	30
	High	Zinc Oxide	100	100	80	70

[a] These estimated levels consider only wheat flour as main fortification vehicle in a public health programme. If other mass-fortification programmes with other food vehicles are implemented effectively, these suggested fortification levels may need to be adjusted downwards as needed.

[b] Estimated per capita consumption of <75 g/day does not allow for addition of sufficient level of fortificant to cover micronutrient needs for women of childbearing age. Fortification of additional food vehicles and other interventions should be considered.

[c] NR = Not Recommended because very high levels of electrolytic iron needed could negatively affect sensory properties of fortified flour.

[d] These amounts of zinc fortification assume 5 mg zinc intake and no additional phytate intake from other dietary sources.

Rationale and evidence

Wheat and maize flour fortification should be considered when industrially-produced flour is regularly consumed by large population groups in a country. Wheat and maize flour fortification programmes are expected to be most effective in achieving a public health impact if mandated at the national level, and can help achieve international public health goals.

Decisions about which nutrients to add and the appropriate amounts to add to fortify flour should be based on a series of factors, including the nutritional needs and deficiencies of the population; the usual consumption profile of "fortifiable" flour (i.e. the total estimated amount of flour milled by industrial roller mills, produced domestically or imported, which could in principle be fortified); sensory and physical effects of the fortificant nutrients on flour and flour products; fortification of other food vehicles; population consumption of vitamin and mineral supplements; and costs.

Flour fortification programmes should include appropriate quality assurance and quality control programmes at mills, as well as regulatory and public health monitoring of the nutrient content of fortified foods and assessment of the nutritional and health impacts of the fortification strategies.

Though wheat and maize flours can be fortified with several micronutrients, iron, folic acid, vitamin B_{12}, vitamin A and zinc, are the five micronutrients recognized to be of public health significance in developing countries.

Other interventions with an impact on nutrition

This document has focused on health-related actions with an impact on nutrition, or what are also known as "direct nutrition interventions". Many other health interventions and non-health related interventions outside the health sector also can have an important impact on nutrition. However, the evidence for those actions is variable and requires further elaboration, which is outside the scope of this publication. **Table I-15** provides a preliminary list of actions and **Part II** describes how some of these different types of interventions have been linked in implementation.

Table I-15 Health and non-health related interventions with an impact on nutrition

Intervention	Link
Other nutrition-related health interventions affecting women and children	
Prevention of adolescent pregnancy	
Pregnancy spacing	
Intermittent preventive treatment of malaria in pregnancy	
Prevention and cessation of tobacco, alcohol and drug consumption in pregnancy	
Reduction of indoor air pollution	
Prevention and control of occupational risk in pregnancy	
Prevention and control of genitourinary infections in pregnancy	
Provision of insecticide-treated bednets (to prevent malaria and anaemia in pregnant women)	http://www.who.int/elena/titles/bednets_malaria_pregnancy/en/index.html
Properly-timed cord clamping	http://www.who.int/elena/titles/cord_clamping/en/index.html
Deworming of children and adolescents	http://www.who.int/elena/titles/deworming/en/index.html
Deworming of pregnant women	http://www.who.int/elena/titles/deworming/en/index.html
Handwashing with soap and other hygienic interventions	http://www.who.int/elena/titles/wsh_diarrhoea/en/index.html
Household water treatment and safe storage	
Community promotion of sanitation	
Non-health related interventions with an impact on nutrition	
1. Agriculture and food production	
Micronutrient fortification of staple foods	http://www.who.int/elena/titles/biofortification/en/index.html
Micronutrient fortification of complementary foods	
Salt iodization	http://www.who.int/elena/titles/salt_iodization/en/index.html
Water fluoridation	
Interventions to improve food security at household level	
Production of nutrient-rich foods and staple foods of the poor	
Home gardening and large-scale fruit and vegetable production	
Micronutrient-rich crop varieties (e.g. orange-flesh sweet potatoes)	
Diversified food production, and improved storage and processing of food	

Intervention	Link
Interventions to improve the nutritional quality of foods (reduction of the content of salt, fats and sugars, and elimination of trans-fatty acids	
Agricultural activities that generate employment	
Small-scale agriculture	
Nutrition counselling integrated into agricultural extension programmes	
Women's role in agriculture supported	
2. Social protection	
Conditional and unconditional cash transfers	
Food aid	
3. Trade	
Taxation, subsidies or direct pricing to influence prices and encourage healthy eating and lifelong physical activity	
Approaches, i.e. stepwise or comprehensive, to reduce the impact of marketing of foods high in saturated fats, trans-fatty acids, free sugars or salt to children	
Provision of food in public institutions	
Implementation of the International Code of Marketing of Breast-milk Substitutes	
Information to be provided on key nutritional aspects, as proposed in the Codex Guidelines on Nutritional Labelling	
4.Education	
Women's primary and secondary education	
Improvement of diet and physical activity in schools	
5. Labour	
Support to lactating working women (through adopting and enforcing ILO Maternity Protection Convention, 2000 (No. 183) and Recommendation (No. 191)	
6. Information	
Conducting social marketing campaigns	
Labelling of food products	
7. Water and sanitation	
Improvement of water supply	
Improvement of sanitation	

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Part II

Effectiveness of large-scale nutrition programmes: evidence and implications

The purpose of Part II of this document is to show how some of the essential nutrition actions described in Part I have been implemented in large-scale programmes in various settings, briefly state what the outcomes have been, and examine the evidence for attribution of changes in nutritional outcomes to programme activities. Some background on the evolution of programmatic evidence is given, and implications for the future are drawn. Additionally, there is a section describing findings from cash transfer programmes.

1. The evolution of evidence for the effects of nutrition interventions, 1960–2010

Systematic scientific studies of the nature and causes of malnutrition in children and mothers in low-income societies were brought into early focus by Scrimshaw and colleagues (*1*), based largely on work in Central America. A number of prospective studies, of which one of the most influential was conducted in Narangwal, India (*2*), established that nutrition interventions were efficacious in contributing to child health, survival, growth and development. The authors of a synthesis of ten such studies (*3*) concluded that health and nutrition interventions do have a positive impact on children's nutrition.

Primary health care, as conceived at the Alma Ata conference (*4*), included nutrition interventions, as did Child Survival programmes (*5*) and similar initiatives, as brought together at the World Summit for Children (*6*). These interventions were bundled (e.g. UNICEF's GOBI-FFF – growth monitoring, oral rehydration, breastfeeding, immunization, female education, family spacing and food supplements) and applied on a large scale, but evaluations of impact were scarce. The evidence for designing effective programmes continued to be based primarily on the efficacy of individual interventions in experimental conditions.[1] A few large-scale programmes which started in the 1980s, such as the Tamil Nadu Integrated Nutrition Programme (TINP) supported by the World Bank, and the Iringa Joint Nutrition Support Programme (JNSP), supported by UNICEF and WHO, were carefully monitored, and the evidence continues to be relevant.

A considerable variety of interventions have been regarded as part of nutrition programmes (and many are also included in health-related programmes, such as the Integrated Management of Childhood Illness – IMCI (*7*)). The content ranged from feeding programmes and behavioural change, to immunization and medical interventions. The scope of this review was set by considerations of efficacy studies, and experience of programmes either defined as strictly nutrition, or with substantial nutrition components or objectives. For example, the *Lancet* nutrition series (*8*) evaluated 20 separately-defined interventions. As described in **Part I** of this document, an independent but similar set of ENAs may be grouped as addressing general nutrition, micronutrients and disease control. The main routes or platforms for interventions targeting mothers and young children are community based, usually linked to health facilities (or government outreach activities), and/or campaigns such as child health days/weeks. Cash transfer programmes, conditional or unconditional (CCTs or CTs) have recently increased in coverage and importance in addressing health and nutrition problems; usually they constitute programmes (or platforms) themselves, with conditionality linked to health, nutrition and education (see later section).

Evidence for the impact of nutrition actions from experimental studies (i.e. efficacy trials) has shown that child (and less often maternal) nutritional status can benefit from direct interventions (*9, 10, 11*). However, scaling-up based on efficacy results requires caution, as operational programmes have different conditions than efficacy trials, and priority should be given to evaluating effectiveness under operational conditions. This approach requires alternative, rigorous methods, beyond randomized trials (*12*), that have so far rarely been applied and carried through.

While a number of large-scale programmes were undertaken starting in the 1970s (see **Table II-1**), only a few included impact evaluation. Programme development continued without a solid evidence base, both as large-scale investments from the World Bank (e.g. in Bangladesh, Madagascar and Senegal), and as development of national programmes (e.g. in Thailand and Vietnam). The Thailand programme was developed after rejecting conventional externally-driven

[1] Effectiveness refers to estimated changes in outcome (e.g. child nutritional status) in large-scale operational programmes; and efficacy to changes in outcome estimated to be attributable to the intervention under controlled conditions.

Table II-1 Programmes included in reviews of effectiveness

Programme	Publi-cation	Gwatkin (3)	Berg (15)	ACC / SCN (16)	ACC/SCN (17)	Mason (21)	UNICEF/ ADB (18 & 19)	WB/ UNICEF (21)	DCP2 (61)	WB (23)	Lancet (11)	WB (28)	Part II	Annex 3
	Year[a]	(80)	(81)	(91)	(96)	(00)	(01)	(03)	(06)	(06)	(06)	(10)	(12)	
Rural Guatemala 1, 2	(59–77)	Y	Y											
Imesi Nigeria	(69–77)	Y	Y											
North Peru	(62–67)	Y	Y											
Etimsgut, Turkey	(65)	Y	Y											
Narangwal, Punjab, India	(68–73)	Y	Y											
Jamblad, India	(71–)	Y	Y											
Hanover, Jamaica	(73–)	Y	Y											
Kavar, Iran	(73)	Y	Y											
Botswana Drought Relief	(82–88)			Y										
Costa Rica, NNHCP, HSDP	(74–)			Y		Y			Y		Y			
Gambia, Health/ Nutrition	(89)			Y							Y			
Ghana, Weaning Foods	(86–)			Y										
India, ICDS1	(90–97)			Y	Y	Y	Y	Y					Y	C
India, ICDS2	(93–01)					Y	Y	Y	Y		Y	Y	Y	C
India, TINP 1+II	(80–89)			Y	Y	Y	Y	Y	Y	Y	Y		Y *	C
Indonesia, UPGK	(79–)			Y	Y	Y			Y	Y	Y		Y *	C
Indonesia, CHN3	(93–01)												Y	
Peru, Copaca	(89)			Y										
Philippines, Price Subsidy	(83–86)			Y										
Philippines, BIDANI	(78–)			Y			Y	Y			Y		Y	C
Philippines, ECD									Y		Y	Y	Y	C
Tanzania, JNSP Iringa	(84–88)			Y	Y	Y		Y	Y	Y	Y		Y *	C

