ESSENTIAL NUTRITION ACTIONS

mainstreaming nutrition through the life-course

World Health Organization

ESSENTIAL NUTRITION ACTIONS

mainstreaming nutrition through the life-course

World Health Organization

Essential nutrition actions: mainstreaming nutrition through the life-course

ISBN 978-92-4-151585-6

Cover design and layout: Alberto March (Barcelona, Spain)

Printed by the WHO Document Production Services, Geneva, Switzerland

Photo credit (front cover): RH Ingram_JS; Mónica Suárez Galindo; Christopher Futche; Vijay Kutty

Photo credit (back cover): WorldVision.org; Samer Daboul; Axel Guevara; GettyImages

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

This compilation of guidelines was coordinated by the World Health Organization (WHO) Department of Nutrition for Health and Development. Dr Pura Rayco-Solon and Dr Juan Pablo Peña-Rosas oversaw the preparation of this document, with the leadership of Dr Francesco Branca. WHO acknowledges the technical contribution from Camila M Chaparro, who produced the initial draft.

The following individuals contributed to the technical work of this document: Filiberto Beltran Velazquez, Evelyn Boy, Mercedes de Onis, Katrin Engelhardt, Kaia Engesveen, Monica Flores Urrutia, Maria Nieves Garcia Casal, Laurence Grummer-Strawn, Lina Mahy, Jason Montez, Chizuru Nishida, Lisa Rogers, Zita Weise Prinzo and Rain Yamamoto. We thank Ms Rosa Seminario Gandolfo for the administrative support for the completion of this publication.

Financial support

WHO thanks the Bill & Melinda Gates Foundation, Nutrition International and the International Micronutrient Malnutrition Prevention and Control Programme of the United States Centers for Disease Control and Prevention for providing financial support for this work. Donors do not fund specific guidelines and do not participate in any decision related to the guideline development process.

PUBLICATION HISTORY

This publication is an update of the 2013 WHO publication entitled *Essential nutrition actions: improving maternal, newborn, infant and young child health and nutrition*.[1] It provides a compact list of nutrition-related interventions recommended by WHO. WHO recommendations aim to advise intended end-users (policy-makers, programme implementers and other stakeholders) what they can or should do in specific situations to achieve the best outcomes possible, individually or collectively.

A WHO guideline is any document developed by WHO containing recommendations for clinical practice or public health policy. WHO guidelines are developed in line with the *WHO handbook for guideline development* (2nd edition).[2]

[1] Essential nutrition actions: improving maternal, newborn, infant and young child health and nutrition. Geneva: World Health Organization; 2013 (http://apps.who.int/iris/bitstream/10665/84409/1/9789241505550_eng.pdf?ua=1).

[2] WHO handbook for guideline development, 2nd ed. Geneva: World Health Organization; 2014 (http://apps.who.int/medicinedocs/documents/s22083en/s22083en.pdf).

ABBREVIATIONS

ART	antiretroviral therapy
BMI	body mass index
DALY	disability-adjusted life-year
eLENA	e-Library of Evidence for Nutrition Actions
EVIPnet	Evidence-Informed Policy Network
IQ	intelligence quotient
IMCI	Integrated Management of Childhood Illness
MNP	multiple micronutrient powder
PCR	polymerase chain reaction
PPE	personal protective equipment
RUIF	ready-to-use infant formula
RUTF	ready-to-use therapeutic food
SDG	Sustainable Development Goal
SMART	specific, measurable, achievable, relevant, time-bound
TB	tuberculosis
UNICEF	United Nations Children's Fund
USA	United States of America
USAID	United States Agency for International Development
VMNIS	Vitamin and Mineral Nutrition Information System
WHO	World Health Organization

WHO continues to deliver support to countries through its norms and standards work and advocacy for multisectoral actions that are critical to the effective implementation of nutrition interventions at country level

FOREWORD

Dr Naoko Yamamoto, Assistant Director-General, Healthier Populations

Achieving one billion more people enjoying better health and well-being entails addressing the determinants and risks to health through multisectoral actions, not limited to the health system alone, and focusing on health, functioning and well-being, not mortality alone. Nutrition is a key determinant of healthier populations, and malnutrition in all its forms is a key risk factor, with serious impact on morbidity and human capital across the life-course.

The Sustainable Development Goals (SDGs)[1] and the United Nations Decade of Action on Nutrition (2016–2025),[2] which were proclaimed by the United Nations General Assembly as follow-up to the Second International Conference on Nutrition (ICN2),[3] are bringing a renewed momentum for nutrition, with a clear expectation for a leadership role reaffirmed for the World Health Organization (WHO), in providing evidence-informed guidance on nutrition and healthy diets. ICN2 called for action to address all forms of malnutrition, including undernutrition, overweight/obesity and diet-related noncommunicable diseases, goals that were then taken up by the SDGs in 2015.

Through its mandate, WHO continues to deliver support to countries through its norms and standards work and advocacy for multisectoral actions that are critical to the effective implementation of nutrition interventions at country level. WHO leads the strengthening of and innovation in the evidence base on the efficacy, effectiveness, safety, values and preferences, and other considerations around interventions addressing all forms of malnutrition in stable and emergency settings, including healthy diets and other relevant determinants for the management of noncommunicable diseases and improvement of human capital across the life-course. WHO leads and coordinates the review, update or expansion of WHO guidance on efficacious, effective, ethical essential nutrition actions in public health, and clinical interventions for health and well-being of all at all ages, along with best implementation practices, using an equity lens in line with the efforts for universal health coverage.

Addressing known, modifiable risk factors can promote health and prevent premature deaths. The most effective interventions for tackling risk factors require engagement of actors outside the health sector. Reducing the prevalence of, and exposure to, risks, such as unhealthy diets, requires a multisectoral approach to influencing public policies in trade, social development, transport, finance, education, agriculture and other sectors.

I am thus very pleased with the publication of *Essential nutrition actions: mainstreaming nutrition through the life-course* as a compendium of the nutrition interventions recommended by WHO. It aims to support countries to develop national multisectoral action plans to reduce risk factors, through strategic leadership and a coordination role among other sectors; to develop integrated policies on promoting healthy growth, managing overweight and obesity in children and adolescents and promoting healthy diets; while addressing the social determinants of health and health equity.

---

1 United Nations. Sustainable Development Goals: 17 goals to transform our world (http://www.un.org/sustainabledevelopment/).

2 Resolution adopted by the General Assembly on 1 April 2016: United Nations Decade of Action on Nutrition (2016–2025). In: United Nations General Assembly 70th session, 2015–2016. New York, New York: United Nations; 2016 (A/RES/70/259; http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/70/259).

3 Second International Conference on Nutrition. Rome, 19–21 November 2014. Conference outcome document: Framework for Action. Rome: Food and Agriculture Organization of the United Nations; 2014 (ICN2 2014/3. Corr.1; http://www.fao.org/3/a-mm215e.pdf).

INTRODUCTION

INTRODUCTION

Scope and purpose

Universal health coverage aims to ensure that all individuals and communities receive the health services they need, without suffering financial hardship. Health services include all services dealing with the promotion, maintenance and restoration of health. They include both personal and population-based health services *(1)*. It includes the full spectrum of essential, quality health services, from health promotion to prevention, treatment, rehabilitation and palliative care. It is a fundamentally political goal rooted in the human right to health. Universal health coverage is at the forefront of international and national efforts as part of the United Nations 2030 Agenda for Sustainable Development *(2)*, and achieving universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all is a target of the Sustainable Development Goal 3 (SDG3): "Ensure healthy lives and promote well-being for all at all ages" *(3)*. Nutrition, as a maker and marker of development, is a foundation to the Sustainable Development Goals, and especially SDG2 and SDG3 *(3)*. Healthy diets and effectively implemented nutrition-specific and nutrition-sensitive interventions will help countries to achieve these goals.

Moving towards universal health coverage requires strengthening of health systems in all countries

Primary health care is the foundation of universal health coverage; it is a whole-of-society approach to health and well-being, centred on the needs and preferences of individuals, families and communities. It addresses the broader determinants of health and focuses on the comprehensive and interrelated aspects of physical, mental and social health and well-being. Nutrition is a foundation for health and well-being for all, leaving no one behind, and a critical component of primary health care, through its promotion and prevention, addressing its determinants, and a people-centred approach. Mainstreaming nutrition as part of integrated people-centred health services[1] will put the comprehensive needs of people and communities, not only diseases, at the centre of health systems, and will empower people to have a more active role in their own health.

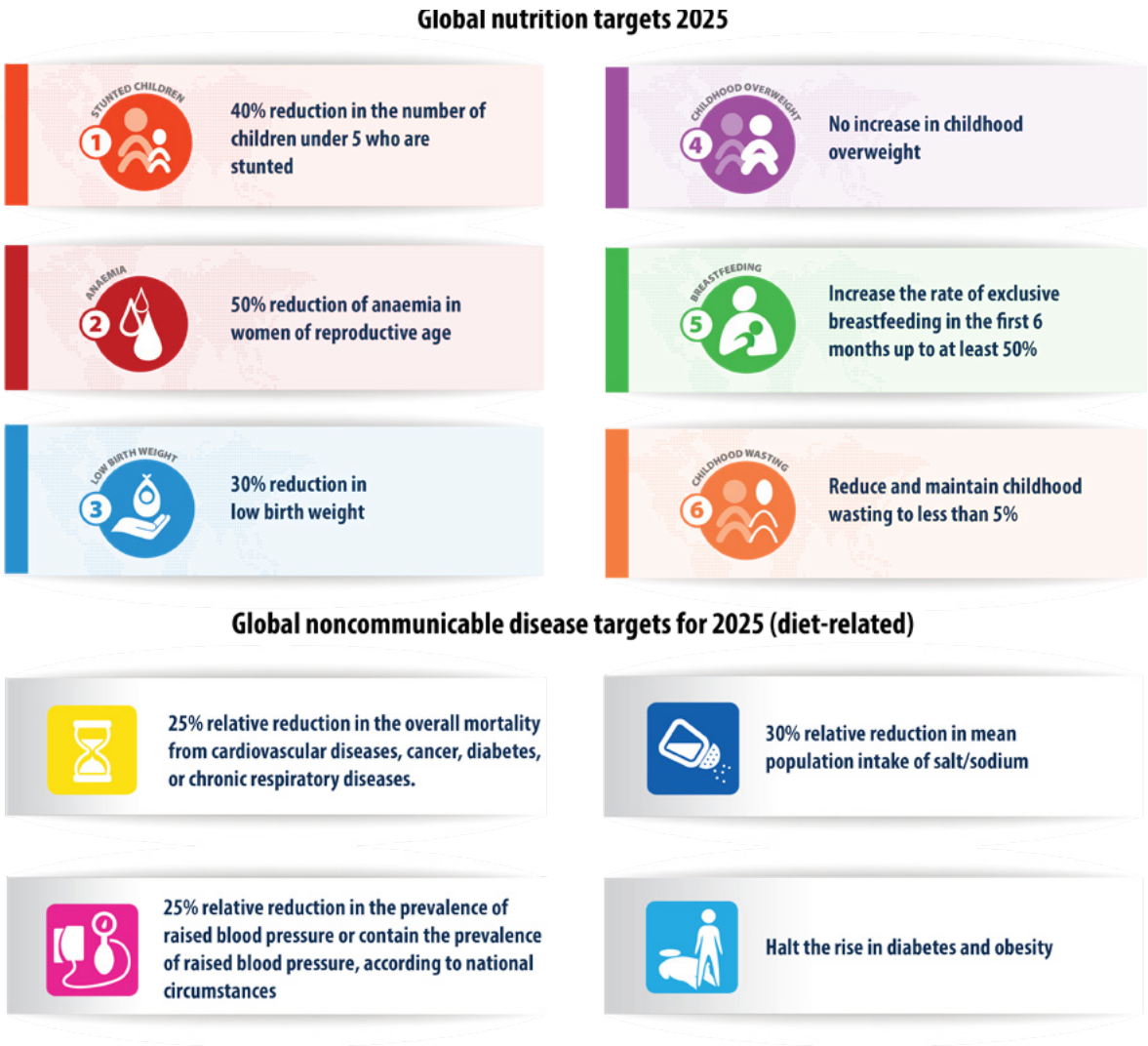
The World Health Organization (WHO) has developed a cohesive definition for primary health care based on three components: (i) meeting people's health needs through comprehensive promotive, preventive, curative, rehabilitative and palliative care through the life-course, strategically prioritizing key health-care services aimed at individuals and families through primary care, and services aimed at the population through public health functions, as the central elements of integrated health services; (ii) systematically addressing the broader determinants of health (including social, economic and environmental factors, as well as people's characteristics and behaviours), through , commercial evidence-informed public policies and actions across all sectors; and (iii) empowering individuals, families and communities to optimize their health, as advocates for policies that promote and protect health and well-being, as co-developers of health and social services, and as self-carers and caregivers to others. The *Declaration of Astana* comes amid a growing global movement for greater investment in primary health care to achieve universal health coverage *(4)*. The role of nutrition in health and development is embodied in this renewed effort. Moving towards universal health coverage requires strengthening of health systems

[1] Integrated health services refers to health services that are managed and delivered so that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease-management, rehabilitation and palliative care services, coordinated across the different levels and sites of care within and beyond the health sector, and according to their needs through the life-course *(1)*.

in all countries. To support countries' decision-makers, and stakeholders' commitment to mainstreaming essential nutrition actions in primary health-care settings for universal health coverage, a cross-functional multipartner working group is being established under the leadership of WHO.

Global momentum to address malnutrition has increased significantly over the past several years. The WHO global nutrition targets 2025, established and endorsed by the World Health Assembly in 2012 *(5)*, aim to combat all forms of malnutrition, including undernutrition, overweight and obesity, as well as micronutrient deficiencies (see Fig. 1). Reaching these targets will contribute to achievement of the United Nations Sustainable Development Goals, established in 2015, which build upon the Millennium Development Goals, and are a "universal call to action to end poverty, protect the planet, and ensure prosperity for all" by 2030 *(3)*. Even more recently, the United Nations General Assembly proclaimed 2016–2025 the United Nations Decade of Action on Nutrition, calling on governments to intensify action to reduce hunger and malnutrition *(6)*.

Fig. 1. WHO global nutrition targets 2025 and global, diet-related, noncommunicable disease targets for 2025



Source: Evidence-based nutrition interventions included in the WHO e-Library of Evidence for Nutrition Actions (eLENA) that may contribute to the achievement of the WHO global nutrition and diet-related NCD targets. Geneva: World Health Organization; 2016 (https://www.who.int/elena/titles/summary_eLENA_interventions_global_targets.pdf?ua=1) *(7)*.

At the same time, and to meet the call for greater investment in implementing and scaling up evidence-informed practices to improve nutrition outcomes, WHO has been working to strengthen the evidence base on effective nutrition actions to address malnutrition in all its forms. The WHO Guidelines Review Committee, established in 2007, and various WHO guideline development groups – which consist of global experts from a broad range of fields, specialties, backgrounds and experiences, including nutrition, public health, paediatrics, social sciences and programme implementation – are committed to the development and updating of numerous guidelines in nutrition, to be used by Member States to implement and mainstream nutrition actions in health and development programmes. WHO's e-Library of Evidence for Nutrition Actions (eLENA) *(8)* serves as an online library of evidence-informed guidelines for an ever-expanding list of nutrition interventions, and aims to be a single point of reference for the latest nutrition guidelines, recommendations and related information. The extent to which these actions are implemented by countries is monitored through the WHO Global database on the Implementation of Nutrition Action (GINA).

The current document aims to address a broader scope of key interventions to prevent malnutrition in all its forms, at all life stages and in multiple target groups

The present document has been developed by the WHO Department of Nutrition for Health and Development, as resource to support the Member States and other actors, to intensify action in nutrition, and provide updated and comprehensive evidence-informed guidance in nutrition. This updated "essential nutrition actions" document builds upon a previous WHO publication that presented actions considered critical for preventing undernutrition targeting the first 1000 days of life *(9)*. The current document aims to address a broader scope of key interventions to tackle malnutrition in all its forms, at all life stages and in multiple target groups.[1] Recent decades have seen an emergence in low- and middle-income countries of a "double-burden of malnutrition". This refers to conditions related to "overnutrition" among children and adults – overweight and obesity and diet-related noncommunicable diseases, including diabetes – coexisting with undernutrition in the same populations, households and individuals. While many of the original essential nutrition actions (e.g. exclusive breastfeeding, appropriate complementary feeding) will also help to address overweight/obesity and related conditions, the present document now includes preventive actions that explicitly address these conditions at the opposite end of the malnutrition spectrum. As in the past, this updated document also promotes the implementation of essential nutrition actions as part of comprehensive and coordinated action from multiple sectors. Many essential nutrition actions are direct nutrition actions (i.e. nutrition-specific interventions), such as micronutrient supplementation, or recommendations on infant feeding. Many others, address underlying causes of malnutrition and include those implemented by other sectors that have significant implications for nutritional status (e.g. water, sanitation and hygiene; infectious disease control; reproductive health). The document's primary purpose is to provide a comprehensive compilation of essential nutrition actions to address malnutrition in all its forms, in a concise and user-friendly format that aims to aid in decision-making processes for integration of nutrition interventions in national health policies, strategies, and plans based on country-specific needs and global priorities.

[1] "Essential nutrition actions approach" also refers to a framework delivery of an integrated package of interventions developed in 1997, with collaboration between WHO, the United Nations Children's Fund (UNICEF) and the United States Agency for International Development (USAID). It has been updated (2015) to include essential hygiene actions and a greater emphasis on social and behaviour change among other updates. See reference *(10)*.

The global burden of malnutrition

Malnutrition includes stunting, wasting, underweight, micronutrient deficiencies, overweight and obesity (among both children and adults), and associated chronic conditions such as diabetes, cardiovascular disease and some cancers (see Table 1). Malnutrition, in one form or another, is estimated to affect one in three people globally *(11)* and is linked to morbidity and mortality. The Global Burden of Disease Study 2013 identified "dietary risks" as constituting the largest risk factor responsible for the global burden of disease (11.3 million deaths and 241.4 million disability-adjusted life years [DALYs]), with child and maternal malnutrition (1.7 million deaths and 176.9 million DALYs), and high body mass index (BMI; 4.4 million deaths and 134.0 million DALYs) not far behind *(12)*. Approximately 45% of mortality in children aged under 5 years is linked to malnutrition *(13)*.

Table 1. Malnutrition in all its forms and associated diet-related noncommunicable diseases

Form of malnutrition	Definition
Child stunting[a]	Low height-for-age
Child wasting[b]	Low weight-for-height
Child overweight[c]	High weight-for-height
Micronutrient deficiency or insufficiency	Iron, folate, vitamin A, zinc, iodine
Adult obesity	Carrying excess body fat with a body mass index equal to or higher than 30 kg/m²
Noncommunicable diseases	Many conditions, including heart disease, stroke, cancer, diabetes and chronic lung disease

[a] Length or height-for-age 2 or more standard deviations below the median compared to the *WHO child growth standards*.
[b] Weight-for-length or height 2 or more standard deviations below the median compared to the *WHO child growth standards*.
[c] Weight-for-length or height 2 or more standard deviations above the median compared to the *WHO child growth standards*.

Globally, stunting has been declining; between 1990 and 2018, the prevalence of stunting in children aged under 5 years declined from 39.3% to 21.9%, representing a decrease in the number of children with stunting from 253.4 million to 149.0 million *(14)*. However, global estimates mask much slower progress in Africa (42.6% to 33.1%) and South-East Asia (49.6% to 31.9%) *(14)*. Wasting still affects 49.5 million children aged under 5 years (7.3%) worldwide, with more than half of these children residing in South-East Asia *(14)*.

During this same period, overweight has been increasing; the prevalence of children considered overweight rose from 5.0% to 5.9% between 1990 and 2018, an increase of over 9 million children (from 30.9 million in 1990 to 40.1 million in 2018) *(14)*.

In 2016, more than 1.9 billion adults aged 18 years and older were overweight. Of these over 650 million adults were obese. Also, 39% of adults aged 18 years and over (39% of men and 40% of women) were overweight. Overall, about 13% of the world's adult population (11% of men and 15% of women) were obese in 2016 *(15)*. The worldwide prevalence of obesity nearly tripled between 1975 and 2016. The "double burden of malnutrition", among both children and adults, creates unique challenges for resource-limited countries in terms of its potential negative impact, increasing health-care costs, reducing productivity and slowing economic growth, but also provides opportunities for countries to implement integrated actions in nutrition.

Micronutrient malnutrition remains a significant public health challenge – approximately one third of the world's population (32.9%) suffers from anaemia, as of 2010 *(16)*. The population groups most vulnerable to anaemia, as of 2016, include children under 5 years of age (41.7% with anaemia), particularly infants and children under 2 years

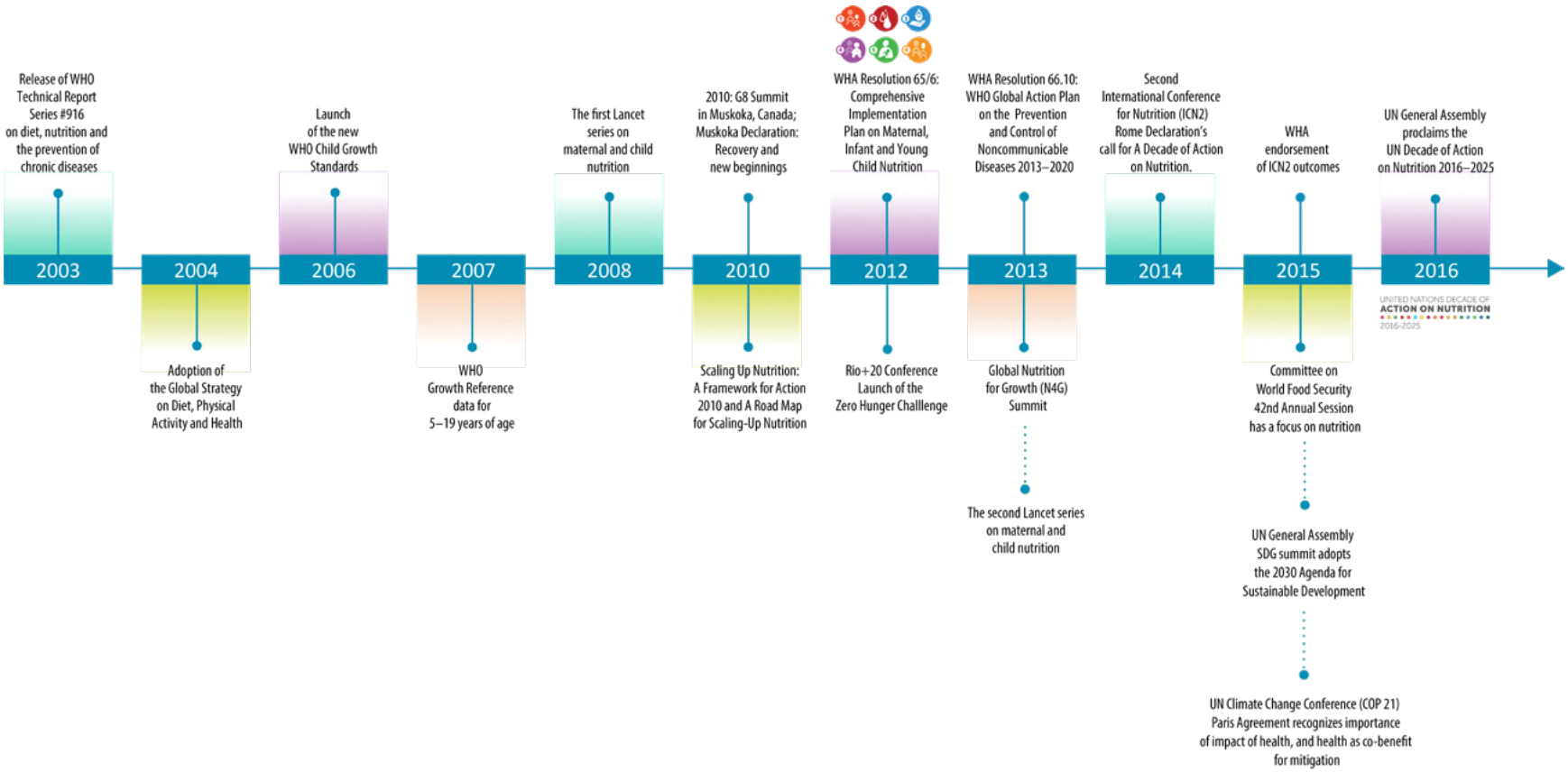
of age; non-pregnant women (15–49 years; 32.5% with anaemia); and pregnant women (40.1% with anaemia) *(17, 18)*. This equates to roughly 800 million women and children with anaemia globally. Iron deficiency, a primary cause of anaemia in many settings, is estimated to affect an even larger number of people – 2 billion *(19)* – and, independently of the negative effects caused by anaemia, is associated with delayed cognitive and behavioural development in children, as well as reduced productivity in adults and impaired cognitive functioning in women. Other prevalent micronutrient deficiencies include vitamin A and zinc. Vitamin A deficiency increases the risk of infectious morbidity and mortality from diarrhoea or measles, and can cause visual impairment in children and pregnant women, as well as anaemia. Zinc deficiency is also associated with increased risk of infectious morbidity and can impair growth. Still other nutrient deficiencies, notably of calcium and folic acid, place pregnant women at risk of pregnancy complications and poor birth outcomes.

Global targets for nutrition

In 2012, the 65th World Health Assembly endorsed the WHO global nutrition targets 2025, which provide concrete goals against which progress toward ending malnutrition in all its forms can be measured (see Fig. 1) *(5)*. These six targets have helped focus the global community on priority areas to improve the nutritional status of women, infants and children. Closely following the establishment of the global nutrition targets, an additional three diet-related global noncommunicable disease targets were endorsed by the World Health Assembly, as part of the WHO *Global action plan for the prevention and control of noncommunicable diseases 2013–2020 (20)* (see Fig. 1). Reaching these nine targets will contribute to achievement of the United Nations Sustainable Development Goals, particularly SDG2 and SDG3, which aim to end hunger, achieve food security, improve nutrition, address all forms of malnutrition for all age groups, and ensure health and well-being for all at every stage of life, and came into effect in 2016 (see Fig. 2) *(3)*. The aims of SDG2 and SDG3 directly address nutrition (see Fig. 2), but in total, 12 of the 17 SDGs have indicators that are highly relevant to nutrition *(11)*. The past decade has witnessed the establishment of several global commitments and shared global declarations that have brought action in nutrition to

Fig. 2. Sustainable Development Goals most relevant to nutrition, and associated targets

Fig. 3. Timeline of global commitments in nutrition 2003–2016



SDG: Sustainable Development Goal; UN: United Nations; WHA: World Health Assembly; WHO: World Health Organization.
Source: World Health Organization. Nutrition. Historical highlights of Decade of Action (https://www.who.int/nutrition/decade-of-action/historical_highlights/en/) *(21)*.

the forefront (see Fig. 2) *(21)*. More specifically, the United Nations Decade of Action on Nutrition 2016–2025 focuses on action to reduce hunger and malnutrition and has recommitted Member States of WHO to achieve the WHO global nutrition targets *(6)*.

Despite these global efforts and commitments, it has become apparent that progress to improve nutrition among women, infants and children has fallen behind the pace needed to meet established global targets, and renewed and increased commitment and action are needed. Recent assessments of progress towards the WHO global nutrition targets 2025 indicate that current rates of progress will not be sufficient to meet the established goals, though there is considerable variability in progress across regions and towards targets *(5, 11)*. Many countries may meet targets related to stunting, wasting and overweight among children aged under 5 years, and exclusive breastfeeding, but progress related to maternal anaemia, overweight, diabetes and obesity among adults is lagging behind *(11)*.

Life-course approach and overview of essential nutrition actions

Healthier populations are achieved through multisectoral actions that are not limited to health systems alone, though often using the stewardship, advocacy and regulatory functions of health ministries. Optimal nutrition for individual health and development bridges interventions by health systems to improve the health of populations. Interventions addressing health through the life-course (covering women, men, infants, children, adolescents and older persons) contribute to the delivery of integrated primary health care. A life-course approach is critical to operationalize the worldwide commitment to people-centred primary health care.

Nutritional insults during certain life stages can have both short-term and long-term implications, including intergenerational effects

Tackling malnutrition in all its forms requires that nutritional needs are addressed at key life stages through the entire life-course. Nutritional insults during certain life stages can have both short-term and long-term implications, including intergenerational effects. For example, the importance of adequate fetal nutrition during pregnancy and during the first 2 years of life has been well emphasized for prevention of undernutrition among children, but is also a key determinant of the later development of adult overweight and associated chronic conditions such as diabetes *(10)*. Attempting to address these chronic conditions by starting with adults would not recognize the significance of nutrition at many other prior life stages.

Thus, adopting a life-course approach to nutrition requires understanding of key nutritionally sensitive life stages and the linkages between them, addressing multiple forms of malnutrition during the life-course simultaneously (e.g. undernutrition during pregnancy and early children and later overweight). Addressing nutrition through the life-course also requires a more holistic view and integrated provision of health and nutrition services by health-care systems in all settings.

Table 2 provides an overview of the essential nutrition actions for healthier populations over the life-course, recognizing the linkages between different life stages, the potential for intergenerational effects, the involvement of other sectors in addition to the health sector, and the importance of addressing malnutrition in all its forms. Links to relevant documents for each of the actions in Table 2 are provided in Annex 1, as well as at the end of the text on each nutrition action in the main part of this document.

Ensuring access to nutrition-related products can help support these strategic priorities by reducing the risk and burden of health conditions associated with

deficiencies in nutritional intake. Nutrition-related products in the *WHO model list of essential medicines (22)* and the *WHO model list of essential medicines for children (23)* are listed in Annex 2.

A summary checklist of all the essential nutrition actions presented in this document follows this section, with the page numbers, to help with easy reference. The checklist is organized in a user-friendly way to help decision-makers in Member States easily identify appropriate interventions for particular target groups and specific nutrition concerns. Some interventions are applicable in all settings (e.g. healthy diets), and are highlighted using a ✓ symbol. Other interventions may only be applicable in certain settings or for certain subgroups (e.g. iron supplementation in settings where the prevalence of anaemia is ≥20%, and are presented with a ❑ symbol. Finally, interventions that are not recommended are indicated with a **X**. For each intervention, the relevance to specific settings and/or populations is indicated and this is followed by information on the WHO recommendation, a summary of key evidence, key actions for implementation, considerations and contribution to the global targets. The contribution of each of the essential nutrition actions to achievement of the WHO global nutrition targets 2025 and diet-related 2025 targets for noncommunicable diseases is presented in Annex 3.

Table 2. Overview of the essential nutrition actions for healthier populations over the life-course

			Health sector						
			Primary health care						
	Context (all settings vs targeted)	ESSENTIAL NUTRITION ACTIONS	Promotive	Preventive	Curative	Rehabilitative	Palliative	Specialist / referral care	Other sectors involved
I. MULTISECTORAL INTERVENTIONS FOR HEALTHIER POPULATIONS									
	All	A. Healthy diet	x	x	x	x	x		Agriculture, education, trade and industry
	All	B. Fortification of condiments and staple foods with vitamins and minerals	x	x	x	x	x		Education, trade and industry
II. NUTRITION THROUGH THE LIFE-COURSE									
1. Infants	All	A. Optimal timing of umbilical cord clamping		x					
	All	B. Protecting, promoting and supporting breastfeeding	x	x					Labour (maternity protection), water, sanitation and hygiene (WASH)
	Targeted	C. Care of low-birth-weight and very low-birth-weight infants			x				
	Targeted	D. Assessment and management of wasting			x	x	x	x	
	Targeted	E. Vitamin A supplementation for infants under 6 months of age		x	x				
2. Children	All	A. Appropriate complementary feeding	x	x					Education, trade and industry
	All	B. Growth monitoring and assessment	x	x					Education
	Targeted	C. Assessment and management of wasting			x	x	x	x	Education, trade and industry

	Context (all settings vs targeted)	ESSENTIAL NUTRITION ACTIONS	Health sector						Other sectors involved
			Primary health care					Specialist / referral care	
			Promotive	Preventive	Curative	Rehabilitative	Palliative		
II. NUTRITION THROUGH THE LIFE-COURSE									
2. Children	Targeted	D. Iron-containing micronutrient supplementation		x	x				Education, trade and industry
	Targeted	E. Vitamin A supplementation		x	x				Education, trade and industry
	Targeted	F. Iodine supplementation		x	x				Education, trade and industry
	Targeted	G. Zinc supplementation in the management of diarrhoea			x				Education, trade and industry
3. Adolescents	Targeted	A. Iron-containing micronutrient supplementation		x	x				Education, trade and industry
4. Adults	All	A. Nutritional care of women during pregnancy and postpartum	x	x	x				Education, trade and industry Labour (maternity protection and parental leave)
	Targeted	B. Iron-containing micronutrient supplementation		x	x				Education, trade and industry
	Targeted	C. Iodine supplementation		x	x				Education, trade and industry
5. Older persons	Targeted	A. Nutritional care for at-risk older persons	x	x					Education, trade and industry
6. Specific conditions	Targeted	A. Nutritional care for persons living with HIV				x		x	Education
	Targeted	B. Nutritional care for persons with tuberculosis				x	x	x	Education
	Targeted	C. Preventive chemotherapy for the control of soil-transmitted helminth infection (deworming)		x	x				Education
	Targeted	D. Nutritional care for persons with Ebola virus disease		x		x	x	x	Education
	Targeted	E. Nutritional care for persons with viral haemorrhagic disease (including Ebola, Marburg, Lassa and Crimean-Congo haemorrhagic fever)		x		x		x	Education
	Targeted	F. Nutritional care for infants in the context of Zika virus transmission		x			x	x	Education
	Targeted	G. Feeding of infants of mothers who are carriers of chronic hepatitis B		x		x		x	Education
	Targeted	H. Feeding of infants in settings with an ongoing pandemic of influenza A (H1N1) virus transmission		x					Education
	Targeted	I. Vitamin A supplementation for infants and children with measles			x				Education
III. NUTRITION IN EMERGENCIES[a]									
	All	A. Infant and young child feeding in emergencies	x	x					All sectors
	All	B. Preventing and controlling micronutrient deficiencies in emergencies	x	x	x				All sectors

[a] The interventions presented in the section are not exhaustive and other nutrition actions through the life-course can be adapted as needed, to emergency settings.