Programme	Publi-cation	Gwatkin (3)	Berg (15)	ACC / SCN (16)	ACC/SCN (17)	Mason (21)	UNICEF/ ADB (18 & 19)	WB/ UNICEF (21)	DCP2 (61)	WB (23)	Lancet (11)	WB (28)	Part II	Annex 3
	Year[a]	(80)	(81)	(91)	(96)	(00)	(01)	(03)	(06)	(06)	(06)	(10)	(12)	
Tanzania, CSD	(85–95)			Y	Y	Y		Y	Y		Y		Y	
Tanzania, IMCI												Y	Y	
Tanzania, HSDP2	(00–)													
Thailand, Health/ Nutrition	(82–)			Y	Y	Y			Y	Y	Y		Y *	C
Brazil, Food supplement	(76)				Y									
Brazil, Child Pastoral Programme	(83)										Y		Y	C
Brazil, IMCI												Y	Y	
Brazil, BA (CCT)													Y	
Brazil, BFP (CCT)													Y	
Zimbabwe, Supplementary Food Productionn	(81–)				Y				Y		Y			
Bangladesh, BINP	(95–02)					Y	Y		Y	Y	Y	Y	Y *	C
Bangladesh, NNP	(04–07)										Y		Y	C
Bangladesh, BRAC									Y					
Bangladesh, HNPSP	(07–10)												Y	
Cambodia							Y							
Pakistan, LHWs	(94–)						Y						Y	C
Vietnam, Health/ Nutrition							Y					Y	Y *	C
Sri Lanka, Thriposha and others							Y							
Madagascar, Secaline	(93–97)							Y			Y	Y	Y	C
Madagascar, Seecaline	(99–03)							Y		Y	Y	Y	Y *	C

Programme	Publi-cation	Gwatkin (3)	Berg (15)	ACC / SCN (16)	ACC/SCN (17)	Mason (21)	UNICEF/ ADB (18 & 19)	WB/ UNICEF (21)	DCP2 (61)	WB (23)	Lancet (11)	WB (28)	Part II	Annex 3
	Year[a]	(80)	(81)	(91)	(96)	(00)	(01)	(03)	(06)	(06)	(06)	(10)	(12)	
Madagascar, Linkages											Y			
Mexico, Oportunidades	(97–)								Y	Y		Y	Y	C
Honduras, AIN-C									Y	Y	Y		Y	C
Jamaica, Community Health Aides									Y					
Ethiopia, Linkages											Y			
Ethiopia, PSNP (Food Aid)												Y	Y	
Ethiopia, CBN	(08–)												Y *	C
Senegal, CNP	(96–)										Y	Y	Y	C
Senegal, NEP	(02–)										Y	Y	Y *	C
Mauritania	(99–05)										Y			
Colombia, CCT												Y		
Nicaragua, community health									Y	Y		Y		
Nicaragua, CCT												Y	Y	
Ghana, CB programme	(99)										Y			
India, Woman & Child Development											y			
Colombia, FA	(02–)												Y	C

"–" after year means programme is continuing at the time of writing. No data was available for some programmes.
Y * had enough data to estimate change in outcome (underweight, ppts/year) and intensity as CHWs/1000 or $/child per year
C: case study done, provided in Annex 3.

plans (*13*). The drive to proceed in the relative absence of positive evaluation results was widely noted, for example by Save the Children-UK (*14*). (This programme is discussed later.)

Evaluations and assessments of operational programmes gradually built up from findings from large-scale programmes as they expanded from the 1980s on. Based on this development, some 61 projects, mostly large scale, have been reviewed (see **Table II-1**), representing most of the programmes considered relevant over about the last 30 years. Some of the early projects, such as the Narangwal study, tended towards efficacy trials, and they provide a basis for later work. Reviews by Gwatkin and colleagues (*3*) and Berg (*15*) drew on the same projects, and were significant in catalysing the expansion of large-scale programmes starting in the 1980s (*16*). Eleven commissioned country case studies provided additional information (*17*). A regional planning project sponsored by the Asian Development Bank and UNICEF assessed programmes in seven Asian countries (*18, 19*). An assessment of nutritional trends associated with nine programmes (*20*) was carried out as part of the *Combating malnutrition: time to act study* (*21*), which included four in-depth country investigations. The review was extended to include estimates of resources (intensity, as resources/head per year), coverage, outcomes and other key factors, for 15 programmes (*22*). A World Bank report (*23*), quoting many of the projects listed in **Table II-1**, referred to "short routes to improving nutrition", meaning direct interventions as opposed to changing context (e.g. education, income).

The *Lancet* nutrition series (*11*) contains many of the efficacy results reported in **Part I**, as well as drawing on a number of the same set of established large-scale projects in **Table II-1** (*24*). Nonetheless, the paucity of rigorous effectiveness evaluations of large-scale programmes was highlighted by the comprehensive *Lancet* exercise. The World Bank sponsored re-evaluation in at least two cases – for Bangladesh (*25*) and Madagascar (*26*), as well as an evaluation of their Senegal programme (*27*). The Independent Evaluation Group published a synthesis of 28 evaluations (some large-scale, some experimental) (*28*). This review failed to elicit a clear pattern of activities linked to impact. However, it did not include estimates of intensity of resource use, which is likely to account for some differences. It acknowledged the likely impact of a number of the programmes reviewed, and where feasible estimated effect sizes. (This relation between input levels – 'intensity' – and size of effect has been rarely examined until recently.)

Several external agencies, such as the World Bank, the United States Agency for International Development, the Swedish International Development Agency and UNICEF supported these programmes. The reviews that synthesized these experiences (**Table II-1**) relied mainly on implementation and management aspects, since few evaluation data were available.

2. What do we need to know?

The actual impact in large-scale operational, multi-component programmes depends not just on the efficacy (hence, potential impact) of individual interventions, e.g. counselling on feeding practices. It also depends on the means by which these are provided (platforms or routes), the resource use, the context, and the interactions with other activities and factors. Without these it is difficult to interpret diverse results, as noted above (*28*). Not just interventions, but the routes by which people participate need consideration.

The evidence from large-scale programmes should be combined with efficacy to reach generalizable conclusions concerning the evidence and its interpretation, as well as its application to possible designs and resourcing of strengthened, scaled-up or new programmes intended to accelerate improvement of nutrition in children and women in low- and middle-income countries. Direct estimation of impact from some form of randomized assignment to treatment groups has virtually never proved feasible in national or large-scale programmes. Estimates of effectiveness at this scale depend on evaluation designs that attempt to extract likely net change attributable to an intervention by a variety of methods, often described as quasi-experimental (including natural experiments). Probably the only near-national programme that deliberately assigned the population to treatment or comparison groups was the *Progresa/Oportunidades* programme in Mexico (*29*).

The development over time of large-scale maternal and child nutrition programmes (e.g. as measured by growth or BMI) was significantly interrupted by a move towards micronutrient programmes, which were largely run outside mainstream maternal and child activities. For instance, iodized salt was usually a separate programme, and VAD was mainly addressed through intermittent high dose capsule distribution in child health campaigns and/or immunization activities. Iron supplementation was linked to regular programmes, but generally has not achieved much outreach or impact. In the last decade, priorities have moved towards a more balanced and integrated approach. However, the data available on large-scale programmes cannot distinguish possible effects of different components on general nutrition (measured by anthropometry), although in principle micronutrient effects could be estimated when there are data (e.g. for anaemia).

Programmes should not be seen as simply an additive combination of single components (or separate interventions). Very often, multiple interventions can be expected to modify each other's effects.[1] Resources may not be additive: once a system is working, the mix of interventions can be flexible, and the marginal costs of adding activities lowered (within reason, without overwhelming the front-line worker). Key questions – of resource intensity and programme quality, coverage, context, and platforms or routes by which individuals are in contact with overall combined programme activities – are only recently being estimated as crucial determinants of outcome (*22, 23, 24*). This part of the document aims to stress the effectiveness of multi-component, large-scale, operational programmes, and to be useful for decisions on policies and programmes; in fact, the evaluation results appear adequate to contribute to such decisions (see Habicht and colleagues (*30*) on matching evaluation designs to decision needs).

[1] These interactions can be either direction: as examples, controlling diarrhoea would be expected to make feeding programmes more effective; measles immunization would lead to vitamin A supplements having less impact on measles mortality.

3. The impact on whom is being estimated?

The aim of this work is to provide evidence for attribution of changes in nutritional outcomes to programme activities. For this, it is necessary to define precisely whose nutritional outcome is being assessed, that is, whether the outcome refers to the participants or to the overall population (by age, sex, etc.). The initial rate of improvement appears to be much faster than the sustained rate, and this initial rate needs to be distinguished from the sustained rate to see consistent results. Typically the initial rate is about 5–10 percentage points change in underweight (ppt)/year, over a limited period (probably several months), and the sustained rate is then 1–2 ppt/year. A typical underlying (no programme) improving trend is around -0.5 ppt/year (e.g. starting at 40%, reducing to 35% in a decade).

Four rates may be measured:

(1) Participants' initial rate (usually obtained from weighing data);

(2) Participants' sustained rate;

(3) Population initial rate;[1]

(4) Population sustained rate (e.g. from population-based evaluation surveys; related to participants' rate by coverage, although participants may change, coming in and out of the programme). This is the indicator used in **Figures II-1** and **II-2**, discussed later.

The effect size can be measured as *rates* of change – e.g. ppt/year – or as before-after (one time) changes. *Rate* is used for programmes which are not usually intended to have a one-time impact but to keep going until the intended outcome reaches a norm or goal.[2] Efficacy results usually refer to particular groups of participants (e.g. during pregnancy; 12–24 months old), and are not always translated into expected effects in terms of population prevalence reductions (i.e. rates of improvement in the population). Victora and colleagues (*12*) have discussed in detail the differences expected between efficacy rates and those from routine programmes. The *Lancet* series reported simulations for coverages, giving the outputs as mortality, stunting and disability-adjusted life years (*11*). Rates are used as the outcome for effectiveness, and effect sizes given as ppt/year.

[1] Usually not reported – population-based surveys are seldom carried out early in programmes.

[2] Objectives are often stated as, for example, reducing underweight in preschool children by 25% over five years. Note that this translates into ppt/year using the starting prevalence; if this is (say) 40%, then the objective is to reach 30% in 5 years, which is 10/5 ppt/year, = 2 ppt/year.

Figure II-1 **Population sustained rate of underweight reduction (ppts/yr) compared to programme intensity estimated as CHNWs per 1000 children, as part-time equivalents (0.1 FTEs)**

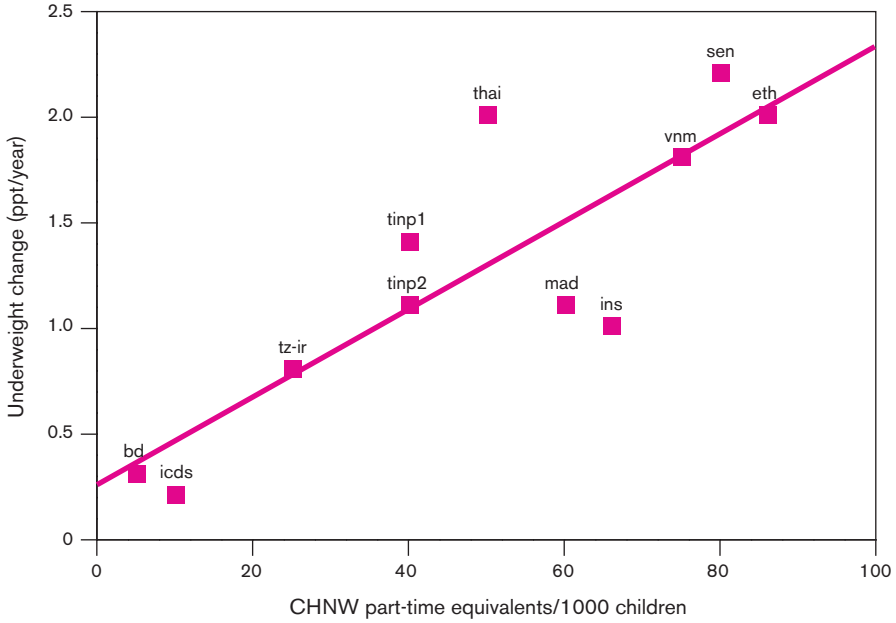
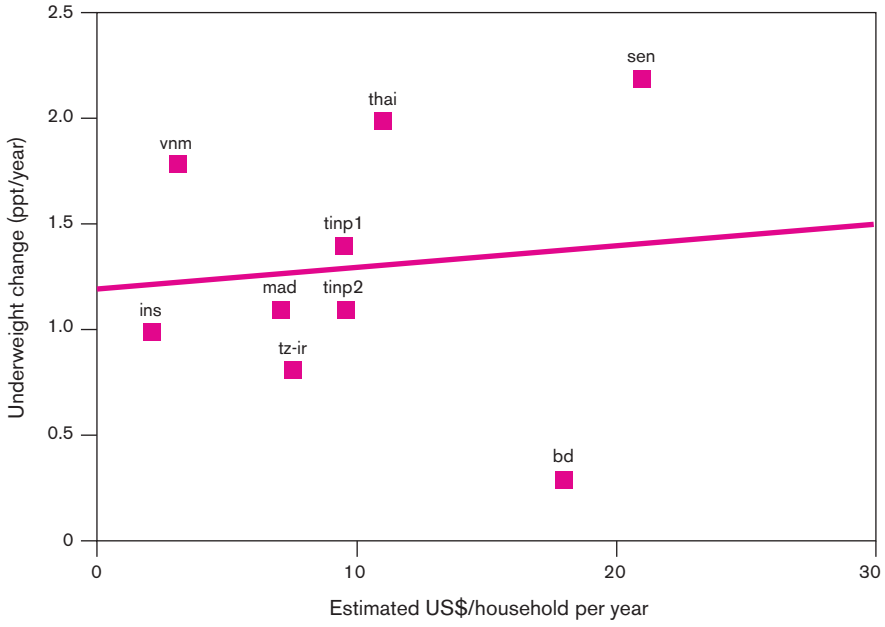


Figure II-2 **Population sustained rate of underweight reduction (ppts/year) compared to programme intensity estimated as programme expenditures, running (not start-up) costs, US$/household per year**



Key

bd	Bangladesh Integrated Nutrition Project
eth	Ethiopia Community Based Nutrition Programme
icds	India Integrated Child Development Services Project I
ins	Indonesia Family Nutrition Improvement Programme
mad	Madagascar Second Community Nutrition Project
sen	Senegal Community Nutrition Programme
thai	Thailand National Nutrition Programme
tinp1	Tamil Nadu Integrated Nutrition Programme I
tinp2	Tamil Nadu Integrated Nutrition Programme II
tz-ir	Tanzania Iringa Joint Nutrition Support Programme
vnm	Vietnam Protein-Energy Malnutrition Control Programme

4. Shape of response curve

Two important non-linear effects should be distinguished. First, the observation noted above that the initial rate of reduction in malnutrition among participants, soon after the programme is launched, tends to be much more rapid than the sustained rate; thus, the prevalence curve is steep and then flattens. The reasons are not well established, but it seems likely that a vulnerable part of the population – for example, those currently ill – may respond quickly to care and medical attention, and improve rapidly. The causes of current underweight may be different for other segments of the population – for example, feeding practices or food insecurity – and they may improve less rapidly. It is the sustained rate that will eventually bring long-term nutrition improvement. What happens to the initial improvement if the programme is discontinued is not known, but it seems likely that it would deteriorate again. The estimated sustained rate at the population level is used as the main indicator.

Second, a non-linear dose-response type of relation between improvement rates (among participants) and resources applied is expected. This has long been postulated (*31*), and a rule suggested that US$ 5–US$ 10/head per year is needed to bring an additional 1–2 ppt/year improvement in underweight (*17*). Below this a less-than-proportional effect is seen – a threshold level must be reached before improvement starts. (A corollary is that spending too little per participant does not just solve the problem more slowly, but does not solve it at all, and wastes resources.) Until now not enough data have been available to examine this empirically. However, community health/nutrition worker (CHNW) numbers (e.g. CHNWs per 1000 households) give a useful measure of intensity and allow estimation of what resources are needed to achieve an effect.

In sum, one aim is to assess what types of operational programmes – multi-component, through different platforms – bring about a sustained reduction in child underweight among participants, and what level of resources is needed. Of the 60-plus country programmes identified (see **Table II-1**), 21 are reviewed here, and data were extracted from 11 that appeared to give reasonable estimates of both nutrition improvements and resource uses, as shown in **Figures II-1** and **II-2**.

5. Which components via what routes/platforms are included in effective programmes?

The programme components considered are summarized in **Table II-2**, which shows the groupings for the effectiveness of large-scale programmes reviewed, and their equivalent headings as ENAs whose efficacy has been reviewed in **Part I**; and in turn in the *Lancet* nutrition series.

For most programmes supplementary feeding refers to children, though occasionally may include women (e.g. in Ethiopia and Mexico). Counselling is considered to be community-based, rather than promotion via media. Growth monitoring is included as an operational programme component, but by itself has no efficacy. Micronutrient supplementation does not include fortification, since the latter is usually provided by routes other than those described here. Almost all the available programme outcome data are on general nutrition (of children), measured by anthropometry.

Programme components were delivered by one or more of four routes shown in **Table II-3**. Community nutrition centres were the main route, usually as a base for CHNWs who may carry out home visits. The distribution of routes was similar between the 32 programmes in total (**Table II-3a**), the 21 programmes which were described in detail (**Table II-3b**), and the 11 programmes for which quantitative data were available (**Table II-3c**). At least 70% of the programmes were community based, with CHNWs operating from a local nutrition centre. **Tables II-3a**, **II-3b**, and **II-3c** indicate that those analysed quantitatively (**Table II-3c**), selected because of data availability, were not substantially different from the larger groups from which they were drawn.

The 32 programmes in **Table II-1** were identified from a literature search for information on programme activities or components. Regardless of platform, all programmes reviewed were multi-component. Of the 32 programmes, 60% or more implemented supplementary feeding (usually targeted), growth monitoring and counselling (support for breastfeeding, complementary feeding or pregnancy, alone or in combination) (see **Table II-4a**); 80% or more of the 21 programmes described in detail implemented these components (**Table II-4b**). All programmes for which quantitative data were available included the three components (**Table II-4c**), with counselling as the intervention most frequently provided. More than one half of programmes reviewed implemented micronutrient supplementation and one third or more reported referral or treatment, which may have included community-based treatment of malnutrition.

Table II-2 Linkage in terminology between Part II, Part I, and the *Lancet* nutrition series

Programme components in Part II	Essential nutrition actions in Part I	*Lancet* nutrition series[a]
General nutrition[b]		
Counselling and promotion of breastfeeding	Breastfeeding counselling and support by health care staff	Breastfeeding promotion and support
	Breastfeeding counselling and support by CHWs	
Counselling and promotion of complementary feeding practices, +/- supplementary feeding (children; targeted supplementary food provided in some projects)	Complementary feeding, quality counselling and behaviour change communication	Complementary feeding support with provision of supplementary food/cash transfers
	Counselling and support for appropriate feeding of low-birth-weight infants	Complementary feeding support without provision of supplementary food/cash transfers
Growth monitoring	No efficacy alone	No efficacy alone
Referral, treatment	Moderate acute malnutrition covered	SAM case management
	SAM not covered	
Conditional cash transfers	Not covered yet for efficacy	Conditional cash transfers (dietary diversification: no effect noted)
Micronutrient supplementation		
Iron/folic acid supplementation	Iron supplementation for children	Iron folate and iron supplementation
	Iron and folic acid supplements for menstruating women	
	Iron and folic acid supplements for pregnant women	
Vitamin A supplementation	Vitamin A supplementation for children under 5	Vitamin A supplementation
Zinc supplementation	Zinc supplements for diarrhoea management	Zinc supplementation (preventive and therapeutic)
Multiple micronutrient supplementation	Home fortification with multiple micronutrients of foods for young children	Multiple micronutrient supplements in pregnancy
Disease Control		
Hygiene	Handwashing and other hygienic practices	Hygiene interventions

[a] Derived from Tables 3,4,5,6,7 & 8 in Lancet Series 3 (see 11).
[b] The three main headings, "General nutrition, Micronutrient supplementation, Disease control" etc. are in line with the Lancet nutrition series (11), paper 3.