The United Nations Decade of Action on Nutrition 2016–2025 focuses on action to reduce hunger and malnutrition and has recommitted Member States of WHO to achieve the WHO global nutrition targets

Axel Guevara


© RH Ingram_JS

CHECKLIST OF ESSENTIAL NUTRITION ACTIONS

CHECKLIST OF ESSENTIAL NUTRITION ACTIONS

Key to symbols used

√ : interventions that are applicable in all settings

❑ : interventions that may only be applicable in certain settings or for certain subgroups

X : interventions that are not recommended

Actions	Population groups	Applicable contexts or settings	Interventions	Check	Pages
I. MULTISECTORAL INTERVENTIONS FOR HEALTHIER POPULATIONS					
A. Healthy diet					
	All population groups	All countries, all settings	Create a healthy food environment that enables people to adopt and maintain healthy dietary practices	✓	24
B. Fortification of condiments and staple foods with micronutrients					
	All population groups	All countries, all settings	Universal salt iodization	✓	27
	All population groups	Settings where the food vehicle is a staple food	Fortification of maize flour and corn meal with vitamins and minerals	❑	29
	All population groups	Settings where rice is a staple food	Fortification of rice with vitamins and minerals	❑	30
	All population groups	Settings where wheat flour is a staple food	Fortification of wheat flour with vitamins and minerals	❑	31
II. NUTRITION THROUGH THE LIFE-COURSE					
1. Infants					
A. Optimal timing of umbilical cord clamping					
	All births	All countries, all settings	Optimal timing of umbilical cord clamping	✓	33
B. Protecting, promoting and supporting breastfeeding					
	All infants	All countries, all settings	Support early initiation, establishment and maintenance of breastfeeding and immediate skin-to-skin contact	✓	34
	All infants	All countries, all settings	Optimize newborn feeding practices and address additional care needs of infants	✓	36
	All infants	All facilities providing maternity and newborn services	Create an enabling environment for breastfeeding in health facilities	✓	38
	All infants	All countries, all settings	Enable exclusive breastfeeding for the first 6 months of life	✓	39
	All infants	All countries, all settings	Enable continued breastfeeding	✓	40
	All infants	All countries, all settings	Counsel women to improve breastfeeding practices	✓	42

Actions	Population groups	Applicable contexts or settings	Interventions	Check	Pages
C. Care of low-birth-weight and very low-birth-weight infants					
	Infants born with birth weight between 1000 g and 2500 g	All countries, all settings	Optimal feeding of low-birth-weight and very low-birth-weight infants	❑	45
	Infants born with birth weight between 1000 g and 2500 g	All countries, all settings	Enable kangaroo mother care for low-birth-weight infants	❑	46
D. Assessment and management of wasting					
	Infants under 6 months of age	All countries, all settings	Identify infants under 6 months of age with severe acute malnutrition (undernutrition)	✓	48
	Infants under 6 months of age with severe acute malnutrition	All countries, all settings	Inpatient management of infants under 6 months of age with severe acute malnutrition (undernutrition)	❑	49
	Infants under 6 months of age with severe acute malnutrition	All countries, all settings	Outpatient management of infants under 6 months of age with severe acute malnutrition (undernutrition)	❑	51
E. Vitamin A supplementation for infants under 6 months of age					
	Infants under 6 months of age	All countries, all settings	Neonatal vitamin A supplementation (i.e. supplementation within the first 28 days of life) is not recommended	X	53
	Infants under 6 months of age	All countries, all settings	Vitamin A supplementation for infants aged 1–5 months is not recommended	X	53
2. Children					
A. Appropriate complementary feeding					
	Infants and young children aged 6–23 months	All countries, all settings	Enable feeding of appropriate complementary foods	✓	54
B. Growth monitoring and assessment					
	Children under 5 years of age	All countries, all settings	Weight and height or length assessments for children under 5 years of age	✓	56
	Children under 5 years of age	All countries, all settings	Nutrition counselling for children under 5 years of age	✓	57
	Children under 5 years of age who are overweight	All countries, all settings	Develop a management plan for overweight children under 5 years of age presenting to primary health-care facilities	❑	57
C. Assessment and management of wasting					
	Infants and children aged 6–59 months	All countries, all settings	Identify infants and children aged 6–59 months with severe acute malnutrition (undernutrition)	✓	58
	Infants and children aged 6–59 months with severe acute malnutrition (undernutrition)	All countries, all settings	Inpatient management of infants and children aged 6–59 months with severe acute malnutrition (undernutrition)	❑	59
	Infants and children aged 6–59 months with severe acute malnutrition (undernutrition)	All countries, all settings	Outpatient management of infants and children aged 6–59 months with severe acute malnutrition (undernutrition)	❑	61

Actions	Population groups	Applicable contexts or settings	Interventions	Check	Pages
	Infants and children aged 6–59 months with moderate acute malnutrition (undernutrition)	All countries, all settings	Management of infants and children aged 6–59 months with moderate acute malnutrition (undernutrition)	❑	63
	Infants and children aged 6–59 months with moderate acute malnutrition (undernutrition)	All countries, all settings, primary health-care facilities	Provision of supplementary foods to infants and children with moderate wasting presenting to primary health-care facilities	❑	65
	Infants and children aged 6–59 months with moderate acute malnutrition (undernutrition)	All countries, all settings	Provision of supplementary foods for treating stunting among infants and children who present to primary health-care facilities is not recommended	X	65
D. Iron-containing micronutrient supplementation					
	Infants and young children aged 6–23 months	Settings in which the prevalence of anaemia in children under 2 years of age (or under 5 years of age, if the former is unavailable) is 20% or more	Provision of iron-containing micronutrient powders for point-of-use fortification of foods for infants and young children aged 6–23 months	❑	66
	Children aged 2–12 years	Settings in which the prevalence of anaemia in children aged 2–12 years is 20% or more	Provision of iron-containing micronutrient powders for point-of-use fortification of foods for children aged 2–12 years	❑	68
	Infants and young children aged 6–23 months	Settings in which the prevalence of anaemia in infants and young children under 2 years of age is 40% or more	Daily iron supplementation for infants and young children aged 6–23 months	❑	70
	Children aged 2–12 years	Settings where the prevalence of anaemia in children over 2 years of age is 40% or more	Daily iron supplementation for children aged 2–12 years	❑	71
	Children aged 2–12 years	Settings where the prevalence of anaemia in children over 2 years of age is 20% or more	Intermittent iron supplementation for children aged 2–12 years	❑	73
E. Vitamin A supplementation					
	Infants and children aged 6–59 months	Settings where the prevalence of night-blindness is 1% or more in children aged 24–59 months, or the prevalence of vitamin A deficiency is 20% or higher in infants and children aged 6–59 months	High-dose vitamin A supplementation for infants and children aged 6–59 months	❑	75
F. Iodine supplementation					
	Infants and young children aged 6–23 months	Settings where 20% or fewer households have access to iodized salt and complementary food fortified with iodine is not available	Iodine supplementation (or iodine-fortified complementary food) for infants and young children aged 6–23 months	❑	77
G. Zinc supplementation in the management of diarrhoea					
	Infants and children with diarrhoea	All countries, all settings	Zinc supplementation with increased fluids and continued feeding for management of diarrhoea in children	❑	79

Actions	Population groups	Applicable contexts or settings	Interventions	Check	Pages
3. Adolescents					
A. Iron-containing micronutrient supplementation					
	Menstruating non-pregnant adolescent girls	Settings where the prevalence of anaemia in non-pregnant women is 20% or higher	Intermittent iron and folic acid supplementation for menstruating non-pregnant adolescent girls	❑	80
	Menstruating non-pregnant adolescent girls	Settings where the prevalence of anaemia in non-pregnant women is 40% or higher	Daily iron supplementation for menstruating non-pregnant adolescent girls	❑	81
4. Adults					
A. Nutritional care of women during pregnancy and postpartum					
	Pregnant women	Settings where 20% or more of women are underweight (low body mass index)	Nutritional counselling on healthy diet to reduce the risk of low birth weight	❑	84
	Pregnant women	Settings where 20% or more of women are underweight (low body mass index)	Energy and protein dietary supplements for pregnant women in undernourished populations	❑	85
	Pregnant women	Settings where the population is undernourished	High-protein supplementation is not recommended for pregnant women in undernourished populations	X	86
	Pregnant women	All countries, all settings, routine antenatal care	Daily iron and folic acid supplementation for pregnant women	✓	86
	Pregnant women	Settings where the prevalence of anaemia in pregnant women is less than 20% or daily iron is not acceptable due to side-effects	Intermittent iron and folic acid supplementation for pregnant women	❑	88
	Pregnant women	Settings where 5% or more of women have a history of night-blindness in pregnancies in the past 3–5 years, or if 20% or more of pregnant women have vitamin A deficiency	Vitamin A supplementation for pregnant women	❑	89
	Pregnant women	Settings where dietary calcium intake is low	Calcium supplementation for pregnant women to reduce the risk of pre-eclampsia	❑	91
	Pregnant women	All countries, all settings, routine antenatal care	Vitamin B_6 (pyridoxine) supplementation is not recommended	X	92
	Pregnant women	All countries, all settings, routine antenatal care	Vitamin C and E supplementation is not recommended	X	92
	Pregnant women	All countries, all settings, routine antenatal care	Vitamin D supplementation is not recommended	X	93
	Pregnant women	All countries, all settings, routine antenatal care	Routine use of multiple micronutrient powders during pregnancy is not recommended as an alternative to standard iron and folic acid supplementation	X	93
	Pregnant women	Research settings only	Zinc supplementation is only recommended for pregnant women in the context of rigorous research	❑	93
	Pregnant women	All countries, all settings, routine antenatal care	Multiple micronutrient supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes	X	93

Actions	Population groups	Applicable contexts or settings	Interventions	Check	Pages
	Pregnant women	Settings with a high prevalence of nutritional deficiencies	Multiple micronutrient supplements that contain iron and folic acid may be considered for maternal health	❑	93
	Postpartum women	All countries, all settings, routine care	Vitamin A supplementation for postpartum women is not recommended for the prevention of maternal and infant morbidity and mortality	X	94
	Postpartum women	Settings with a 20% or higher population prevalence of gestational anaemia	Oral iron supplementation, either alone or in combination with folic acid supplementation	❑	94
B. Iron-containing micronutrient supplementation					
	Non-pregnant women	Settings where the prevalence of anaemia in non-pregnant women is 20% or higher	Intermittent iron and folic acid supplementation for non-pregnant women (15–49 years)	❑	96
	Non-pregnant women	Settings where the prevalence of anaemia in non-pregnant women is 40% or higher	Daily iron supplementation for non-pregnant women (15–49 years)	❑	98
C. Iodine supplementation					
	Non -pregnant and pregnant women	Settings where 20% or fewer households have access to iodized salt and pregnant women are difficult to reach	Iodine supplementation for non-pregnant women (15–49 years) and pregnant women	❑	100
5. Older persons					
A. Nutritional care for at-risk older persons					
	Older adults with undernutrition (BMI <18.5 kg/m²)	All countries, all settings	Oral supplemental nutrition with dietary advice for older people affected by undernutrition	❑	103
6. Specific conditions					
A. Nutritional care for persons living with HIV					
	Infants and young children	All countries, settings in which the prevalence of HIV is high and diarrhoea, pneumonia and undernutrition are common causes of infant and child mortality	Ensure optimal infant and young child feeding in the context of HIV	❑	105
	Infants and children aged 6 months to 14 years living with HIV	All countries and contexts, settings with HIV transmission	Nutritional care for infants and children aged 6 months to 14 years living with HIV	❑	107
	Pregnant women living with HIV	All countries and contexts, settings with HIV transmission	Vitamin A supplementation for pregnant women living with HIV is not recommended for reducing the risk of mother-to-child transmission of HIV	X	108

Actions	Population groups	Applicable contexts or settings	Interventions	Check	Pages
B. Nutritional care for persons with tuberculosis					
	All population groups with active tuberculosis	All countries and contexts, settings with tuberculosis transmission	Nutritional assessment and counselling for persons with active tuberculosis	❑	109
	Pregnant women with active tuberculosis	All countries and contexts, settings with tuberculosis transmission	Nutritional assessment, counselling and management for pregnant women with active tuberculosis	❑	110
	All population groups with active tuberculosis and moderate undernutrition	All countries and contexts, settings with tuberculosis transmission	Nutritional assessment, counselling, and management for persons with active tuberculosis and moderate undernutrition	❑	111
	All population groups with active tuberculosis and severe undernutrition	All countries and contexts, settings with tuberculosis transmission	Nutritional assessment, counselling and management for persons with active tuberculosis and severe undernutrition	❑	113
	Lactating mothers who are infected with tuberculosis and their infants	All countries and contexts, settings with tuberculosis transmission	Ensure optimal infant feeding of infants of mothers infected with tuberculosis	❑	116
C. Preventive chemotherapy for the control of soil-transmitted helminth infection (deworming)					
	Children aged 12 months and older	Settings where the baseline prevalence of any soil-transmitted infection is 20% or more among children aged 12 months and older	Preventive deworming for children aged 12 months and older	❑	117
	Non-pregnant women	Settings where the baseline prevalence of any soil-transmitted infection is 20% or more	Preventive deworming for non-pregnant women (15–49 years)	❑	119
	Pregnant women	Settings where the prevalence of infection with soil-transmitted helminths (hookworm and/or *T. trichiura*) among pregnant women is 20% or more and where anaemia is a severe public health problem (40% or higher among pregnant women)	Preventive deworming for pregnant women after the first trimester	❑	120
D. Nutritional care for persons with Ebola virus disease					
	Infants of mothers with Ebola virus disease	Settings with transmission of Ebola virus disease	Optimal feeding of infants of mothers with Ebola virus disease	❑	122
	Patients with Ebola virus disease	Settings with transmission of Ebola virus disease	Feeding protocols for adults and children older than 6 months with Ebola virus disease	❑	124
E. Nutritional care for persons with viral haemorrhagic disease (including Ebola, Marburg, Lassa and Crimean-Congo haemorrhagic fever)					
	Infants of mothers with viral haemorrhagic disease	Settings with transmission of viral haemorrhagic disease	Optimal feeding of infants of mothers with viral haemorrhagic diseases (including Ebola, Marburg, Lassa and Crimean-Congo haemorrhagic fever)	❑	127
	Patients with viral haemorrhagic disease	Settings with transmission of viral haemorrhagic disease	Feeding protocols for adults and children older than 6 months with viral haemorrhagic disesase (including Ebola, Marburg, Lassa and Crimean-Congo haemorrhagic fever)	❑	129

Actions	Population groups	Applicable contexts or settings	Interventions	Check	Pages
F. Nutritional care for infants in the context of Zika virus transmission					
	Infants born to mothers with suspected, probable or confirmed Zika virus infection, or who reside in or have travelled to areas with ongoing Zika virus transmission	Settings with Zika virus transmission	Optimal infant feeding in areas of Zika virus transmission	❑	132
G. Feeding of infants of mothers who are carriers of chronic hepatitis B					
	Infants of mothers who are carriers of chronic hepatitis B	All countries and contexts, settings with hepatitis B transmission	Optimal feeding of infants of mothers who are carriers of chronic hepatitis B	❑	134
H. Feeding of infants in settings with an ongoing pandemic of influenza A (H1N1) virus transmission					
	All infants	Settings with an ongoing pandemic of influenza A (H1N1) virus transmission	Optimal infant feeding in areas of pandemic influenza A (H1N1) virus transmission	❑	136
I. Vitamin A supplementation for infants and children with measles					
	Infants and children with measles	All countries, all settings	Vitamin A supplementation for infants and children with measles	❑	138
III. NUTRITION IN EMERGENCIES[a]					
A. Infant and young child feeding in emergencies					
	Infants and young children aged 6–23 months	Emergency settings	Optimal infant and young child feeding in emergencies	❑	140
	Infants and children aged 6–59 months	Emergency settings	Appropriate complementary foods and multiple micronutrient supplementation for infants and children affected by an emergency	❑	142
B. Preventing and controlling micronutrient deficiencies in emergencies					
	Pregnant and lactating women	Emergency settings	Nutritional support and micronutrient supplementation for pregnant and lactating women affected by an emergency	❑	145

[a] The interventions presented in the section are not exhaustive and other nutrition actions through the life-course can be adapted as needed, to emergency settings.

Addressing nutrition through the life-course also requires a more holistic view and integrated provision of health and nutrition services by health-care systems in all settings

© UNDP Peru / Mónica Suárez Galindo

ESSENTIAL NUTRITION ACTIONS

I. Multisectoral interventions for healthier populations

A. Healthy diet

✓ Create a healthy food environment that enables people to adopt and maintain healthy dietary practices

Applicable contexts/population groups: All countries, all settings; all population groups

WHO recommendation

Reduce the intake of free sugars through the life-course. In both adults and children, WHO recommends reducing the intake of free sugars to less than 10% of total energy intake. WHO suggests a further reduction of the intake of free sugars to below 5% of total energy intake.

Increase potassium intake from food to reduce blood pressure and the risk of cardiovascular disease, stroke and coronary heart disease in adults. WHO recommends a potassium intake of at least 90 mmol/day (3510 mg/day) for adults. WHO suggests an increase in potassium intake from food to control blood pressure in children. The recommended potassium intake of at least 90 mmol/day should be adjusted downward for children, based on the energy requirements of children relative to those of adults.

Reduce sodium intake to reduce blood pressure and the risk of cardiovascular disease, stroke and coronary heart disease in adults. WHO recommends a reduction to below 2 g/day sodium (5 g/day salt) in adults. WHO recommends a reduction in sodium intake to control blood pressure in children. The recommended maximum level of intake of 2 g/day sodium in adults should be adjusted downward for children, based on the energy requirements of children relative to those of adults.

Modify dietary fat intake:

- total fat intake should be less than 30% of total energy intake
- saturated fatty acid intake should be less than 10% of total energy intake[a]
- *trans*-fatty acid intake should be less than 1% of total energy intake[a]

Consume at least 400 g, or five portions, of fruit and vegetables per day.

[a] Saturated fatty acids and *trans*-fatty acids should be replaced with unsaturated fatty acids, particularly polyunsaturated fatty acids.

Summary of key evidence

- In both adults and children, the intake of free sugars should be reduced to less than 10% of total energy intake. A reduction to less than 5% of total energy intake would provide additional health benefits. Consuming free sugars increases the risk of dental caries (tooth decay). Excess calories from foods and drinks that are high in free sugars also contribute to unhealthy weight gain, which can lead to overweight and obesity. Recent evidence also shows that free sugars influence blood pressure and serum lipids, and suggests that a reduction in intake of free sugars reduces risk factors for cardiovascular diseases.

- Most people consume too much sodium through salt (corresponding to consuming an average of 9–12 g of salt per day) and not enough potassium (less than 3.5 g). High sodium intake and insufficient potassium intake contribute to high blood pressure, which in turn increases the risk of heart disease and stroke. Reducing salt intake to the recommended level of less than 5 g per day could prevent 1.7 million deaths each year. Potassium can mitigate the negative effects of elevated sodium consumption on blood pressure. Intake of potassium can be increased by consuming fresh fruit and vegetables.
- Reducing the total fat intake to less than 30% of total energy intake helps to prevent unhealthy weight gain and reduces the risk of developing noncommunicable diseases.
- Eating at least 400 g, or five portions, of fruit and vegetables per day has been shown to reduce the risk of noncommunicable diseases and helps to ensure an adequate daily intake of dietary fibre.

Key actions for implementation

- Promoting a healthy food environment – including food systems that promote a diversified, balanced and healthy diet – requires the involvement of multiple sectors and stakeholders, including government and the public and private sectors.
- Creating coherence in national policies and investment plans – including trade, food and agricultural policies – to promote a healthy diet and protect public health can be done through:
  - o increasing incentives for producers and retailers to grow, use and sell fresh fruit and vegetables;
  - o reducing incentives for the food industry to continue or increase production of processed foods containing high levels of saturated fats, *trans*-fats, free sugars and salt/sodium;
  - o encouraging reformulation of food products to reduce the contents of saturated fats, *trans*-fats, free sugars and salt/sodium, with the goal of eliminating industrially produced *trans*-fats;
  - o implementing the WHO *Set of recommendations on the marketing of foods and non-alcoholic beverages to children*;
  - o establishing standards to foster healthy dietary practices through ensuring the availability of healthy, nutritious, safe and affordable foods in preschools, schools, other public institutions and the workplace;
  - o exploring regulatory instruments (e.g. marketing restrictions, nutrition labelling policies, fiscal and pricing policies) to promote a healthy diet;
  - o encouraging transnational, national and local food services and catering outlets to improve the nutritional quality of their foods, ensuring the availability and affordability of healthy choices, and to review portion sizes and pricing.
- Encouraging consumer demand for healthy foods and meals through:
  - o promoting consumer awareness of a healthy diet;
  - o developing school policies and programmes that encourage children to adopt and maintain a healthy diet;
  - o educating children, adolescents and adults about nutrition and healthy dietary practices;
  - o encouraging culinary skills, including in children through schools;
  - o supporting point-of-sale information, including through nutrition labelling that ensures accurate, standardized and comprehensible information on nutrient contents in foods (in line with the Codex Alimentarius Commission guidelines), with the addition of front-of-pack labelling to facilitate consumer understanding;
  - o providing nutrition and dietary counselling at primary health-care facilities.

Considerations

- Increased production of processed foods, rapid urbanization and changing lifestyles have led to a shift in dietary patterns. People are now consuming more foods that are high in energy, fats, free sugars and salt/sodium, and many people do not eat enough fruit, vegetables and other foods containing dietary fibre such as whole grains
- The exact make-up of a diversified, balanced and healthy diet will vary, depending on individual characteristics (e.g. age, sex, lifestyle and degree of physical activity), cultural context, locally available foods and dietary customs. However, the basic principles of what constitutes a healthy diet remain the same

Contributes to global nutrition targets: #1 Stunting; #2 Anaemia; #3 Low birth weight; #4 Children overweight; #5 Exclusive breastfeeding; #6 Wasting

Contributes to global noncommunicable disease targets: #4 Salt intake; #6 Raised blood pressure; #7 Diabetes and obesity

WHO guidelines and recommendations

- Healthy diet. Geneva: World Health Organization; 2018 (Fact sheet no. 394; https://www.who.int/nutrition/publications/nutrientrequirements/healthy_diet_fact_sheet_394.pdf?ua=1, accessed 10 May 2019).
- Guideline: sugars intake for adults and children. Geneva: World Health Organization; 2015 (https://apps.who.int/iris/bitstream/handle/10665/149782/9789241549028_eng.pdf?sequence=1, accessed 10 May 2019).
- Guideline: potassium intake for adults and children. Geneva: World Health Organization; 2012 (reprinted 2014) (https://apps.who.int/iris/bitstream/handle/10665/77986/9789241504829_eng.pdf?sequence=1, accessed 10 May 2019).
- Guideline: sodium intake for adults and children. Geneva: World Health Organization; 2012 (reprinted 2014) (https://apps.who.int/iris/bitstream/handle/10665/77985/9789241504836_eng.pdf?sequence=1, accessed 10 May 2019).
- Set of recommendations on the marketing of foods and non-alcoholic beverages to children. Geneva: World Health Organization; 2010 (https://apps.who.int/iris/bitstream/handle/10665/44416/9789241500210_eng.pdf?sequence=1, accessed 14 May 2019).
- Vitamin and mineral requirements in human nutrition, 2nd ed. Report of a joint WHO/FAO expert consultation, Bangkok, Thailand, 21–30 September 1998. Geneva: World Health Organization and Food and Agriculture Organization of the United Nations; 2004 (https://apps.who.int/iris/bitstream/handle/10665/42716/9241546123.pdf?ua=1, accessed 11 May 2019).
- Diet, nutrition and the prevention of chronic diseases. Report of a joint WHO/FAO expert consultation. Geneva: World Health Organization; 2003 (WHO Technical Report Series No 916; https://apps.who.int/iris/bitstream/handle/10665/42665/WHO_TRS_916.pdf, accessed 11 May 2019).
- Protein and amino acid requirements in human nutrition. Report of a joint WHO/FAO/UNU expert consultation. Geneva: World Health Organization; 2002 (WHO Technical Report Series No 935; https://apps.who.int/iris/bitstream/handle/10665/43411/WHO_TRS_935_eng.pdf?ua=1, accessed 11 May 2019).
- Human energy requirements. Report of a joint FAO/WHO/UNU expert consultation. Rome, 17–24 October 2001. Rome: Food and Agriculture Organization of the United Nations; 2002 (FAO Food and Nutrition Report Series 1; http://www.fao.org/3/a-y5686e.pdf, accessed 11 May 2019).

B. Fortification of condiments and staple foods with micronutrients

✓ Universal salt iodization

Applicable contexts/population groups: All countries, all settings; all population groups

WHO recommendation

All food-grade salt, used in household and food processing, should be fortified with iodine, as a safe and effective strategy for the prevention and control of iodine deficiency disorders in populations living in stable and emergency settings.

Suggested concentrations for the fortification of food-grade salt with iodine are provided in the table below.

Suggested concentrations for the fortification of food-grade salt with iodine

Estimated salt consumption (including consumption of table salt, as well as salt from processed food), g/day	Average amount of iodine to add, mg/kg salt (recommended nutrient intake + estimated losses)
3	65
4	49
5	39
6	33
7	28
8	24
9	22
10	20
11	18
12	16
13	15
14	14

Summary of key evidence

- Iodized salt has a large effect on reducing the risk of goitre, cretinism, low cognitive function, and iodine inadequacy, as indicated by low urinary iodine excretion.
- In some contexts, iodization of salt at the population level may cause a transient increase in the population incidence of hyperthyroidism, but not hypothyroidism. However, the beneficial effects of iodization of salt far outweigh the potential adverse effects.

Key actions for implementation

- This recommendation recognizes that salt reduction and salt iodization are compatible. Monitoring of sodium (salt) intake and iodine intake at country level is needed to adjust salt iodization over time as necessary, depending on observed salt intake in the population, to ensure that individuals consume sufficient iodine despite reduction of salt intake.
- Iodized salt should reach, and be used by, all members of the population after 1 year of age. Infants and young children are assumed to be covered via breast milk, or iodine-enriched infant formula milk when this is prescribed. Addition of salt to products consumed by young children may need regulation, to avoid insufficient or excessive consumption of either sodium (salt) or iodine.

- Since pregnant women have a daily iodine requirement of 250 µg/day, other interventions such as iodine supplementation could be considered if iodine inadequacy is found. Intake of salt correlates with caloric intake, and pregnant women usually increase their energy intake during this physiological stage.
- It is essential to monitor the quality of food-grade salt, to ensure both the efficacy and safety of the process of iodine fortification. Monitoring of urinary iodine excretion and urinary iodine concentration is useful not only to detect deficiency but also to detect excessive intakes and therefore prevent the health risks of iodine excess, by adjusting the level of iodine fortification accordingly, as part of a monitoring system. Countries should determine iodine losses from iodized salt under local conditions of production, climate, packaging and storage. For these reasons, iodine losses may be extremely variable and influence the additional amount of iodine that should be added at factory level.
- Fortification of salt with iodine should be appropriately regulated by governments and harmonized with other local or country programmes, to ensure that fortified food-grade salt is delivered safely within the acceptable dosage range. Particular attention should be given to identifying potential barriers to equitable access for all population groups needing iodine-fortified salt.
- Country programmes should be culturally appropriate for the target populations, so the intervention is accepted, adopted and sustained.
- Clear legislation should also be established for food producers and distributors, especially where the main source of dietary salt is processed foods and meals consumed outside households. Legislation should cover not only proper iodization of salt, but also the salt content of industrialized food products.

Considerations

- Policies for salt iodization and reduction of salt to below 5 g/day are compatible, cost effective and of great public health benefit. Although salt is an appropriate vehicle for iodine fortification, iodization of salt should not justify promotion of salt intake to the public.
- The concentrations of iodine may need to be adjusted by national authorities responsible for the implementation and monitoring of universal salt iodization, in light of their own data regarding dietary salt intake.
- The national distribution of salt consumption must provide key guidance for the concentration of iodine in salt; sufficient iodine should be supplied to most members of the population, even those with the lowest salt intake, while at the same time preventing excessive iodine supply to those individuals whose salt intake remains high.
- Regular monitoring and evaluation can identify barriers that may be limiting equal access to fortified salt and thus preserving health inequities. Sustained implementation and scale-up derive great benefit from appropriate monitoring mechanisms.
- Establishment of an efficient system for ongoing and routine collection of relevant data, including measures of quality assurance and household use of iodized salt and measures of programme performance, is critical to ensure programmes for iodized salt are effective and sustained.

❑ Fortification of maize flour and corn meal with vitamins and minerals

Applicable contexts/population groups: Settings where the food vehicle is a staple food; all population groups

WHO recommendation

Fortification of maize flour and corn meal with iron is recommended to prevent iron deficiency in populations, particularly vulnerable groups such as children and women.

Fortification of maize flour and corn meal with folic acid is recommended to reduce the risk of occurrence of births with neural tube defects.

Summary of key evidence

- Evidence on fortification of maize flour with folic acid or iron shows a positive effect on health outcomes in the general population. Fortification of maize flour with iron, in combination with other micronutrients, reduces the risk of iron deficiency but has no effect on anaemia in children.
- Addition of folic acid to wheat and maize flour in the United States of America (USA) and other countries has had a significant impact on multiple measures, including folate intake, blood folate concentrations and the prevalence of neural tube defects.

Key actions for implementation

- There is documented evidence from several countries that fortification of other staple foods with zinc, vitamin A, folic acid, vitamin D and calcium is associated with significant reductions in the incidence of deficiency-related outcomes, and improvements in the health status of populations. Countries can integrate fortification of maize flour and corn meal as part of their national programmes for prevention and control of micronutrient deficiencies and insufficiencies.
- The choice and concentration of nutrients for fortification of maize flour or corn meal should be considered in the context of the strategy, including consideration of the vitamin and mineral nutritional needs and intake gaps of the target populations; the usual level of consumption of maize flour, corn meal and products made from these staples; the sensory and physical effects of the fortificant on white and yellow maize flour, corn meal and flour products; the fortification of other food vehicles; the population use of vitamin and mineral supplements; other ongoing nutrition interventions; costs; feasibility; and acceptability.
- The choice of iron compound is a compromise between cost, bioavailability, micronutrient interactions and the acceptance of texture, taste, smell and/or colour. Nixtamalized flour (lime treated), commonly used in the Americas, is more reactive to ferrous compounds. The use of electrolytic iron does not appear to be effective in fortification of nixtamalized maize flour.
- Although the evidence in maize flour or corn meal is rather limited, addition of other vitamins and minerals in fortification of maize flour and corn meal is a common and optional practice.
- Since some of the B-complex vitamins naturally present in the maize grain are removed during milling and degerming, the restoration of niacin, riboflavin and thiamine in maize flour should remain a regular practice in fortification, especially niacin for non-nixtamalized maize flour. This strategy has contributed to the virtual elimination of beriberi and pellagra in many countries.
- The addition of vitamin C and the removal of phytates in maize flour and corn meal could increase the bioavailability of iron.

Considerations

- Food fortification should be guided by national standards, with quality assurance and quality control systems to ensure quality fortification. Continuous programme monitoring should be in place as part of a process to ensure high-quality implementation.
- Countries that fortify maize flour also frequently fortify wheat flour. A combined fortification strategy using multiple vehicles appears to be a suitably effective option for reaching all segments of the population. In this context, selection of a combined fortification formula that is applicable to both types of flour may be appropriate.

❑ Fortification of rice with vitamins and minerals

Applicable contexts/population groups: Settings where rice is a staple food; all population groups

WHO recommendation

Fortification of rice with iron is recommended as a public health strategy to improve the iron status of populations, in settings where rice is a staple food.

Fortification of rice with vitamin A may be used as a public health strategy to improve the iron status and vitamin A nutrition of populations.

Fortification of rice with folic acid may be used as a public health strategy to improve the folate nutritional status of populations.

Summary of key evidence

- Provision of rice fortified with vitamins and minerals including iron, when compared with unfortified rice, probably improves iron status by reducing the risk of iron deficiency by 35% and increasing the average concentration of haemoglobin by almost 2 g/L, but may not make a difference to the risk of anaemia in the general population of those aged over 2 years.
- When the fortification of rice includes vitamin A, it may reduce both iron deficiency and vitamin A deficiency.
- When fortification includes folic acid, fortified rice may slightly increase serum folate concentrations.

Key actions for implementation

- The number and amounts of nutrients should be adapted according to the needs of the country. If other fortification programmes with other food vehicles (i.e. wheat flour, maize flour or corn meal) and other micronutrient interventions are jointly implemented effectively, these suggested fortification levels need to be adjusted downwards as necessary. A combined fortification strategy using multiple vehicles appears to be a suitably effective option for reaching all segments of the population.
- The number and amounts of nutrients should be adapted according to the needs of the country. If other fortification programmes with other food vehicles (i.e. wheat flour, maize flour or corn meal) and other micronutrient interventions are jointly implemented effectively, these suggested fortification levels need to be adjusted downwards as necessary. A combined fortification strategy using multiple vehicles appears to be a suitably effective option for reaching all segments of the population.

- Rice milling results in the loss of a significant proportion of B vitamins and minerals that are found predominately in the outer germ and bran layers. Nutrient losses during milling can be minimized by a process called parboiling, in which raw rice is soaked in water and partially steamed before drying and milling, resulting in some of the B vitamins migrating further into the grain.
- Since some of the fat- and micronutrient-rich bran layers are removed during rice milling, the restoration of thiamine, niacin, riboflavin and vitamin B_6 (pyridoxine) in the fortification profile should remain a regular practice in fortification.
- The prevalence of depletion and deficiency of vitamin B_{12} (cobalamin) is high in all age groups, reaching 50% in some countries. The inclusion of vitamin B_{12} is recommended when staples are fortified with folic acid, to avoid the masking effect of folic acid on vitamin B_{12} deficiency.
- Fortification of rice with iron has been a challenge, since most of the bioavailable iron powders used in food fortification are coloured, which produces changes in the aspect of fortified kernels compared to unfortified ones.

Considerations

- Mandatory rice-fortification programmes can only be effective if they are properly implemented and legislation enforced.
- Food fortification should be guided by national standards, with quality assurance and quality control systems to ensure quality fortification. Continuous programme monitoring should be in place, as part of a process to ensure high-quality implementation. Monitoring of consumption patterns and evaluation of micronutrient status in the population can inform adjustment of fortification levels over time.
- Rice fortification on a national scale requires a large, cost-effective and sustainable supply of fortified kernels.
- In malaria-endemic areas, the provision of iron through rice fortification, as a public health strategy, should be done in conjunction with public health measures to prevent, diagnose and treat malaria.
- Behaviour-change communication strategies may be necessary for overcoming barriers and creating and maintaining demand for fortified rice.

❑ Fortification of wheat flour with vitamins and minerals

Applicable contexts/population groups: Settings where wheat flour is a staple food; all population groups

WHO recommendation

Fortification of wheat flour is a preventive food-based approach to improve the micronutrient status of populations over time, which can be integrated with other interventions in efforts to reduce vitamin and mineral deficiencies when these are identified as public health problems.

Fortification of wheat flour with folic acid increases the intake of folate by women and can reduce the risk of neural tube and other birth defects..

Summary of key evidence

- Fortification of wheat flour should be considered when industrially produced flour is regularly consumed by large population groups in a country. Programmes for fortification of wheat and maize flour could be 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

- Addition of folic acid to wheat flour in various countries has had a significant impact on multiple measures, including folate intake, blood folate concentrations and the prevalence of neural tube defects.