Table II-3 Frequency of platforms/routes used for components in programmes reviewed

Table II-3a Frequency of platform/route used for provision of programme components

32 programmes overall, for which components were given

Platform/route	N	%
Health facility	3	9.4
Community-nutrition centre	23	71.9
Community-home based	4	12.5
Cash/conditional cash transfer	6	18.8

Table II-3b Frequency of platform/route used for provision of programme components

21 programmes for which detailed information was available, given in case studies (in Annex)

Platform/route	N	%
Health facility	1	4.8
Community-nutrition centre	19	90.5
Community-home based	4	19.0
Cash/conditional cash transfer	1	4.8

Table II-3c Frequency of platform/route used for provision of programme components

11 programmes for which outcome and resource data could be estimated

Platform/route	N	%
Health facility	0	0.0
Community-nutrition centre	10	100.0
Community-home based	1	10.0
Cash/conditional cash transfer	0	0.0

Table II-4 Frequency of types of components in programmes reviewed

Table II-4a Frequency of programme components

32 programmes reviewed overall

Components	N	%
Counselling (breastfeeding, complementary feeding, pregnancy)[a]	28	87.5
Supplementary feeding[b]	19	59.4
Growth monitoring	25	78.1
Micronutrient supplementation[c]	17	53.1
Referral, treatment[d]	11	34.4

Table II-4b Frequency of programme components

21 programmes with details in case studies

Components	N	%
Counselling (breastfeeding, complementary feeding, pregnancy)	21	100.0
Supplementary feeding	17	81.0
Growth monitoring	19	90.5
Micronutrient supplementation	12	57.1
Referral, treatment	9	42.9

Table II-4c Frequency of programme components

11 programmes for which outcome/resources could be estimated quantitatively

Components	N	%
Counselling (breastfeeding, complementary feeding, pregnancy)	10	100.0
Supplementary feeding	10	100.0
Growth monitoring	10	100.0
Micronutrient supplementation	6	60.0
Referral, treatment	3	30.0

[a] Counselling may include support for EBF, continued breastfeeding, and complementary feeding.
[b] Supplementary feeding usually targeted based on growth monitoring.
[c] Micronutrient supplementation includes vitamin A and/or iron.
[d] Referral and treatment may include community-based treatment of severe malnutrition. Immunization and deworming not included due to lack of programme information; typically provided in Child Health Day activities.

6. Estimating nutrition improvement achieved and associated resources

6.1 Data sources and calculations

As indicated previously, about 60 programmes, mostly large-scale, were identified, almost all from previous reviews as listed in **Table II-1**. Of these, 21 were reviewed in detail, and for 11 programmes, sufficient data on both outcome (underweight,[1] ppt/year) and intensity of resources (CHNWs per 1000 households,[2] and US$/household per year) were identified and further reviewed to explore associations. Initial identification of these programmes was by country; within countries, data on individual programmes were then investigated further. For each country and programme, the estimates for reduction in underweight and resource intensity were made from available materials.

The intensity estimates were determined from project documents, reports, etc. (for further details, see **Annex 3**). CHNWs were classified as full or part-time. Based on informal enquiries (e.g. in Thailand), it was estimated that part-time CHNWs worked about one half-day per week, so that one full-time CHNW would be equivalent to ten part-time ones, except where indicated. The finances assigned to the programmes were taken from budget or expenditure reports, and are very approximate. They were divided by the child population covered to give US$/child per year. The figures are intended to estimate running costs, but in some cases part of start-up costs was included. The sources of the results used are described below.

Bangladesh. The Bangladesh Integrated Nutrition Project (BINP) operated from 1995 to 2002 with approximate coverage by area of 15% (59/464 *thanas*). Intensity of CHNWs was reported as 1:200 children (*19*), i.e. about 5:1000 households. Resource intensity was estimated at approximately US$ 18/household per year, including supplementary feeding.

Various evaluations of BINP's nutritional impact were conducted by both internal and external reviewers. The estimate used of BINP impact on child underweight[3] was derived from a theory-based impact evaluation of the project in which a combination of data from previous evaluations was used (*33, 34*). This latter evaluation reported an overall 2.0 ppt reduction in underweight due to BINP activities, i.e. 0.3 ppt/yr.

Subsequent activities led into the National Nutrition Programme (NNP), 2004–2007, whose intended coverage was 105/464 *thanas*. This programme had implementation problems; the baseline survey was delayed and the end survey never conducted (*35*). Thus, no estimate of effect is available.

Support for nutrition activities became absorbed into the Health and Nutrition Population Sector Programme (HNPSP), 2007–2010 (25% nutrition and food security; about US$ 4 300 m in funding, 37% external). HNPSP has no available evaluation data, and disbursement (as of July 2010) was about 5%, so was clearly slow in starting (*35*).

Ethiopia. The Community Based Nutrition Programme (CBN), as part of the National Nutrition Programme, was initiated in 2008 and continues today (*36*). Population coverage in target areas (now approximately 250/640 *woredas* (districts)) is approximately 40% and intensity of CHWs is about 1:23 children, estimated as 0.2 FTEs, i.e. 86:1000 households (*37*). Estimates of reduction in underweight from the CBN programme are preliminary, derived from an initial analysis

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[1] As far as possible, the age group for which these estimates were made was 0–5 years; no adjustment was made if only other age groups were reported (e.g. 0–3 years).

[2] While most CHNWs are part-time, in some projects full-time CHNWs are hired. Part-time CHNWs were calculated as 0.1 full-time equivalents (FTEs).

[3] Early estimates of initial reduction in underweight among participants were rapid, for severe malnutrition 13.8% to 2.9% from April to November 1997 (*32*). UNICEF unpublished figures showed underweight in participants changed from 79% to 66% from April 1997 to March 1998 (*20*, Figure 2e.)

of weighing programme data from mid-2008 to mid-2010. The initial high rate of improvement among participants (estimated at approximately 8.0 ppt/year) is difficult to distinguish from the sustained rate. However, this latter rate appears to be approximately 5.0 ppt/year; with estimated 40% coverage this gives a sustained population rate of 2.0 ppt/year.

India. The Tamil Nadu Integrated Nutrition Programme I (TINP I) was implemented from 1980 to 1989 with approximately 46% coverage by area (173/373 rural blocks in 11 districts). CHW intensity for TINP I was reported as 1:150 households (*38*), or 40:1000 households. Resource intensity of TINP I was previously estimated at US$ 9.50/household per year (*38*). Reduction in underweight in TINP areas was approximately 1.4 ppt/year (*38*) or 1.5 ppt/year (*39*).

The Tamil Integrated Nutrition Programme II (TINP II) ran from 1990–1997, and coverage was approximately 80% by area (316/385 rural blocks). TINP II intensity of CHWs and resources was the same as TINP I (*22*). The sustained rate of reduction in population underweight attributed to TINP II was 1.1 ppt/year (*40*).

The Integrated Child Development Services Project I (ICDS I) was supported by the World Bank and other donors from 1990-1997, with population coverage of approximately 2.5% (*41*). The intensity of CHNWs, known as *Anganwadi* workers (ANWs) (estimated at 20% FTE) was 1:1000 persons, i.e. approximately 1:200 children (*19*) or 10:1000 households. While there are no definitive evaluations, most reports on ICDS 1 estimate that the change in underweight attributable to the programme was slight (*41, 42*); the rate is plotted as 0.2 ppt/year.

Indonesia. The Family Nutrition Improvement programme (UPGK), also known as the *Posyandu* (weighing post) programme, started around 1979 and expanded to national coverage, continuing until constrained by an economic crisis in the late 1990s. From 1975–1990 coverage was approximately 90% by area (58 000/65 000 villages) (*22, 43, 44*). The number of children per *posyandu* was about 60.[1] Rohde (*45*) refers to five CHNWs per *posyandu*, nearly one million in total. However, they had limited training (3 days) and high turnover, and on evaluation only a small percentage was able to provide meaningful counselling. At 4 CHNWs per *posyandu*, this gives 66 CHNWs/1000.

Recurrent costs, which may be seen as those needed for sustained activities, were estimated at approximately US$ 1/household per year (*45*), but this figure may not include all local costs. The reduction in underweight ascribed to UPGK activities based on previous research was approximately 1.0 ppt/year (*22*).

Madagascar. The Second Community Nutrition Project (SEECALINE) was supported by the World Bank and others from 1999–2003; coverage was approximately 50% by area (56/111districts) (*46*). SEECALINE intensity of CHWs was estimated as 1:125 households to 1:225 households (*21, 47*), or 60:1000 households. Resource intensity for the project was estimated at US$ 10/ household per year based on project documents (*21*). The rate of underweight reduction was reported as 0.86-1.25 ppts/year (*47*), or approximately 1.1 ppt/year for the population sustained rate.

Senegal. The Community Nutrition Program (CNP) operated from 1995–2001, with coverage of approximately 20% of children under 3 years of age (*48*). Intensity of CHWs was about 1:124 households (*48*), i.e. 80:1000 households. Approximately 98% of beneficiaries were reached, and therefore the rate for participants is about equivalent to that of the population as a whole. Resource intensity of the CNP was approximately US$ 40/household per year based on 6 months of participation for children (*48*).[2] Estimated reduction in population underweight was 2.2 ppt/year (*48*).

Tanzania. The Iringa JNSP was implemented from 1984–1991, and coverage was approximately 85% by area (6/7 districts). Estimated CHNW intensity of the programme was 1:40 households

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[1] (43) reports 214,000 *posyandus* with 13 million participating children.

[2] Children were enrolled for 6 months, then discharged as rehabilitated; costs were estimated as US$ 60/child, taken as US $60/child per year for comparisons here (i.e. assumes they would not be readmitted during the year).

(*49*), i.e. 25:1000 households. Resource intensity of JNSP was US$ 8–US$ 17/household per year (*22*). The sustained rate of reduction in underweight was 0.8 ppts/year (*50*).

Thailand. The National Nutrition Program (NNP) began in 1975 and continues at the time of writing, with reportedly about 100% coverage by area reached in 1990 (*51*). Estimates of CHNW intensity are 1:20 households (*13*), i.e. 50:1000 households. Resource intensity is estimated as US$ 11/household per year (*22, 52*).

Thai underweight estimates for 1982–1990 are found in a case study (*52*). Data for calculating the rate come from both the weighing programme (1982–90) and a number of surveys, which use both National Center for Health Statistics (NCHS) and local Thai standards. The sustained rate (1986–90) was 1.9 ppt/year (*52*) from the weighing programme, during which time coverage was around 90%; the rate in 1984–90 was 2.8 ppt/year. Using NCHS standards, the rate during 1987-95 was 1.5 ppt/year (*53*). Another report (*54*) gave underweight estimates of 40.6% for 1986 and 31.3% for 1995 using national standards, i.e. 1.0 ppt/year. The sustained population rate during the programme was 2.0 ppt/year.

Vietnam. The Protein-Energy Malnutrition (PEM) Control Programme was initiated in 1994/95 with coverage reported as approximately 100% (*55*). By 2005 an estimated 100 000 CHNWs (nutrition collaborators) were in place for an intensity of approximately 1 CHNW per 70 households, i.e. 75:1000 households. Resource intensity was about US$ 0.70/household per year, excluding district and commune costs. Reduction in underweight, as the population sustained rate, was about 1.5–2.0 ppt/year from 1994–1998 plotted as 1.8 ppt/year from repeated surveys and from 1999–2005 data from the weighing programme (*55, 56*).