Key actions for implementation

- The selection of the type and quantity of vitamins and minerals to add to flour, either as a voluntary standard or a mandatory requirement, lies with national decision-makers in each country and therefore the choice of compounds as well as quantities should be viewed in the context of each country's situation.
- 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/health impacts of the fortification strategies.

Considerations

- Food fortification should be guided by national standards, with quality assurance and quality control systems to ensure quality fortification. Continuous programme monitoring should be in place as part of a process to ensure high-quality implementation.
- 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.

Contributes to global nutrition targets: #2 Anaemia; #3 Low birth weight

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Guideline: fortification of rice with vitamins and minerals as a public health strategy. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/272535/9789241550291-eng.pdf?ua=1, accessed 10 May 2019).
- WHO guideline: fortification of maize flour and corn meal with vitamins and minerals. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/251902/9789241549936-eng.pdf?sequence=1, accessed 11 May 2019).
- Guideline: fortification of food-grade salt with iodine for the prevention and control of iodine deficiency disorders. Geneva: World Health Organization; 2014 (https://apps.who.int/iris/bitstream/handle/10665/136908/9789241507929_eng.pdf?sequence=1, accessed 11 May 2019).
- Recommendations on wheat and maize flour fortification. Meeting report: interim consensus statement. Geneva: World Health Organization; 2009 (WHO/NMH/NHD/MNM/09.1; https://www.who.int/nutrition/publications/micronutrients/wheat_maize_fort.pdf, accessed 11 July 2019).
- Allen L, de Benoist B, Dary O, Hyrrell R, editors. Guidelines on food fortification with micronutrients. Geneva: World Health Organization and Food and Agriculture Organization of the United Nations; 2006 (https://apps.who.int/iris/bitstream/handle/10665/43412/9241594012_eng.pdf?ua=1, accessed 11 May 2019).

II. Nutrition through the life-course

1. Infants

A. Optimal timing of umbilical cord clamping

✓ Optimal timing of umbilical cord clamping

Applicable contexts/population groups: All countries, all settings; all births

WHO recommendation

Delayed umbilical cord clamping (not earlier than 1 min after birth) is recommended for improved maternal and infant health and nutrition outcomes and should be performed during the provision of essential neonatal care.

Summary of key evidence

- Term infants receiving early cord clamping (less than 1 min after birth) are at significantly higher risk of developing iron deficiency at 3–6 months of age than infants receiving delayed cord clamping.
- Early cord clamping in preterm infants increases the risk of necrotizing enterocolitis and intraventricular haemorrhage and the need for blood transfusions.
- The primary intervention of active management of the third stage of labour for the prevention of postpartum hemorrhage is the use of a uterotonic drug. Early cord clamping is generally contraindicated as a component of active management.

Key actions for implementation

- Revise and update policies (at regional, national and local levels), curricula/textbooks and clinical protocols to include delayed cord clamping as part of essential newborn care. In the past, protocols for neonatal resuscitation and active management of the third stage of labour have conflicted with the practice of delayed cord clamping. Policies need to be updated so that they reflect the most up-to-date evidence-based care, which includes delayed cord clamping.
- Provide in-service training on the optimal timing of umbilical cord clamping and how it can be integrated with other care practices.
- Address and adjust the organization of delivery care services (in terms of physical location of labour beds and resuscitation tables, responsibilities of delivery care providers, etc.), to allow implementation of delayed cord clamping along with other essential newborn care practices (e.g. skin-to-skin contact, early initiation of breastfeeding), in a variety of settings and delivery modes (i.e. vaginal and caesarean).

Considerations

- Early cord clamping (less than 1 min after birth) is not recommended unless the neonate is asphyxiated and needs to be moved immediately for resuscitation.
- For newborn term or preterm babies who do not require positive-pressure ventilation, the cord should not be clamped earlier than 1 min after birth.
- When newborn term or preterm babies require positive-pressure ventilation, the cord should be clamped and cut, to allow effective ventilation to be performed.

  - If there is experience in providing positive-pressure ventilation without cutting the umbilical cord, ventilation can be initiated before cutting the cord.
- Newborn babies who do not breathe spontaneously after thorough drying should be stimulated by rubbing the back 2–3 times before clamping the cord and initiating positive-pressure ventilation.
- Delayed cord clamping is recommended even among women living with HIV or women with unknown HIV status.

Contributes to global nutrition targets: #2 Anaemia; #3 Low birth weight

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Guideline: delayed umbilical cord clamping for improved maternal and infant health and nutrition outcomes. Geneva: World Health Organization; 2014 (https://apps.who.int/iris/bitstream/handle/10665/148793/9789241508209_eng.pdf?ua=1, accessed 10 May 2019).
- Beyond survival: integrated delivery care practices for long-term maternal and infant nutrition, health and development, 2nd ed. Washington (DC): Pan American Health Organization; 2013 (https://www.paho.org/hq/dmdocuments/2013/BeyondSurvival.pdf, accessed 11 May 2019).
- WHO recommendations for the prevention and treatment of postpartum haemorrhage. Geneva: World Health Organization; 2012 (https://apps.who.int/iris/bitstream/handle/10665/75411/9789241548502_eng.pdf?sequence=1, accessed 11 May 2019).
- Guidelines on basic newborn resuscitation. Geneva: World Health Organization; 2012 (https://apps.who.int/iris/bitstream/handle/10665/75157/9789241503693_eng.pdf?sequence=1, accessed 11 May 2019).

B. Protecting, promoting and supporting breastfeeding

✓ Support early initiation, establishment and maintenance of breastfeeding and immediate skin-to-skin contact

Applicable contexts/population groups: All countries, all settings; all infants

WHO recommendation

All mothers should be supported to initiate breastfeeding as soon as possible after delivery, ideally within the first hour after the birth of their infant, including in facilities where maternity and newborn care is provided.

Early and uninterrupted skin-to-skin contact between mothers and infants should be facilitated and encouraged as soon as possible after delivery. Place babies in skin-to-skin contact with their mothers immediately following birth, for at least an hour.

Mothers should receive practical support to enable them to initiate and establish breastfeeding and manage common breastfeeding difficulties. Mothers should be enabled to position and attach their infants to the breast.

Mothers should be coached on how to express breast milk as a means of maintaining lactation in the event of their being separated temporarily from their infants.

Facilities providing maternity and newborn services should enable mothers and their infants to remain together and to practise rooming-in through the day and night. This may not apply in circumstances when infants need to be moved for specialized medical care.

Mothers should be supported to practise responsive feeding as part of nurturing care. Encourage and help mothers to recognize when their babies are ready to breastfeed. Among healthy, term infants, feeding cues may be apparent within the first 15–20 min after birth.

Summary of key evidence

- Early, focused and optimal support to initiate and establish breastfeeding has positive effects on maternal, infant and child outcomes far beyond the hospital stay. Early skin-to-skin contact and early initiation of breastfeeding increase the likelihood of any or exclusive breastfeeding for up to 3–6 months of life, as well as the overall duration of breastfeeding. Early initiation of breastfeeding has also been shown to reduce infection-specific neonatal mortality in infants. Women who are shown how to breastfeed in the immediate postnatal period are more likely to continue any or exclusive breastfeeding to 6 months of age.
- Babies interact more with their mother, stay warmer, and cry less when in skin-to-skin contact. Rooming-in improves exclusive breastfeeding in the early postpartum period: mothers and infants who room-in together are almost twice as likely to be exclusively breastfeeding during their facility stay.

Key actions for implementation

- Begin the practice of early skin-to-skin contact in the first few minutes after delivery, while newborn assessment is occurring. Allow uninterrupted skin-to-skin contact for ideally an hour or more, as long as the mother and infant are both tolerating the practice well. During this time, sensible vigilance and safety precautions should be taken, so that health-care personnel can observe for, assess and manage any signs of distress.
- Provide guidance to health workers on the minimum support that all mothers need, and improve health-worker competence towards addressing common breastfeeding problems.
- Support mothers to form an early and close relationship with their infants and help them feed their infants; such support is highly valued by mothers. Mothers who experience early skin-to-skin contact, or who have had a positive experience with being supported in the initial breastfeeds, appreciate and would like to repeat these experiences. Mothers who are given conflicting advice or are given information in a mechanistic manner feel undermined. Identify ways for mothers who deliver by caesearan section, or who have medical instability that precludes initiating breastfeeding in the first hour after birth, to remain with their infants for skin-to-skin contact (as appropriate) and initiate breastfeeding as soon as they are able. There is a dose–response effect of early initiation of breastfeeding, with earlier initiation resulting in greater benefits. After caesarean delivery, it is common for the mother and infant to be monitored separately, preventing early contact and initiation of breastfeeding. Ways to address this include eliminating routine observation of a well neonate in a special care nursery after caesarean delivery while the mother is in postoperative recovery; adjusting staffing models or the spatial organization of operating rooms to provide support for skin-to-skin contact; and delaying newborn procedures to allow for mother–baby contact.
- Support, revitalize, expand and institutionalize the Baby-Friendly Hospital Initiative. The Ten Steps to Successful Breastfeeding of the Baby-Friendly Hospital Initiative emphasize the importance of keeping mothers and babies together in the period immediately after delivery (i.e. rooming-in), as well as providing mothers with the support they need to initiate early breastfeeding.

Considerations

- Expressing breast milk can be a technique for stimulating attachment and effective suckling during the establishment of breastfeeding, not just when mothers and infants are separated.
- Almost all mothers can breastfeed successfully; however, there are a small number of health conditions of the infant or mother that may justify that the mother does not breastfeed, either temporarily or permanently. In these cases, breast-milk substitutes are medically indicated. These conditions include the following:
  - o infants with classic galactosaemia, maple syrup urine disease or phenylketoneuria should not receive breast milk or any other milk except specialized formula milk;
  - o infants born with very low birth weight (less than1500 g) or at less than 32 weeks' gestation, or who are at risk of hypoglycaemia, may need other food in addition to breast milk, for a limited period;
  - o mothers with HIV (if replacement feeding is acceptable, feasible, affordable, sustainable and safe) may justify permanent avoidance of breastfeeding.
- The following maternal conditions may justify temporary avoidance of breastfeeding: mothers with severe illness that prevent a mother from caring for her infant; mothers with herpes simplex virus type 1 and active lesions on her breasts; mothers taking sedating psychotherapeutic drugs, anti-epileptic drugs or opiods, or combinations of these drugs; mothers taking radioactive iodine-131; mothers using topical iodine or iodophors in excess; or mothers receiving cytotoxic chemotherapy.
- Skin-to-skin contact promotes immediate breastfeeding, as it takes advantage of an infant's early alertness and innate behaviours to latch on to the breast within the first hour of life, often without particular assistance. However, in addition to breastfeeding support, caregivers should provide adequate and continual supervision of mother–newborn dyads during the first hours of life, to monitor the infant's clinical condition and ensure proper positioning of the infant to avoid airway obstruction.
- Mothers of infants admitted to the neonatal intensive care unit should be sensitively supported to enable them to have skin-to-skin contact with their infants, recognize their infants' behaviour cues, and effectively express breast milk soon after birth.

✓ Optimize newborn feeding practices and address additional care needs of infants

Applicable contexts/population groups: All countries, all settings; all infants

WHO recommendation

All mothers should be discouraged from giving any food or fluids to their infant other than breast milk, unless medically indicated.

Mothers should be supported to recognize their infants' cues for feeding, closeness and comfort, and enabled to respond accordingly to these cues, with a variety of options, during their stay at the facility providing maternity and newborn services.

For preterm infants who are unable to breastfeed directly, non-nutritive sucking and oral stimulation may be beneficial until breastfeeding is established.

If expressed breast milk or other feeds are medically indicated for term infants, feeding methods such as cups, spoons or feeding bottles and teats may be used during their stay at the facility.

If expressed breast milk or other feeds are medically indicated for preterm infants, feeding methods such as cups or spoons are preferable to feeding bottles and teats.

Summary of key evidence

- Early additional feeds other than breast milk (e.g. water) have been shown to decrease rates of breastfeeding up to 20 weeks after birth.
- When additional feeds are medically indicated, or when direct breastfeeding is not possible, avoiding the use of feeding bottles and teats among preterm infants increases their likelihood of any or exclusive breastfeeding up to 6 months post-discharge.

Key actions for implementation

- Additional foods and fluids apart from breast milk should only be given when medically acceptable reasons exist. Lack of resources, staff time or knowledge are not justifications for the use of early additional foods or fluids.
- Provide guidance and counselling of mothers and other family members on the use or avoidance of pacifiers and/or feeding bottles and teats, to enable them to make informed decisions on the use of these products until breastfeeding is successfully established.
- Support mothers to respond in a variety of ways to behavioural cues for feeding, comfort or closeness, including breastfeeding, skin-to-skin contact, cuddling, carrying, talking, singing and so forth. Such guidance enables them to build caring, nurturing relationships with their infants and increase their confidence in themselves, in breastfeeding and in their infants' growth and development.
- There should be no promotion of breast-milk substitutes, feeding bottles and teats, pacifiers or dummies, in any part of facilities providing maternity and newborn services, or by any of the staff.
- Health facilities and their staff should not give feeding bottles and teats or other products within the scope of the *International Code of Marketing of Breast-milk Substitutes* and its subsequent related World Health Assembly resolutions, to breastfeeding infants.
- Strengthen the monitoring and enforcement of the *International Code of Marketing of Breast-milk Substitutes* to limit marketing of formula milk.

Considerations

- Many mothers value pacifiers and a considerable number would introduce pacifiers even when discouraged from doing so. Many also value the convenience of using feeding bottles and teats to provide breast milk when their infants are not on the breast. Mothers can be supported to make informed decisions regarding the use of pacifiers and bottles and teats during their stay at the facilities providing maternity and newborn services, by ensuring that they are aware of the risk of interfering with breastfeeding during these early days.

✓ Create an enabling environment for breastfeeding in health facilities

Applicable contexts/population groups: All countries, all facilities providing maternity and newborn services; all infants

WHO recommendation

Facilities providing maternity and newborn services should have a clearly written breastfeeding policy that is routinely communicated to staff and parents.

Health-facility staff who provide infant feeding services, including breastfeeding support, should have sufficient knowledge, competence and skills to support women to breastfeed.

Where facilities provide antenatal care, pregnant women and their families should be counselled about the benefits and management of breastfeeding.

As part of protecting, promoting and supporting breastfeeding, discharge from facilities providing maternity and newborn services should be planned for and coordinated, so that parents and their infants have access to ongoing support and appropriate care.

Summary of key evidence

- Having a written policy, training of health workers, and discharge planning with linkage to continuing support helps to create an effective health-delivery system within the facilities providing maternity and newborn services that can respond to the needs of mothers and infants.
- Training health workers on breastfeeding implementation tends to improve their knowledge as well as their compliance with practices of the Baby-Friendly Hospital Initiative.
- Antenatal education on breastfeeding, particularly on breastfeeding initiation, has been shown to have positive effects on breastfeeding outcomes.

Key actions for implementation

- Create an enabling environment for breastfeeding, by establishing and communicating policies and guidelines that underpin the quality standards for promoting, protecting and supporting breastfeeding in facilities providing maternity and newborn services. These policies and guidelines include provisions of the *International Code of Marketing of Breast-milk Substitutes* and its subsequent related World Health Assembly resolutions.
- Provide relevant training for health workers, to ensure quality standards are implemented effectively according to their roles.
- Offer parents antenatal breastfeeding education that is tailored to their individual needs, is sensitively given and considers their social and cultural context. For example, providing peer-to-peer and group counselling and support for appropriate breastfeeding at the community and facility level, or communication campaigns through appropriate media channels, could be arranged. Such education will prepare them to address challenges they may face.
- Prepare mothers for discharge by ensuring that they can feed and care for their infants and have access to continuing breastfeeding support. The breastfeeding support in the succeeding days and weeks after discharge will be crucial in identifying and addressing early breastfeeding challenges that occur.

- Minimize disruption to breastfeeding during the stay in the facilities providing maternity and newborn services, by establishing and supporting health-care practices that enable a mother to breastfeed for as much, as frequently and for as long as she wishes (e.g. immediate and uninterrupted skin-to-skin contact, rooming-in).
- Coordinate clinical systems in facilities providing maternity and newborn services, so that standards of care for breastfeeding support are coordinated across the obstetric, midwifery and paediatric services, and help develop services that improve the outcomes for those using them.

Considerations

- Most mothers value linkages to breastfeeding support after discharge, regardless of the type of linkage. Such connections and support give them a greater sense of security in caring for their infants.

✓ Enable exclusive breastfeeding for the first 6 months of life

Applicable contexts/population groups: All countries, all settings; all infants

WHO recommendation

Infants should be exclusively breastfed (meaning only breast milk with no other solids or liquids given, with the exception of oral rehydration solution, vitamin/mineral drops or medicines) for the first 6 months of life, to achieve optimal growth, development and health.

Summary of key evidence

- Exclusive breastfeeding – defined as the practice of only giving an infant breast milk for the first 6 months of life – has the single largest potential impact on child mortality of any preventive intervention.
- Together with appropriate complementary feeding, breastfeeding has the potential to reduce mortality among children under 5 years of age by 19%.
- Exclusive breastfeeding reduces the risk of gastrointestinal infection and of all-cause mortality, and protects infants from respiratory infections.
- Exclusive breastfeeding also has a protective effect against obesity later in life.

Key actions for implementation

- Support, revitalize, expand and institutionalize the Baby-Friendly Hospital Initiative.
- Strengthen the monitoring and enforcement of the *International Code of Marketing of Breast-milk Substitutes* and subsequent World Health Assembly resolutions, to limit marketing of formula milk.
- Improve maternity protection through the workplace (e.g. 6 months of mandatory paid maternity leave and polices to encourage women to breastfeed in the workplace), to empower women to exclusively breastfeed.
- Provide community-based strategies to support exclusive breastfeeding, such as peer-to-peer or group counselling and communication campaigns to provide support for breastfeeding at the community and facility level.
- Invest in training and capacity-building in protection, promotion and support for exclusive breastfeeding.

Considerations

- Almost all mothers can breastfeed successfully; however, there are a small number of health conditions of the infant or mother that may justify that the mother does not breastfeed, either temporarily or permanently. In these cases, breast-milk substitutes are medically indicated. These conditions include the following:
  - o infants with classic galactosaemia, maple syrup urine disease or phenylketoneuria should not receive breast milk or any other milk except specialized formula milk;
  - o infants born with very low birth weight (less than1500 g) or at less than 32 weeks' gestation, or who are at risk of hypoglycaemia, may need other food in addition to breast milk, for a limited period;
  - o mothers with HIV (if replacement feeding is acceptable, feasible, affordable, sustainable and safe) may justify permanent avoidance of breastfeeding.
- The following maternal conditions may justify temporary avoidance of breastfeeding: mothers with severe illness that prevent a mother from caring for her infant; mothers with herpes simplex virus type 1 and active lesions on her breasts; mothers taking sedating psychotherapeutic drugs, anti-epileptic drugs or opiods, or combinations of these drugs; mothers taking radioactive iodine-131; mothers using topical iodine or iodophors in excess; or mothers receiving cytotoxic chemotherapy.
- Rates of exclusive breastfeeding tend to increase when effective policy and regulatory frameworks and guidelines exist and when comprehensive programming is implemented at scale. Countries that have successfully increased rates of exclusive breastfeeding have, among other factors, shown strong political commitment at the highest levels for breastfeeding; effective coordination of programme and policy strategies; effective communication strategies tailored to the local context; dedicated and adequate resources; and use of data to design interventions and track progress.

✓ Enable continued breastfeeding

Applicable contexts/population groups: All countries, all settings; all infants

WHO recommendation

Infants should be exclusively breastfed for the first 6 months of life, to achieve optimal growth, development and health. Thereafter, to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe complementary foods, while continuing to breastfeed for up to 2 years or beyond.

Summary of key evidence

- Breastfeeding provides optimal nutrition for the first 6 months of life and continues to provide an important nutritional contribution well beyond the first year of life.
- Breastfeeding protects against common children illnesses, such as diarrhoea and pneumonia, supports optimal linear growth, and has been associated with higher intelligence quotient (IQ) in children. Continued breastfeeding also delays maternal fertility and is associated with reduced risk of breast and ovarian cancer, type 2 diabetes, hypertension and some cardiovascular diseases in the mother.

Key actions for implementation

- Support, revitalize, expand and institutionalize the Baby-Friendly Hospital Initiative.
- Strengthen the monitoring and enforcement of the *International Code of Marketing of Breast-milk Substitutes* and subsequent World Health Assembly resolutions, to limit marketing of formula milk.
- Provide counselling (peer-to-peer and group counselling) and support for appropriate breastfeeding at the community and facility level, including through communication campaigns.
- Improve maternity protection through the workplace (e.g. 6 months of mandatory paid maternity leave and polices to encourage women to breastfeed in the workplace).

Considerations

- Almost all mothers can breastfeed successfully; however, there are a small number of health conditions of the infant or mother that may justify that the mother does not breastfeed, either temporarily or permanently. In these cases, breast-milk substitutes are medically indicated. These conditions include the following:
  - infants with classic galactosaemia, maple syrup urine disease or phenylketoneuria should not receive breast milk or any other milk except specialized formula milk;
  - infants born with very low birth weight (less than 1500 g) or at less than 32 weeks' gestation, or who are at risk of hypoglycaemia, may need other food in addition to breast milk, for a limited period;
  - mothers with HIV (if replacement feeding is acceptable, feasible, affordable, sustainable and safe) may justify permanent avoidance of breastfeeding.
- The following maternal conditions may justify temporary avoidance of breastfeeding: mothers with severe illness that prevent a mother from caring for her infant; mothers with herpes simplex virus type 1 and active lesions on her breasts; mothers taking sedating psychotherapeutic drugs, anti-epileptic drugs or opiods, or combinations of these drugs; mothers taking radioactive iodine-131; mothers using topical iodine or iodophors in excess; or mothers receiving cytotoxic chemotherapy.

✓ Counsel women to improve breastfeeding practices

Applicable contexts/population groups: All countries, all settings; all infants

WHO recommendation

- Breastfeeding counselling should be provided to all pregnant women and mothers with young children.
- Breastfeeding counselling should be provided in both the antenatal period and postnatally, and up to 24 months or longer.
- Breastfeeding counselling should be provided at least six times, and additionally as needed.
- Breastfeeding counselling should be provided through face-to-face counselling. It may, in addition, be provided though telephone or other remote modes of counselling.
- Breastfeeding counselling should be provided as a continuum of care, by appropriately trained health-care professionals and community-based lay and peer breastfeeding counsellors.
- Breastfeeding counselling should anticipate and address important challenges and contexts for breastfeeding, in addition to establishing skills, competencies and confidence among mothers.
- Protection, promotion and support of breastfeeding, in accordance with international guidance, are essential in emergencies. Breastfeeding counselling should be an integral part of emergency-preparedness plans for infant and young child feeding, and both initial and sustained responses.

Summary of key evidence

- Counselling is a process and interaction between counsellors and pregnant women or mothers. Breastfeeding counselling is therefore not intended to be a "top-down" intervention of "telling women what to do". The aim of breastfeeding counselling is to empower women to breastfeed, while respecting their personal situations and wishes. Breastfeeding counselling is, therefore, never to be forced upon any woman. This would be contrary to the concept of counselling. Rather, counselling is made available and accessible to all pregnant women and mothers, particularly those who are considering or already breastfeeding.
- Breastfeeding counselling for pregnant women can enable them to have the best start at breastfeeding, with support to allow mothers and their neonates to initiate breastfeeding as soon as possible after birth, stay together through the day and night, and establish and maintain breastfeeding with proper attachment and positioning.
- Sensitive and effective counselling can assist mothers who are considering or are already breastfeeding to overcome challenges. By emphasizing that breastfeeding provides protection and comfort as well as food, counselling can respond to the particular barriers that individual mothers face.
- Mothers who may not be considering breastfeeding could be supported to make informed choices about feeding their infants and children. Counselling can highlight the extensive and resounding evidence on the benefits of breastfeeding, as well as providing mothers with scientific, unbiased and factual information about other infant and young child feeding choices, so that they can safely and responsively feed their child.
- Those who are breastfeeding as well as giving additional foods or fluids (such as infant formula milk or other breast-milk substitutes) are encouraged to continue breastfeeding as much as they are able to, while they are supported with sensitivity and care to address challenges that they may be facing around feeding their child.

Key actions for implementation

- Common challenges and contexts include returning to work or school; the specific needs of mothers who are obese, adolescent girls, primiparous (first-time) mothers or mothers carrying multiple pregnancies (when the mother is pregnant with two or more babies); mothers with mental health difficulties; mothers of infants with special needs, e.g. low birth weight or disability; mothers who deliver by caesarean section; breastfeeding in public spaces; and breastfeeding in humanitarian emergencies.
- Counselling during pregnancy or soon after birth includes encouraging mothers and their families to start a nurturing, caring and responsive relationship with their infant. Feeding decisions at this time may be shaped by experiences, contexts and various influences around them, as well as having short- and long-term consequences. Breastfeeding counselling at this time aims to enable a positive and loving environment in which the neonate can thrive.
- Postnatal breastfeeding counselling further supports mothers and their families in enabling them to build closeness, with skin-to-skin contact and responsive feeding. Mothers may need extra support in establishing and boosting their confidence in breastfeeding, recognizing the milk ejection reflex (or let-down) and effective feeding, and understanding feeding patterns and growth spurts.
- Parents and caregivers need to be enabled to access appropriate help when they have concerns about feeding. This may be particularly important in the first few weeks after birth when breastfeeding is being established, and during potential changes in their situation (such as the mother's return to school or work), when they may have concerns about maintaining breastfeeding, according to their individual circumstance. An assessment of breastfeeding effectiveness may be valuable in reassuring parents and addressing issues around feeding.
- Provision of at least six breastfeeding counselling contacts allows for a full range of support to breastfeeding mothers and their families, beginning in the antenatal period through to the introduction of complementary feeding and beyond. Policy-makers and implementers are duty-bound to ensure that breastfeeding counselling contacts are of sufficient quality and quantity to be effective, while ensuring that their use does not expose the mothers and their families to financial hardship.
- People-centred breastfeeding counselling means that the counselling responds to the individual mothers' and families' needs, preferences and values. If individual family situations preclude them from accessing at least six counselling contacts, they are, nonetheless, encouraged and enabled to go to as many as they can, and maximize the benefit of this resource with meaningful engagement without stigma or recrimination.
- The minimum of six breastfeeding counselling contacts may occur at the following time points: before birth (antenatal period); during and immediately after birth (perinatal period up to the first 2–3 days after birth); at 1–2 weeks after birth (neonatal period); in the first 3–4 months (early infants); at 6 months (at the start of complementary feeding); and after 6 months (late infants and early children), with additional contacts as necessary (for instance, when planning to return to school or work, or any time that concerns or challenges related to breastfeeding arise) or when opportunities for breastfeeding counselling occur (such as during child immunization visits).

Considerations

- To some extent, all breastfeeding counselling is anticipatory. The goal of the counselling contact is to support mothers in achieving their individualized goals for breastfeeding, whether they are considering initiating breastfeeding, or they are already breastfeeding and are facing particular challenges for continuation of breastfeeding. Anticipatory counselling therefore refers to evaluating and assessing potential and existing challenges that may impact the mothers' breastfeeding goals. The anticipatory nature of breastfeeding counselling helps to reduce potential risks, problems or complications, for optimal breastfeeding.
- In difficult or complicated circumstances, positive feedback and emotional support are especially needed to support the mothers' confidence and self-efficacy in breastfeeding.
- Using the principles of person-centred and quality-focused care, each Member State may need to identify which circumstances will require additional training and skills-building, based on their assessment of the primary challenges to optimal breastfeeding in their contexts.
- Advice and information for women who do not intend to breastfeed need to be considered as potential components of anticipatory counselling for pregnant women.
- During emergencies, appropriate and timely support to infant and young child feeding saves lives; protects child nutrition, health and development; and benefits mothers. Breastfeeding counselling is a vital intervention in emergency response and needs to be protected. Emergency preparedness is critical to a timely, efficient and appropriate response.
- Emergency preparedness includes training of personnel likely to be involved in providing support to mothers in an emergency, and building the capacity of those delivering services during a response. As a minimum, staff in contact with mothers and children aged under 2 years are trained to be sensitive to psychosocial issues, on nutrition screening and on referral pathways to more specialist support.
- More specialist capacity to counsel mothers with heightened needs, such as stressed or traumatized mothers, malnourished infants and mothers, low-birth-weight infants, and infants with disability and feeding difficulties, may be needed.

Contributes to global nutrition targets: #1 Stunting; #4 Children overweight; #5 Exclusive breastfeeding; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- Guideline: counselling of women to improve breastfeeding practices. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/280133/9789241550468-eng.pdf?ua=1, accessed 10 May 2019).
- Implementation guidance: protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services – the revised Baby-friendly Hospital Initiative. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/272943/9789241513807-eng.pdf?ua=1, accessed 11 May 2019).
- Guideline: protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services. Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/259386/9789241550086-eng.pdf?sequence=1, accessed 11 May 2019).

- The International Code of Marketing of Breast-milk Substitutes. Frequently asked questions, 2017 update. Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/254911/WHO-NMH-NHD-17.1-eng.pdf?ua=1, accessed 11 May 2019).
- WHO recommendations on postnatal care of the mother and newborn. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/97603/9789241506649_eng.pdf?sequence=1, accessed 11 May 2019).
- World Health Organization, United Nations Children's Fund. Baby-Friendly Hospital Initiative: revised, updated and expanded for integrated care. Geneva: World Health Organization; 2009 (https://www.who.int/nutrition/publications/infantfeeding/bfhi_trainingcourse/en/, accessed 11 May 2019).
- World Health Organization, United Nations Children's Fund. Acceptable medical reasons for use of breast-milk substitutes. Geneva: World Health Organization; 2009 (WHO/NMH/NHD/09.01; WHO/FCH/CAH/09.01; https://apps.who.int/iris/bitstream/handle/10665/69938/WHO_FCH_CAH_09.01_eng.pdf?ua=1, accessed 11 May 2019).
- The optimal duration of exclusive breastfeeding. Report of an expert consultation, Geneva, Switzerland, 28–30 March 2001. Geneva: World Health Organization; 2001 (WHO/NHD/01.09; WHO/FCH/CAH/01.24; https://apps.who.int/iris/bitstream/handle/10665/67219/WHO_NHD_01.09.pdf?ua=1, accessed 11 May 2019).
- International Code of Marketing of Breast-milk Substitutes. Geneva: World Health Organization; 1981 (https://apps.who.int/iris/bitstream/handle/10665/40382/9241541601.pdf?sequence=1, accessed 11 May 2019).

C. Care of low-birth-weight and very low-birth-weight infants

❑ Optimal feeding of low-birth weight and very low-birth-weight infants

Applicable contexts/population groups: All countries, all settings; infants born with birth weight between 1000 g and 2500 g

WHO recommendation

- Low-birth-weight infants, including very low-birth-weight infants (infants with birth weight between 1000 g and 1500 g), should be fed their mother's own milk. Low-birth-weight infants should be exclusively breastfed until 6 months of age.

In settings where safe and affordable milk banking facilities are available or can be set up:

- Low-birth-weight infants, including very low-birth-weight infants, who cannot be fed their mother's own milk should be fed donor human milk.

In resource-limited settings:

- Low-birth-weight infants, including very low-birth-weight infants, who cannot be fed their mother's own milk or donor human milk, should be fed standard infant formula milk up to 6 months of age.
- Very low-birth-weight infants (infants with birth weight between 1000 g and 1500 g) who fail to gain weight despite feeding with adequate breast milk should be provided with human milk fortifiers, preferably those that are human milk based.
- Very low-birth-weight infants who cannot be fed their mother's own milk or donor human milk and fail to gain weight with standard infant formula milk should be provided with preterm infant formula milk.

Summary of key evidence

- Feeding low-birth-weight infants with formula milk increases the risk of mortality, severe infections and necrotizing enterocolitis, and decreases mental development scores, as compared to feeding with their mother's own milk.
- Feeding low-birth-weight infants with donor human milk is associated with lower incidence of infections and necrotizing enterocolitis, as compared to feeding with formula milk.

Key actions for implementation

- Low-birth-weight infants who are able to breastfeed should be put to the breast as soon as possible after birth, when they are clinically stable.
- Low-birth-weight infants who need to be fed by an alternative oral feeding method should be fed by cup, palladia or spoon.
- Feeding of low-birth-weight infants should be based on the infant's hunger cues, except when the infant remains asleep beyond 3 hours after the last feed.
- For very low birth-weight infants in resource-limited settings, enteral feeds of 10 mL/kg per day should be provided, preferably of expressed breast milk, starting from the first day of life, with the remaining fluid requirement met by intravenous fluid.

Considerations

- These recommendations do not apply to sick infants, or to infants with a birth weight below 1000 g.

❑ Enable kangaroo mother care for low-birth-weight infants

Applicable contexts/population groups: All countries, all settings; infants born with birth weight less than 2000 g

WHO recommendation

- Kangaroo mother care is recommended for the routine care of neonates weighing 2000 g or less at birth, and should be initiated in health-care facilities as soon as the neonates are clinically stable.
- Kangaroo mother care involves:
  - o early, continuous and prolonged skin-to-skin contact between a mother and her neonates;
  - o frequent and exclusive breastfeeding;
  - o early discharge from hospital.
- Neonates weighing 2000 g or less at birth should be provided as close to continuous kangaroo mother care as possible.
- Intermittent kangaroo mother care, rather than conventional care, is recommended for neonates weighing 2000 g or less at birth, if continuous kangaroo mother care is not possible.

Summary of key evidence

- Low-birth-weight infants are at increased risk of early growth retardation, infectious disease, developmental delay and death during infants and children.
- Conventional neonatal care of low-birth-weight infants is expensive and requires highly skilled staff and permanent logistic support.
- Kangaroo mother care, which includes early, continuous and prolonged skin-to-skin contact between a mother and her neonate, frequent and exclusive breastfeeding, and early discharge from hospital, has been shown to be a safe and effective alternative to conventional neonatal care, especially in low-resource settings.
- Kangaroo mother care may also reduce morbidity and mortality in low-birth-weight infants and increase breastfeeding.

Key actions for implementation

- Establish a national policy for kangaroo mother care, to ensure a coherent and effective integration of kangaroo mother care within established health-system structures and education/training curricula. At the facility level, each health facility implementing kangaroo mother care should have policies and guidelines in place, adapted to the local context and culture.
- Provide existing health-care staff with basic training in breastfeeding and adequate training in all aspects of kangaroo mother care, and establish a programme of continuing education.
- Counsel mothers with low-birth weight infants on the options available to them for care of their infants; the benefits and implications (mothers' time, length of hospital stay) of kangaroo mother care; and what the practice entails.

Considerations

- These recommendations do not apply to clinically unstable infants.

Contributes to global nutrition targets: #1 Stunting; #4 Children overweight; #5 Exclusive breastfeeding; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- WHO recommendations on interventions to improve preterm birth outcomes. Geneva: World Health Organization; 2015 (https://apps.who.int/iris/bitstream/handle/10665/183037/9789241508988_eng.pdf?sequence=1, accessed 10 May 2019).
- Guidelines on optimal feeding of low birth-weight infants in low- and middle-income countries. Geneva: World Health Organization; 2011 (https://www.who.int/maternal_child_adolescent/documents/9789241548366.pdf?ua=1, accessed 11 May 2019).
- Kangaroo mother care: a practical guide. Geneva: World Health Organization; 2003 (https://www.who.int/reproductivehealth/publications/maternal_perinatal_health/9241590351/en/, accessed 11 May 2019).

D. Assessment and management of wasting

✓ Identify infants under 6 months of age with severe acute malnutrition (undernutrition)

Applicable contexts/population groups: All countries, all settings; infants under 6 months of age

WHO recommendation

Infants who are under 6 months of age and have a weight-for-length more than 3 *z*-scores below the *WHO child growth standards* median, or the presence of bilateral pitting oedema, are considered to have severe acute malnutrition. These children should receive the same general medical care as infants with severe acute malnutrition who are 6 months of age or older.

Use of the WHO growth velocity standards, and the assessment of growth velocity (weight), is equally important as, or even more important than, a single weight-for-length value.

Summary of key evidence

- Severe acute malnutrition is increasingly being recognized in infants under 6 months of age and is associated with higher mortality in young infants than in older infants and children.
- The development of severe acute malnutrition in infants under 6 months of age commonly reflects suboptimal feeding practices, especially breastfeeding practices, in addition to other contributing factors, including low birth weight, diarrhoea, or chronic disease/disability.

Key actions for implementation

- Feeding approaches for infants under 6 months of age with severe acute malnutrition should prioritize establishing, or re-establishing, effective exclusive breastfeeding by the mother or other caregiver.

Considerations

- Assessment of the physical and mental health status of mothers or caregivers should be promoted, and relevant treatment or support provided.

❑ Inpatient management of infants under 6 months of age with severe acute malnutrition (undernutrition)

Applicable contexts/population groups: All countries, all settings; infants under 6 months of age with severe acute malnutrition as previously defined (See Identify infants under 6 months of age with severe acute malnutrition (undernutrition))

WHO recommendation

- Infants under 6 months of age with severe acute malnutrition and any of the following complicating factors should be admitted for inpatient care and further assessment:
  - o any serious clinical condition or medical complication for infants aged 6 months or older with severe acute malnutrition, as outlined in Recommendation 1.3 of the WHO Guideline: updates on the management of severe acute malnutrition in infants and children;
  - o recent weight loss or failure to gain weight;
  - o ineffective feeding (attachment, positioning and suckling) directly observed by health-care workers for 15–20 min, ideally in a supervised separated area;
  - o any pitting oedema;
  - o any medical or social issue needing more detailed assessment or intensive support (e.g. disability, depression of the caregiver, or other adverse social circumstances).
- Infants with severe acute malnutrition who are admitted for inpatient care:
  - o should be given parenteral antibiotics to treat possible sepsis and appropriate treatment for other medical complications such as tuberculosis (TB), HIV, surgical conditions or disability;
  - o should be breastfed where possible, and the mothers or female caregivers should be supported to breastfeed their infants. If an infant is not breastfed, support should be given to the mother or female caregiver to relactate. If this is not possible, wet nursing[a] should be encouraged;
  - o should be provided a supplementary feed, especially where breast milk intake through breastfeeding is not sufficient:
    - supplementary suckling approaches should, where feasible, be prioritized;
    - for infants with severe acute malnutrition but no oedema, expressed breast milk should be given, and, where this is not possible, commercial (generic) infant formula milk or F-75 (only during the initial or stabilization phase) or diluted F-100[b] may be given, either alone or as the supplementary feed together with breast milk;
  - o should not be given undiluted F-100 at any time (owing to the high renal solute load and risk of hypernatraemic dehydration);
  - o if there is no realistic prospect of being breastfed, should be given appropriate and adequate replacement feeds, such as commercial (generic) infant formula milk, with relevant support to enable safe preparation and use, including at home when discharged.

[a] Potential wet nurses should be tested for HIV.

[b] Prepared F-100 should be further diluted by adding 30% water.

- Infants under 6 months of age who have been admitted to inpatient care can be transferred to outpatient care when all the following conditions are met:
  - all clinical conditions or medical complications, including oedema, are resolved;
  - the infant has good appetite, and is clinically well and alert;
  - weight gain on either exclusive breastfeeding or replacement feeding is satisfactory, e.g. above the median of the *WHO growth velocity standards* or more than 5 g/kg per day for at least 3 successive days;
  - the infant has been checked for immunizations and other routine interventions;
  - the mothers or caregivers are linked with needed community-based follow-up and support.
- Infants under 6 months of age can be discharged from all care when all the following conditions are met:
  - they are breastfeeding effectively or feeding well with replacement feeds;
  - they have adequate weight gain or they have weight-for-length or height 2 or more standard deviations below the median compared to the WHO child growth standards.

Summary of key evidence

- Severe acute malnutrition is increasingly being recognized in infants under 6 months of age and is associated with higher mortality in young infants than in older infants and children.
- The development of severe acute malnutrition in infants under 6 months of age commonly reflects suboptimal feeding practices, especially breastfeeding practices, in addition to other contributing factors, including low birth weight, diarrhoea or chronic disease/disability.

Key actions for implementation

- Feeding approaches for infants who are under 6 months of age with severe acute malnutrition should prioritize establishing, or re-establishing, effective exclusive breastfeeding by the mother or other caregiver.

Considerations

- Assessment of the physical and mental health status of mothers or caregivers should be promoted, and relevant treatment or support provided.
- Infants who have been identified to have poor weight gain and who have not responded to nutrition counselling and support should be admitted for further investigation and treatment.
- Any infant or child with a general danger sign as defined by the Integrated Management of Children Illness (IMCI)[a] should be admitted for urgent treatment and care.

[a] Unable to drink or breastfeed; vomits everything; has had convulsions (more than one or prolonged >15 min); lethargic or unconscious; convulsing now.

❑ Outpatient management of infants under 6 months of age with severe acute malnutrition (undernutrition)

Applicable contexts/population groups: All countries, all settings; infants under 6 months of age with severe acute malnutrition as previously defined (See Identify infants under 6 months of age with severe acute malnutrition (undernutrition))

WHO recommendation

- Infants under 6 months of age with severe acute malnutrition but none of the complications listed for admission to inpatient care should be treated as outpatients.
- Infants under 6 months of age with severe acute malnutrition who do not require inpatient care should:
  - o be provided with counselling and support for optimal infant and young child feeding, based on general recommendations for feeding infants and young children, including for low-birth-weight infants;
  - o have their weight gain monitored weekly to observe changes;
  - o be referred to inpatient care if they do not gain weight, or lose weight while the mother or caregiver is receiving support for breastfeeding;
  - o have an assessment of the physical and mental health status of their mothers or caregivers and relevant treatment or support provided.

Summary of key evidence

- Severe acute malnutrition is increasingly being recognized in infants under 6 months of age and is associated with higher mortality in young infants than in older infants and children.
- The development of severe acute malnutrition in infants under 6 months of age commonly reflects suboptimal feeding practices, especially breastfeeding practices, in addition to other contributing factors, including low birth weight, diarrhoea or chronic disease/disability.
- Severe acute malnutriton can be effectively treated in the community without admission to a health facility or therapeutic feeding centre.
- Community treatment of severe acute malnutrition relies on timely detection of severe acute malnutrition, as well as regular monitoring of weight gain and support for breastfeeding.

Key actions for implementation

- Feeding approaches for infants who are under 6 months of age with severe acute malnutrition should prioritize establishing, or re-establishing, effective exclusive breastfeeding by the mother or other caregiver.

Considerations

- Assessment of the physical and mental health status of mothers or caregivers should be promoted, and relevant treatment or support provided.
- Infants who have been identified to have poor weight gain and who have not responded to nutrition counselling and support should be admitted for further investigation and treatment.
- Any infant or child with a general danger sign as defined by the IMCI[a] should be admitted for urgent treatment and care.

[a] Unable to drink or breastfeed; vomits everything; has had convulsions (more than one or prolonged >15 min); lethargic or unconscious; convulsing now.

Contributes to global nutrition targets: #6 Wasting

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Guideline. Assessing and managing children at primary health care facilities to prevent overweight and obesity in the context of the double burden of malnutrition. Updates for the Integrated Management of Children Illness (IMCI). Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/259133/9789241550123-eng.pdf, accessed 10 May 2019).
- Guideline: updates on the management of severe acute malnutrition in infants and children. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/95584/9789241506328_eng.pdf?sequence=1, accessed 11 May 2019).
- Pocketbook of hospital care for children: guidelines for the management of common children illnesses, 2nd ed. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/81170/9789241548373_eng.pdf?sequence=1, accessed 16 May 2019).
- WHO child growth standards and the identification of severe acute malnutrition in infants and children. A joint statement by the World Health Organization and United Nations Children's Fund. Geneva: World Health Organization; 2009 (https://apps.who.int/iris/bitstream/handle/10665/44129/9789241598163_eng.pdf?ua=1, accessed 10 May 2019).
- WHO child growth standards. Growth velocity based on weight, length and head circumference. Methods and development. Geneva: World Health Organization; 2009 (https://www.who.int/childgrowth/standards/velocity/tr3_velocity_report.pdf, accessed 10 May 2019).
- Management of severe malnutrition: a manual for physicians and other senior health workers. Geneva: World Health Organization; 1999 (https://apps.who.int/iris/bitstream/handle/10665/41999/a57361.pdf?sequence=1, accessed 10 May 2019).

E. Vitamin A supplementation for infants under 6 months of age

X Neonatal vitamin A supplementation (i.e. supplementation within the first 28 days of life) is not recommended

X Vitamin A supplementation for infants aged 1–5 months is not recommended

Applicable contexts/population groups: All countries, all settings; infants under 6 months of age

Rationale

- In settings where vitamin A deficiency and/or undernutrition is common, infants – who are dependent on external sources of vitamin A – are likely to receive inadequate amounts of vitamin A from breast milk, owing to poor maternal nutritional status. Supplementation of neonates with vitamin A has been a proposed solution.
- Data are inconsistent, however, with most providing no clear indication of benefit of neonatal vitamin A supplementation.
- Studies indicate that vitamin A supplementation for infants under 6 months of age provides no benefit in terms of reducing the risk of illness and death.

Further information

- Guideline: neonatal vitamin A supplementation. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44626/9789241501798_eng.pdf?sequence=1, accessed 10 May 2019).
- Guideline: vitamin A supplementation in infants 1–5 months of age: Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44628/9789241501811_eng.pdf?sequence=1, accessed 11 May 2019).

2. Children

A. Appropriate complementary feeding

❑ Enable feeding of appropriate complementary foods

Applicable contexts/population groups: All countries, all settings; infants and young children aged 6–23 months

WHO recommendation

Infants should be exclusively breastfed for the first 6 months of life, to achieve optimal growth, development and health. Thereafter, to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe complementary foods, while continuing to breastfeed for up to 2 years or beyond.

For the breastfed child aged 6–23 months:

- 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. Continue frequent, on-demand breastfeeding until 2 years of age or beyond.
- Practise responsive feeding, applying the principles of psychosocial care.
- Practise good hygiene and proper food handling.
- Start at 6 months of age with small amounts of food and increase the quantity as the child gets older, while maintaining frequent breastfeeding.
- Gradually increase the consistency and variety of food as the infant gets older, adapting to their requirements and abilities.
- Increase the number of times that the child is fed complementary foods as they get older.
- Feed a variety of foods to ensure that nutrient needs are met.
- As needed, use fortified complementary foods or vitamin–mineral supplements (preferably mixed with or fed with food) for the infant.
- 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.

For the non-breastfed child aged 6–23 months:

- Ensure that the child's energy needs are met.
- Practise good hygiene and proper food handling.
- Practise responsive feeding, applying the principles of psychosocial care.
- Gradually increase the consistency and variety of food as the infant gets older, adapting to their requirements and abilities.
- 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.
- Feed a variety of foods to ensure that nutrient needs are met.

- As needed, use fortified foods or vitamin–mineral supplements (preferably mixed with or fed with food) that contain iron.
- 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.
- 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.

Summary of key evidence

- Complementary feeding refers to feeding of solid or semi-solid foods starting at 6 months when breast milk alone is no longer sufficient to meet the nutritional requirements of infants.
- Optimal complementary feeding is critical for preventing malnutrition during a period of time when infection caused by food contamination increases and when low-density foods are often used to replace breast milk.

Key actions for implementation

- Provide quality counselling of mothers and caregivers and support for appropriate complementary feeding at the facility and community level, including behaviour-change communication regarding optimal feeding practices to other family and community decision-makers.
- Maximize the use of locally produced foods in any given setting.
- If locally available foods will not satisfy nutritional requirements, consider alternative foods/products, such as centrally produced fortified foods, micronutrient powders for point-of-use fortification, or lipid-based nutrient supplements.

Contributes to global nutrition targets: #1 Stunting; #4 Overweight

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- Guiding principles for feeding non-breastfed children 6–24 months of age. Geneva: World Health Organization; 2005 (https://apps.who.int/iris/bitstream/handle/10665/43281/9241593431.pdf?sequence=1, accessed 10 May 2019).
- Pan American Health Organization, World Health Organization. Guiding principles for complementary feeding of the breastfed child. Washington (DC): Pan American Health Organization; 2003 (https://www.who.int/nutrition/publications/guiding_principles_compfeeding_breastfed.pdf, accessed 10 May 2019).

B. Growth monitoring and assessment

❑ Weight and height or length assessments for children under 5 years of age

Applicable contexts/population groups: All countries, all settings; children under 5 years of age

WHO best practice statement[a]

All infants and children aged under 5 years presenting to primary health-care facilities should have both weight and length/height measured, in order to determine their weight-for-length/height and to classify their nutritional status according to the *WHO child growth standards*.

[a] A best practice statement is not a recommendation that can be supported by comparative clinical studies, but rather a formal statement of practices that are considered important and in the best interest of patients.

Summary of key evidence

- The prevalence of overweight and obesity has increased sharply in recent decades, including among children and in all regions of the world. As of 2018, an estimated 40 million children aged under 5 years were overweight, with consequences for increased risk of type 2 diabetes, high blood pressure, asthma and other respiratory problems, sleep disorders and liver disease.
- Children with moderate or severe wasting, severe acute malnutrition or moderate stunting are at increased risk of mortality, particularly those who are severely affected.
- With respect to identifying both wasting and overweight and obesity, it is important to relate a child's weight-for-age to their length/height, in order to correctly interpret their nutritional status. Measuring weight only can lead to misclassification of nutritional status, though measurement of height/length is not routine in many settings.
- The double burden of malnutrition – where undernutrition and overnutrition can exist simultaneously in the same household or individual – means that both undernutrition and overweight need to be reliably identified by public health approaches.

Key actions for implementation

- Provide training to health workers on correct height/length assessment among children aged under 5 years and standardize height measurements as part of growth monitoring programmes or primary care for children aged under 5 years.
- Provide sensitization to health workers around the importance of height measurements for accurately assessing nutritional status, as well as to parents of young children.

✓ Nutrition counselling for children under 5 years of age

Applicable contexts/population groups: All countries, all settings; children under 5 years of age

WHO best practice statement[a]

Caregivers and families of infants and children aged under 5 years presenting to primary health-care facilities should receive general nutrition counselling, including promotion and support for exclusive breastfeeding in the first 6 months and continued breastfeeding until 24 months or beyond.

[a] A best practice statement is not a recommendation that can be supported by comparative clinical studies, but rather a formal statement of practices that are considered important and in the best interest of patients.

Summary of key evidence

- The prevalence of overweight and obesity has increased sharply in recent decades, including among children and in all regions of the world. As of 2018, an estimated 40 million children aged under 5 years were overweight, with consequences for increased risk of type 2 diabetes, high blood pressure, asthma and other respiratory problems, sleep disorders and liver disease.
- Children with moderate or severe wasting, severe acute malnutrition or moderate stunting are at risk of increased mortality, particularly those who are severely affected.

Key actions for implementation

- Provide training to health workers on correct height/length assessment among children aged under 5 years and standardize height measurements as part of growth monitoring programmes or primary care for children aged under 5 years.
- Provide sensitization to health workers around the importance of height measurements for accurately assessing nutritional status, as well as to parents of young children.

❑ Develop a management plan for overweight children under 5 years of age presenting to primary health-care facilities

Applicable contexts/population groups: All countries, all settings; children under 5 years of age who are overweight

WHO recommendation

At primary health-care facilities, children aged under 5 years who are identified as obese should be assessed and an appropriate management plan should be developed. This can be done by a health worker at primary health-care level, if adequately trained, or at a referral clinic or local hospital.

Summary of key evidence

- The prevalence of overweight and obesity has increased sharply in recent decades, including among children and in all regions of the world. As of 2018, an estimated 40 million children aged under 5 years were overweight, with consequences for increased risk of type 2 diabetes, high blood pressure, asthma and other respiratory problems, sleep disorders and liver disease.

Key actions for implementation

- All obese children and their caregivers should be assessed and a comprehensive care plan should be developed to address underlying risk factors, promote weight reduction and healthy practices, and provide psychosocial support. Assessment should include screening for early indicators of metabolic syndrome, e.g. raised blood pressure for age, or hyperglycaemia/insulin resistance or signs of hyperlipidaemia.
- Depending on the capacity of staff at primary health-care facilities, a management plan for weight management and dealing with medical complications will be needed. This may be undertaken at a primary health-care facility or may require referral to specialist services at another centre. After a management plan has been developed, it may be possible to follow up children at primary health-care facilities, depending on local resources and capacity.

Considerations

- These referral systems for children with obesity should be clarified when the recommendation is being implemented at primary health-care facilities. Low availability, or lack of services may be a significant constraint.

Contributes to global nutrition targets: #1 Stunting; #4 Children overweight; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- Guideline. Assessing and managing children at primary health care facilities to prevent overweight and obesity in the context of the double burden of malnutrition. Updates for the Integrated Management of Children Illness (IMCI). Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/259133/9789241550123-eng.pdf, accessed 10 May 2019).
- WHO child growth standards and the identification of severe acute malnutrition in infants and children. A joint statement by the World Health Organization and United Nations Children's Fund. Geneva: World Health Organization; 2009 (https://apps.who.int/iris/bitstream/handle/10665/44129/9789241598163_eng.pdf?ua=1, accessed 10 May 2019).

C. Assessment and management of wasting

✓ Identify infants and children aged 6–59 months with severe acute malnutrition (undernutrition)

Applicable contexts/population groups: All countries, all settings; infants and children aged 6–59 months

WHO recommendation

Children with a mid-upper arm circumference <115 mm or weight for height/length more than 3 *z*-scores below the *WHO growth standards* median, or with any degree of bilateral pitting oedema are considered to have severe acute malnutrition. These children should be referred for full assessment at a treatment centre for the management of severe acute malnutrition.

Summary of key evidence

- Severe acute malnutrition (undernutrition) affects nearly 20 million children under 5 years of age worldwide (primarily in south Asia and sub-Saharan Africa) and is estimated to contribute to approximately 1 million child deaths each year.
- Early identification of severe acute malnutrition (undernutrition) is important for initiating treatment and minimizing the risk of complications. This can be done in both community and health-care settings, using appropriate indicators.

Key actions for implementation

- In community settings, trained community health workers and community members should measure the mid-upper arm circumference of infants and children aged 6–59 months; while they are in primary health-care facilities and hospitals, health-care workers should assess the mid-upper arm circumference or the weight-for-height/weight-for-length status.
- In both settings, infants and children should be examined for bilateral pitting oedema.

Considerations

- Visible severe wasting is not included as a diagnostic criterion. However, all undernourished children should be clinically examined when undressed, as part of routine management.
- All anthropometric indicators are assumed to be derived from the *WHO child growth standards*.

❑ Inpatient management of infants and children aged 6–59 months with severe acute malnutrition (undernutrition)

Applicable contexts/population groups: All countries, all settings; infants and children aged 6–59 months with severe acute malnutrition, defined as a mid-upper arm circumference less than 115 mm or weight-for-height/length more than 3 *z*-scores below the *WHO child growth standards* median, or with any degree of bilateral pitting oedema

WHO recommendation

Children who are identified as having severe acute malnutrition should first be assessed with a full clinical examination to confirm whether they have medical complications and whether they have an appetite.

- Children who have appetite (pass the appetite test[a]) and are clinically well and alert should be treated as outpatients.
- Children who have medical complications, severe oedema (+++[b]), or poor appetite (fail the appetite test[a]), or who present with one or more Integrated Management of Children Illness (IMCI) danger signs[c] should be treated as inpatients.

F-75 therapeutic milk is recommended for use as the therapeutic food in the stabilization phase of inpatient management of children with severe acute malnutrition. F-100 therapeutic milk may be used as the therapeutic food in the rehabilitation phase of inpatient management of children with severe acute malnutrition. Inpatient care treatment guidelines are outlined in the documents listed at the end of this section.

[a] Appetite test (https://www.fantaproject.org/sites/default/files/resources/Appetite-Test-NACS-Module%204-Mar2017.pdf).
[b] Severe oedema generalized to the feet, legs, arms and face.
[c] Unable to drink or breastfeed; vomits everything; has had convulsions (more than one or prolonged >15 min); lethargic or unconscious; convulsing now.

Children aged 6–59 months with severe acute malnutrition who are admitted to hospital (inpatient care) can be transferred to outpatient care when their medical complications, including oedema, are resolving and they have good appetite, and are clinically well and alert.

Summary of key evidence

- Severe acute malnutrition (undernutrition) affects nearly 20 million children under 5 years of age worldwide (primarily in south Asia and sub-Saharan Africa) and is estimated to contribute to approximately 1 million child deaths each year.
- Early identification of severe acute malnutrition (undernutrition) is important for initiating treatment and minimizing the risk of complications.
- While many children with severe acute malnutrition (undernutrition) can be treated in the community (see "Outpatient management of children aged 6–59 months with severe acute malnutrition (undernutrition)"), children with medical complications or severe oedema, or who fail the appetite test, or present with one or more IMCI danger signs need to be treated as inpatients.
- WHO has developed guidelines for the inpatient treatment of children aged under 5 years with severe acute malnutrition (undernutrition) in hospitals and health centres.

Key actions for implementation

- In primary health-care facilities and hospitals, health-care workers should assess the mid-upper arm circumference or the weight-for-height/length status of infants and children aged 6–59 months and also examine them for bilateral oedema.
- Infants and children aged 6–59 months who have a mid-upper arm circumference less than 115 mm or a weight-for-height/length more than 3 z-scores below the *WHO child growth standards* median, or have bilateral oedema, should be immediately admitted to a programme for the management of severe acute malnutrition.

Considerations

- Visible severe wasting is not included as a diagnostic criterion. However, all malnourished children should be clinically examined when undressed, as part of routine management.
- All anthropometric indicators are assumed to be derived from the *WHO child growth standards*.
- Admission for inpatient care may also be warranted if there are significant mitigating circumstances such as disability or social issues, or there are difficulties with access to care.
- Children with severe acute malnutrition (undernutrition) who are discharged from treatment programmes should be periodically monitored to avoid a relapse.

❑ Outpatient management of infants and children aged 6–59 months with severe acute malnutrition (undernutrition)

Applicable contexts/population groups: All countries, all settings; infants and children aged 6–59 months with severe acute malnutrition, defined as a mid-upper arm circumference less than 115 mm or weight-for-height/length more than 3 *z*-scores below the *WHO child growth standards* median, or with any degree of bilateral pitting oedema

WHO recommendation

Children who are identified as having severe acute malnutrition should first be assessed with a full clinical examination to confirm whether they have medical complications and whether they have an appetite.

- Children who have appetite (pass the appetite test[a]) and are clinically well and alert should be treated as outpatients.
- Children who have medical complications, severe oedema (+++)[b], or poor appetite (fail the appetite test[a]) or present with one or more Integrated Management of Childhood Illness (IMCI) danger signs[c] should be treated as inpatients.
- Outpatient care guidelines are outlined in detail in the documents listed at the end of this section. Briefly:
  - o children aged over 6 months with severe acute malnutrition, appetite and no medical complications can be managed in the community;
  - o children with uncomplicated severe acute malnutrition, not requiring to be admitted and who are managed as outpatients, should be given a course of oral antibiotic such as amoxicillin;
  - o children with severe acute malnutrition should be provided a ready-to-use therapeutic food (RUTF) in amounts adjusted to their weight;
  - o children aged 6–59 months with severe acute malnutrition should receive the daily recommended nutrient intake of vitamin A throughout the treatment period;
  - o children should be offered safe drinking water to drink at will and breastfeeding should be continued and offered ad libitum;
  - o children being managed as outpatients should be followed up weekly by a skilled health-care worker;
  - o children who fail to respond, or who develop medical complications, should be assessed by an experienced health-care worker and referred for inpatient care;
  - o children with severe acute malnutrition should only be discharged from treatment when their weight-for-height/length has increased to 2 *z*-score or less below the *WHO child growth standards* median and they have had no oedema for at least 2 weeks, or their mid-upper-arm circumference is 125 mm or more and they have had no oedema for at least 2 weeks.

[a] Appetite test (https://www.fantaproject.org/sites/default/files/resources/Appetite-Test-NACS-Module%204-Mar2017.pdf).

[b] Severe oedema generalized to the feet, legs, arms and face.

[c] Unable to drink or breastfeed; vomits everything; has had convulsions (more than one or prolonged >15 min); lethargic or unconscious; convulsing now.

Summary of key evidence

- Severe acute malnutrition (undernutrition) affects nearly 20 million children under 5 years of age worldwide (primarily in south Asia and sub-Saharan Africa) and is estimated to contribute to approximately 1 million child deaths each year.
- Early identification of severe acute malnutrition (undernutrition) is important for initiating treatment and minimizing the risk of complications.
- Uncomplicated forms of severe acute malnutrition (undernutrition) can be effectively treated in the community without admission to a health facility or therapeutic feeding centre, through use of RUTF given to children until they have gained adequate weight. RUTFs are soft or crushable foods that can be consumed easily by children from the age of 6 months without adding water and have a similar composition to F-100, which is the therapeutic diet used in hospital settings.
- Community treatment of severe acute malnutrition (undernutrition) relies on timely detection of severe acute malnutrition, as well as regular monitoring of weight gain.

Key actions for implementation

- In primary health-care facilities and hospitals, health-care workers should assess the mid-upper arm circumference or the weight-for-height/weight-for-length status of infants and children aged 6–59 months and also examine them for bilateral oedema.
- In community settings, trained community health workers and community members should measure the mid-upper arm circumference of infants and children aged 6–59 months, while in primary health-care facilities and hospitals, health-care workers should assess the mid-upper arm circumference or the weight-for-height/length status.
- In both settings, infants and children should be examined for bilateral pitting oedema.
- Children with severe acute malnutrition (undernutrition) who are discharged from treatment programmes should be periodically monitored to avoid a relapse.
- Children with severe acute malnutrition (undernutrition) should be provided with about 5000 IU vitamin A daily, either as an integral part of therapeutic foods or as part of a multi-micronutrient formulation. If they are given therapeutic foods that are not fortified as recommended in WHO specifications, and vitamin A is not part of other daily supplements, they should be given a high dose of vitamin A (50 000 IU, 100 000 IU or 200 000 IU, depending on age) on admission to a treatment programme.

Considerations

- Visible severe wasting is not included as a diagnostic criterion. However, all malnourished children should be clinically examined when undressed, as part of routine management.
- All anthropometric indicators are assumed to be derived from the *WHO child growth standards*.
- The anthropometric indicator that is used to confirm severe acute malnutrition (undernutrition) should also be used to assess whether a child has reached nutritional recovery, i.e. if mid-upper arm circumference is used to identify that a child has severe acute malnutrition (undernutrition), then mid-upper arm circumference should be used to assess and confirm nutritional recovery. Similarly, if weight-for-height is used to identify that a child has severe acute malnutrition (undernutrition), then weight-for-height should be used to assess and confirm nutritional recovery.

- Children admitted with only bilateral pitting oedema should be discharged from treatment based on whichever anthropometric indicator, mid-upper arm circumference or weight-for-height is routinely used in programmes.
- Percentage weight gain should not be used as a discharge criterion.
- In some settings, it may be possible to construct an appropriate therapeutic diet using locally available nutrient-dense foods with added micronutrient supplements. However, this approach requires very careful monitoring because it is hard to achieve nutrient adequacy.
- Given the overlap in presentation of severe acute malnutrition (undernutrition) and HIV infection and AIDS in children, especially in poor areas, strong links between community-based management of severe acute malnutrition and AIDS programmes are essential. Voluntary counselling and testing should be available for children with severe acute malnutrition and for their mothers. At the same time, children who are known to be living with HIV and who develop severe acute malnutrition should have access to therapeutic feeding to improve their nutritional status.

❑ Management of infants and children aged 6–59 months with moderate acute malnutrition (undernutrition)

Applicable contexts/population groups: All countries, all settings; infants and children aged 6–59 months with moderate acute malnutrition, defined as a mid-upper arm circumference 115 mm or more and less than125 mm or weight-for-height/length between 2 and 3 *z*-scores below the *WHO child growth standards* median, without oedema

WHO recommendation

Infants and children aged 6–59 months with moderate acute malnutrition (defined as a mid-upper arm circumference 115 mm or more and less than 125 mm or weight-for-height between 2 and 3 *z*-scores below the *WHO child growth standards* median, without oedema) need to consume nutrient-dense foods to meet their extra needs for weight and height gain and functional recovery.

Dietary management of these children should be based on the optimal use of locally available foods; in settings where the available foods will not meet the requirements of children with moderate acute malnutrition, specially formulated supplementary foods[a] can be used.

[a] Supplementary foods are specially formulated foods, in ready-to-eat or milled form, which are modified in their energy density, protein, fat or micronutrient composition to help the nutritional requirements of specific populations. A proposed nutrient composition of supplementary foods for the management of moderately malnourished children can be found in the WHO technical note referenced at the end of this section.

Summary of key evidence

- Children with moderate acute malnutrition require increased intake of energy and essential nutrients.
- The dietary management of children with moderate acute malnutrition should be based on optimal use of locally available foods.
- In settings where food is scarce or where some nutrients are not sufficiently available through local foods, specially formulated supplementary foods have been used to treat children with moderate acute malnutrition.
- WHO has published a technical note (referenced at the end of this section) that summarizes existing knowledge and presents principles on the dietary management of children with moderate acute malnutrition. This technical note also proposes a nutrient composition profile for supplementary foods.

Considerations

- Currently there are no evidence-informed recommendations on the composition of supplementary foods used to treat children with moderate acute malnutrition (undernutrition).
- Management of moderate acute malnutrition (undernutrition) in children aged 6–59 months should include essential nutrition actions such as breastfeeding promotion and support, education and nutrition counselling for families, and other activities that identify and prevent the underlying causes of undernutrition, including nutrition insecurity.
- 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 contain 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.

Contributes to global nutrition targets: #6 Wasting

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Guideline. Assessing and managing children at primary health care facilities to prevent overweight and obesity in the context of the double burden of malnutrition. Updates for the Integrated Management of Children Illness (IMCI). Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/259133/9789241550123-eng.pdf?sequence=1, accessed 11 May 2019).
- Guideline. Updates on the management of severe acute malnutrition in infants and children. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/95584/9789241506328_eng.pdf?ua=1, accessed 10 May 2019).
- Pocketbook of hospital care for children. Guidelines for the management of common children illnesses, 2nd ed. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/81170/9789241548373_eng.pdf?sequence=1, accessed 11 May 2019).
- Technical note: supplementary foods for the management of moderate acute malnutrition in infants and children 6–59 months of age. Geneva: World Health Organization; 2012 (https://apps.who.int/iris/bitstream/handle/10665/75836/9789241504423_eng.pdf?sequence=1, accessed 11 May 2019).
- IMAI district clinician manual: hospital care for adolescents and adults. Guidelines for the management of common illnesses with limited resources. Geneva: World Health Organization; 2011 (https://www.who.int/hiv/pub/imai/imai2011/en/, accessed 11 May 2019).
- WHO child growth standards and the identification of severe acute malnutrition in infants and children. A joint statement by the World Health Organization and United Nations Children's Fund. Geneva: World Health Organization; 2009 (https://apps.who.int/iris/bitstream/handle/10665/44129/9789241598163_eng.pdf?ua=1, accessed 10 May 2019).
- Management of severe malnutrition: a manual for physicians and other senior health workers. Geneva: World Health Organization; 1999 (https://apps.who.int/iris/bitstream/handle/10665/41999/a57361.pdf?sequence=1, accessed 11 May 2019).

❑ Provision of supplementary foods to infants and children with moderate wasting presenting to primary health-care facilities

Applicable contexts/population groups: All countries, all settings; infants and children aged 6–59 months with moderate acute malnutrition, primary health-care facilities

Rationale

- Every child with moderate acute malnutrition deserves treatment. Treatment includes medical interventions - when necessary - and counselling, dietary support and other complementary interventions as indicated.
- Supplementary foods are not systematically recommended as a routine default component of treatment for moderate wasting for all children as not every child with with moderate wasting in every context requires this specific intervention.
- Infants and children aged 6-59 month with moderate wasting need to consume a diet consisting of nutrient-dense foods to meet their extra needs for nutritional and functional recovery. Ideally, this should come in the form of locally available nutritious foods. Feasibility of which should take into account the availability, affordability and accessibility of nutrient-dense foods. Nutrient-dense foods are those high in nutrients relative to their caloric content, i.e. they have a relatively high content of vitamins, minerals, essential amino acids and healthy fats. Examples of nutrient-dense foods include animal source foods, beans, nuts, and many fruits and vegetables.
- There may be a role for the provision of supplementary foods in settings where there is a high prevalence of acute malnutrition or food insecurity, at community or household level, and as part of the continuum of care for the individual child that includes appropriate treatment of clinical conditions and other modifiable factors, provision of nutritional counselling, and subsequent follow-up to assess the response. IMCI has no explicit guidance for health workers when they identify a child with moderate wasting.
- Evidence for improved growth from supplementation of children with moderate acute malnutrition is limited, and the range of supplements available have not been evaluated for this purpose.

X Provision of supplementary foods for treating stunting among infants and children who present to primary health-care facilities

Applicable contexts/population groups: All countries, all settings; infants and children aged 6–59 months with moderate stunting

Rationale

- There is no evidence that supplementary feeding changes stunting outcomes.
- In addition, the resources required for providing supplementary foods are substantial in terms of the food, as well as storage, distribution and staff training costs.