6.2 Do levels of resources relate to rates of improvement?

Estimates of changes in preschool children's underweight prevalences were calculated for 11 of the programmes examined (see last column of **Table II-1**) where both outcome results (underweight change) and resources (intensity as CHNWs/1000, and US$/child per year) were available.

In **Figure II-1** the rate of underweight reduction (y-axis) is plotted with the CHNWs/1000 children, part-time equivalents. The rate (y-axis) is probably more dependable than the intensity, although both are somewhat uncertain. Above about 30 CHNWs/1000 children there are improvements of 1–2 ppt/year. It has not been possible to extract the underlying (without programme) rate in most cases; however, it would usually not be more than -0.5 ppt/year.

Most of the rate estimates are reasonably well known – Thailand and Vietnam are from national programmes, Tanzania/Iringa and TINP have been widely reported and Bangladesh, Madagascar and Senegal have been estimated by World Bank evaluators. The Ethiopia figure is from recent data and unpublished, but appears to be a fairly conservative estimate. The Indonesia rate appears low; however, the financial data (*45*) (see **Figure II-2**) has been a long-standing low outlier which may also explain the relatively low improvement rate.

Financial data (**Figure II-1**) seem to show little relation of effect with financial resources. At the lower end of resources the Vietnam figure does not include local costs, and (as above) the Indonesia figure may be an underestimate. While most programmes probably require a minimum of US$ 10/child per year to show impact, how the funds are used may be more important than the amount per child.

7. Implications

7.1 Implications for programmes: limitations and caveats

The role of individual interventions in improving child nutrition was discussed in **Part I** of this document. Efficacy in terms of, for example, counselling changing breastfeeding practices, is well understood. The impact of these changes on child health and development outcomes, while covered in fewer studies, is reasonably well established. Bhutta and colleagues (*11*) provide an important synthesis as shown in **Table II-2**. The issue addressed concerns the evidence that interventions, known to be efficacious individually, have an impact when incorporated into operational large-scale programmes.

The extended list of programmes in **Table II-1** covers those that have been used for overviews in the past (up to 2010), with some newer ones identified and introduced for this review. Material was sought that described their content, with particular focus on quantitative measures of outcome and of programme coverage and resources. Some characteristics of 32 programmes were extracted, and detailed case studies developed for 21 of these based on availability of information (see Annex 3). Outcome evaluation data and resource estimates were considered adequate for 11 of these (see **Tables II-3** and **II-4**). The resource indicators chosen were (a) CHNWs per 1000 participants (or CHNWs/1000 households) and (b) running expenditures as US$/household per year. The commonest outcome, underweight prevalence in children, was estimated as a rate of change, as ppt/year. Assessing outcomes should distinguish initial rates of improvement – now seen to be quite rapid – from the sustained rates (after a year or so); and between programme participants and the overall child population. (These distinctions are not always made in reports.) The population sustained rate of improvement was estimated in comparing outcomes.

The limited quality and number of the evaluation results for effectiveness of operational nutrition programmes is widely recognized to be a major constraint. The approach to evaluation of operational programmes is necessarily quite different to efficacy trials (*12*) and can rarely use randomization to treatment and comparison groups. Other designs can be employed, and especially when these are prospective, can give plausible inferences on impact, usually requiring some advanced analyses. As Bhutta and colleagues (*11*) noted from their extensive literature search for meta-analyses, "(of) evidence from effectiveness trials and programme assessments, fewer than 3% of all interventions qualified" for inclusion. Virtually all their data were from trials, and the results refer to efficacy. The quality of evidence on effectiveness is weaker, and permits including a number of the programmes excluded by Bhutta and colleagues. However, as described above, a number of programmes have been evaluated (some re-evaluated, e.g. by the World Bank, from Bangladesh, Madagascar and Senegal), and extracting the best estimates where data are available seems to give at least a plausible pattern, e.g. as shown in **Figure II-1**. Details of how the numbers were obtained are given in the text above and in the case studies in **Annex 3**.

Previous syntheses of evaluation results – including on efficacy – have not emphasized the key factors of coverage and resource intensity. Differences in resources (per capita) would be likely to influence impact, and would account for part of the differences between impact observed in large-scale programmes versus trials and pilot projects (where resources are normally less constrained). Thus particular attention has been paid to relating outcomes to resources. The indicators that could be obtained, e.g. CHNWs/1000, do not reflect quality, training, incentives, supervision and other crucial factors which should be included in future studies. CHNWs/1000 may also be an available proxy indicator of broader programme effort.

The programmes considered operate through CHNWs, based usually in community centres (with home visiting); the distribution of platforms is shown in **Table II-3**. Supervision is usually through the health system. The programmes have a reasonably common overall pattern of activities – counselling, micronutrients, etc. – but within these details vary, presumably with different conditions and contexts. Supplementary feeding – meaning provision of food, usually intended

to be complementary[1] foods for young children – is quite common in these programmes, nearly always targeted to children identified as at risk through growth monitoring or other assessments. Growth monitoring is not itself expected to improve nutrition, but has been found to be a regular activity in most programmes. The outcome used, underweight, may not be affected by the micronutrient components. The relation between programmes with common but not standardized features and a general nutrition outcome can be examined. The relative effects of individual components cannot be assessed in the present data.

7.2 Specific implications for designing future programmes and sustaining existing ones

When assessed in successful programmes, it appears that the initial improvement in underweight prevalence in participants is quite rapid, reducing by up to 10 ppt in the first year or so. At the same time, severe malnutrition also falls rapidly to low levels (e.g. 10% to 2%). This pattern was seen in, for example, Bangladesh (early BNIP), Ethiopia, Senegal, Tanzania (Iringa), Thailand and other places. The reasons for this initial response are not known, and are likely to be in part from treatment of diseases and immunization.

The sustained rate, over a number of years, is what presumably makes a long-term difference. An expected dose-response is seen roughly in the sustained rate (**Figure II-1**), measuring the resources as CHNWs/1000 households (or children). The results suggest that a level of around 30 CHNWs/1000 (1 CHNW:33 children, estimated as part time, 0.1 FTEs) is needed for an improvement rate of 1 ppt/year or higher in underweight.

The most important implication is that *community-based nutrition programmes can be effective, and that adequate resources – for example, enough CHNWs, trained and supported – must be put into these, and sustained over years, for them to provide a substantial impact on child nutrition*. For example, a with-programme improvement rate of 1.5 ppt/year is typical; current sub-regional child underweight prevalences are 13%–23% in Africa, with change rates of 0.1 to -0.2 ppt/year; in Asia these figures are 18%–33%, with change rates of -0.3 to -1.0 ppt/year. A rate of 1.5 ppt/year over 10 years reduces these prevalences by 15 ppt, i.e. to 0%–7% in Africa and 3%–18% in Asia (*57*). Thus, sustaining these activities at the required intensity for 10 years or so would substantially reduce child malnutrition, as has been seen in several countries with national programmes (e.g. Thailand, Vietnam).[2]

The resources needed show no such relation (**Figure II-2**), partly because of difficulties in estimating financial resources. This finding may also reflect that it is how funds are used that counts: investing in local organizations, and especially appropriate training, support, and incentives for community workers, are key.

The precise details of the interventions (counselling, referral, micronutrients, etc.) may not be the most essential factor, although of course they must be relevant and appropriate to the context. The extent of contact between trained, familiar community workers and mothers with children may be more crucial. It could be argued that the impact comes not primarily from delivering services, but from fostering the collective efficacy of communities: mothers obtain more control over their families' health and survival, and increase their own effective efforts.[3] This is catalysed and supported by the community-based programme structure.

The question of interfacing with vertical programmes – child health days or weeks – was not explicitly studied here. Experience in six African countries (*58, 59*) indicates that there are opportunity costs to child health days/weeks for community-based programmes (e.g. personnel

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[1] "Complementary foods" refers to those given from six months on to complement breastfeeding; it may in practice refer to children's foods after weaning. Supplementary foods refer here to foods provided from outside of the household.

[2] Countries that have experienced transitions at these rates are illustrated in (*57*), Figure 9 – some of which may be attributable to nutrition programmes (but the data are insufficient to estimate how much).

[3] This argument is elaborated on p. 1067 in (*22*). The huge commitments of their own scarce resources that poor families make to children's education attest to the strong will to foster children's welfare, when people know better how to do so.

and resources are temporarily reassigned). While these can be mutually supportive, only a few interventions are effective on the six-monthly periodicity typical of child health days/weeks (notably immunization). Transition to continuing community-based activities as soon as outreach is adequate is implied.

In sum, community-based nutrition programmes would seem to be reasonably established as an effective route for bringing about significant reductions in child malnutrition. To do this they need to be supported and sustained for long enough to bring about lasting change. In principle, if they continue for sufficient time for intergenerational impact – fewer small girls growing up to be small mothers having small babies – to take effect, they can contribute to bringing about a permanent transition in populations' nutritional status. Indeed, these transitions are completed or underway in many countries (*60*), and the policy should be to accelerate these in many more.

8. Cash Transfer Programmes

Cash transfer programmes, conditional (on health/nutrition related actions: CCTs) or unconditional (CTs) have expanded rapidly in recent years, and are of increasing importance for improving nutrition. They are highly complementary to other nutrition actions, and involve establishing eligibility, usually based on low income. Hence, they are positively targeted towards the poor and most vulnerable. The level of resources/head is much higher than for typical nutrition programmes – but the objectives are broader – and the scale in terms of coverage equal or higher. Their effect on nutrition is both through increasing resources (income), and, for conditional programmes, enhancing use of services such as immunization and education. The impact on nutritional status of children is potentially both through maternal nutrition and hence intra-uterine growth and development, and through infant and young child feeding, care, and use of health services.

Examples of CCTs and CTs that have been described and evaluated to some extent were drawn from the literature, agency reports, and other documents for this section. These sixteen case studies are described in **Annex 3**, and some characteristics summarized in **Table II-5**. CCTs are the usual form for these programmes in Latin America, where they have been operating for some time, while CTs are the norm in Africa.

Cash transfer programmes provide assistance in the form of money in order to increase household income. Transfers may be given without requirements that household members meet specified conditions, or be contingent upon compliance with a specified set of conditions. CCTs have increased in popularity in recent years due to their perceived ability to create long-term benefits through encouraging behaviour adoption that improves well-being, and investing in human capital (*62*). Provision of transfer is generally targeted to poor households. Programmes may directly affect nutrition (e.g. providing supplements), or connect to nutrition outcomes less directly (e.g. through increasing use of health services, antenatal care or education). Conditionalities may include periodic health visits, growth monitoring, vaccination when applicable, antenatal care, and attendance at education sessions by mothers (*63*).

Both CTs and CCTs are forms of social assistance, or safety nets, assisting beneficiaries who are vulnerable to impoverishment without support (*62, 64*). Public works programmes (productive safety nets) and in-kind transfers (food for work) are two other components of social safety nets but will not be described in detail here. Ethiopia's PSNP is included as cash transfers are provided to mothers. In sub-Saharan Africa overall approximately 137 programmes were in operation in 37 countries in 2009 (*64*). Transfer programmes in Latin American countries are mostly CCTs, which have dramatically increased in popularity in comparison to CTs, as well as expanded to other regions, in the past 10 years (*63*).

Several programmes, such as *Oportunidades* in Mexico, *Bolsa Familia* in Brazil, and *Red de Protección Social* in Nicaragua include requirements for receipt of transfers specific to addressing nutritional concerns. Conditions intended to improve nutritional outcomes may address behaviours through group nutrition education sessions and growth monitoring and promotion, which also may be accompanied by more personalized counselling. Conditionalities aimed at improving micronutrient status may be employed in CCT programmes through provision of essential micronutrients and food or supplements to supply both macro- and micronutrients, though the latter has been limited to Mexico's *Progresa* (*65*).

Conditionalities in programmes with nutrition objectives may be determined based on country context and nutrition actions for which there is evidence of efficacy. CCTs that are intended to improve nutritional outcomes should be "well coordinated with the existing priorities guiding a country's nutrition policy" (65). General agreement exists as to which interventions are the most efficacious, therefore guiding conditional requirements in CCT programmes. The efficacy of these ENAs are described in Part I of this document and include: exclusive breastfeeding for six months, appropriate complementary feeding, appropriate nutritional care of sick and severely malnourished children, adequate intake of vitamin A and iron for women and children and adequate intake of iodine by all household members (*65* from *66*).

8.1 Mechanisms, demand and supply-side

Preference for CCT programmes over in-kind and unconditional transfers has grown for several reasons. CCTs offer greater flexibility for determination of household needs and decreased logistical costs relative to in-kind transfers. In comparison to unconditional transfer programmes CCTs are promoted as a direct investment in human capital, as well as an incentive for households to adopt behaviours that improve well-being, both offering long-term benefits (*62*).

Various mechanisms by which CCT programmes work to improve maternal and child nutrition have been proposed:

- As women typically receive the cash transfer, programme beneficiaries may be empowered to prioritize care for both themselves and their children during the CCT programme and even after it ends (*65*).
- An increase in household purchasing power for food and health services may result from CCT programmes (*65*). Due to the multifactoral nature of undernutrition, complementary interventions need to be supplied and maintained in addition to income provision for real improvement (*67*).
- Direct provision of micronutrients and/or energy supplements may be provided to mothers and children, though this practice has not been widespread in CCT programmes thus far (*65*).
- Conditionalities such as growth monitoring for children, antenatal care for mothers, and participation in nutrition education sessions for both may improve maternal and child nutrition by addressing behavioural determinants of undernutrition (*65*).

An important consideration of the ability of CCTs to improve nutritional status involves determining the effects of providing both demand- and supply-side incentives. Transfers offered to families can increase demand for health and nutrition services by overcoming barriers to access such as direct costs, indirect costs (transport, food during hospitalization) and opportunity costs (loss of income due to health-seeking activities). CCTs aimed at increasing demand for preventive services may also have positive spillover effects, thus furthering long-term benefits for beneficiaries (*62*).

Inadequate or poor quality supply of services limits the effectiveness of demand-side CCTs. Therefore some programmes are implementing supply-side transfers in addition to those typically provided directly to beneficiaries. For example, the *Programa de Asignación Familiar* (PRAF) provides health centres with approximately US$ 6000 annually for meeting quality improvement and service standards at rural health posts, including nutrition training for mothers (*68*).

8.2 Coverage and resource intensities

In CCT programmes providing both demand and supply-side incentives the effects on health and nutritional outcomes of each as well as the combination should be distinguished. For example, an evaluation of Honduras's PRAF demonstrated that demand-side transfers resulted in the largest ppt increase in healthcare visits among children under three years of age, as well as attendance at growth monitoring within the same age group as compared to controls. The combination of demand- and supply-side benefits increased utilization of both health visits and growth monitoring to a lesser extent, but supply-side incentives alone failed to increase utilization of either. The demand- and supply-side benefits individually and in combination resulted in improvements in antenatal care attendance (five or more sessions), although supply-side incentives resulted in the lowest percentage point increase (*65*). This example may be flawed since health facilities received slightly more than one half of their expected incentives, but it is reasonable to assume that supply-side incentives may be beneficial only when demand-side transfers are offered concurrently.

Cash transfer programmes vary in implementation stage as pilots, early or small-scale programmes or national coverage (see **Table II-5** and details in **Annex 1**). Among pilot and early or small-scale programmes, mostly CTs in sub-Saharan Africa and CCTs in Latin America, coverage ranges from approximately 4000 beneficiaries, as in Zambia's Kalomo Pilot Social Cash Transfer Scheme (*69*) to 165 000 beneficiaries in Nicaragua's RPS (*70*). This coverage represents less than 1% and 3% of the populations respectively. Large-scale CCT programmes, mostly in operation in

Latin American countries, range in coverage from about 1 million participants, as in Honduras's PRAF (*68*), to 45 million participants in Brazil's BF Programme (*65*). About 15% and 25% of the population (100% of the targeted poor) are covered with these programmes respectively.

Estimates of programme intensity are based on the amount of transfer provided to beneficiaries. Among CT programmes, transfers range from US$ 6/household per month in Mozambique's National Institute of Social Action (INAS) Food Subsidy Programme (PSA) (*71*) to US$ 25/household per month in South Africa's Child Support Grant (CSG) (*72*). Among CCT programmes, the lowest estimate of expenditure was US $4/household per month in Honduras's PRAF, or less than 10% of average household consumption (*73*). In contrast, the highest expenditure was US$ 60/household per month in Brazil's BF programme (*65*) or approximately 15% of average household consumption (*73*). It should be noted that among BF beneficiaries not all households receive this amount as transfers are dependent upon the level of poverty and number of children.

8.3 Effect on nutrition outcomes

Effectiveness of CCTs is estimated mostly from programmes in Latin America. It is based on data for various age groups of children and a variety of outcomes, thus making comparisons with large-scale nutrition programmes themselves (as in this document) problematic. However, impacts on child growth, birth weight, as well as on food expenditure and consumption have been estimated (see **Annex 2**, last column).

Mexico's *Oportunidades* has multiple evaluations reporting an approximate 1.0 cm increase in height among children ages 0–6 months and 12–36 months, all as compared to controls (*62*). Improvement in HAZ scores as compared to controls of 0.13 (Brazil's BF, children less than 7 years of age), 0.25 (South Africa's CSG, children less than 36 months), 0.161 (Colombia's FA, children less than 24 months), and 0.17 (Nicaragua's RPS, children less than 5 years) were reported (*62, 72*).

Increase in birth weight of 0.13 kg was reported among beneficiaries as compared to controls in Mexico's *Oportunidades* (*74*). Additionally, an increase of 0.58 kg in "newborn" weight was reported for beneficiaries in Colombia's FA, although this should be interpreted with caution since the programme was targeted to children rather than mothers. Although mixed results have been found, there is evidence that CCT programmes can have a positive impact on child nutritional status. To date most CCT programmes designed to improve nutritional and health outcomes have targeted children rather than mothers, resulting in a lack of data available on changes in maternal nutritional status (*65*).

8.4 Linkage to direct nutrition programmes

Both types of cash transfer programmes offer a link to existing nutrition programmes within a country. Furthermore, they may work to bolster both demand- and supply-side improvements in nutrition services at the community level. When considering implementation of a cash transfer programme designed to improve undernutrition, several rules for determining appropriateness of using nutrition-related conditionalities have been proposed. An unconditional CT programme should be used when nutrition programmes of good quality are in place and utilized extensively. In contrast, a CCT programme is more useful when current nutrition programmes are not well-utilized, but quality is good. CCTs in addition to supply-side incentives should be considered when both quality and utilization of nutrition programmes is poor. Finally, when a country does not have an existing nutrition programme a CCT should be considered only when both services of appropriate quality can be introduced and when beneficiaries are able to utilize the services (*65*).

A number of important factors are likely to affect the positive impact of CCTs on maternal and child nutrition outcomes. Programmes should focus on the window of opportunity for nutrition impact, pregnancy through two years of age, and therefore target beneficiaries in this range. Conditionalities should be specific to nutrition, based on best practices, including ENAs, for which there is evidence of efficacy. Supply-side transfers should be provided when needed in order to maintain quality and quantity of health and nutrition services, thus increasing the ability of CCTs to improve the nutritional status of mothers and children.

Table II-5 Summary of CCT/CT programmes studied

Type	Region	No. programmes	Resources ($/household/month): examples	Population coverage (in millions): examples
CCT	Africa	1	Republic of South Africa US$ 25	South Africa 8
	Asia	3	Sri Lanka US$ 2–9 India US$ 130/pregnancy	Sri Lanka: 2 India: 0.6
	Latin America	5	Brazil US$ 30-60 Mexico US$ 15 Colombia US$ 17 Nicaragua US$ 19 Honduras US$ 4	Brazil: 45 Mexico: 25 Honduras: 0.2
CT	Africa	8	Ethiopia US$ 4 Mozambique US$ 3–6 Senegal US$ 14 Kenya US$ 5 Zambia US$ 8 Malawi US$ 4–13	Ethiopia: 8 Mozambique: 0.2 Senegal: 0.3 Kenya: 0.3
	Asia	0		
	Latin America	0		

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Annexes

Annex 1. Components and platforms for 32 nutrition programmes with comparative data