Further information

- Guideline. Assessing and managing children at primary health care facilities to prevent overweight and obesity in the context of the double burden of malnutrition. Updates for the Integrated Management of Children Illness (IMCI). Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/259133/9789241550123-eng.pdf, accessed 10 May 2019).
- Technical note: supplementary foods for the management of moderate acute malnutrition in infants and children 6–59 months of age. Geneva: World Health Organization; 2012 (https://apps.who.int/iris/bitstream/handle/10665/75836/9789241504423_eng.pdf?sequence=1, accessed 11 May 2019).

D. Iron-containing micronutrient supplementation

❑ Provision of iron-containing micronutrient powders for point-of-use fortification of foods for infants and young children aged 6–23 months

Applicable contexts/population groups: Settings in which the prevalence of anaemia in children under 2 years of age (or under 5 years of age, if the former is unavailable) is 20% or more

WHO recommendation

In populations where anaemia is a public health problem, point-of-use fortification of complementary foods with iron-containing micronutrient powders (MNPs) is recommended, to improve iron status and reduce anaemia among infants and young children aged 6–23 months. A suggested scheme for fortification and the composition of MNP sachets is provided in the table below.

Suggested scheme for point-of-use fortification with iron-containing micronutrient powders of foods consumed by infants and young children aged 6–23 months

Composition per sachet[a]	Iron: 10–12.5 mg of elemental iron[b] Vitamin A: 300 µg of retinol Zinc: 5 mg of elemental zinc With or without other micronutrients to achieve 100% of the recommended nutrient intake[c]
Regimen	Programme target of 90 sachets/doses over a 6-month period
Target group	Infants and young children aged 6–23 months, starting at the same time as weaning foods are introduced into the diet
Settings	Areas where the prevalence of anaemia in children aged under 2 years or under 5 years is 20% or higher

[a] MNPs are generally packaged in small sachets that are temperature- and moisture-resistant, easy to transport and store, and have a long shelf-life

[b] 12.5 mg of elemental iron equals 37.5 mg of ferrous fumarate or 62.5 mg of ferrous sulfate heptahydrate or equivalent amounts in other iron compounds. In children aged 6–12 months, sodium iron EDTA (NaFeEDTA) is generally not recommended. If NaFeEDTA is selected as a source of iron, the EDTA intake (including other dietary sources) should not exceed 1.9 mg EDTA/kg/day.

[c] Recommended nutrient intake (RNI). Multiple micronutrient powders can be formulated with or without other vitamins and minerals in addition to iron, vitamin A and zinc, to achieve 100% of the recommended nutrient intake, and also taking into consideration the technical and sensory properties.

Summary of key evidence

- It can be challenging to meet the requirements for key nutrients like iron and vitamin A in young children through plant-based diets alone. In many settings, the cost of animal-source foods is prohibitive and mass-fortified products may not be available or may not meet nutrient needs.
- MNPs – powders that contain multiple micronutrients that can be mixed into complementary foods – have been shown to reduce iron deficiency and anaemia and increase haemoglobin concentrations. They have several logistical advantages over supplements (e.g. packaged in small sachets, making them easy to transport and store) as well as biological advantages (e.g. reduced frequency and severity of side-effects, a more "physiological" provision of nutrients with food).

Key actions for implementation

- The term "home fortification" has been substituted by the term "point-of-use fortification" because the process of fortification occurs not only at home but also at schools, nurseries, refugee camps or other places, where appropriate.
- The use of multiple micronutrient powders is a preventive strategy for implementation at population level without screening for any condition or disease. Children diagnosed with anaemia should be treated appropriately, according to WHO and national guidelines.
- Anaemia is frequently caused by iron deficiency, but other factors may contribute to anaemia, including other micronutrient deficiencies (e.g. folic acid, zinc, vitamins A and B_{12}), malaria, soil-transmitted helminths, other infections, and blood disorders (e.g. thalassaemias, sickle cell). The use of multiple micronutrient powders for the age groups indicated in the recommendations should be part of an integrated approach to address anaemia, which should explicitly address inequities in the causes of micronutrient deficiencies (i.e. some population groups are more affected and/or vulnerable to micronutrient deficiencies than other groups when stratifying by, for instance, income level, place of residence or educational level, as well as when taking into account cultural practices, social norms around gender, or stigma suffered by groups that are discriminated against in each specific context).
- Programmes of point-of-use fortification with micronutrient powders should include a behaviour-change strategy that promotes awareness and correct use of this product, proper and hygienic preparation, feeding of complementary foods for children older than 6 months and a healthy diet for children older than 2 years. Recommended breastfeeding practices, hand-washing with soap, prompt attention to fever in malaria settings, and measures to manage diarrhoea should also be included. Further, these programmes should include training for health-care workers or other types of workers to adequately provide nutrition counselling and demonstrate the correct use of multiple micronutrient powders.

Considerations

- In malaria-endemic areas, the provision of iron in any form, including micronutrient powders for point-of-use fortification, should be implemented in conjunction with measures to prevent, diagnose and treat malaria. Provision of iron through these interventions should not be made to children who do not have access to malaria-prevention strategies (e.g. provision of insecticide-treated bednets and vector-control programmes), prompt diagnosis of malaria illness, and treatment with effective antimalarial drug therapy.
- In settings where iron supplementation among the target population has been widely implemented and has proved to be effective, a cost-effectiveness analysis is recommended, to determine whether the current intervention should be replaced by provision of MNPs.

❑ Provision of iron-containing micronutrient powders for point-of-use fortification of foods for infants and children aged 2–12 years

Applicable contexts/population groups: Settings in which the prevalence of anaemia in children aged 2–12 years is 20% or more; children aged 2–12 years

WHO recommendation

In populations where anaemia is a public health problem, point-of-use fortification of foods with iron-containing micronutrient powders (MNPs) in children aged 2–12 years is recommended, to improve iron status and reduce anaemia. A suggested scheme for fortification and the composition of MNP sachets is provided in the table below.

Suggested scheme for point-of-use fortification of foods with iron-containing micronutrient powders in children aged 2–12 years	
Composition per sachet[a]	Iron: 10–12.5 mg of elemental iron for children aged 2–4 years and 12.5–30 mg of elemental iron for children aged 5–12 years[b] Vitamin A: 300 µg of retinol Zinc: 5 mg of elemental zinc, with or without other micronutrients to achieve 100% of the recommended nutrient intake With or without other micronutrients to achieve 100% of the RNI[c]
Regimen	Programme target of 90 sachets/doses over a 6-month period
Target group	Children aged 2–12 years
Settings	Areas where the prevalence of anaemia in children under 5 years of age is 20% or higher

[a] MNPs are generally packaged in small sachets that are temperature- and moisture-resistant, easy to transport and store, and have a long shelf-life; where feasible, likely consumption from other sources, including home diets and fortified foods, should be taken into consideration for eastablishing the composition of the sachet.

[b] 12.5 mg of elemental iron equals 37.5 mg of ferrous fumarate or 62.5 mg of ferrous sulfate heptahydrate or equivalent amounts in other iron compounds. If sodium iron EDTA (NaFeEDTA) is selected as a source of iron, the dose of elemental iron should be reduced by 3–6 mg due to its higher bioavailability. The appropriate range of NaFeEDTA is an area of research need.

[c] Recommended nutrient intake (RNI). Multiple micronutrient powders can be formulated with or without other vitamin and minerals in addition to iron, vitamin A and zinc to achieve 100% of the recommended nutrient intake and also taking into consideration the technical and sensory properties.

Summary of key evidence

- It can be challenging to meet the requirements for key nutrients like iron and vitamin A in children through plant-based diets alone. In many settings, the cost of animal-source foods is prohibitive and mass-fortified products may not be available or may not meet nutrient needs.
- MNPs – powders that contain multiple micronutrients that can be mixed into foods – have been shown to reduce iron deficiency and anaemia and increase haemoglobin concentrations. They have several logistical advantages over supplements (e.g. packaged in small sachets, making them easy to transport and store) as well as biological advantages (e.g. reduced frequency and severity of side-effects, a more "physiological" provision of nutrients with food).

Key actions for implementation

- Prior to implementation, interventions involving point-of-use fortification of foods with MNPs should have well-defined objectives that take into account available resources; existing policies; suitable delivery platforms; and suppliers, communication channels and potential stakeholders.
- Point-of-use fortification programmes using MNPs should start with a pilot and be scaled up, as experience and evidence grow and resources allow. They should also be preceded by an assessment of the nutritional status of children and existing measures to control anaemia and vitamin A deficiency (e.g. supplementation programmes or provision of fortified foods), to ensure that daily micronutrient needs are not exceeded.
- Ideally, MNPs should be implemented as part of a national infant and young child feeding programme. The selection of the most appropriate delivery platform should be context specific, with the aim of reaching the least favoured populations and ensuring an adequate and continued supply of the powders.
- Point-of-use fortification programmes that include use of MNPs should also include a behaviour-change communication strategy that promotes awareness and correct use of the powders, along with information on hand-washing with soap and hygienic preparation of food; prompt attention to fever in malaria settings; and measures to manage diarrhoea.

Considerations

- In malaria-endemic areas, the provision of iron should be implemented in conjunction with measures to prevent, diagnose and treat malaria.
- In settings where iron supplementation among the target population has been widely implemented and has proved to be effective, a cost-effectiveness analysis is recommended, to determine whether the current intervention should be replaced by provision of MNPs.

❑ Daily iron supplementation for infants and young children aged 6–23 months

Applicable contexts/population groups: Settings in which the prevalence of anaemia in infants and young children under 2 years of age is 40% or more; infants and young children aged 6–23 months

WHO recommendation

Daily iron supplementation is recommended as a public health intervention for infants and young children aged 6–23 months, living in settings where the prevalence of anaemia is 40% or higher in this age group, for preventing iron deficiency and anaemia. A suggested scheme for supplementation is provided in the table below.

Suggested scheme for daily iron supplementation for infants and young children aged 6–23 months	
Supplement composition	10–12.5 mg elemental iron[a]
Supplement form	Drops/syrups
Frequency	Daily
Duration	Three consecutive months in a year
Target group	Infants and young children (6–23 months of age)
Settings	Where the prevalence of anaemia in infants and young children is 40% or higher[b]

[a] 10–12.5 mg of elemental iron equals 50–62.5 mg of ferrous sulfate heptahydrate, 30–37.5 mg of ferrous fumarate or 83.3–104.2 mg of ferrous gluconate.

[b] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).

Summary of key evidence

- Iron deficiency is thought to be the primary nutritional cause of anaemia and is associated with impaired cognitive development and school performance.
- Children under 2 years of age have particularly high iron requirements, owing to their rapid growth and development, and meeting those nutrient needs can be challenging in many settings.
- Daily iron supplementation for children aged 6–23 months decreases the risk of anaemia, iron deficiency and iron deficiency anaemia.

❑ Daily iron supplementation for children aged 2–12 years

Applicable contexts/population groups: Settings where the prevalence of anaemia in children over 2 years of age is 40% or more; children aged 2–12 years

WHO recommendation

Daily iron supplementation is recommended as a public health intervention for preschool children (24–59 months) and school-age children (5–12 years), living in settings where the prevalence of anaemia in these age groups is 40% or higher, for increasing haemoglobin concentrations, improving iron status and preventing iron deficiency and anaemia. A suggested scheme for supplementation is provided in the table below.

Suggested schemes for daily iron supplementation for children aged 24–59 months and 5–12 years

Target group	Preschool-age children (24–59 months)	School-age children (5–12 years)
Supplement composition	30 mg of elemental iron[a]	30–60 mg of elemental iron[b]
Supplement form	Drops/syrups/tablets	Tablets or capsules
Frequency	Daily	Daily
Duration	Three consecutive months per year	Three consecutive months per year
Settings	Where the prevalence of anaemia in preschool-age children is 40% or higher[c]	Where the prevalence of anaemia in school-age children is 40% or higher[c]

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

[b] 30–60 mg of elemental iron equals 150–300 mg of ferrous sulfate heptahydrate, 90–180 mg of ferrous fumarate, or 250–500 mg of ferrous gluconate.

[c] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).

Summary of key evidence

- Approximately 600 million preschool and school-age children have anaemia and roughly half of anaemia cases are estimated to be due to iron deficiency. Iron deficiency anaemia in children has been linked to increased children morbidity and impaired cognitive development and school performance.
- Children are particularly vulnerable to iron deficiency anaemia because of their increased iron requirements in the periods of rapid growth, especially in the first 5 years of life.
- Daily iron supplementation for children aged 24–59 months is associated with increased ferritin (an indicator of iron stores) and haemoglobin levels, and lower risk of anaemia, iron deficiency and iron deficiency anaemia in children aged 5–12 years.

Key actions for implementation

- Prior to implementation, a public health programme that includes the provision of iron supplements to children should have well-defined objectives that take into account available resources, existing policies, suitable delivery platforms and suppliers, communication channels, and potential stakeholders. The selection of the most appropriate delivery platform should be context specific, with the aim of ensuring that the most vulnerable members of the populations are reached.
- Supplementation programmes should start with a pilot and be scaled up as experience and evidence grow and resources allow.
- Ideally, an iron supplementation programme should be implemented as part of a multisectoral approach to control anaemia, through addressing other micronutrient deficiencies (vitamin A, folic acid, B vitamins, in addition to iron), and infectious disease (malaria, helminths/parasites). Though iron deficiency is frequently the primary factor contributing to anaemia, it is important to recognize that not all anaemia will be corrected with iron alone.
- A plan for monitoring and evaluation with appropriate indicators is encouraged at all stages. As part of this, an ongoing assessment of the accessibility and acceptability of the intervention should be conducted, to inform programme design and development.
- Proper training of health workers is necessary for delivery of the intervention and also for collection of the data needed for programme monitoring and surveillance, including information on factors related to health inequities.

Considerations

- Daily oral iron supplementation is a preventive strategy for implementation at the population level. If a child is diagnosed with anaemia, national guidelines for the treatment of anaemia should be followed.
- If the prevalence of anaemia among preschool and school-age children is 20–40%, intermittent regimens of iron supplementation can be considered.
- In malaria-endemic areas, iron supplementation does not increase the risk of clinical malaria or death when regular malaria-surveillance and treatment services are provided. Oral iron interventions should not be given to children who do not have access to malaria-prevention strategies (e.g. provision of insecticide-treated bednets and vector-control programmes), prompt diagnosis of malaria illness, and treatment with effective antimalarial drug therapy.
- The risk of clinical malaria is not more likely among iron-replete children given iron supplementation in malaria-endemic areas. There is no need to screen for anaemia prior to iron supplementation in settings where anaemia is highly prevalent.
- Since malaria infection can occur in early infants and is especially dangerous at this age, in malaria-endemic areas, iron supplements should only be given to infants who sleep under insecticide-treated bednets, and where all episodes of malaria illness can be promptly treated with effective antimalarial drug therapy according to national guidelines.

❑ Intermittent iron supplementation for children aged 2–12 years

Applicable contexts/population groups: Settings where the prevalence of anaemia in children over 2 years of age is 20% or more; children aged 2–12 years

WHO recommendation

In settings where the prevalence of anaemia in preschool (24–59 months) or school-age (5–12 years) children is 20% or higher, intermittent iron supplementation is recommended as a public health intervention for preschool and school-age children, to improve iron status and reduce the risk of anaemia. A recommended dosage amount and schedule is provided in the table below.

Suggested schemes for intermittent iron supplementation for children aged 24–59 months and 5–12 years

Target group	Preschool-age children (24–59 months)	School-age children (5–12 years)
Supplement composition	25 mg of elemental iron[a]	45 mg of elemental iron[b]
Supplement form	Drops/syrups	Tablets/capsules
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	
Settings	Where the prevalence of anaemia in preschool or school-age children is 20% or higher[c]	

[a] 25 mg of elemental iron equals 75 mg of ferrous fumarate, 125 mg of ferrous sulfate heptahydrate or 210 mg of ferrous gluconate.

[b] 45 mg of elemental iron equals 135 mg of ferrous fumarate, 225 mg of ferrous sulfate heptahydrate or 375 mg of ferrous gluconate.

[c] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).

Summary of key evidence

- Approximately 600 million preschool and school-aged children have anaemia and roughly half of anaemia cases are estimated to be due to iron deficiency. Iron-deficiency anaemia in children has been linked to increased children morbidity and impaired cognitive development and school performance.
- Children are particularly vulnerable to iron-deficiency anaemia because of their increased iron requirements in the periods of rapid growth, especially in the first 5 years of life.
- Supplementation with iron once, twice or three times per week on non-consecutive days has been proposed as an effective and safe way to increase children's iron intake. These intermittent regimens may lead to fewer side-effects than the daily regimen and increase adherence to supplementation.

Key actions for implementation

- Prior to implementation, a public health programme that includes the provision of iron supplements to children should have well-defined objectives objectives that take into account available resources, existing policies, suitable delivery platforms and suppliers, communication channels and potential stakeholders.
- Supplementation programmes should start with a pilot and be scaled up as experience and evidence grow and resources allow.

- Ideally, an iron supplementation programme should be implemented as part of a multisectoral approach to control anaemia, through addressing other micronutrient deficiencies (vitamin A, folic acid, B vitamins, in addition to iron), and infectious disease (malaria, helminths/parasites). Though iron deficiency is frequently the primary factor contributing to anaemia, it is important to recognize that not all anaemia will be corrected with iron alone.
- The provision of iron supplements on an intermittent basis may be integrated into school or community programmes to reach the target populations. The selection of the most appropriate delivery platform should be context specific, with the aim of ensuring that the most vulnerable members of the populations are reached.
- A plan for monitoring and evaluation with appropriate indicators is encouraged at all stages. As part of this, an ongoing assessment of the accessibility and acceptability of the intervention should be conducted, to inform programme design and development.
- Proper training of health workers is necessary for delivery of the intervention and also for collection of the data needed for programme monitoring and surveillance, including information on factors related to health inequities.

Considerations

- In malaria-endemic areas, the provision of iron supplements should be implemented in conjunction with adequate measures to prevent, diagnose and treat malaria.
- Intermittent iron supplementation is a preventive strategy for implementation at population level. If a child is diagnosed with anaemia in a clinical setting, they should be treated with daily iron supplementation until their haemoglobin concentration rises to normal. They can then be switched to an intermittent regimen to prevent the recurrence of anaemia.
- Where infection with hookworm is endemic (prevalence 20% or greater), it may be more effective to combine iron supplementation with anthelminthic treatment in children aged over 5 years. Universal anthelminthic treatment, irrespective of infection status, is recommended at least annually in these areas.
- If intermittent iron supplementation is integrated into existing school or community programmes, these programmes should ensure that the daily nutritional needs of preschool or school-age children are met and not exceeded, through the evaluation of nutritional status and intake, as well as consideration of existing anaemia and micronutrient deficiency-control measures (such as provision of vitamin A supplements, fortified foods and anthelminthic therapy).

Contributes to global nutrition targets: —

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- WHO guideline: use of multiple micronutrient powders for point-of-use fortification of foods consumed by infants and young children aged 6–23 months and children aged 2–12 years. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/252540/9789241549943-eng.pdf?ua=1, accessed 7 May 2019).
- Guideline: daily iron supplementation in infants and children. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/204712/9789241549523_eng.pdf?sequence=1, accessed 11 May 2019).
- Guideline: Intermittent iron supplementation in preschool and school-age children. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44648/9789241502009_eng.pdf?sequence=1, accessed 11 May 2019).

E. Vitamin A supplementation

❑ High-dose vitamin A supplementation for infants and children aged 6–59 months

Applicable contexts/population groups: Settings where the prevalence of night-blindness is 1% or more in children aged 24–59 months of age, or the prevalence of vitamin A deficiency is 20% or higher in infants and young children aged 6–59 months

WHO recommendation:

In settings where vitamin A deficiency is a public health problem (where the prevalence of night-blindness is 1% or higher in children aged 24–59 months, or where the prevalence of vitamin A deficiency [serum retinol 0.70 µmol/L or lower] is 20% or higher in infants and children aged 6–59 months), high-dose vitamin A supplementation is recommended for infants and children aged 6–59 months. A suggested scheme for supplementation is provided in the table below.

Suggested vitamin A supplementation scheme for infants and children aged 6–59 months

Target group	Infants aged 6–11 months (including HIV-positive infants)	Children aged 12–59 months (including HIV-positive children)
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 aged 24–59 months, or where the prevalence of vitamin A deficiency (serum retinol 0.70 µmol/L or lower) is 20% or higher in infants and children aged 6–59 months	

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. 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.

Summary of key evidence

- Vitamin A deficiency during infants and children can lead to visual impairment, and increased illness and mortality from children infections, including diarrhoea and measles.
- Vitamin A deficiency alone is responsible for 6% of deaths in children aged under 5 years in Africa and 8% in South-East Asia.
- Vitamin A supplementation for children aged 6–59 months is associated with a reduced risk of all-cause mortality and a reduced incidence of diarrhoea.

Key actions for implementation

- 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, vitamin A supplementation should be implemented as part of an integrated strategy that includes control of vitamin A deficiencies. Vitamin A supplementation should be used along with other strategies to improve vitamin A intakes, such as dietary diversification and food fortification.
- A vitamin A supplementation programme should begin as a pilot and be scaled up as the evidence grows and resources allow. Vitamin A supplements should be delivered to children aged 6–59 months twice yearly, during health-system contacts. This should be marked on the child health card, or integrated into other public health programmes aimed at improving child survival, such as national immunization days for polio or measles, or biannual child health days delivering a package of interventions such as deworming, distribution of insecticide-treated mosquito nets and immunizations.
- A plan for monitoring and evaluation with appropriate indicators is encouraged at all stages.

Considerations

- The above recommendation can also be applied in populations where infants and children may be infected with HIV.
- These recommendations do not cover the treatment of xerophthalmia nor the use of vitamin A supplements during episodes of measles.
    - o See "Vitamin A supplementation for infants and children with measles" for use of vitamin A as a part of management of measles.

Contributes to global nutrition targets: #1 Stunting

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Guideline: vitamin A supplementation for infants and children 6–59 months of age. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44664/9789241501767_eng.pdf;jsessionid=8588A6A1ABE288A2F7F3E5047E71E1D6?sequence=1, accessed 10 May 2019).

F. Iodine supplementation

❑ Iodine supplementation (or iodine-fortified complementary food) for infants and young children aged 6–23 months

Applicable contexts/population groups: Countries or settings where 20% or fewer households have access to iodized salt and complementary food fortified with iodine is not available; infants and young children aged 6–23 months

WHO recommendation

Countries, or areas within countries, in which less than 20% of the households have access to iodized salt should assess the current situation of their salt-iodization programme, to identify national or subnational problems and to update their strategies and action plans. Children aged 6–23 months should be given either a supplement or complementary food fortified with iodine until the salt-iodization programme is scaled up. A recommended daily and annual dose is provided in the table below for children aged 6–23 months.

WHO-recommended dosages of daily and annual iodine supplementation for infants and young children aged 6–23 months

Population group	Daily dose of iodine supplement (µg/day)	Single annual dose of iodized oil supplement (mg/year)
Infants and young children aged under 2 years[a,b]	90	200

[a] For infants aged 0–5 months, iodine supplementation should be given through breast milk. This implies that the infant is exclusively breastfed and that the lactating mother received iodine supplementation (see Iodine supplementation for non-pregnant women (15–49 years) and pregnant women "for recommended dosages for these groups".

[b] These figures for iodine supplements are given in situations where complementary food fortified with iodine is not available, in which case iodine supplementation is required for children aged 6–23 months.

Summary of key evidence

- Iodine is essential for healthy brain development in the fetus and young child.
- WHO and UNICEF recommend universal salt iodization as a global strategy. However, in certain countries, salt iodization may not be feasible in all regions, and some countries have not yet achieved adequate coverage with iodized salt.
- Evidence suggests that in settings where universal salt iodization is not fully implemented, pregnant and lactating women and children under 2 years of age may not be receiving adequate amounts of iodized salt and thus are getting insufficient iodine for their needs.

Key actions for implementation

- Assess the current situation of the salt-iodization programme, population iodine nutrition status, and household coverage with iodized salt, to identify national or subnational problems.
- Update salt-iodization strategies and action plans to achieve universal coverage of iodized salt, through increasing political commitment, advocacy, capacity-building of the salt industry, creation and enforcement of regulations/legislation regarding salt iodization, and effective monitoring.

- Explore the feasibility of providing iodine supplements or fortified foods to infants and young children aged 6–23 months until salt iodization is scaled up.
- Monitoring of iodine fortification and supplementation programmes is crucial, to ensure that additional iodine intake is effective in reducing iodine deficiency, while preventing excessive intake that may lead to adverse health consequences. The monitoring process should include the assessment of coverage and iodine nutrition status.

Considerations

- Countries, or areas within countries, in which 20–50% of the households have access to iodized salt will need to assess the feasibility of increasing iodine intake in the form of a supplement or iodine-fortified foods for the most susceptible groups. This assessment (described in further detail in the WHO guideline at the end of this section) includes:
  - o assessing population iodine nutrition status, household coverage with iodized salt (preferably disaggregated) and salt-iodization programmes;
  - o developing new plans to strengthen salt iodization;
  - o if a country does not succeed in scaling up its salt-iodization programme within 2 years, exploring the feasibility of increasing the iodine intake of susceptible groups by means of supplements or iodine-fortified foods, as a temporary measure, while strengthening the salt-iodization programme;
  - o assessing the feasibility of providing additional iodine should include: (i) the costing of supplementation; (ii) existing channels for distribution to reach the target groups; (iii) the likely duration of supplementation; and (iv) potential compliance.
- Irrespective of where countries, or areas within countries, are categorized with respect to coverage of iodized salt, there are specific situations, such as in emergencies, among displaced people, and in geographically remote areas, where additional iodine intake should be considered. If iodized salt is not accessible in these specific situations, increasing iodine intake is required in the form of iodine supplements for pregnant and lactating women, and a supplement or complementary food fortified with iodine for infants and young children aged 6–23 months.

Contributes to global nutrition targets: —

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Joint statement by the World Health Organization and the United Nations Children's Fund. Reaching optimal iodine nutrition in pregnant and lactating women and young children. Geneva: World Health Organization; 2007 (https://www.who.int/nutrition/publications/micronutrients/WHOStatement_IDD_pregnancy.pdf, accessed 10 May 2019).

G. Zinc supplementation in the management of diarrhoea

❑ Zinc supplementation with increased fluids and continued feeding for management of diarrhoea in infants and children

Applicable contexts/population groups: All countries, all settings; infants and children with diarrhoea

WHO recommendation

Mothers, other caregivers and health workers should provide children with diarrhoea with 20 mg per day of zinc supplementation (10 mg/day for children <6 months of age) for 10–14 days.

Summary of key evidence

- Diarrhoea remains a leading cause of death among infants and young children in low- and middle-income countries.
- Oral rehydration salts are a proven life-saving treatment for children with diarrhoea.
- Use of zinc supplements with oral rehydration salts has been shown to reduce diarrhoeal mortality by 23%, reduce the duration and severity of diarrhoea, and prevent subsequent diarrhoeal episodes.
- Zinc is thought to affect immune function or intestinal structure or function, as well as the epithelial recovery process during diarrhoea.

Key actions for implementation

- Resolve policy issues that may prevent scaling up of zinc treatment, including empowering community-level workers to use zinc in diarrhoea case-management; improving outreach and service linkages with communities; and updating and disseminating child health policies to include the use of zinc for treatment of diarrhoea.
- Address supply issues that restrict adequate supplies of zinc supplements in some countries/settings.
- Improve routine data collection to measure progress on diarrhoea control, so that appropriate decisions can be made.

Considerations

- Countries should protect, prevent and treat diarrhoea, and implement these measures as part of an integrated package of child survival interventions.
- Complementary interventions for treatment of diarrhoea in addition to zinc supplementations with oral rehydration salts among children include improved care-seeking behaviour and referrals; improved case-management at community and health-facility levels; and continued feeding.

Contributes to global nutrition targets: #1 Stunting

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Ending preventable child deaths from pneumonia and diarrhea by 2025. The Integrated Global Action Plan for Pneumonia and Diarrhoea (GAPPD). Geneva: World Health Organization/The United Nations Children's Fund; 2013 (https://apps.who.int/iris/bitstream/handle/10665/79200/9789241505239_eng.pdf;jsessionid=342A1A224BAB99DCFACCAD5F941388DF?sequence=1, accessed 10 May 2019).

3. Adolescents

A. Iron-containing micronutrient supplementation

❑ Intermittent iron and folic acid supplementation for menstruating non-pregnant adolescent girls

Applicable contexts/population groups: Settings where the prevalence of anaemia in women is 20% or higher; menstruating non-pregnant adolescent girls

WHO recommendation

In populations where the prevalence of anaemia among non-pregnant women is 20% or higher, intermittent iron and folic acid supplementation is recommended as a public health intervention for menstruating non-pregnant adolescent girls, to improve their haemoglobin concentrations and iron status and reduce the risk of anaemia. A suggested scheme for supplementation is provided in the table below.

Suggested scheme for intermittent iron and folic acid supplementation for menstruating non-pregnant adolescent girls	
Supplement composition	Iron: 60 mg of elemental iron[a] Folic acid: 2800 µg (2.8 mg)
Supplement form	Tablets
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
Target group	All menstruating non-pregnant adolescent girls
Settings	Populations where the prevalence of anaemia among non-pregnant women is 20% or higher[b]

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

[b] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).

Summary of key evidence

- More than one third of non-pregnant women have anaemia and roughly half of these cases are estimated to be due to iron deficiency. Because of their iron losses due to menstruation and typically low iron content of their diets, menstruating non-pregnant adolescent girls are at particular risk of iron deficiency and anaemia.
- Intermittent supplementation with iron and folic acid (i.e. once, twice or three times a week) has been shown to be effective, safe and more acceptable than daily supplementation for improving haemoglobin concentrations in menstruating adolescent girls and lowering their risk of anaemia.

Key actions for implementation

- Intermittent supplementation with iron and folic acid for menstruating non-pregnant adolescent girls should ideally be integrated into national programmes for sexual and reproductive health. The selection of the most appropriate delivery platform should be context specific, with the aim of reaching the most vulnerable populations and ensuring a timely and continuous supply of supplements.

- Supplementation should be preceded by an evaluation of the nutritional status of menstruating non-pregnant adolescent girls and of the existing measures to control anaemia and folate insufficiency, such as programmes for hookworm control, food fortification or adequate diet promotion, so as to not exceed recommended dosages of iron.
- Providing behaviour-change communication on the benefits of the intervention and management of side-effects, along with provision of high-quality supplements with appropriate packaging, will improve the acceptability and adherence to iron and folic acid supplementation. Such a strategy can also serve to promote dietary diversification and the intake of food combinations that improve iron absorption.

Considerations

- Intermittent iron and folic acid supplementation is a preventive strategy for implementation at population level. If an adolescent girl 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.
- In malaria-endemic areas, the provision of iron and folic acid supplements should be implemented in conjunction with adequate measures to prevent, diagnose and treat malaria.
- Intermittent iron and folic acid supplements could be given to women planning pregnancy, to improve their iron stores. On confirmation of pregnancy, women should receive standard antenatal care, including daily or intermittent iron and folic acid supplementation, depending on their anaemia status.

❑ Daily iron supplementation for menstruating non-pregnant adolescent girls

Applicable contexts/population groups: Settings where the prevalence of anaemia non-pregnant in women is 40% or higher; menstruating non-pregnant adolescent girls

WHO recommendation

Daily iron supplementation is recommended as a public health intervention for menstruating non-pregnant adolescent girls where anaemia is highly prevalent (40% or higher anaemia prevalence), for the prevention of anaemia and iron deficiency. A suggested scheme for supplementation is provided in the table below.

Suggested scheme for daily iron supplementation for menstruating non-pregnant adolescent girls	
Supplement composition	30–60 mg of elemental iron[a]
Supplement form	Tablets
Frequency	Daily
Duration	Three consecutive months per year
Target group	All menstruating non-pregnant adolescent girls
Settings	Where the prevalence of anaemia in non-pregnant women is 40% or higher[b]

[a] 30–60 mg of elemental iron equals 90–180 mg of ferrous fumarate, 150–300 mg of ferrous sulfate heptahydrate or 250–500 mg of ferrous gluconate.

[b] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).

Summary of key evidence

- More than one third of non-pregnant women have anaemia and roughly half of these cases are estimated to be due to iron deficiency. Because of their iron losses due to menstruation and typically low iron content of their diets, menstruating non-pregnant adolescent girls are at particular risk of iron deficiency and anaemia.
- Adherence may be a concern if the intervention is perceived as non-essential. Barriers to adherence may need to be addressed (for instance, with behaviour-change communication if the intervention is not perceived as necessary among the beneficiaries).

Key actions for implementation

- Prior to implementation, an iron supplementation programme should have well-defined objectives that take into account available resources, existing policies, suitable delivery platforms and suppliers, communication channels and potential stakeholders.
- Supplementation programmes should start with a pilot and be scaled up as experience and evidence grow and resources allow.
- Daily oral iron supplementation is a preventive strategy for implementation at the population level. If an adolescent girl is diagnosed with anaemia, national guidelines for the treatment of anaemia should be followed.
- Daily oral iron supplementation should be considered in the context of other interventions containing iron (fortified foods, multiple micronutrient powders, lipid-based nutrient supplements).
- The selection of the most appropriate delivery platform should be context specific, with the aim of reaching the most vulnerable populations and ensuring a timely and continuous supply of supplements.
- All women, from the moment they begin trying to conceive until 12 weeks of gestation, should take a folic acid supplement. Daily oral iron and folic acid supplementation should be part of routine antenatal care, started as early as possible and continued throughout pregnancy. Where the prevalence of anaemia in pregnant women is high (40% or more), supplementation should continue for 3 months in the postpartum period.
- A plan for monitoring and evaluation with appropriate indicators is encouraged at all stages. As part of this, an ongoing assessment of the accessibility and acceptability of the intervention should be conducted, to inform programme design and development.

Considerations

- In malaria-endemic areas, the provision of iron supplements should be implemented in conjunction with adequate measures to prevent, diagnose and treat malaria.
- In malaria-endemic areas, iron supplementation does not increase the risk of clinical malaria or death when regular malaria-surveillance and treatment services are provided. Oral iron interventions should not be given to adolescent girls who do not have access to malaria-prevention strategies (e.g. provision of insecticide-treated bednets and vector-control programmes), prompt diagnosis of malaria illness, and treatment with effective antimalarial drug therapy.
- The risk of clinical malaria is not more likely among iron-replete adolescent girls given iron supplementation in malaria-endemic areas. There is no need to screen for anaemia prior to iron supplementation in settings where anaemia is highly prevalent.