COUNTRY	PROGRAMME NAME	Quanti-tative?	PLATFORMS				COMPONENTS						
			Facility	Community nutrition centre	Community worker based at home	CT/CCT	Coun-selling	SF	GM	MNs	Referral	Imm	FFW/CT
Bangladesh	BINP (1995–2002)	Y	–	Y	–	–	Y	Y	Y	–	–	–	–
	NNP (2004–07)	–	–	Y	–	–	Y	Y	Y	–	–	–	–
	HNPSP (2007–10)	–	Y	–	–	–	Y	–	–	Y	–	Y	–
Brazil	CPP (1983–present)	–	–	–	Y	–	Y	–	Y	Y	Y	–	–
	IMCI (1997–present)	–	Y	Y	–	–	Y	–	–	–	Y	–	–
	BA (2001–03)	–	–	–	–	Y	Y	–	Y	–	–	Y	Y
	BFP (2003–present)	–	–	–	–	Y	Y	–	Y	–	–	Y	Y
Colombia	FA (2002–present)	–	–	–	–	Y	–	–	Y	–	–	–	Y
Ethiopia	PSNP (2005–present)	–	–	–	–	Y	–	–	–	–	–	–	Y
	EOS/EEOS (2004–present)	Y	CHD	Y	–	–	–	Y	–	Y	Y	–	–
	NNP/CBN (2008–present)	–	–	Y	–	–	Y	Y	Y	Y	Y	–	–
Honduras	AIN–C (1995–present)	–	–	Y	Y	–	Y	–	Y	Y	Y	–	–
India	TINP I (1980–89)	Y	–	Y	–	–	Y	Y	Y	Y	–	–	–
	TINP II (1990–97)	Y	–	Y	–	–	Y	Y	Y	Y	Y	–	–
	ICDS I (1990–97)	Y	–	Y	–	–	Y	Y	–	–	Y	–	–
	ICDS II (1993–2001)	–	–	–	–	–	Y	Y	–	–	Y	–	–
Indonesia	UPGK Posyandus (1975–90)	Y	–	Y	–	–	Y	Y	Y	Y	–	–	–
	CHN3 (1993–2001)	–	–	Y	–	–	Y	Y	Y	–	–	–	–
Madagascar	SECALINE (1993–97)	Y	–	Y	–	–	Y	Y	Y	–	Y	–	–
	SEECALINE (1999–2003)	–	–	Y	Y	–	Y	Y	Y	–	Y	–	–
Mexico	*Oportunidades* (1997–present)	–	–	–	–	Y	Y	Y	Y	Y	–	–	Y
Nicaragua	RPS (2000–05)	–	–	–	–	Y	Y	–	Y	Y	–	–	Y
Pakistan	LHW (1994–present)	–	–	Y	–	–	Y	–	Y	Y	Y	–	–
Philippines	BIDANI (1978–79)	–	–	Y	–	–	Y	Y	Y	–	–	–	–
	ECD (1998–2005)	–	Y	–	Y	–	Y	Y	Y	Y	–	–	–

COUNTRY	PROGRAMME NAME	Quanti-tative?	PLATFORMS				COMPONENTS						
			Facility	Community nutrition centre	Community worker based at home	CT/CCT	Coun-selling	SF	GM	MNs	Referral	Imm	FFW/CT
Senegal	CNP (1995–2001)	Y	–	Y	–	–	Y	Y	Y	–	–	–	–
	PRN (2002–06)	–	–	Y	–	–	Y	–	Y	Y	–	–	–
Tanzania	JNSP (1984–91)	Y	CHD	Y	–	–	Y	Y	Y	–	Y	–	–
	CSD (1985–95)	–	–	Y	–	–	Y	–	Y	Y	–	–	–
	HSDP2 (2003–present)	–	–	Y	–	–	–	–	–	Y	–	–	–
Thailand	NNP (1975–present)	Y	–	Y	–	–	Y	Y	Y	Y	–	–	–
Vietnam	PEM Control Programme (1999–present)	Y	–	Y	–	–	Y	Y	Y	Y	–	–	–

Note: Programme name: see abbreviations at front of main document. **Platforms:** facility – health post or centre, CHD = Child Health Days (or weeks) linked to facility; community nutrition centre, or community worker based at home; CT/CCT – cash transfer or conditional cash transfer programme as base for intervention, may include food provision. **Components:** counselling; SF = provision of supplementary food (usually selective); GM = growth monitoring; MNs = micronutrients; referral; Imm = immunization; FW/CT = food–for–work or cash transfer.

Annex 2. Summary of CT/CCT programmes

Programme	Country statistics	CCT or CT	Eligibility	Benefit	Coverage	Maternal/related child outcomes
Bangladesh Income Generation for Vulnerable Group Development (IGVGD) – BRAC/WFP 1985–present	**Population (2005)** 153 122 000 **GNI/capita (2009 US$)** 590 **Avg HH size** 4.7 (2007) **% below poverty line** 49.6 (2005)	CCT	– Widowed or abandoned female-headed HH – HH own <1 acre of land – HH earn <300 *taka* (US$ 6) per month – Selection of women for VGD by local elected officials for entry into programme; BRAC further selects for IGVGD	– 30 kg of food grain for 18 months Conditions: – weekly meetings, skills training – save minimum 25 *taka* (US$ 0.50) per month with BRAC – potential for graduation into microcredit programme	– national programme covering ~1.4 million women – average provision is ~41 *taka* (US$ 1/day); approximately 1/5 of average monthly expenditures	
Brazil *Bolsa Alimentacão* (BA): 2001–2003 – now part of *Bolsa Familia Programme* (BF) 2003–present	**Population (2005)** 186 075 000 **GNI/capita (2009 US$)** 8040 **Avg HH size** 4.1 (1996) **% below poverty line** 4.3 (2008)	CCT	– Geographic targeting: federal and municipal level – HH assessment: per capita monthly income ceilings of R$120 (US$ 66) for moderately poor HHs and R$60 (US$ 33) for extremely poor HHs	**BA:** – R$15–45 (US$ 7–21) – maximum 3 children **BF:** – R$18 (US$ 10) pregnant woman or child – maximum 3 children – R$54–112 (US$ 30–61) poor–extremely poor **Conditions:** – children 0–7 years of age: scheduled vaccines; regular health visits and growth monitoring – pregnant/lactating women: regular pre- and postnatal visits; health and nutrition education seminars	– **BA** (2003): 1.5 million beneficiaries – **BF:** 11.1 million families (45 million beneficiaries) – 2006 (25% of Brazilian population, 100% of poor)	N**utritional** – 0.13 decrease in HAZ scores among children less than 7 years of age compared to control (*1*) – lack of results reported: conditionalities not monitored due to lack of available health services (*2*)

Programme	Country statistics	CCT or CT	Eligibility	Benefit	Coverage	Maternal/related child outcomes
Colombia *Familias en Acción* 2002–present	**Population (2005)** 43 049 000 **GNI/capita (2009 US$)** 4930 **Avg HH size** 4.1 (2005) **% below poverty line** 16 (2006)	CCT	– HH with children <7 years of age – lowest of income categories (based on HH characteristics) as determined by system for identifying and selecting beneficiaries –roughly equal to poorest 1/5 of HH	– US$ 17/month (per mother, not child) **Conditions:** – children attend health visits established by Growth and Development Programme (MoH); weighed and measured	– 700 municipalities (2005) – ~400 000 HH – ~2.1 million persons	**Intermediate** – increase in intake of protein and vegetables in both urban and rural children – 33.2% increase in children 24–48 months of age with up-to-date preventive health visits compared to controls (*3*) **Nutritional** – 0.161 HAZ score increase in children <24 months of age compared to control group (non-enrollees) – 0.58 kg increase in "newborn" weight (proxy for birth weight in study) in urban areas – 0.069 decrease in probability of chronic malnourishment (as measured by increase in height) in children <24 months of age (*1*)
Ethiopia Meket Livelihoods Development Project 2003–2008	**Population (2005)** 74 661 000 **GNI/capita (2009 US$)** 330 **Avg HH size** 5 (2005) **% below poverty line** 39 (2005)	CT	– beneficiaries found through peasant associations and officials (livestock, land access, previous harvest) – HH who cannot or should not work; includes pregnant and lactating mothers (other beneficiaries received cash for work)	– cash relief to meet "essential food expenditure" in bad years – 30 *Birr* (US$ 3.50) per person/month	– estimated 11% of all HH involved – no formal number, percentage of HH receiving cash relief is set – Data n/a for average income of beneficiaries due to variability with seasons/HH size	– frequency of feeding of children increased during programme – care increased; young mothers able to spend more time with children
Ethiopia Productive Safety Net Programme 2005–present	**Population (2005)** 74 661 000 **GNI/capita (2009 US$)** 330 **Avg HH size** 5 (2005) **% below poverty line** 39 (2005)	CT	– *woredas* (districts) that received most relief food assistance in past 10 years (2004) – HH in districts with food gaps of at least 3 months in past 3 years and received food assistance – pregnant/lactating women among those who receive CT (10%–20% of beneficiaries)	– either cash or food transfers: 6 months of year **Cash:** 10 *birr*/day or 50 *birr*/month **Food:** 3 kg cereal/day or 15 kg/month – unconditional for pregnant/lactating mothers	– 7.5 million people (11% of population) – 244 of more than 500 districts; 8 of 10 regions	– HH that received at least ½ of transfers had increased food security – transfer levels were below programme targets (*4*)

Programme	Country statistics	CCT or CT	Eligibility	Benefit	Coverage	Maternal/related child outcomes
Honduras *Programa de Asignación Familiar* II – *Bono Salud* (Health Bonus) component 2000–present	**Population (2005)** 6 893 000 **GNI/capita (2009 US$)** 1820 **Avg HH size** 4.8 (2005) **% below poverty line** 18.2 (2006)	CCT	– municipal-level targeting; quantified poverty in municipalities with highest levels of malnutrition (lowest average HAZ scores) – Poor HH with pregnant women or children <3 years of age	**Demand:** $L660 (US$ 46.3)/ family per year **Conditions:** – women: 5 prenatal and 1 postnatal visits – children: nutrition and health visits **Supply:** $L87,315 (US$ 6020)/ facility per year **Conditions:** – quality improvement at rural health posts – services provided meet standards; includes nutrition training for mothers	– 133 municipalities – 240 000 HH – 1115 towns – 15% of population (~1 million persons)	**Intermediate** – 20.2% increase in child health visits (at least 1 in past month) compared to control – 18.7% increase in women completing more than 5 antenatal visits compared to controls (*1*) **Nutritional** – No changes in health outcomes, including HAZ scores; may be due to lack of programme implementation and/or poor quality of evaluation (*5*)
India Dr. Muthulakshmi Maternity Benefit Scheme 2006–present	**Population (2009)** 1 155 347 678 **GNI/capita (2009 USD)** 1180 **Avg HH size** 4.8 (2006) **% below poverty line** 41.6 (2005)	CCT	– loss of wages of pregnant women in families below poverty line: 12,000INR/ annum (US$ 266) – pregnant women above age 19	– 6000INR (US$ 133) – intended in 2 installments: ½ at 5th month of pregnancy; ½ after birth – in reality given after birth since 2009	– 4.95 million (2008–09) (*6*)	
India Janani Suraksha Yojana 2007/08 –present	**Population (2009)** 1 155 347 678 **GNI/capita (2009 US$)** 1180 **Avg HH size** 4.8 (2006) **% below poverty line** 41.6 (2005)	CCT	– pregnant women in families living below poverty line – at least 18 years of age – first/second births only	– 700INR (US$ 155)		
Kenya Hunger Safety Net Programme 2009–present	**Population (2005)** 35 817 000 **GNI/capita (2009 US$)** 770 **Avg HH size** 4.2 (2008) **% below poverty line** 19.7 (2005)	CT	– chronically food insecure (aged, orphans, widows, persons with disabilities) – high dependency ratio	– bimonthly CT for 3 years – monthly: Ksh 355 (US$ 5) per HH head and Ksh 178 (US$ 2.50) per each additional family member	Phase I: 4 poorest districts (Turkana, Marsabit, Wajir, Mandera) – 60 000 HH (300 000 persons)	Monitoring and evaluation plan in place

Programme	Country statistics	CCT or CT	Eligibility	Benefit	Coverage	Maternal/related child outcomes
Malawi Mchinji Social Cash Transfer Pilot Scheme 2006–present	**Population (2005)** 13 654 000 **GNI/capita (2009 US$)** 280 **Avg HH size** 4.4 (2004) **% below poverty line** 73.9 (2004)	CT	– ultra poor: below lowest expenditure quintile and below national poverty line (1 meal/day, no valuable assets) – labour constrained: HH without person age 19–64 fit for work (elderly, child-headed, chronically ill, disabled) OR HH with member able to work, but dependency ratio of more than 3	– 1 member HH: 600MK (US$ 4) – 2 member HH: 1000 MK (US$ 7) – 3 member HH: 1400MK (US$ 10) – 4 member HH: 1800MK (US$ 13)	– targets lowest 10% of HH below ultra-poverty line (10 029MK (US$ 72) per capita/year = 27MK(US$ 0.20)/day) – 23 561 HH reached (2009) – 92 786 persons reached (2009)	**Intermediate** Based on head of HH report: – decreased illness in previous month among children in intervention compared to control (42% vs. 55%) – improved food intake in intervention HH compared to control (93% vs. 11%) – 3.1 ppts increase in average number of food groups consumed after 1 year by intervention HH compared to control (2.7 vs. 0.4) **Nutritional** –10.5 ppts reduction in underweight after 1 year among intervention children compared to control (19.6% vs. 9.1%) (*7*)
Mexico *Oportunidades* (formerly *Progresa*) 1997–present	**Population (2005)** 105 330 000 **GNI/capita (2009 US$)** 8920 **Avg HH size** 4 (2005) **% below poverty line** 3.4 (2008)	CCT	– poor community chosen based on literacy, HH infrastructure, employment – poor HH within communities chosen based on socioecomic status, occupation, income, disability, access to health services (78% of HH eligible)	– transfer for health: US$ 15/HH per month **Conditions:** – every member attends regular clinic visits and talks – monthly meeting for principal beneficiary – 5 prenatal visits for pregnant women – nutritional supplements for pregnant/lactating women	– 5 million low-income families (2007) – 97% of eligible HH with young children enrolled in programme – CT equivalent to 17%–20% of pre-programme HH consumption/capita (rural)	**Nutritional** – 1.1 cm increase in height among children 0–6 months of age in poorest households compared to control (crossover group) – mean haemoglobin 0.37 g/dL higher after 1 year of Progresa compared to control with no exposure (*1*) – 1.0 cm increase in height among children 12–36 months of age compared to control (*1*) – 1.0 cm increase in height among children 12–36 months of age compared to control (*1*) – 0.1273 gm increase in birth weight compared to control (*8*) – 4.6 ppts reduction in low birth weight for participating women compared to control (*8*)

Programme	Country statistics	CCT or CT	Eligibility	Benefit	Coverage	Maternal/related child outcomes
Mozambique *INAS* Food Subsidy Programme (PSA) 1997–present	**Population (2005)** 20 834 000 **GNI/capita (2009 US$)** 440 **Avg HH size** 5 (2005) **% below poverty line** 74.7 (2003)	CT	– HH in absolute poverty – head of HH unable to work, older woman, older man, handicapped, chronically sick, malnourished, pregnant – beneficiaries need ID cards or birth certificates – resident of area for more than 6 months – monthly income < Mzm 70 000 (US$ 3)	– Mzm 70 000–140 000 (US$ 3–6) per month/HH dependent on HH size	– operates in each province – targeting ~1% of population – 2005: 160 000 persons (HH and registered dependents)	(*9*)
Nicaragua *Red de Protección Social* 2000–2005	**Population (2005)** 5 455 000 **GNI/capita (2009 US$)** 1000 **Avg HH size** 5.3 (2001) **% below poverty line** 15.8 (2005)	CCT	– resident of municipalities chosen (consisted of 59 rural regions in 6 of 20 municipalities) – initial phase: high score on marginality index (family size, lack of piped water, lack of latrine, % of persons >5 years of age illiterate) – Second phase: most HH in intervention regions were beneficiaries	– cash transfer every other month = US$ 224/HH/year – antiparasitic meds, iron supplements, vitamins **Conditions:** – health education workshops every 2 months – growth monitoring: monthly age <24 months; every 2 months 2–5 years of age	– 6 of 20 municipalities in which development programme (Participatory Micro-planning) was in operation – ~90% of HH in intervention regions were beneficiaries – ~3% of population covered (165 000 persons)	**Intermediate** – 4.5% increase in food expenditure of HH budget in intervention group (decrease in control group seen despite level of poverty-explained by programme effect of increasing food security) – increase in diet diversity; increase in number and quality of food items purchased (*10*) – 17.5% increase in children 0–3 years of age taken for health control and weighed in previous 6 months compared to control (*1*) **Nutritional** – 0.17 HAZ score increase in children less than 5 years of age compared to control group – 5.3% decrease in children less than 5 who are stunted – 6.0% decrease in children less than 5 who are underweight (*1*)
Senegal Child Focused Social Cash Transfer and Nutrition Security Project 2009–present	**Population (2005)** 11 281 000 **GNI/capita (2009 US$)** 1030 **Avg HH size** 8.7 (2005) **% below poverty line** 33.5 (2005)	CT	– mothers with children 0–5 years of age – inadequate HH food consumption per survey: local community leaders to verify eligibility	– FCFA 7000 (US$ 14)/ month per mother in HH with at least 1 child under age 5 (~14% of average food basket for HH of 4 adults) – bimonthly CT for 6–12 months	– 10 districts with "critical" levels of malnutrition (>15%) in which Standardized Monitoring and Assessment for Relief and Transition surveys were conducted – 320 000 children under 5 years of age	Monitoring and evaluation plan in place

Programme	Country statistics	CCT or CT	Eligibility	Benefit	Coverage	Maternal/related child outcomes
South Africa South African Child Support Grant 1998–present	**Population (2009)** 49 320 150 **GNI/capita** (2009 US$) 5 770 **Avg HH size** 3.8 (2003) **% below poverty line** 26.2 (2000)	CT	Children <14 years of age residing in HH with monthly income of primary caregiver and his/her spouse (not entire HH) below R800 (US$ 110)–rural and R1100 (US$ 150)–urban	– R170 (US$ 25) monthly to caregiver of eligible child	– 7.8 million beneficiaries (2006–07) (*11*)	**Nutritional** –0.25 HAZ score increase among children when treatment (transfer) is provided for at least 24 months as compared to less than 1 month during the first 36 months of life (*12*)
Sri Lanka Samurdhi (consumption grant transfer component-food stamps) 1995–present	**Population (2005)** 19 531 000 **GNI/capita (2009 US$)** 1990 **Avg HH size** 4.3 (2004) **% below poverty line** 14 (2002)	CCT	– combined HH income less than Rs 1000 (US$ 9)/month – "Voluntary" labour in community development projects dependent upon size of grant (e.g. 4–5 man-days for grant of Rs 500) – unemployment in entire HH – all requirements must be met	– Rs 250–1000 (US$ 2.25–US$ 9)/month (dependent on # in HH and monthly income) – HH receipt of stamps every 6 months for monthly use – portion of grant withdrawn for forced savings	– designed as targeted programme – 60% of transfers go to lowest 2 expenditure quintiles – 36% of HH in lowest quintile missed – 21 of 25 districts; ~1.9 million families covered (~41% of population) **Intensity:** – Average transfer is Rs 381 (US$ 3): covers 14%–21% of HH food expenditure	**Intermediate** – limited 7% average increase in HH food consumption among poorest 40% (*13*)
Zambia Kalomo Pilot Social Cash Transfer Scheme 2004–present	**Population (2005)** 11 738 000 **GNI/capita (2009 US$)** 970 **Avg HH size** 4.9 (2007) **% below poverty line** 64.3 (2004)	CT	– critically poor (chronic hunger, undernourished, begging, danger of starvation) – incapacitated: HH without able-bodied person of working age (very old, young or sick); high dependency ratio	– HH without children: ZMK 30 000 (US$ 6) per month – HH with children: ZMK 40 000 (US$ 8) = 50 kg bag of maize	– 10% of HH in pilot region: ~1 000 HH = 3 856 persons – Public Welfare Assistance Scheme structures responsible for targeting and approval process	**Intermediate** – decrease in HH members living on 1 meal daily by 6.0 ppts (19.3% to 13.3%) after 1 year – increase in diet diversity (vegetables, fruits, fish, meat) after 1 year – decrease in illness by 7.8 ppts (42.8% to 35%) after 1 year (*14*) **Nutritional** – monitoring data based on growth monitoring cards: 8 ppts decrease in underweight among children 0–5 years of age (41% to 33%) (*15*) – not replicated in final evaluation (*14*)

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Malnutrition in all its forms is closely linked, either directly or indirectly, to major causes of death and disability worldwide. The causes of malnutrition are directly related to inadequate dietary intake as well as disease, but indirectly to many factors, among others household food security, maternal and child care, health services and the environment. While most nutrition interventions are delivered through the health sector, non-health interventions can also be critical. Actions should target the different causes to reach sustainable change, which requires a multisectoral approach.

This document includes WHO guidance on nutrition interventions targeting the first 1000 days of life. Focusing on this package of essential nutrition actions, policy-makers could reduce infant and child mortality, improve physical and mental growth and development, and improve productivity. Part I presents the interventions currently recommended by WHO, summarizes the rationale and the evidence, and describes the actions required to implement them. The document uses a life-course approach, from pre-conception throughout the first two years of life. Part II provides an analysis of community-based interventions aimed at improving nutrition and indicates how effective interventions can be delivered in an integrated fashion.

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