- Daily iron supplementation is a preventive strategy for implementation at population level. If an adolescent girl is diagnosed with anaemia in a clinical setting, she should be treated with daily iron supplementation until her haemoglobin concentration rises to normal. She can then be switched to an intermittent regimen to prevent the recurrence of anaemia.
- If the prevalence of anaemia is 20–40%, intermittent regimens of iron supplementation can be considered.
- Where infection with hookworm is endemic (prevalence 20% or greater), it may be more effective to combine iron supplementation with anthelminthic treatment. Universal anthelminthic treatment, irrespective of infection status, is recommended at least annually in these areas.
- The selection of the most appropriate delivery platform should be context specific, with the aim of reaching the most vulnerable populations and ensuring a timely and continuous supply of supplements. If daily iron supplementation is integrated into existing school or community programmes, these programmes should ensure that the daily nutritional needs of menstruating adolescent girls are met and not exceeded, through the evaluation of nutritional status and intake, as well as consideration of existing anaemia and micronutrient deficiency-control measures (such as provision of vitamin A supplements, fortified foods and anthelminthic therapy).

Contributes to global nutrition targets: #2 Anaemia

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Guideline: implementing effective actions for improving adolescent nutrition. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/260297/9789241513708-eng.pdf?sequence=1, accessed 10 May 2019).
- Guideline. Daily iron supplementation in adult women and adolescent girls. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/204761/9789241510196_eng.pdf?sequence=1, accessed 10 May 2019).
- Guideline: intermittent iron and folic acid supplementation in menstruating women. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44649/9789241502023_eng.pdf, accessed 10 May 2019).

4. Adults

A. Nutritional care of women during pregnancy and postpartum

❑ Nutritional counselling on healthy diet to reduce the risk of low birth weight

Applicable contexts/population groups: Settings where 20% or more of women are underweight (low BMI); pregnant women

WHO recommendation

In undernourished populations (20% or more low BMI among women), nutrition education on increasing daily energy and protein intake is recommended for pregnant women to reduce the risk of low-birth-weight neonates.

Summary of key evidence

- Good nutrition and a healthy diet during pregnancy are critical for a mother's health, as well as that of her child. A healthy diet contains adequate energy, protein, vitamins and minerals, obtained from a variety of foods, including green and orange vegetables, meat, fish, beans, nuts, whole grains and fruit.
- Evidence suggests that nutrition education and counselling may support optimal gestational weight gain, reduce the risk of anaemia in late pregnancy, increase birth weight, and lower the risk of preterm delivery. This strategy aims to increase the diversity and amount of foods consumed; promote adequate weight gain through sufficient and balanced protein and energy intake; and promote consistent and continued use of micronutrient supplements, food supplements or fortified foods.
- In undernourished populations, counselling may be more effective when women are also provided with nutrition support, such as food or micronutrient supplements where needed.

Key actions for implementation

- Provide strong training to practitioners that includes standardized guidance on nutrition that is evidence informed, sustainable, reproducible, accessible and adaptable to different cultural settings.
- Consider the delivery platform, provider and intervention style, to improve engagement of pregnant women with antenatal care services. Women may be more receptive to advice and information provided in an unhurried, caring and supportive way. Stakeholders might wish to consider alternative delivery platforms (e.g. peer counsellors, media reminders) and task-shifting for delivery of this intervention.
- In areas that are also highly food insecure or those with little access to a variety of foods, providing additional complementary interventions, such as distribution of balanced protein and energy supplements, to improve the effectiveness of nutritional counselling, is recommended.

Considerations

- Anthropometric characteristics of the general population are changing, and this needs to be taken into account by regularly reassessing the prevalence of undernutrition to ensure that the intervention remains relevant.

❑ Energy and protein dietary supplements for pregnant women in undernourished populations

Applicable contexts/population groups: Settings where 20% or more of women are underweight (low BMI); pregnant women

WHO recommendation

In undernourished populations (20% or more low BMI among women), balanced energy and protein dietary supplementation is recommended for pregnant women, to reduce the risk of stillbirths and small-for-gestational age neonates.

Summary of key evidence

- Undernourished pregnant women may be at increased risk for adverse pregnancy outcomes, including giving birth to low-birth-weight infants.
- Providing balanced protein–energy supplementation (i.e. supplements in which protein provides less than 25% of the total energy content) to undernourished pregnant women has been shown to promote gestational weight gain, improve fetal growth, and reduce the risk of stillbirth, low-birth-weight infants and small-for-gestational age infants.

Key actions for implementation

- Understand the context-specific etiology of undernutrition at the national and subnational levels (e.g. seasonal food shortages) before developing the supplementation programme. In this process, alternatives to direct supplement delivery, such as cash or vouchers, or improved local/national food production and distribution, should be explored.
- Identify the best delivery platforms, including antenatal care visits and alternative platforms. Continued and adequate supply of supplements is required, and antenatal care visits may not be sufficient, depending on local visit schedules. Additional visits may need to be scheduled, or alternative delivery mechanisms (e.g. community health workers) explored.
- Establish a quality-assurance programme to guarantee that supplements are manufactured, packaged and stored in controlled and uncontaminated environments. Local production of supplements – with appropriate quality assurance – may mitigate the cost and logistical implications of supplement delivery.
- Establish and implement a plan for monitoring and evaluation, with appropriate indicators; this is encouraged at all stages, including monitoring of household-level use, storage, waste and sharing of supplements.
- Identify context-specific and culturally appropriate ways (e.g. mass media, cellphone message) to remind women to take their supplements, and also how to manage supplement side-effects.
- In malaria-endemic areas, the provision of iron and folic acid supplements should be implemented in conjunction with adequate measures to prevent, diagnose and treat malaria.

Considerations

- This recommendation is for populations or settings with a high prevalence of undernourished pregnant women, and not for individual pregnant women identified as being undernourished.
- High-protein supplementation during pregnancy does not appear to be beneficial and may be harmful to the fetus (see the section that follows: "High-protein supplementation is not recommended for pregnant women in undernourished populations").
- Complementary interventions, such as antenatal nutritional advice with the aim of increasing maternal energy and protein intake, may be effective in increasing maternal protein intake and reducing the risk of preterm birth.
- Anthropometric characteristics of the general population are changing, and this needs to be taken into account to ensure that only those women who are likely to benefit (i.e. only undernourished women) are included. It is not known where there are risks associated with providing this intervention to women with a high BMI.

X High-protein supplementation is not recommended for pregnant women in undernourished populations

Applicable contexts/population groups: Settings where the population is undernourished; pregnant women

Rationale

- There is insufficient evidence on the benefits, if any, of high-protein supplementation.
- High-protein supplementation increases small-for-gestational age neonates.

✓ Daily iron and folic acid supplementation for pregnant women

Applicable contexts/population groups: All countries, all settings, routine antenatal care; pregnant women

WHO recommendation

Daily oral iron and folic acid supplementation with 30–60 mg of elemental iron[a] and 400 µg (0.4 mg) of folic acid[b] is recommended for pregnant women, to prevent maternal anaemia, puerperal sepsis, low birth weight and preterm birth.

In settings where anaemia in pregnant women is a severe public health problem (40% or more of pregnant women have anaemia with haemoglobin concentration <110 g/L), 60 mg of elemental iron is the preferred dose.

[a] The equivalent of 60 mg of elemental iron is 300 mg ferrous sulfate heptahydrate, 180 mg ferrous fumarate or 500 mg of ferrous gluconate.
[b] Folic acid should be commenced as early as possible (ideally before conception), to prevent neural tube defects.

Summary of key evidence

- More than 40% of pregnant women worldwide have anaemia, with half of anaemia cases estimated to be due to iron deficiency.
- Pregnant women require additional iron and folic acid, to meet their own nutritional needs as well as those of the developing fetus. Deficiencies in iron and folic acid during pregnancy can potentially negatively impact the health of the mother and her pregnancy, as well as fetal development.
- Evidence has shown that the use of iron and folic acid supplements is associated with a reduced risk of iron deficiency and anaemia in pregnant women.

Key actions for implementation

- Understand the context-specific etiology of anaemia and prevalence of risk factors at the country level, to make adaptations to the recommendation as needed.
- Provide effective communication with pregnant women regarding diet and healthy eating, including information on dietary sources of vitamins and minerals and dietary diversity and the importance of adhering to supplementation schemes. Women may be more receptive to advice and information provided in an unhurried, caring and supportive way.
- Task-shift responsibilities for supplement delivery to a broad range of cadres, including lay health workers, auxiliary nurses, nurses, midwives and doctors.
- In malaria-endemic areas, the provision of iron and folic acid supplements should be implemented in conjunction with adequate measures to prevent, diagnose and treat malaria.

Considerations

- In the first and third trimesters, the haemoglobin threshold for diagnosing anaemia is 110 g/L; in the second trimester, it is 105 g/L.
- The above guidelines are a preventive strategy for anaemia. If a woman is diagnosed with anaemia during pregnancy, her daily elemental iron should be increased to 120 mg until her haemoglobin concentration rises to normal (110 g/L or higher). Thereafter, she can resume the standard daily antenatal iron dose to prevent recurrence of anaemia.

❑ Intermittent iron and folic acid supplementation for pregnant women

Applicable contexts/population groups: Settings where the prevalence of anaemia in pregnant women is less than 20% or daily iron is not acceptable due to siide-effects; pregnant women

WHO recommendation

Intermittent oral iron and folic acid supplementation with 120 mg of elemental iron[a] and 2800 µg (2.8 mg) of folic acid once weekly is recommended for pregnant women, to improve maternal and neonatal outcomes if daily iron is not acceptable due to side-effects, and in populations with an anaemia prevalence among pregnant women of less than 20%.

[a]The equivalent of 120 mg of elemental iron is 600 mg ferrous sulfate heptahydrate, 360 mg ferrous fumarate or 1000 mg ferrous gluconate.

Summary of key evidence

- More than 40% of pregnant women worldwide have anaemia, with half of anaemia cases estimated to be due to iron deficiency.
- Pregnant women require additional iron and folic acid, to meet their own nutritional needs as well as those of the developing fetus. Deficiencies in iron and folic acid during pregnancy can potentially negatively impact the health of the mother and her pregnancy, as well as fetal development.

- Evidence has shown that the use of iron and folic acid supplements is associated with a reduced risk of iron deficiency and anaemia in pregnant women.
- Despite the proven efficacy of daily iron supplementation, use has been limited in programme settings, possibly due to a lack of compliance, concerns about the safety of the intervention among women with an adequate iron intake, and variable availability of the supplements at community level.
- Experience has shown that intermittent regimens may be more accepted by women, with increased adherence to supplementation programmes.

Key actions for implementation

- Ensure accurate measurement of maternal blood haemoglobin, to confirm the prevalence of anaemia before establishing a programme for intermittent iron supplementation.
- Provide effective communication with pregnant women regarding diet and healthy eating, including information on dietary sources of vitamins and minerals and dietary diversity and the importance of adhering to supplementation schemes. Women may be more receptive to advice and information provided in an unhurried, caring and supportive way.
- Task-shift responsibilities for supplement delivery to a broad range of cadres, including lay health workers, auxiliary nurses, nurses, midwives and doctors.
- Identify context-specific, and culturally appropriate ways (e.g. mass media, cellphone message) to remind women to take their supplements, and also how to manage supplement side-effects.
- In malaria-endemic areas, the provision of iron and folic acid supplements should be implemented in conjunction with adequate measures to prevent, diagnose and treat malaria.

Considerations

- In the first and third trimesters, the haemoglobin threshold for diagnosing anaemia is 110 g/L; in the second trimester, it is 105 g/L.
- The above guidelines are a preventive strategy for anaemia. If a woman is diagnosed with anaemia during pregnancy, her daily elemental iron should be increased to 120 mg until her haemoglobin concentration rises to normal (110 g/L or higher). Thereafter, she can resume the standard daily antenatal iron dose to prevent recurrence of anaemia.

❑ Vitamin A supplementation for pregnant women

Applicable contexts/population groups: Settings where 5% or more of women have a history of night-blindness in pregnancies in the past 3–5 years, or if 20% or more of pregnant women have a vitamin A deficiency; pregnant women

WHO recommendation

Vitamin A supplementation is only recommended for pregnant women in areas where vitamin A deficiency is a severe public health problem,[a] to prevent night-blindness. In such settings, vitamin A can be given daily or weekly. Existing WHO guidance suggests a dose of up to 10 000 IU vitamin A per day, or a weekly dose of up to 25 000 IU.

[a] Vitamin A deficiency is a severe public health problem if >5% of women in a population have a history of night blindness in their most recent pregnancy in the previous 3–5 years that ended in a live birth, or if >20% of pregnant women have a serum retinol level <0.70 µmol/L.

Summary of key evidence

- Vitamin A is important for vision, immune function and fetal growth and development. Vitamin A deficiency can cause visual impairment in the form of night-blindness and also increase susceptibility to illness.
- Pregnant women are susceptible to vitamin A deficiency throughout gestation, but are at most risk during the third trimester of pregnancy, owing to accelerated fetal development and the physiological increase in blood volume during this period.
- Some evidence indicates that low doses of vitamin A supplements given daily or weekly to pregnant women, starting in the second or third trimester, can reduce the severity of decline in maternal serum retinol levels during late pregnancy and the symptoms of night-blindness. Vitamin A supplements provided to pregnant women who are vitamin A deficient probably reduce maternal anaemia.
- However, current evidence indicates that vitamin A supplementation during pregnancy does not reduce the risk of illness or death in mothers or their infants.
- Vitamin A supplementation for pregnant women is only recommended in settings where vitamin A deficiency is severe, and is not recommended to improve maternal and perinatal outcomes.

Key actions for implementation

- Encourage pregnant women to receive adequate nutrition, through consumption of a healthy balanced diet, with particular emphasis on foods that are rich in vitamin A. Women may be more receptive to advice and information provided in an unhurried, caring and supportive way.
- Provide training to health-care providers on nutrition, including dietary sources of vitamin A.
- Vitamin A supplementation for pregnant women should be integrated into national programmes for adolescent and reproductive health, as well as programmes for control of vitamin A deficiency. Supplementation should be preceded by an evaluation of the nutritional status of women and of existing measures to control vitamin A deficiency.

Considerations

- 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 vitamin A status. A single dose of a vitamin A supplement greater than 25 000 IU is not recommended, as its safety is uncertain. Furthermore, a single dose of a vitamin A supplement greater than 25 000 IU might be teratogenic if consumed between day 15 and day 60 from conception.
- There is no demonstrated benefit from taking vitamin A supplements in populations where habitual daily vitamin A intakes exceed 8000 IU or 2400 µg, and the potential risk of adverse events increases with higher intakes (above 10 000 IU) if supplements are routinely taken by people in these populations.

Contributes to global nutrition targets: #1 Stunting; #2 Anaemia; #3 Low birth weight; #6 Wasting

Contributes to global noncommunicable disease targets: —

❑ Calcium supplementation for pregnant women to reduce the risk of pre-eclampsia

Applicable contexts/population groups: Settings where dietary calcium intake is low; pregnant women

WHO recommendation

In populations with low dietary calcium intake,[a] daily calcium supplementation (1.5–2.0 g elemental calcium) is recommended for pregnant women, to reduce the risk of pre-eclampsia.

[a] The target group for this recommendation comprises populations with observed low dietary calcium intake or those living in geographical areas where calcium-rich foods are not commonly available or consumed. In some studies, low dietary calcium intake has been defined as less than 900 mg per day. See "Considerations" below for methods to determine calcium intake.

Summary of key evidence

- Hypertensive disorders such as pre-eclampsia and eclampsia are among the main causes of maternal deaths and preterm births, especially in low-income countries.
- Preterm births are the leading cause of early neonatal deaths and infant mortality, and survivors are at higher risk of respiratory disease and long-term neurological morbidity.
- Obesity, diabetes, twin or teenage pregnancies and low calcium consumption increase the risk of developing pre-eclampsia.
- Calcium supplementation improves calcium intake and consequently reduces the risk of hypertensive disorders during pregnancy.

Key actions for implementation

- Provide effective communication to and counselling of pregnant women regarding diet and healthy eating, including information on rich dietary sources of calcium and the importance of adhering to supplementation schemes. Women may be more receptive to advice and information provided in an unhurried, caring and supportive way.
- Women should be counselled to avoid taking iron and calcium supplements concomitantly, owing to negative interactions between the two nutrients on absorption; supplements should ideally be taken several hours apart. The acceptability of supplements may be improved if the total daily dose is divided into three doses, preferably taken at mealtimes.
- Task-shift responsibilities for supplement delivery to a broad range of cadres, including lay health workers, auxiliary nurses, nurses, midwives and doctors.
- Identify context-specific, and culturally appropriate ways (e.g. mass media, cellphone message) to remind women to take their calcium supplements.

Considerations

- Determination of the dietary calcium intake of an individual woman is a complex task. Calcium intake at population level can be estimated through various means, including dietary surveys using 24-hour recalls, food-frequency questionnaires or food weighing, as well as through secondary data estimates derived from Food and Agriculture Organization of the United Nations (FAO) food balance sheets or household consumption and expenditure surveys.
- There is no clear evidence on the optimal timing of calcium supplementation during pregnancy; stakeholders may want to start supplementation at the first antenatal care visit.

Contributes to global nutrition targets: —

Contributes to global noncommunicable disease targets: #6 Raised blood pressure

WHO guidelines and recommendations

- WHO recommendation. Calcium supplementation during pregnancy for the prevention of pre-eclampsia and its complications. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/277235/9789241550451-eng.pdf, accessed 10 May 2019).
- WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/250796/9789241549912-eng.pdf?sequence=1, accessed 10 May 2019).

X Vitamin B_6 (pyridoxine) supplementation is not recommended

Applicable contexts/population groups: All countries, all settings, routine antenatal care; pregnant women

Rationale

- There is insufficient evidence on the benefits and harms, if any, of routine vitamin B_6 supplementation in pregnancy.
- Pregnant women should be encouraged to receive adequate nutrition, which is best achieved through consumption of a healthy, balanced diet.

X Vitamin C and E supplementation is not recommended

Applicable contexts/population groups: All countries, all settings, routine antenatal care; pregnant women

Rationale

- Combined vitamin C and E supplements have been evaluated mainly in the context of preventing pre-eclampsia (on which they appear to have little or no effect).
- Vitamin C alone may prevent prelabour rupture of membranes, and future research should consider vitamin C supplements apart from vitamin E.
- Pregnant women should be encouraged to receive adequate nutrition, which is best achieved through consumption of a healthy, balanced diet.

X Vitamin D supplementation is not recommended

Applicable contexts/population groups: All countries, all settings, routine antenatal care; pregnant women

Rationale

- Owing to the limited evidence currently available to directly assess the benefits and harms of the use of vitamin D supplementation alone in pregnancy for improving maternal and infant health outcomes, the use of this intervention during pregnancy as part of routine antenatal care is not recommended.
- The moderate-certainty evidence showing that adding vitamin D to calcium supplementation probably increases the incidence of preterm birth is of concern and this potential harm needs further investigation.
- Pregnant women should be advised that sunlight is the most important source of vitamin D. They should also be encouraged to receive adequate nutrition, which is best achieved through consumption of a healthy, balanced diet.

X Routine use of multiple micronutrient powders during pregnancy is not recommended as an alternative to standard iron and folic acid supplementation

Applicable contexts/population groups: All countires, all settings, routine antenatal care; pregnant women

❑ Zinc supplementation is only recommended for pregnant women in the context of rigorous research

Applicable contexts/population groups: All countries, research settings only; pregnant women

Rationale

- Though there is some evidence that zinc supplementation may reduce preterm birth, further research is warranted.
- It is unclear from the available evidence, what dose or timing of zinc supplementation, if any, might lead to a possible reduction in preterm birth. There is also little to no evidence of the side-effects of zinc supplementation, nor is it clear how zinc may compete with iron and calcium for absorption.

X Multiple micronutrient supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes

Applicable contexts/population groups: All countries, all settings, routine antenatal care; pregnant women

❑ Multiple micronutrient supplements that contain iron and folic acid may be considered for maternal health

Applicable contexts/population groups: Settings with a high prevalence of nutritional deficiencies; pregnant women

X Vitamin A supplementation for postpartum women is not recommended for the prevention of maternal and infant morbidity and mortality

Applicable contexts/population groups: All countries, all settings, routine postnatal care; postpartum women

Rationale

- There is some evidence showing that vitamin A supplementation for postpartum women may have little or no effect on maternal and infant morbidity or mortality.
- Postpartum women should be encouraged to receive adequate nutrition, which is best achieved through consumption of a balanced healthy diet during lactation.
- This recommendation does not cover the treatment of xerophthalmia. Existing guidelines for the treatment of xerophthalmia in women should be referred to in these cases.

❑ Oral iron supplementation, either alone or in combination with folic acid

Applicable contexts/population groups: Settings with a 20% or higher population prevalence of gestational anaemia; women postpartum

Rationale

Women during the postnatal period should be counselled on nutrition. Iron deficiency is one of the most common forms of nutritional deficiencies, particularly among vulnerable groups such as women, children and low-income populations. Iron deficiency often precedes anaemia, and anaemia during pregnancy is one of the strongest predictors of anaemia during the postpartum period, beginning just after childbirth throughout the subsequent 6 weeks. The consequences of iron deficiency and anaemia during the postpartum period can be serious and have long-term health implications for the mother and her infant.

Remarks

- For ease of implementation and continuity of care, postpartum supplementation should begin as early as possible after delivery, and the iron-supplementation regimen (e.g. dose and whether consumed daily or weekly) should follow that used during pregnancy, or alternatively should start with that planned for menstruating women.
- In cases in which a woman is diagnosed with anaemia in a clinical setting, she should be treated in accordance with the country's policy, or the WHO recommendation of daily iron (120 mg of elemental iron plus 400 µg of folic acid) supplements, until her haemoglobin concentration rises to normal.

WHO guidelines and recommendations

- WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/250796/9789241549912-eng.pdf?sequence=1, accessed 10 May 2019).
- Guideline: use of multiple micronutrient powders for point-of-use fortification of foods consumed by pregnant women. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/204639/9789241549516_eng.pdf?sequence=1, accessed 11 May 2019).
- Guideline: iron supplementation in postpartum women. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/249242/9789241549585-eng.pdf?sequence=1&isAllowed=y, accessed 8 July 2019).
- WHO recommendations on postnatal care of the mother and newborn. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/97603/9789241506649_eng.pdf?sequence=1, accessed 8 July 2019).
- Guideline: vitamin A supplementation in postpartum women. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44623/9789241501774_eng.pdf?sequence=1, accessed 11 May 2019).

B. Iron-containing micronutrient supplementation

❑ Intermittent iron and folic acid supplementation for non-pregnant women (15–49 years)

Applicable contexts/population groups: Settings where the prevalence of anaemia in non-pregnant women is 20% or higher; non-pregnant women

WHO recommendation

In populations where the prevalence of anaemia among non-pregnant women is 20% or higher, intermittent iron and folic acid supplementation is recommended as a public health intervention for non-pregnant women, to improve their haemoglobin concentrations and iron status and reduce the risk of anaemia. A suggested scheme for supplementation is provided in the table below.

Suggested scheme for intermittent iron and folic acid supplementation for non-pregnant women	
Supplement composition	Iron: 60 mg of elemental iron[a] Folic acid: 2800 µg (2.8 mg)
Supplement form	Tablets
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
Target group	All non-pregnant women (15–49 years)
Settings	Populations where the prevalence of anaemia in non-pregnant women is 20% or higher[b]

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

[b] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).

Summary of key evidence

- More than one third of women have anaemia and roughly half of these cases are estimated to be due to iron deficiency. Because of their iron losses due to menstruation and typically low iron content of their diets, women are at particular risk of iron deficiency and anaemia.
- Intermittent supplementation with iron and folic acid (i.e. once, twice or three times a week) has been shown to be effective, safe and more acceptable than daily supplementation for improving haemoglobin concentrations in women and lowering their risk of anaemia.

Key actions for implementation

- Intermittent supplementation with iron and folic acid for women should ideally be integrated into national programmes for sexual and reproductive health. The selection of the most appropriate delivery platform should be context specific, with the aim of reaching the most vulnerable populations and ensuring a timely and continuous supply of supplements.
- Supplementation should be preceded by an evaluation of the nutritional status of women and of the existing measures to control anaemia and folate insufficiency, such as programmes for hookworm control, food fortification or adequate diet promotion, so as to not exceed recommended dosages of iron.
- Providing behaviour-change communication on the benefits of the intervention and management of side effects, along with provision of high-quality supplements with appropriate packaging, will improve the acceptability and adherence to iron and folic acid supplementation. Such a strategy can also serve to promote dietary diversification and the intake of food combinations that improve iron absorption.

Considerations

- 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.
- In malaria-endemic areas, the provision of iron and folic acid supplements should be implemented in conjunction with adequate measures to prevent, diagnose and treat malaria.
- Intermittent iron and folic acid supplements could be given to women planning pregnancy to improve their iron stores. On confirmation of pregnancy, women should receive standard antenatal care, including daily or intermittent iron and folic acid supplementation depending on their anaemia status.

❑ Daily iron supplementation for non-pregnant women (15–49 years)

Applicable contexts/population groups: Settings where the prevalence of anaemia in non-pregnant women is 40% or higher; non-pregnant women

WHO recommendation

Daily iron supplementation is recommended as a public health intervention for non-pregnant women where anaemia is highly prevalent (≥40% anaemia prevalence), for the prevention of anaemia and iron deficiency. A suggested scheme for supplementation is provided in the table below.

Suggested scheme for daily iron supplementation for non-pregnant women	
Supplement composition	30–60 mg of elemental iron[a]
Supplement form	Tablets
Frequency	Daily
Duration	Three consecutive months per year
Target group	All non-pregnant women (15–49 years)
Settings	Where the prevalence of anaemia in women is 40% or higher[b]

[a] 30–60 mg of elemental iron equals 90–180 mg of ferrous fumarate, 150–300 mg of ferrous sulfate heptahydrate or 250–500 mg of ferrous gluconate.

[b] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).

Summary of key evidence

- More than one third non-pregnant women have anaemia and roughly half of these cases are estimated to be due to iron deficiency. Because of their iron losses due to menstruation and typically low iron content of their diets, women are at particular risk of iron deficiency and anaemia.
- Adherence may be a concern if the intervention is perceived as non-essential. Barriers to adherence may need to be addressed (for instance, with behaviour-change communication if the intervention is not perceived as necessary among the beneficiaries).

Key actions for implementation

- Prior to implementation, an iron supplementation programme should have well-defined objectives that take into account available resources, existing policies, suitable delivery platforms and suppliers, communication channels and potential stakeholders.
- Supplementation programmes should start with a pilot and be scaled up as experience and evidence grow and resources allow.

- Daily iron supplementation is a preventive strategy for implementation at the population level. If a woman is diagnosed with anaemia, she should be treated with daily iron supplementation until her haemoglobin concentration rises to normal. She can then be switched to an intermittent regimen to prevent the recurrence of anaemia.
- Daily iron supplementation should be considered in the context of other interventions containing iron (fortified foods, multiple micronutrient powders, lipid-based nutrient supplements).
- The selection of the most appropriate delivery platform should be context specific, with the aim of reaching the most vulnerable populations and ensuring a timely and continuous supply of supplements.
- All women, from the moment they begin trying to conceive until 12 weeks of gestation, should take a folic acid supplement. Daily oral iron and folic acid supplementation should be part of routine antenatal care, begun as early as possible and continued throughout pregnancy. Where the prevalence of anaemia in pregnant women is high (40% or more), supplementation should continue for 3 months in the postpartum period.
- A plan for monitoring and evaluation with appropriate indicators is encouraged at all stages. As part of this, an ongoing assessment of the accessibility and acceptability of the intervention should be conducted to inform programme design and development.

Considerations

- In malaria-endemic areas, the provision of iron supplements should be implemented in conjunction with adequate measures to prevent, diagnose and treat malaria.
- In malaria-endemic areas, iron supplementation does not increase the risk of clinical malaria or death when regular malaria-surveillance and treatment services are provided. Oral iron interventions should not be given to adults who do not have access to malaria-prevention strategies (e.g. provision of insecticide-treated bednets and vector-control programmes), prompt diagnosis of malaria illness, and treatment with effective antimalarial drug therapy.
- The risk of clinical malaria is not more likely among iron-replete adults given iron supplementation in malaria-endemic areas. There is no need to screen for anaemia prior to iron supplementation in settings where anaemia is highly prevalent.
- Daily oral iron supplementation is a preventive strategy for implementation at population level. If a woman is diagnosed with anaemia in a clinical setting, she should be treated with daily iron supplementation until her haemoglobin concentration rises to normal. She can then be switched to an intermittent regimen to prevent the recurrence of anaemia.
- If the prevalence of anaemia is 20–40%, intermittent regimens of iron supplementation can be considered.
- Where infection with hookworm is endemic (prevalence 20% or greater), it may be more effective to combine iron supplementation with anthelminthic treatment. Universal anthelminthic treatment, irrespective of infection status, is recommended at least annually in these areas.
- The selection of the most appropriate delivery platform should be context specific, with the aim of reaching the most vulnerable populations and ensuring a timely and continuous supply of supplements. If daily iron supplementation is integrated into existing school or community programmes, these programmes should ensure that the daily nutritional needs of women are met and not exceeded, through the evaluation of nutritional status and intake, as well as consideration of existing anaemia and micronutrient deficiency-control measures (such as provision of vitamin A supplements, fortified foods and anthelminthic therapy).

Contributes to global nutrition targets: #2 Anaemia

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Guideline. Daily iron supplementation in adult women and adolescent girls. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/204761/9789241510196_eng.pdf?sequence=1, accessed 10 May 2019).
- Guideline: intermittent iron and folic acid supplementation in menstruating women. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44649/9789241502023_eng.pdf?sequence=1, accessed 11 May 2019).

C. Iodine supplementation

❑ Iodine supplementation for non-pregnant women (15–49 years) and pregnant women

Applicable contexts/population groups: Settings where 20% or fewer households have access to iodized salt and pregnant women are difficult to reach; non-pregnant and pregnant women

WHO recommendation

Countries, or areas within countries, in which less than 20% of the households have access to iodized salt should assess the current situation of their salt-iodization programme, to identify national or subnational problems and to update their strategies and action plans. Pregnant women should be given an iodine supplement (daily or annually) until the salt-iodization programme is scaled up. In cases where it is difficult to reach pregnant women, supplementation for all women is advised until the salt-iodization programme is scaled up. A recommended daily and annual dose for non-pregnant and pregnant women is provided in the table below.

WHO-recommended dosages of daily and annual iodine supplementation[a] for non-pregnant and pregnant women

Population group	Daily dose of iodine supplement (µg/day)	Single annual dose of iodized oil supplement (mg/year)
Pregnant women	250	400
Non-pregnant women (15–49 years)	150	400

[a] These figures for iodine supplementation are given in situations where 20% or fewer households have access to iodized salt and pregnant women are difficult to reach.

Summary of key evidence

- Iodine is essential for healthy brain development in the fetus and young child.

- WHO and UNICEF recommend universal salt iodization as a global strategy. However, in certain countries, salt iodization may not be feasible in all regions, and some countries have not yet achieved adequate coverage with iodized salt.
- Evidence suggests that in settings where universal salt iodization is not fully implemented, pregnant and lactating women and children under 2 years of age may not be receiving adequate amounts of iodized salt and thus are getting insufficient iodine for their needs. If pregnant women are difficult to contact, all women should receive iodine supplementation (daily or annually).

Key actions for implementation

- Assess the current situation of the salt-iodization programme, population iodine nutrition status, and household coverage with iodized salt, to identify national or subnational problems.
- Update salt-iodization strategies and action plans, to achieve universal coverage of iodized salt through increasing political commitment, advocacy, capacity-building of the salt industry, creation and enforcement of regulations/legislation regarding salt iodization, and effective monitoring.
- Explore the feasibility of providing iodine supplements for women until salt iodization is scaled up.
- Monitoring of iodine fortification and supplementation programmes is crucial, to ensure that additional iodine intake is effective in reducing iodine deficiency, while preventing excessive intake that may lead to adverse health consequences. The monitoring process should include the assessment of coverage and iodine nutrition status.

Considerations

- Countries, or areas within countries, in which 20–50% of the households have access to iodized salt will need to assess the feasibility of increasing iodine intake in the form of a supplement or iodine-fortified foods for the most susceptible groups. This assessment (described in further detail in the WHO guideline at the end of this section) includes:
  - assessing population iodine nutrition status, household coverage with iodized salt (preferably disaggregated) and salt-iodization programmes;
  - developing new plans to strengthen salt iodization;
  - if a country does not succeed in scaling up its salt iodization programme within 2 years, exploring the feasibility of increasing the iodine intake of susceptible groups by means of supplements or iodine-fortified foods, as a temporary measure, while strengthening the salt-iodization programme;
  - assessing the feasibility of providing additional iodine should include: (i) the costing of supplementation; (ii) existing channels for distribution to reach the target groups; (iii) the likely duration of supplementation; and (iv) potential compliance.
- Irrespective of where countries, or areas within countries, are categorized with respect to coverage of iodized salt, there are specific situations such as in emergencies, among displaced people, and in geographically remote areas, where additional iodine intake should be considered. If iodized salt is not accessible in these specific situations, increasing iodine intake is required in the form of iodine supplements for pregnant and lactating women, and a supplement or complementary food fortified with iodine for children aged 7–24 months.

Contributes to global nutrition targets: —

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Joint statement by the World Health Organization and the United Nations Children's Fund. Reaching optimal iodine nutrition in pregnant and lactating women and young children. Geneva: World Health Organization; 2007 (https://www.who.int/nutrition/publications/micronutrients/WHOStatement_IDD_pregnancy.pdf, accessed 10 May 2019).

© ingimage

5. Older persons

A. Nutritional care for at-risk older persons

❑ Oral supplemental nutrition with dietary advice for older people affected by undernutrition

Applicable contexts/population groups: All countries, all settings; older adults with undernutrition (BMI lower than 18.5 kg/m^2)

WHO recommendation

Oral supplemental nutrition[a] with dietary advice should be recommended for older people affected by undernutrition.

[a] Oral supplemental nutrition is the provision of additional high-quality protein, calories and adequate amounts of vitamins and minerals tailored to the individual's needs, assessed by a trained health-care professional. The assessment allows for the best source and vehicle for these nutrients to be defined, whether through the use of supplements, nutrient-rich foods, or specialized commercial or non-commercial nutritional formulations.

Summary of key evidence

- Increased life expectancy, leading to population ageing, is occurring most rapidly in low- and middle-income countries, with important implications for long-term care needs for older adults in these settings. Increasing age coincides with many physiological changes that increase the risk of undernutrition and subsequent physical and cognitive impairments. Undernutrition is a major problem among older adults, affecting up to 22%. Undernutrition in the elderly leads to reduced bone and muscle mass, increased frailty, diminished cognitive function and ability to care for oneself, and thus a higher risk of becoming dependent on care.
- Ageing is accompanied by physiological changes that can have a negative impact on nutritional status and, consequently, intrinsic capacity. Sensory impairments (a decreased sense of taste and smell, for example), poor oral health, isolation, loneliness and depression – individually or in combination – all increase the risk of undernutrition in older age.
- Ageing is associated with changes in body composition; after the age of 60 years, there is a progressive decrease in body weight that results mainly from a decrease in fat-free mass and lean mass, and an increase in fat mass. Stable body weight overall masks such age-related changes in body composition.
- Older people who do not consume enough protein are at increased risk of developing sarcopenia, osteoporosis and impaired immune response.
- Evidence indicates that oral supplemental nutrition for older adults with undernutrition can significantly reduce mortality and improve weight gain.

Key actions for implementation

- Perform nutritional assessments specific to the older person and include nutritional history, records of food intake or 24-hour dietary recall, physical examination with particular attention to signs of inadequate nutrition or overconsumption, and specific laboratory tests if applicable.
- Assess muscle mass and muscle strength as part of the assessment of nutritional status.
- Encourage dietary counselling, to ensure a healthy diet that provides adequate amounts of energy, protein and micronutrients for all older people, including those who are at risk of or affected by undernutrition. Protein absorption decreases with age, and thus standard protein intakes may not be sufficient for older adults.

- Consider specially formulated supplementary foods, such as those that are in ready-to-eat form, to help meet the nutritional requirements of older adults.
- Consider social dining (eating with others) or family-style meals to help manage undernutrition, particular among those who are living alone or are socially isolated.

Considerations

- There will be resource implications for identification of malnourished older adults, and nutritional assessments and provision of nutrition counselling to these individuals, as well as oral supplemental nutrition.
- Refer older people with evidence of potentially serious underlying physical illness (gross cachexia, rapid weight loss, obstruction or difficulty swallowing, vomiting, chronic diarrhoea, abdominal pain or swelling) for medical review by a physician or specialist.

Contributes to global nutrition targets: —

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Integrated care for older people. Guidelines on community-level interventions to manage declines in intrinsic capacity. Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/258981/9789241550109-eng.pdf?sequence=1, accessed 10 May 2019).

Pixabay

6. Specific conditions

A. Nutritional care for persons living with HIV

❑ Ensure optimal infant and young child feeding in the context of HIV

Applicable contexts/population groups: All countries, settings in which the prevalence of HIV is high and diarrhoea, pneumonia and undernutrition are common causes of infant and child mortality; infants and young children

WHO recommendation

- Mothers known to be living with HIV should be provided with lifelong antiretroviral therapy (ART) interventions or antiretroviral prophylaxis to reduce HIV transmission through breastfeeding.
- National or subnational health authorities should decide whether health services will principally counsel mothers known to be living with HIV to either breastfeed and use antiretroviral medication, or avoid all breastfeeding.

In settings where health services provide and support lifelong ART, including adherence counselling, and promote and support breastfeeding among women living with HIV:

- Mothers known to be living with HIV (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 continuing breastfeeding.
- The duration of breastfeeding should not be restricted for mothers living with HIV. Mothers living with HIV should breastfeed for at least 12 months and may continue breastfeeding for up to 24 months or longer (similar to the general population) while being fully supported for ART adherence.
- Breastfeeding should then only stop once a nutritionally adequate and safe diet without breast milk can be provided.
- Mothers known to be living with HIV who decide to stop breastfeeding at any time should stop gradually within 1 month. Mothers or infants who have been receiving antiretroviral prophylaxis should continue prophylaxis for 1 week after breastfeeding is fully stopped. It is not advisable to stop breastfeeding abruptly.
- When mothers known to be living with HIV decide to stop breastfeeding at any time, their infants should be provided with safe and adequate replacement feeds, to enable normal growth and development.
    - Mothers known to be living with HIV 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.
    - Mothers known to be living with HIV may consider expressing and heat-treating breast milk as an interim feeding strategy.
- If infants and young children are known to be HIV infected, mothers are strongly encouraged to exclusively breastfeed for the first 6 months of life and continue breastfeeding as per the recommendations for the general population, that is, up to 2 years or beyond.
- National and local health authorities should actively coordinate and implement services in health facilities and activities in workplaces, communities and homes, to protect, promote and support breastfeeding among women living with HIV.

Summary of key evidence

- Exclusive breastfeeding during the first months of life carries less risk of HIV transmission than mixed feeding, provides protection against infectious diseases, and provides other child survival and development benefits.
- However, compared with non-breastfeeding in resource-limited settings, mixed feeding in the first 6 months of life is associated with reduced morbidity among HIV-exposed (and unexposed) infants.
- Antiretroviral drugs can significantly reduce the risk of postnatal transmission through breastfeeding during the first 6 months, as well as afterwards when complementary foods are introduced.

Key actions for implementation

- Develop or revise a comprehensive evidence-based infant and young child feeding policy that includes HIV and infant feeding.
- Promote and support appropriate infant and young child feeding practices.
- Provide adequate support to women living with HIV, to enable them to successfully carry out the recommended infant feeding practices, including ensuring access to ART.
- Develop and implement a communication strategy to promote appropriate infant feeding practices aimed at decision-makers, health workers, civil society, community workers, mothers and families.
- Implement and enforce the *International Code of Marketing of Breast-milk Substitutes* and subsequent World Health Assembly resolutions.

Considerations

- WHO recommends lifelong ART for everyone from the time when any adult (including pregnant and breastfeeding women) or child is first diagnosed with HIV infection.
- Since 2010, WHO has recommended that national health authorities recommend one infant-feeding practice to mothers who are living with HIV, to be promoted and supported by maternal, newborn and child health services. If health authorities do not agree to endorse the above recommendations (i.e. exclusive breastfeeding for the first 6 months while the mother or infant receives ART, with continued breastfeeding), they should recommend and counsel mothers to avoid all breastfeeding.
- Although exclusive breastfeeding is recommended, practising mixed feeding is not a reason to stop breastfeeding in the presence of antiretroviral drugs, which reduce the risk of postnatal HIV transmission in the context of mixed feeding.
- For mothers with HIV, shorter durations of breastfeeding (<12 months) are better than never initiating breastfeeding at all.

Contributes to global nutrition targets: #1 Stunting; #4 Children overweight; #5 Exclusive breastfeeding; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- Guideline. Updates on HIV and infant feeding. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/246260/9789241549707-eng.pdf?sequence=1, accessed 10 May 2019).
- WHO guidelines on HIV and infant feeding 2010. An updated framework for priority action. Geneva: World Health Organization; 2012 (https://apps.who.int/iris/bitstream/handle/10665/75152/FWC_MCA_12.1_eng.pdf?sequence=1, accessed 12 May 2019).
- International Code of Marketing and Breast-milk Substitutes. Geneva: World Health Organization; 1981 (https://apps.who.int/iris/bitstream/handle/10665/40382/9241541601.pdf?sequence=1, accessed 11 May 2019).
- HIV and infant feeding in emergencies: operational guidance. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/272862/9789241550321-eng.pdf?ua=1, accessed 10 May 2019).

❑ Nutritional care for infants and children aged 6 months to 14 years living with HIV

Applicable contexts/population groups: All countries and contexts, settings with HIV transmission; infants and children aged 6 months to 14 years living with HIV

WHO recommendation

Infants and children (aged 6 months to 14 years) 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 their nutritional status, and to ensure appropriate growth and development.

Micronutrient intakes at recommended levels need to be assured in children living with HIV, through varied diets, fortified foods and micronutrient supplements, when adequate intakes cannot be guaranteed through local foods.

Summary of key evidence

- HIV infection can impair the nutritional status of infected children from early in life.
- When children with HIV infection become malnourished, they lose more muscle than malnourished children without HIV infection.
- Children with severe growth failure and loss of muscle (lean body tissue) are at an increased risk of death.
- Early nutrition advice and active support is recommended, to ensure adequate energy, protein and micronutrient intakes at all stages of HIV infection, to prevent growth failure and loss of weight.

Key actions for implementation

- Nutritional assessment and support should be integrated into the routine care of children living with HIV. Specific steps for nutritional assessment and support are provided in detail in the WHO guidelines cited at the end of this section.
- Dietary interventions should consider issues of food security, food quantity and food quality, as well as absorption and digestion of nutrients.

Considerations

- Children living with HIV deserve special attention because of their nutritional requirements necessary for growth and development, and because of their dependency on adults for adequate care.

Contributes to global nutrition targets: #1 Stunting; #4 Children overweight; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- Guidelines for an integrated approach to the nutritional care of HIV-infected children (6 months – 14 years). Geneva: World Health Organization; 2009 (https://apps.who.int/iris/handle/10665/44043, accessed 12 May 2019).

X Vitamin A supplementation for pregnant women living with HIV is not recommended as a public health intervention for reducing the risk of mother-to-child transmission of HIV

Applicable contexts/population groups: All countries, all settings; pregnant women living with HIV

Rationale

- Vitamin A supplementation for pregnant women living with HIV probably has little or no effect on mother-to-child transmission of HIV, child death or maternal death.
- All pregnant women, including those living with HIV/AIDS, should be encouraged to receive adequate nutrition through consumption of a healthy balanced diet.
- Current strategies to reduce mother-to-child transmission of HIV include ART, elective caesarean section delivery and use of the most appropriate infant feeding options.

Further information

- Guideline: vitamin A supplementation in pregnancy for reducing the risk of mother-to-child transmission of HIV. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44627/9789241501804_eng.pdf?sequence=1, accessed 12 May 2019).

B. Nutritional care for persons with tuberculosis

❑ Nutritional assessment and counselling for persons with active tuberculosis

Applicable contexts/population groups: All countries and contexts, settings with tuberculosis (TB) transmission; all population groups with active TB

WHO recommendation

All individuals with active TB should receive: (i) an assessment of their nutritional status; and (ii) appropriate counselling based on their nutritional status at diagnosis and throughout treatment.

Summary of key evidence

- Undernutrition increases the risk of TB infection progressing to active disease, by weakening the immune system. Undernourished patients with TB have an increased risk of death and relapse.
- In turn, TB infection increases the risk of undernutrition, by reducing food intake from loss of appetite, nausea and abdominal pain; increasing nutrient losses from diarrhoea and vomiting; and causing metabolic alterations.
- The evidence on the effects of nutritional supplements for TB prevention and care is limited. There is no evidence that nutritional supplementation in addition to standard care improves TB treatment outcomes, or prevents progression from TB infection to active disease.
- However, because of the clear bidirectional causal link between undernutrition and active TB, nutrition screening, assessment and management are integral components of TB treatment and care.
- An adequate diet, containing all essential macro- and micronutrients, is necessary for the well-being and health of all people, including those with TB infection or TB disease.

Key actions for implementation

- All persons with active TB should receive TB diagnosis, treatment and care according to WHO guidelines and international standards of care. When undernutrition is identified at the time of TB diagnosis, TB is considered a key causal factor that needs to be addressed.
- Ideally, these recommendations should be implemented as part of an integrated programme for TB care and support. Specific components of nutritional assessment (i.e. anthropometric, biochemical, clinical and dietary assessment) and goals of nutritional counselling are outlined in the WHO guideline document listed at the end of this section.
- Prior to implementation of these principles and recommendations, a public health programme should have well-defined objectives that take into account available resources, existing policies, suitable delivery platforms and suppliers, communication channels and potential stakeholders.

Considerations

- Poverty and food insecurity are both causes and consequences of TB, and those involved in TB care therefore play an important role in recognizing and addressing these wider socioeconomic issues.
- TB is commonly accompanied by comorbidities such as HIV, diabetes, smoking and alcohol or substance abuse, which have their own nutritional implications, and these should be fully considered during nutritional screening, assessment and counselling.

❑ Nutritional assessment, counselling and management for pregnant women with active tuberculosis

Applicable contexts/population groups: All countries and contexts, settings with TB transmission; pregnant women with active TB

WHO recommendation

All individuals with active TB should receive: (i) an assessment of their nutritional status; and (ii) appropriate counselling based on their nutritional status at diagnosis and throughout treatment.

All pregnant women with active TB should receive multiple micronutrient supplements that contain iron and folic acid and other vitamins and minerals, according to the United Nations Multiple Micronutrient Preparation, to complement their maternal micronutrient needs.

For pregnant women with active TB in settings where calcium intake is low, calcium supplementation as part of antenatal care is recommended for the prevention of pre-eclampsia, particularly among those pregnant women at higher risk of developing hypertension, in accordance with WHO recommendations.

Summary of key evidence

- Undernutrition increases the risk of TB infection progressing to active disease, by weakening the immune system. Undernourished patients with TB have an increased risk of death and relapse.
- In turn, TB infection increases the risk of undernutrition, by reducing food intake from loss of appetite, nausea and abdominal pain; increasing nutrient losses from diarrhoea and vomiting; and causing metabolic alterations.
- During pregnancy, nutritional needs are increased, to support the growth and development of the fetus as well as the mother.
- Because of the detrimental effects of TB on dietary intake and nutritional status, adequate weight gain during pregnancy, which is associated with improved birth weight, is a concern for pregnant women with TB. In addition, pregnant women with TB are at an increased risk of developing pre-eclampsia.
- While there have not been any randomized controlled trials of micronutrient supplements in pregnant women with TB, multiple micronutrient supplements given during pregnancy in non-HIV-infected populations have been effective in reducing rates of low birth weight, small-for-gestational-age infants, and anaemia. In women living with HIV, multiple micronutrients (including iron and folic acid) provided significantly better birth outcomes compared to iron and folic acid alone or no supplements.
- An adequate diet, containing all essential macro- and micronutrients, is necessary for the well-being and health of all people, including those with TB infection or TB disease. The additional nutrient needs incurred by pregnancy make adequate nutrition even more crucial.

Key actions for implementation

- All persons with active TB should receive TB diagnosis, treatment and care according to WHO guidelines and international standards of care. When malnutrition is identified at the time of TB diagnosis, TB is considered a key causal factor that needs to be addressed.

- Ideally, these recommendations should be implemented as part of an integrated programme for TB care and support. Specific components of nutritional assessment (i.e. anthropometric, biochemical, clinical and dietary assessment) and goals of nutritional counselling are outlined in the WHO guideline document listed at the end of this section.
- Prior to implementation of these principles and recommendations, a public health programme should have well-defined objectives that take into account available resources, existing policies, suitable delivery platforms and suppliers, communication channels and potential stakeholders.

Considerations

- Poverty and food insecurity are both causes and consequences of TB, and those involved in TB care therefore play an important role in recognizing and addressing these wider socioeconomic issues.
- TB is commonly accompanied by comorbidities such as HIV, diabetes mellitus, smoking and alcohol or substance abuse, which have their own nutritional implications, and these should be fully considered during nutritional screening, assessment and counselling.

❑ Nutritional assessment, counselling and management for persons with active tuberculosis and moderate undernutrition

Applicable contexts/population groups: All countries and contexts, settings with TB transmission; all population groups with active TB and moderate undernutrition

WHO recommendation

Patients with TB should be nutritionally assessed and receive the same nutritional care and support as other individuals or populations of similar nutritional status, in agreement with all relevant WHO recommendations.

Children aged under 5 years with active TB and moderate acute malnutrition (weight-for-height between 2 and 3 *z*-scores below the *WHO child growth standards* median without oedema) should be managed as any other children with moderate undernutrition. This includes provision of locally available nutrient-rich or fortified supplementary foods, in order to restore appropriate weight-for-height.

Persons with active TB and moderate undernutrition who fail to regain normal BMI after 2 months' treatment for TB, as well as those who are losing weight during TB treatment, should be evaluated for adherence and comorbid conditions. They should also receive nutrition assessment and counselling and, if indicated, be provided with locally available nutrient-rich or fortified supplementary foods, as necessary to restore normal nutritional status.

A daily multiple micronutrient supplement at 1× recommended nutrient intake should be provided in situations where fortified or supplementary foods should have been provided in accordance with standard management of moderate undernutrition, but are unavailable.

Summary of key evidence

- Undernutrition increases the risk of TB infection progressing to active disease, by weakening the immune system. Undernourished TB patients have an increased risk of death and relapse.

- In turn, TB infection increases the risk of undernutrition, by reducing food intake from loss of appetite, nausea and abdominal pain; increasing nutrient losses from diarrhoea and vomiting; and causing metabolic alterations.
- Individuals suffering from moderate undernutrition are at increased risk of the negative health effects of TB.
- The evidence of the effects of nutritional supplements for TB prevention and care is limited. There is no evidence that nutritional supplementation in addition to standard care improves TB treatment outcomes, or prevents progression from TB infection to active disease.
- However, because of the clear bidirectional causal link between undernutrition and active TB, nutrition screening, assessment and management are integral components of TB treatment and care.
- An adequate diet, containing all essential macro- and micronutrients, is necessary for the well-being and health of all people, including those with TB infection or TB disease.
- There is no evidence to recommend that nutritional management of moderate undernutrition should be different for children (under 5 years of age) with active TB than for those without.

Key actions for implementation

- All people with active TB should receive TB diagnosis, treatment and care according to WHO guidelines and international standards of care. When undernutrition is identified at the time of TB diagnosis, TB is considered a key causal factor that needs to be addressed.
- Ideally, these recommendations should be implemented as part of an integrated programme for TB care and support. Specific components of nutritional assessment (i.e. anthropometric, biochemical, clinical and dietary assessment) and goals of nutritional counselling are outlined in the WHO guideline document listed at the end of this section.
- Efforts should be made, within the sound principles of nutritional assessment, counselling and support, to ensure that TB patients are receiving the recommended intake of micronutrients, preferably through food or fortified foods. If that is not possible, micronutrient supplementation at 1× the recommended nutrient intake is warranted.
- Prior to implementation of these principles and recommendations, a public health programme should have well-defined objectives that take into account available resources, existing policies, suitable delivery platforms and suppliers, communication channels and potential stakeholders.

Considerations

- Screening for undernutrition, especially in children under 5 years of age, is recommended at all health-care encounters and this should include contact investigation of TB.
- Poverty and food insecurity are both causes and consequences of TB, and those involved in TB care therefore play an important role in recognizing and addressing these wider socioeconomic issues.
- TB is commonly accompanied by comorbidities such as HIV, diabetes, smoking and alcohol or substance abuse, which have their own nutritional implications, and these should be fully considered during nutritional screening, assessment and counselling.

❑ Nutritional assessment, counselling and management for persons with active tuberculosis and severe undernutrition

Applicable contexts/population groups: All countries and contexts, settings with TB transmission; all population groups with active TB and severe undernutrition

WHO recommendation

Patients with TB should be nutritionally assessed and receive the same nutritional care and support as other individuals or populations of similar nutritional status, in agreement with all relevant WHO recommendations.

School-age children and adolescents (5–19 years) with active TB and severe acute malnutrition (very low BMI-for-age) should be treated in accordance with the WHO recommendations for management of severe acute malnutrition.

Children under 5 years of age with active TB and severe acute malnutrition (mid-upper arm circumference more than 115 mm or weight-for-height/length more than 3 *z*-scores below the *WHO child growth standards* median, or with any degree of bilateral pitting oedema) should be treated in accordance with the WHO recommendations for the management of severe acute malnutrition in children under 5 years of age.

Adults with severe acute malnutrition (very low BMI) and pregnant women with severe acute malnutrition (very low mid-upper-arm circumference) should also be treated in accordance with the WHO recommendations for management of severe acute malnutrition.

Summary of key evidence

- Undernutrition increases the risk of TB infection progressing to active disease, by weakening the immune system. Undernourished TB patients have an increased risk of death and relapse.
- In turn, TB infection increases the risk of undernutrition, by reducing food intake from loss of appetite, nausea and abdominal pain; increasing nutrient losses from diarrhoea and vomiting; and causing metabolic alterations.
- Individuals suffering from severe undernutrition are at significantly increased risk of the negative health effects of TB.
- The evidence of the effects of nutritional supplements for TB prevention and care is limited. There is no evidence that nutritional supplementation in addition to standard care improves TB treatment outcomes, or prevents progression from TB infection to active disease.
- However, because of the clear bidirectional causal link between undernutrition and active TB, nutritional screening, assessment and management are integral components of TB treatment and care.
- An adequate diet, containing all essential macro- and micronutrients, is necessary for the well-being and health of all people, including those with TB infection or TB disease.
- There is no evidence to recommend that nutritional management of severe undernutrition should be different for individuals with active TB than for those without.

Key actions for implementation

- All people with active TB should receive TB diagnosis, treatment and care according to WHO guidelines and international standards of care. When malnutrition is identified at the time of TB diagnosis, TB is considered a key causal factor that needs to be addressed.
- Ideally, these recommendations should be implemented as part of an integrated programme for TB care and support. Specific components of nutritional assessment (i.e. anthropomentric, biochemical, clinical and dietary assessment) and goals of nutritional counselling are outlined in the WHO guideline document listed at the end of this section.
- Prior to implementation of these principles and recommendations, a public health programme should have well-defined objectives that take into account available resources, existing policies, suitable delivery platforms and suppliers, communication channels and potential stakeholders.

Considerations

- Screening for undernutrition, especially in children who are under 5 years of age, is recommended at all health-care encounters and this should include contact investigation of TB.
- Poverty and food insecurity are both causes and consequences of TB, and those involved in TB care therefore play an important role in recognizing and addressing these wider socioeconomic issues.
- TB is commonly accompanied by comorbidities such as HIV, diabetes, smoking and alcohol or substance abuse, which have their own nutritional implications, and these should be fully considered during nutrition screening, assessment and counselling.

Contributes to global nutrition targets: #6 Wasting

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Guidance for national tuberculosis programmes on the management of tuberculosis in children, 2nd ed. Geneva: World Health Organization; 2014 (https://apps.who.int/iris/bitstream/handle/10665/112360/9789241548748_eng.pdf?sequence=1, accessed 12 May 2019).
- Guideline: nutritional care and support for patients with tuberculosis. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/94836/9789241506410_eng.pdf?sequence=1, accessed 12 May 2019).
- Guideline. Updates on the management of severe acute malnutrition in infants and children. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/95584/9789241506328_eng.pdf?ua=1, accessed 10 May 2019).
- WHO child growth standards and the identification of severe acute malnutrition in infants and children. A joint statement by the World Health Organization and United Nations Children's Fund. Geneva: World Health Organization; 2009 (https://apps.who.int/iris/bitstream/handle/10665/44129/9789241598163_eng.pdf?ua=1, accessed 10 May 2019).

❑ Ensure optimal feeding of infants of mothers infected with tuberculosis

Applicable contexts/population groups: All countries and contexts, settings with TB transmission; lactating mothers who are infected with TB and their infants

WHO recommendation

All infants should be fed according to normal infant feeding guidelines. They should start breastfeeding within one hour after birth, be exclusively breastfed for 6 months, and continue to breastfeed up to 2 years of age or beyond, with the addition of adequate complementary foods from about 6 months of age.

Infants at risk of TB infection from their mothers should be given preventive chemotherapy (isoniazid 5 mg/kg once daily orally) for 6 months. The infant should then be immunized with Bacillus Calmette–Guérin (BCG) vaccine when preventive chemotherapy is completed.

Suggested schemes for management are provided in the table below.

Suggested schemes for feeding of infants of mothers infected with TB

Active pulmonary TB diagnosed before delivery			Active pulmonary TB diagnosed after delivery	
Smear negative just before delivery		Smear positive just before delivery		
Treat mother	Treat mother	Treat mother	Treat mother	Treat mother
Breastfeed	Breastfeed	Breastfeed	Breastfeed	Breastfeed
No preventive chemotherapy for infant	Give preventive chemotherapy to infant for 6 months	Give preventive chemotherapy to infant for 6 months	Give preventive chemotherapy to infant for 6 months	Give preventive chemotherapy to infant for 6 months
BCG at birth	BCG after stopping preventive chemotherapy	BCG after stopping preventive chemotherapy	BCG after stopping preventive chemotherapy	If BCG is not given at birth, give it after stopping preventive chemotherapy

Monitor all infants for weight gain and health.

Summary of key evidence

- The best way to prevent TB infection in infants of mothers infected with TB is timely and properly administered chemotherapy for the mother.
- Breastfeeding has significant benefits for mothers and children in low-, middle- and high-income countries, including, among children, lower infectious morbidity and mortality, fewer dental malocclusions and higher intelligence scores; and for mothers, preventing breast cancer, improving birth spacing, and potentially reducing a woman's risk of diabetes and ovarian cancer.

Key actions for implementation

- In any situation, a mother infected with TB should receive a full course of chemotherapy, using the standard short-course regimen recommended in the national TB programme, and monitored by the nearest health facility.

Considerations

- This recommendation is consistent with the *Global strategy for infant and young child feeding* as endorsed by the Fifty-fifth World Health Assembly, in resolution WHA54.2 in 2002, to promote optimal feeding for all infants and young children.

Contributes to global nutrition targets: #1 Stunting; #4: Children overweight; #5 Exclusive breastfeeding; # Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- Global strategy for infant and young child feeding. Geneva: World Health Organization; 2003 (https://apps.who.int/iris/bitstream/handle/10665/42590/9241562218.pdf?sequence=1, accessed 12 May 2019).
- Division of Child Health and Development. Update. Breastfeeding and maternal tuberculosis. A statement prepared jointly by the Division of Child Health and Development, the Global Tuberculosis Programme, the Global Programme for Vaccines and Immunization and Reproductive Health (Technical Support) of the World Health Organisation. Geneva: World Health Organization; 1998 (https://www.who.int/maternal_child_adolescent/documents/pdfs/breastfeeding_and_maternal_tb.pdf, accessed 12 May 2019).

C. Preventive chemotherapy for the control of soil-transmitted helminth infection (deworming)

❑ Preventive deworming for children aged 12 months and older

Applicable contexts/population groups: Settings where the baseline prevalence of any soil-transmitted infection is 20% or more among children aged 12 months and older; children aged 12 months and older

WHO recommendation

Preventive chemotherapy (deworming), using annual or biannual[a] single-dose albendazole (400 mg)[b] or mebendazole (500 mg), is recommended as a public health intervention for all young children (12–23 months of age), preschool (24–59 months of age) and school-age children (5–12 years) living in areas where the baseline prevalence of any soil-transmitted infection is 20% or more among children, in order to reduce the worm burden of soil-transmitted helminths.

[a] Biannual administration is recommended where the baseline prevalence is over 50%.
[b] A half-dose of albendazole (i.e. 200 mg) is recommended for children aged 12–23 months.

Summary of key evidence

- Schistosome and soil-transmitted helminth (roundworms, hookworms and whipworms) infections are among the most common infections in developing countries and can cause internal bleeding, leading to anaemia. They can also cause malabsorption of nutrients, diarrhoea and vomiting, and loss of appetite, further damaging nutritional status.
- Children infected with soil-transmitted helminths benefit significantly from anthelminthic treatment, in terms of reduction of worm burden and weight and height gain.

- The morbidity caused by the different soil-transmitted helminth species in heavily infected individuals is well documented and severe.
- Albendazole and mebendazole are well tolerated among children over 12 months of age, at appropriate doses, with only minor and transient side-effects reported.
- Preventive chemotherapy to control soil-transmitted helminth infections in children is generally well accepted among children, parents, teachers and health workers.

Key actions for implementation

- Treat all children in areas endemic for soil-transmitted helminths, in order to reduce the worm burden in moderately to heavily infected children.
- Deliver deworming together with promotion of health and hygiene, to reduce transmission by encouraging healthy behaviours, such as hand-washing, use of footwear and proper disposal of faeces.
- Provide adequate water, sanitation and hygiene services to break the cycle of infection and reinfection and sustainably control soil-transmitted helminth infections. Form collaborations between programmes for control of soil-transmitted helminth infection and water, sanitation and hygiene programmes, to ensure prioritization of water and sanitation services to areas that are endemic for soil-transmitted helminths.
- Routinely monitor programme coverage, as well as evaluating the impact of the intervention, in order to inform decisions on continuing or ceasing the programme.

Considerations

- The recommendation for preventive chemotherapy among children is being made for the outcome of decreasing the worm burden in areas that are endemic for soil-transmitted helminths. The prevalence of soil-transmitted helminths among children is changing and this needs to be taken into account by regularly assessing the worm burden, to ensure that the intervention remains relevant.
- Preventive chemotherapy is intended to provide benefits only to infected individuals (uninfected individuals are treated only for logistical reasons). Measuring the benefit of preventive chemotherapy in the entire group treated (comprising infected and uninfected preschool and school-age children) reduces the capacity to properly evaluate the benefits obtained by the infected individuals. The most cost-effective approach to reach infected individuals is to treat the entire group at risk without individual diagnosis.

❑ Preventive deworming for non-pregnant women (15–49 years)

Applicable contexts/population groups: Settings where the baseline prevalence of any soil-transmitted infection is 20% or more; non-pregnant women

WHO recommendation

Preventive chemotherapy (deworming), using annual or biannual[a] single-dose albendazole (400 mg) or mebendazole (500 mg), is recommended as a public health intervention for all non-pregnant women living in areas where the baseline prevalence of any soil-transmitted helminth infection is 20% or more among women, in order to reduce the worm burden of soil-transmitted helminths.

[a] Biannual administration is recommended where the baseline prevalence is over 50%.

Summary of key evidence

- Schistosome and soil-transmitted helminth (roundworms, hookworms and whipworms) infections are among the most common infections in developing countries and can cause internal bleeding, leading to anaemia. They also can cause malabsorption of nutrients, diarrhoea and vomiting, and loss of appetite, further damaging nutritional status.
- The morbidity caused by the different soil-transmitted helminth species in heavily infected individuals is well documented and severe.
- Albendazole and mebendazole are effective against soil-transmitted helminthiases, to significantly reduce the number of infections, and are considered safe for use by non-pregnant women. Only minor, transient side-effects have been reported.

Key actions for implementation

- Take extra care and precaution in ensuring that women receiving anthelminthic medicines are not pregnant. Policy-makers may decide to withhold preventive chemotherapy among women if the pregnancy status or gestational age the women is uncertain, or in areas where rates of unplanned pregnancies are high and coverage of antenatal care is low.
- In settings where existing infrastructure has low coverage of adolescent girls, additional resources may be needed to reach this population.
- Deliver deworming together with promotion of health and hygiene, to reduce transmission by encouraging healthy behaviours, such as hand-washing, use of footwear and proper disposal of faeces.
- Provide adequate water, sanitation and hygiene services to break the cycle of infection and reinfection and sustainably control soil-transmitted helminth infections. Form collaborations between programmes for control of soil-transmitted helminth infection and water, sanitation and hygiene programmes, to ensure prioritization of water and sanitation services to areas that are endemic for soil-transmitted helminths.
- Routinely monitor programme coverage, as well as evaluating the impact of the intervention, in order to inform decisions on continuing or ceasing the programme.

Considerations

- As the prevalence and intensity of soil-transmitted helminth infections are related, only light-intensity infection and low morbidity are expected where the prevalence of any soil-transmitted helminth infection is lower than 20%. Large-scale preventive chemotherapy programmes are not recommended in these situations.
- Preventive chemotherapy is intended to provide benefits only to infected individuals (uninfected individuals are treated only for logistical reasons). Measuring the benefit of preventive chemotherapy in the entire group treated (comprising infected and uninfected preschool and school-age children) reduces the capacity to properly evaluate the benefits obtained by the infected individuals. The most cost-effective approach to reach infected individuals is to treat the entire group at risk without individual diagnosis.
- The most cost-effective approach to reach infected individuals is to treat the entire group at risk without individual diagnosis.
- Preventive chemotherapy is generally well accepted among women, health workers and policy-makers, though uncertainty exists around the feasibility of providing this intervention among adolescent girls, as existing infrastructure may vary by country and context.

❑ Preventive deworming for pregnant women after the first trimester

Applicable contexts/population groups: Settings where the prevalence of infection with soil-transmitted helminths (hookworm and/or *T. trichiura*) among pregnant women is 20% or higher and where anaemia is a severe public health problem (40% or higher among pregnant women); pregnant women

WHO recommendation

Preventive chemotherapy (deworming), using single-dose albendazole (400 mg) or mebendazole (500 mg), is recommended as a public health intervention for pregnant women, after the first trimester, living in areas where both: (i) the baseline prevalence of hookworm and/or *T. trichiura* infection is 20% or higher among pregnant women, and (ii) anaemia is a severe public health problem, in order to reduce the worm burden of soil-transmitted helminths.

Summary of key evidence

- Schistosome and soil-transmitted helminth (roundworms, hookworms and whipworms) infections are among the most common infections in developing countries and can cause internal bleeding, leading to anaemia. They also can cause malabsorption of nutrients, diarrhoea and vomiting, and loss of appetite, further damaging nutritional status.
- In areas where soil-transmitted helminths are endemic, helminth infestation is a major cause of anaemia among women. Anaemia during pregnancy has been associated with poor birth outcomes, including low birth weight and prematurity. Severe anaemia during pregnancy is associated with increased risk of infant and maternal mortality.
- Antihelminthic medicines (i.e. deworming) are highly effective in treating helminth infections. Albendazole and mebendazole are well tolerated, with no adverse events in pregnant women and their fetuses when given after the first trimester of pregnancy. Anthelminthic medicines must not be given during the first trimester.

Key actions for implementation

- Use existing channels to reach at-risk populations: implement preventive chemotherapy as part of routine antenatal care in settings in which there are existing infrastructure and maternal health programmes.
- In high-risk settings (prevalence of 50% for soil-transmitted helminthiasis), provide two treatments per year; in areas with a 20–50% prevalence, provide one treatment per year.
- Deliver deworming together with promotion of health and hygiene, to reduce transmission by encouraging healthy behaviours, such as hand-washing, use of footwear and proper disposal of faeces.
- Provide adequate water, sanitation and hygiene services to break the cycle of infection and reinfection and sustainably control soil-transmitted helminth infections. Form collaborations between programmes for control of soil-transmitted helminth infection and water, sanitation and hygiene programmes, to ensure prioritization of water and sanitation services to areas that are endemic for soil-transmitted helminths.
- Routinely monitor programme coverage, as well as evaluating the impact of the intervention, in order to inform decisions on continuing or ceasing the programme.

Considerations

- Infected pregnant women in non-endemic areas should receive anthelminthic treatment in the second or third trimester on a case-by-case basis. A single dose of albendazole (400 mg) or mebendazole (500 mg) should be used.
- The safety of these drugs in pregnancy has not been unequivocally established; however, the benefits are considered to outweigh the disadvantages.
- In areas where anaemia is not a public health problem, the parasite-control intervention is probably not necessary.

Contributes to global nutrition targets: —

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Guideline: preventive chemotherapy to control soil-transmitted helminth infections in at-risk population groups. Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/258983/9789241550116-eng.pdf?sequence=1, accessed 12 May 2019).
- WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/250796/9789241549912-eng.pdf?sequence=1, accessed 10 May 2019).

D. Nutritional care for persons with Ebola virus disease

❑ Optimal feeding of infants of mothers with Ebola virus disease

Applicable contexts/population groups: Settings with transmission of Ebola virus disease; infants of mothers with Ebola virus disease

WHO recommendation

If the lactating woman and child are both positive for infection and replacement feeding with ready-to-use infant formula (RUIF) is acceptable, feasible, and provision is guaranteed: it is recommended to SUSPEND breastfeeding until breast-milk tests are negative.

If the lactating woman positive (or suspected awaiting results) and the child is negative (or contact-asymptomatic) for infection suspend breastfeeding if already initiated.

When artificial feeding is possible, provide RUIF for infants less than 6 months of age, for infants and young children 6-23 months of age provide RUIF or ultra-high temperature (UHT) full-cream (or whole) cow's milk and complementary feeding (with the addition of multiple micronutrient powders if the nutrient contents of the complementary foods is expected to be inadequate).

Details of the infant feeding recommendations are available in the section E. Nutritional care for persons with viral haemorrhagic disease (including Ebola, Marburg, Lassa and Crimean-Congo haemorrhagic fever).

Summary of key evidence

- Ebola virus has been found in breast milk. Given the potential risk of transmission through breast milk and close physical contact during breastfeeding and general infant care, a woman who has been admitted as an Ebola patient may have already infected her breastfed infant.
- However, data are still lacking on how to manage breastfeeding in mother–infant-discordant pairs and especially on how to manage the mother and infant when both test positive for infection. Current recommendations are based on anecdotal cases, limited field experience and the assumption that the presence of Ebola virus in breast milk increases the likelihood of severe Ebola virus disease in an infant who is already infected.

Key actions for implementation

- The safest replacement feeding in the current context for infants aged under 6 months is ready-to-use infant formula milk.
- Wet nursing is not recommended.
- Lactating women who are discharged cured (after two consecutive negative blood polymerase chain reaction [PCR] tests) and have an infant or young child who is Ebola-negative or non-suspected (asymptomatic), should not resume breastfeeding until after they have had two negative breast-milk PCR tests.
- Provide skilled support in breastfeeding initiation and continuation to mothers who decide to breastfeed.
- Utilize families and communities, who are central in supporting optimal infant and young child feeding and improving infant health, to serve as resources for counselling, practical support to mothers for breastfeeding and complementary feeding, solving problems, negotiating with caregivers and facilitating interactive peer sessions.
- Make health workers aware of the complex set of values around breastfeeding, to better equip them to support pregnant and lactating women with their infant-feeding choices, even in the context of an outbreak.

Considerations

- Safe, sustainable feeding with an appropriate breast-milk substitute will be necessary for neonates and some other infants but is challenging and, in many contexts, may expose infants to immediate risks of malnutrition and infectious disease. These infants require special attention and support. There may be cultural stigma associated with use of breast-milk substitute.
- Where possible, provide liquid ready-to-use infant formula milk, which is a less risky option than powdered infant formula milk, since it does not require reconstitution with water.
- A mother who abruptly stops breastfeeding will need help to express her breast milk, to alleviate pain and engorgement and prevent inflammation, especially within the first month after delivery. Her breast milk is a contaminated product and should be treated as per infection-control protocols.
- Psychosocial support of a mother who is separated from her infant is important.

Contributes to global nutrition targets: #1 Stunting; #4 Children overweight; #5 Exclusive breastfeeding; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

❑ Feeding protocols for adults and children older than 6 months with Ebola virus disease

Applicable contexts/population groups: Settings with transmission of Ebola virus disease; patients with Ebola virus disease

WHO recommendation

For patients requiring nutritional support, the foremost considerations in the selection of food commodities includes the low osmolarity and renal solute load of the diet, along with the texture of food commodities.

A suggested scheme for each of the feeding phases of Ebola virus disease patients is provided in the table below.

Suggested scheme for feeding patients at the different stages of Ebola virus disease

Severity of illness	Nutritional management
Rehydration phase Severely dehydrated	ORS (and, if needed, IV fluids)
Maintenance phase Not severely dehydrated Poor or no appetite May or may not have eating difficulties	Milk-based fortified diets (F-75) For adults: "sip feeds" (low renal solute load, low-osmolarity options)
Transition phase Not severely dehydrated Some appetite May or may not have feeding difficulties	*No eating difficulties:* Any one or combination of any of the following: • ready-to-use fortified nutrient-rich biscuits/bars (can also be offered as a porridge or paste) • 1–2 porridges per day of fortified cereal legume blends with added sugar (adults) and added sugar and milk (children) • common family meal (plus MNP, if no fortified food is given), preferably offer LNS[a] in addition to common family food; LNS must be eaten separately *Eating difficulties:* as for those with no eating difficulties, except that: • common family meal should be offered as mashed food or as soups • LNS are not suitable for patients with swallowing difficulties • ready-to-use fortified nutrient-rich biscuits/bars should be offered as porridge In addition, the following commodities are also suitable: • milk-based fortified diets (F-100) • for adults: "sip feeds" (low renal solute load, low-osmolarity options)

IV: intravenous; LNS: lipid-based nutrient supplements; MNP: multiple micronutrient powder; ORS: oral rehydration solution.

[a] LNS refers generically to a range of fortified, lipid-based spreads, including products like ready-to-use therapeutic food (RUTF), used to treat severe acute malnutrition; ready-to-use supplementary food (RUSF), sometimes used as supplementary food to treat moderate acute malnutrition; and others that are used for "point-of-use" fortification to improve diets and aiming to prevent malnutrition.

Summary of key evidence

- Currently, field experience with Ebola virus disease patients in treatment centres shows differences in their capacity to eat and drink. The interim guideline referenced at the end of this section recognizes three feeding phases for these patients – maintenance feeding, transition feeding and boost feeding, in addition to an initial rehydration phase, where necessary.

Key actions for implementation

- In critically ill patients with severe dehydration, nutritional support should not interfere with strategies for volume and electrolyte repletion, as nutritional requirements will temporarily be of a lower priority.
- Even in critically ill patients without severe dehydration who have no appetite, excess energy or protein is not needed and an excess could further compromise liver and kidney function.
- As soon as appetite starts to return, patients need sufficient energy (kcal) and essential nutrients, in addition to fluid electrolytes.
- Patients with Ebola virus disease should be provided with a minimum of the recommended daily allowance for each nutrient. Excess use of any micronutrient is currently not recommended. For patients who receive adequate quantities of fortified ready-to-use food, multivitamins are not required.
- The food that is offered to the patient should ideally be palatable and attractive; be nutrient dense; be liquid, semi-solid or solid (depending on the patient's condition); be easy to ingest and require minimal assistance from health-care staff when the patient eats; carry limited risk of bacterial contamination when kept at the bedside for 2–3 hours; and not require eating utensils, as these can be a source of contamination.
- Whenever possible, an assessment should be done on patients, to indicate what the patient can and prefers to eat, to bridge the gap between what is nutritionally needed and what the patient wants to eat.
- The intake of highly nutrient-dense foods (e.g. ready-to-use therapeutic food and ready-to-use supplementary food) may be important in patients in the boost feeding phase and for patients in the transition feeding phase with no feeding difficulties.
- In most field settings, the use of nasogastric tubes is not currently recommended for the treatment of Ebola virus disease. However, when patients tolerate nasogastric tube placement, exceptions can be made for treatment centres that are fully equipped with sufficient and appropriate staff and material, good infection-prevention/control practice and good waste-disposal management.
- Owing to the high osmolarity of sugary carbonated beverages and fruit juices, it is important that they are not given to patients with diarrhoea, as they may exacerbate diarrhoea. In addition, sugary carbonated beverages are low in electrolytes and nearly all essential nutrients. If patients request these commodities, they should only be offered during the boost feeding phase.
- It is recommended that recovered patients receive a discharge food ration. A nutritional assessment of recovered patients should be taken at discharge, as the presence or absence of malnutrition will determine the appropriate food ration and follow-up care.

Considerations

- Signs and symptoms that affect nutritional care in patients with Ebola virus disease include a lack of appetite, nausea, sore throat, difficulty swallowing and breathing difficulties. Vomiting also interferes with nutritional care and, along with diarrhoea, causes additional nutritional stress through rapid loss of electrolytes, protein, other essential nutrients and fluid.
- The nutritional needs and approach to nutritional care in any individual will be determined by the patient's preceding nutritional status, severity of illness and age, and is assessed by the severity of dehydration, presence of appetite and physical ability to eat.
- The nutritional status of all children aged under 5 years should be assessed by the mid-upper arm circumference and by checking for bilateral pitting oedema of the feet, which may be diagnostic of severe acute malnutrition.
- Small children are at particular risk of dehydration. Inability to drink and feed is frequent, and early intervention with oral rehydration solution (by nasogastric tube if needed) or intravenous fluids may be needed if severely dehydrated. If not severely dehydrated, providing some nutritional support is important, especially in children, balancing their individual needs and their tolerance to food.
- Caregivers (sick family members or survivors) should be present continuously.
- Children should be cared for by health workers and caregivers in full personal protective equipment (PPE), who should be encouraged to carefully comfort the child. Leaving children with "no touch" can be harmful for them.
- A home visit within 2 weeks after discharge should be scheduled, to assess the infant's outcome if the evolution of the outbreak allows it.
- The child protection team should be informed of cases where children are orphaned, to ensure an adequate link to the welfare and social department.

Contributes to global nutrition targets: #1 Stunting; #4: Children overweight; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- Clinical management of patients with viral haemorrhagic fever: a pocket guide for the front-line health workers. Interim emergency guidance for country adaptation. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/205570/9789241549608_eng.pdf, accessed 12 May 2019).
- Interim guideline: nutritional care of children and adults with Ebola virus in treatment centres. Geneva: World Health Organization; 2014 (WHO/NMH/NHD/EPG/14.8; https://apps.who.int/iris/bitstream/handle/10665/145403/WHO_NMH_NHD_EPG_14.8_eng.pdf?ua=1, accessed 12 May 2019).

E. Nutritional care for persons with viral haemorrhagic disease (including Ebola, Marburg, Lassa and Crimean-Congo haemorrhagic fever)

❑ Optimal feeding of infants of mothers with viral haemorrhagic disease (including Ebola, Marburg, Lassa and Crimean-Congo haemorrhagic fever)

Applicable contexts/population groups: Settings with transmission of viral haemorrhagic diseases; infants of mothers with viral haemorrhagic disease

WHO recommendation

Infant feeding recommendations:

Status	Breastfeeding	Nutrition	Care
Lactating woman and child both positive for infection[a]	If replacement feeding with ready-to-use infant formula (RUIF) is acceptable, feasible, and provision is guaranteed: SUSPEND breastfeeding until breast-milk tests are negative.	*When artificial feeding is possible:* <6 months: RUIF 6–23 months: RUIF or ultra-high temperature (UHT) full-cream (or whole) cow's milk and complementary feeding (with the addition of multiple micronutrient powder when the nutrient content of complementary foods is expected to be inadequate) *When artificial feeding is not possible:* Breast milk and, in addition, complementary foods (with the addition of multiple micronutrient powders as necessary) for 6–23 months of age	*When artificial feeding is possible:* The mother and infant should be separated in the Ebola treatment unit (ETU) *When artificial feeding is not possible:* The mother should take care of the infant inside the ETU, if well enough
Lactating woman positive (or suspected awaiting results) and child negative (or contact-asymptomatic) for infection	Suspend	<6 months: RUIF 6–23 months: UHT and complementary feeding	The child should be separated from the mother, placed in an observational unit (cared for by a survivor caregiver) and followed as a contact
Lactating woman negative (or contact-asymptomatic) and child positive for infection	Suspend	<6 months: expressed breast milk if possible and RUIF 6–23 months: UHT and complementary feeding	The child should be taken care of inside the ETU by a survivor caregiver or relative who is positive for infection; the mother should be followed as a contact
Lactating woman and child both negative (or asymptomatic contacts; including quarantined mothers with a breastfed child)	Continue	Breast milk and, in addition complementary foods for 6–23 months of age	Both should be followed as contacts

[a] There is a high level of uncertainty around the risks of continued breastfeeding when both mother and child test positive for infection. This information should be included in the counselling given to the mother, in case she wishes to continue breastfeeding, in which case she should be supported to do so.

Summary of key evidence

- Ebola and Marburg viruses have been found in breast milk. Given the potential risk of transmission through breast milk and close physical contact during breastfeeding and general infant care, a woman who has been admitted as an Ebola, Marburg, Lassa fever or Crimean-Congo haemorrhagic fever patient may have already infected her breastfed infant.
- However, data are still lacking on how to manage breastfeeding in mother–infant-discordant pairs and especially on how to manage the mother and infant when both test positive for infection. Current recommendations are based on anecdotal cases, limited field experience and the assumption that the presence of haemorrhagic disease virus in breast milk increases the likelihood of severe viral haemorrhagic disease in an already infected infant.

Key actions for implementation

- The safest replacement feeding in the current context for infants aged under 6 months is ready-to-use infant formula (RUIF).
- Wet nursing is not recommended.
- Lactating women who are discharged cured (after two consecutive negative blood PCR tests) and have an infant or young children who are virus-negative or non-suspected (asymptomatic), should not resume breastfeeding until after they have had two negative breast-milk PCR tests.
- Provide skilled support in breastfeeding initiation and continuation to mothers who decide to breastfeed.
- Utilize families and communities, who are central in supporting optimal infant and young child feeding and improving infant health, to serve as resources for counselling, practical support to mothers for breastfeeding and complementary feeding, solving problems, negotiating with caregivers and facilitating interactive peer sessions.
- Make health workers aware of the complex set of values around breastfeeding to better equip them to support pregnant and lactating women with their infant-feeding choices, even in the context of an outbreak.

Considerations

- Safe, sustainable feeding with an appropriate breast-milk substitute will be necessary for neonates and some other infants but is challenging and may expose infants to immediate risks of malnutrition and infectious disease in many contexts. These infants require special attention and support. There may be cultural stigma associated with use of breast-milk substitute.
- Where possible, provide liquid ready-to-use infant formula, which is a less risky option than powdered infant formula milk, since it does not require reconstitution with water.
- A mother who abruptly stops breastfeeding will need help to express her breast milk, to alleviate pain and engorgement and prevent inflammation, especially within the first month after delivery. Her breast milk is a contaminated product and should be treated as per infection-control protocols.
- Psychosocial support of a mother who is separated from her infant is important.

Contributes to global nutrition targets: #1 Stunting; #4 Children overweight; #5 Exclusive breastfeeding; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

❑ Feeding protocols for adults and children older than 6 months with viral haemorrhagic disease (including Ebola, Marburg, Lassa and Crimean-Congo haemorrhagic fever)

Applicable contexts/population groups: Settings with transmission of viral haemorrhagic disease; patients with viral haemorrhagic disease

WHO recommendation

For patients requiring nutritional support, the foremost considerations in the selection of food commodities include the low osmolarity and renal solute load of the diet, along with the texture of food commodities.

A suggested scheme for each of the feeding phases of viral haemorrhagic disease patients are provided in the table below.

Suggested scheme for feeding patients at the different stages of viral haemorrhagic disease

Severity of illness	Nutritional management
Rehydration phase Severely dehydrated	ORS (and, if needed, IV fluids)
Maintenance phase Not severely dehydrated Poor or no appetite May or may not have eating difficulties	Milk-based fortified diets (F-75) For adults: "sip feeds" (low renal solute load, low-osmolality options)
Transition phase Not severely dehydrated Some appetite May or may not have feeding difficulties	*No eating difficulties:* Any one or combination of any of the following: • ready-to-use fortified nutrient-rich biscuits/bars (can also be offered as a porridge or paste) • 1–2 porridges per day of fortified cereal legume blends with added sugar (adults) and added sugar and milk (children) • common family meal (plus MNP, if no fortified food is given), preferably offer LNS[a] in addition to common family food; LNS must be eaten separately *Eating difficulties:* as for those with no eating difficulties, except that: • common family meal should be offered as mashed food or as soups • LNS are not suitable for patients with swallowing difficulties • ready-to-use fortified nutrient-rich biscuits/bars should be offered as porridge In addition, the following commodities are also suitable: • milk-based fortified diets (F-100) • for adults: "sip feeds" (low renal solute load, low-osmolarity options)

IV: intravenous; LNS: lipid-based nutrient supplements; MNP: multiple micronutrient powders; ORS: oral rehydration solution.

[a] LNS refers generically to a range of fortified, lipid-based spreads, including products like ready-to-use therapeutic food (RUTF), used to treat severe acute malnutrition; ready-to-use supplementary food (RUSF), sometimes used as supplementary food to treat moderate acute malnutrition; and others that are used for "point-of-use" fortification to improve diets and aiming to prevent malnutrition.

Summary of key evidence

- Currently, field experience with viral haemorrhagic disease patients in treatment centres shows differences in their capacity to eat and drink. The interim guideline for viral haemorrhagic disease referenced at the end of this section recognizes three feeding phases for patients with viral haemorrhagic disease – maintenance feeding, transition feeding and boost feeding, in addition to an initial rehydration phase, where necessary.

Key actions for implementation

- In critically ill patients with severe dehydration, nutritional support should not interfere with strategies for volume and electrolyte repletion, as nutritional requirements will temporarily be of a lower priority.
- Even in critically ill patients without severe dehydration who have no appetite, excess energy or protein is not needed and an excess could further compromise liver and kidney function.
- As soon as appetite starts to return, patients need sufficient energy (kcal) and essential nutrients, in addition to fluid electrolytes.
- Patients with viral haemorrhagic disease should be provided with a minimum of the recommended daily allowance for each nutrient. Excess use of any micronutrient is currently not recommended. For patients who receive adequate quantities of fortified ready-to-use food, multivitamins are not required.
- The food that is offered to the patient should ideally be palatable and attractive; be nutrient dense; be liquid, semi-solid or solid (depending on the patient's condition); be easy to ingest and require minimal assistance from health-care staff when the patient eats; carry limited risk of bacterial contamination when kept at the bedside for 2–3 hours; and not require eating utensils, as these can be a source of contamination.
- Whenever possible, an assessment should be done on patients, to indicate what the patient can and prefers to eat, to bridge the gap between what is nutritionally needed and what the patient wants to eat.
- The intake of highly nutrient-dense foods (e.g. ready-to-use therapeutic food and ready-to-use supplementary food) may be important in patients in the boost feeding phase and for patients in the transition feeding phase with no feeding difficulties.
- In most field settings, the use of nasogastric tubes is not currently recommended for the treatment of viral haemorrhagic disease. However, when patients tolerate nasogastric tube placement, exceptions can be made for treatment centres that are fully equipped with sufficient and appropriate staff and material, good infection-prevention/control practice and good waste-disposal management.
- Owing to the high osmolarity of sugary carbonated beverages and fruit juices, it is important that they are not given to patients with diarrhoea, as they may exacerbate diarrhoea. In addition, sugary carbonated beverages are low in electrolytes and nearly all essential nutrients. If patients request these commodities, they should only be offered during the boost feeding phase.
- It is recommended that recovered patients receive a discharge food ration. A nutritional assessment of recovered patients should be taken at discharge, as the presence or absence of malnutrition will determine the appropriate food ration and follow-up care.

Considerations

- Signs and symptoms that affect nutritional care in patients with viral haemorrhagic disease include a lack of appetite, nausea, sore throat, difficulty swallowing and breathing difficulties. Vomiting also interferes with nutritional care and, along with diarrhoea, causes additional nutritional stress through rapid loss of electrolytes, protein, other essential nutrients and fluid.
- The nutritional needs and approach to nutritional care in any individual will be determined by the patient's preceding nutritional status, severity of illness and age, and is assessed by the severity of dehydration, presence of appetite and physical ability to eat.
- The nutritional status of all children aged under 5 years should be assessed by the mid-upper arm circumference and by checking for bilateral pitting oedema of the feet, which may be diagnostic of severe acute malnutrition.
- Small children are at particular risk of dehydration. Inability to drink and feed is frequent, and early intervention with oral rehydration solution (by nasogastric tube if needed) or intravenous fluids may be needed if severely dehydrated. If not severely dehydrated, providing some nutritional support is important, especially in children, balancing their individual needs and their tolerance to food.
- Caregivers (sick family members or survivors) should be present continuously.
- Children should be cared for by health workers and caregivers in full personal protective equipment (PPE), who should be encouraged to carefully comfort the child. Leaving children with "no touch" can be harmful for them.
- A home visit within 2 weeks after discharge should be scheduled, to assess the infant's outcome if the evolution of the outbreak allows it.
- The child protection team should be informed of cases where children are orphaned, to ensure an adequate link to the welfare and social department.

Contributes to global nutrition targets: #1 Stunting; #4 Children overweight; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- Clinical management of patients with viral haemorrhagic fever: a pocket guide for the front-line health workers. Interim emergency guidance for country adaptation. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/205570/9789241549608_eng.pdf, accessed 12 May 2019).
- Interim guideline: nutritional care of children and adults with Ebola virus in treatment centres. Geneva: World Health Organization; 2014 (WHO/NMH/NHD/EPG/14.8; https://apps.who.int/iris/bitstream/handle/10665/145403/WHO_NMH_NHD_EPG_14.8_eng.pdf?ua=1, accessed 12 May 2019).

F. Nutritional care for infants in the context of Zika virus transmission

❑ Optimal infant feeding in areas of Zika virus transmission

Applicable contexts/population groups: Settings with Zika virus transmission; infants born to mothers with suspected, probable or confirmed Zika virus infection, or who reside in or have travelled to areas with ongoing Zika virus transmission

WHO recommendation

Infants born to mothers with suspected, probable or confirmed Zika virus infection, or who reside in or have travelled to areas of ongoing Zika virus transmission, should be fed according to normal infant feeding guidelines.

They should start breastfeeding within one hour after birth, be exclusively breastfed for 6 months and have timely introduction of adequate, safe and properly fed complementary foods, while continuing breastfeeding up to 2 years of age or beyond.

Summary of key evidence

- Zika virus is a mosquito-borne virus transmitted by *Aedes* mosquitoes; the same mosquito also transmits other vector-borne diseases – dengue, chikungunya and yellow fever. Currently, there is no treatment or vaccine to protect specifically against Zika virus infection.
- Breastfeeding has significant benefits for mothers and children in low-, middle- and high-income countries, including, among children, lower infectious morbidity and mortality, fewer dental malocclusions and higher intelligence scores; and for mothers, preventing breast cancer, improving birth spacing, and potentially reducing a woman's risk of diabetes and ovarian cancer.
- Though Zika virus RNA has been detected in breast milk and thus breast milk may be considered as potentially infectious, there are currently no documented reports of Zika virus being transmitted to infants through breastfeeding.
- In light of the evidence available, the benefits of breastfeeding for the infant and mother outweigh any potential risk of transmission of Zika virus through breast milk.

Key actions for implementation

- Provide skilled support in initiation and continuation of breastfeeding to mothers who decide to breastfeed, whether they or their infants have suspected, probable or confirmed Zika virus infection.
- Provide skilled feeding support from health professionals to mothers and families of infants born with congenital anomalies (e.g. microcephaly), or those presenting with feeding difficulties, to breastfeed their infants.
- Utilize families and communities, who are central in supporting optimal infant and young child feeding and improving infant health, to serve as resources for counselling, practical support to mothers for breastfeeding and complementary feeding, solving problems, negotiating with caregivers and facilitating interactive peer sessions.
- Make health workers aware of the complex set of values around breastfeeding, to better equip them to support pregnant and lactating women with their infant-feeding choices, even in the context of an outbreak.
- Engage multidisciplinary teams for infants who need specialist support in infant feeding, especially for infants who have difficulty breastfeeding. This may be the case, in particular, for infants born with congenital anomalies, including microcephaly, and long-term management may be necessary.

Considerations

- This recommendation is consistent with the *Global strategy for infant and young child feeding,* as endorsed by the Fifty-fifth World Health Assembly, in resolution WHA54.2 in 2002, to promote optimal feeding for all infants and young children.
- The frequency of virus detection, virus kinetics and size of viral load of Zika virus in breast milk is unknown. Though the Zika virus is known to circulate in the blood before the person infected is symptomatic and the virus is detected, these parameters are not known in relation to the virus kinetics in breast milk.

Contributes to global nutrition targets: #1 Stunting; #4 Children overweight; #5 Exclusive breastfeeding; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- Guideline. Infant feeding in areas of Zika virus transmission. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/208875/9789241549660_eng.pdf?sequence=1, accessed 10 May 2019).
- Global strategy for infant and young child feeding. Geneva: World Health Organization; 2003 (https://apps.who.int/iris/bitstream/handle/10665/42590/9241562218.pdf?sequence=1, accessed 9 May 2019).
- WHO Toolkit for the care and support of people affected by complications associated with Zika virus. Geneva: World Health Organization; 2017. License: CC BY-NC-SA 3.0 IGO. (https://apps.who.int/iris/bitstream/handle/10665/255718/9789241512718-eng.pdf;jsessionid=36690213E424BF3EDA92C8E5F96B677D?sequence=1, accessed 8 August 2019).
- Psychosocial support for pregnant women and for families with microcephaly and other neurological complications in the context of Zika virus: Interim guidance for health-care providers. WHO/ZIKV/MOC/16.6. Geneva: World Health Organization, 2016. (https://apps.who.int/iris/bitstream/handle/10665/204492/WHO_ZIKV_MOC_16.6_eng.pdf;jsessionid=12C3DE31F15FBA1EB6D61982FA045E1D?sequence=1, accessed 5 August 2019)

G. Feeding of infants of mothers who are carriers of chronic hepatitis B

❑ Optimal feeding of infants of mothers who are carriers of chronic hepatitis B

Applicable contexts/population groups: All countries and contexts, settings with hepatitis B transmission; infants of mothers who are carriers of chronic hepatitis B

WHO recommendation

All infants should be fed according to normal infant feeding guidelines. They should start breastfeeding within one hour after birth, be exclusively breastfed for 6 months and continue to breastfeed up to 2 years of age or beyond, with the addition of adequate complementary foods from about 6 months of age.

All infants worldwide should receive hepatitis B vaccine as part of routine children immunization. Where feasible, the first dose should be given within 48 hours after birth, or as soon as possible thereafter.

Summary of key evidence

- There is a considerable risk of morbidity and mortality among infants who are not breastfed. There is no evidence that breastfeeding from a mother who is infected with hepatitis B virus poses an additional risk to her infant of hepatitis B virus infection, even without immunization. Thus, even where infection with hepatitis B virus is highly endemic and immunization against hepatitis B is not available, breastfeeding remains the recommended method of infant feeding.
- Immunization for hepatitis B will substantially reduce perinatal transmission, and virtually eliminate any risk of transmission through breastfeeding or breast-milk feeding. Immunization of infants will also prevent infection from all other modes of transmission of hepatitis B virus.
- Breastfeeding has significant benefits for mothers and children in low-, middle- and high-income countries, including, among children, lower infectious morbidity and mortality, fewer dental malocclusions and higher intelligence scores; and for mothers, preventing breast cancer, improving birth spacing, and potentially reducing a woman's risk of diabetes and ovarian cancer.

Key actions for implementation

- Hepatitis B vaccination is recommended for all children worldwide. Reaching all children with at least three doses of hepatitis B vaccine should be the standard for all national immunization programmes. Importantly, all national programmes should include a dose of monovalent hepatitis B vaccine at birth.
- Utilize families and communities, who are central in supporting optimal infant and young child feeding and improving infant health, to serve as resources for counselling, practical support to mothers for breastfeeding and complementary feeding, solving problems, negotiating with caregivers and facilitating interactive peer sessions.

Considerations

- This recommendation is consistent with the *Global strategy for infant and young child feeding*, as endorsed by the Fifty-fifth World Health Assembly, in resolution WHA54.2 in 2002, to promote optimal feeding for all infants and young children.

Contributes to global nutrition targets: #1 Stunting; #4: Children overweight; #5 Exclusive breastfeeding; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- Hepatitis B vaccines: WHO position paper – July 2017. Wkly Epidemiol Rec. 2017;92(27):369–92 (https://apps.who.int/iris/bitstream/handle/10665/255841/WER9227.pdf, accessed 23 May 2019).
- Global strategy for infant and young child feeding. Geneva: World Health Organization; 2003 (https://apps.who.int/iris/bitstream/handle/10665/42590/9241562218.pdf?sequence=1, accessed 9 May 2019).
- Hepatitis B and breastfeeding. A statement prepared jointly by the Global Programme for Vaccines and Immunization (GPV) and the Divisions of Child Health and Development (CHD), and Reproductive Health (Technical Support) (RHT) World Health Organization. Geneva: World Health Organization; 1996 (https://www.who.int/maternal_child_adolescent/documents/pdfs/hepatitis_b_and_breastfeeding.pdf, accessed 10 May 2019).

H. Feeding of infants in settings with an ongoing pandemic of influenza A (H1N1) virus transmission

❑ Optimal infant feeding in areas of pandemic influenza A (H1N1) virus transmission

Applicable contexts/population groups: Settings with an ongoing pandemic of influenza A (H1N1) virus transmission; all infants

WHO recommendation

All infants should be fed according to normal infant feeding guidelines. They should start breastfeeding within one hour after birth, be exclusively breastfed for 6 months, and continue to breastfeed up to 2 years of age or beyond, with the addition of adequate complementary foods from about 6 months of age, including during periods of pandemic influenza A (H1N1) circulation.

If the mother is ill with influenza, she should follow measures to prevent transmission. These include covering coughs and sneezes when caring for and breastfeeding the baby, as well as performing frequent hand hygiene.

The mother can continue breastfeeding, even if she is ill and on antiviral medicines. She should take additional fluids, especially if she has fever.

If severe maternal illness prevents the mother from feeding the infant at her breast, she should be helped to express her breast milk and feed it to the infant by cup or cup and spoon.

Summary of key evidence

- There is a considerable risk of morbidity and mortality among infants who are not breastfed. Infants who are not breastfed are more vulnerable to infectious diseases, including severe respiratory tract infection.
- Breastfeeding has significant benefits for mothers and children in low-, middle- and high-income countries, including, among children, lower infectious morbidity and mortality, fewer dental malocclusions and higher intelligence scores; and for mothers, preventing breast cancer, improving birth spacing, and potentially reducing a woman's risk of diabetes and ovarian cancer.

Key actions for implementation

- Advise pregnant women to avoid crowded places, whenever possible, during community outbreaks. This includes avoiding long waits in crowded clinic waiting areas or using public transportation when coming for health services and for any other travel.
- Pregnant women and new mothers should avoid providing care for those with confirmed, probable or suspected influenza infection, except for their own neonates.
- Do not separate the baby from the mother. Institute rooming-in. Keep newborn infants close to their mothers. In general, this closeness promotes infant survival from various threats.
- Anyone with respiratory symptoms should not provide care for a pregnant woman or a mother and newborn baby.

- When pandemic (H1N1) 2009 vaccines become available in a country, pregnant women should be immunized as a priority group, given their increased risk of complications and death. From May 2010, the new seasonal influenza vaccines (e.g. those prepared for the 2010 southern hemisphere influenza season) have included protection against pandemic (H1N1) 2009 and can be given to pregnant women. Older seasonal vaccines not containing a pandemic 2009 strain will not protect against the pandemic (H1N1) 2009 virus.
- Pandemic (H1N1) 2009 and seasonal influenza vaccines are not recommended for infants under 6 months of age.
- Only inactivated influenza vaccine is suitable for pregnant women and children under 24 months of age. Live attenuated influenza vaccine should not be used in this population.
- Utilize families and communities, who are central in supporting optimal infant and young child feeding and improving infant health, to serve as resources for counselling, practical support to mothers for breastfeeding and complementary feeding, solving problems, negotiating with caregivers and facilitating interactive peer sessions.

Considerations

- This recommendation is consistent with the *Global strategy for infant and young child feeding*, as endorsed by the Fifty-fifth World Health Assembly, in resolution WHA54.2 in 2002, to promote optimal feeding for all infants and young children.

Contributes to global nutrition targets: #1 Stunting; #4 Children overweight; #5 Exclusive breastfeeding; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- Pregnancy and pandemic influenza A (H1N1) 2009: information for programme managers and clinicians. Geneva: World Health Organization; 2010 (https://www.who.int/csr/resources/publications/swineflu/h1n1_guidance_pregnancy.pdf, accessed 10 May 2019).
- Global strategy for infant and young child feeding. Geneva: World Health Organization; 2003 (https://apps.who.int/iris/bitstream/handle/10665/42590/9241562218.pdf?sequence=1, accessed 9 May 2019).

I. Vitamin A supplementation for infants and children with measles

❑ Vitamin A supplementation for infants and children with measles

Applicable contexts/population groups: All countries, all settings; infants and children with measles

WHO recommendation

Vitamin A is recommended for all children with measles. Children should be provided with one dose of vitamin A (see table below for recommended dosages by age) immediately on diagnosis. In areas where the case-fatality for measles is likely to be more than 1%, or in areas of known vitamin A deficiency, a second dose should be provided the following day. In cases in which any eye signs of vitamin A deficiency are present, a third dose is to be provided, at least 2 weeks after the second dose. A suggested scheme for treatment, by age, is provided in the table below.

Suggested vitamin A supplementation scheme for infants and children with measles

Age	Immediately on diagnosis	Next day	2–4 weeks later (if eye signs)
Infants aged under 6 months	50 000 IU	50 000 IU	50 000 IU
Infants aged 6–11 months	100 000 IU	100 000 IU	100 000 IU
Children aged 12 months and over	200 000 IU	200 000 IU	200 000 IU

Summary of key evidence

- Vitamin A deficiency affects the body's immune system and the cells that protect the lining of the lungs and gut, limiting the body's ability to control and prevent infections.
- Vitamin A deficiency is linked with a higher rate of measles infection, as well as increased mortality from measles.
- Children with vitamin A deficiency and measles infection have increased risk of mortality, delayed recovery and post-measles complications.
- Measles infection may precipitate acute vitamin A deficiency and xerophthalmia and is a primary contributor to preventable children blindness.

Key actions for implementation

- Details on the clinical management of children with measles and vitamin A deficiency are provided in the references at the end of this section.

Contributes to global nutrition targets: —

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Treating measles in children. Geneva: World Health Organization; 2004 (WHO/EPI/TRAM/97.02; https://www.who.int/immunization/programmes_systems/interventions/TreatingMeaslesENG300.pdf, accessed 11 May 2019).
- Vitamin A supplements: a guide to their use in the treatment and prevention of vitamin A deficiency and xerophthalmia, 2nd ed. Geneva: World Health Organization; 1997 (https://apps.who.int/iris/bitstream/handle/10665/41947/9241545062.pdf, accessed 11 May 2019).

UNICEF / Frank Dejongh

III. Nutrition in emergencies[a]

A. Infant and young child feeding in emergencies

❑ Optimal infant and young child feeding in emergencies

Applicable contexts/population groups: Emergency settings; infants and young children aged 0–23 months

WHO recommendation

Protect, promote and support early initiation of exclusive breastfeeding in all newborn infants.

Protect, promote and support exclusive breastfeeding in infants under 6 months of age and continued breastfeeding in children aged 6 months to 2 years or beyond.

Every effort should be made to identify alternative ways to breastfeed infants whose biological mothers are unavailable (e.g. relactation or wet-nursing if culturally acceptable). The aim should be to create and sustain an environment that encourages frequent breastfeeding for children up to the age of 2 years and beyond.

The quantity, distribution and use of breast-milk substitutes at emergency sites should be strictly controlled. A nutritionally adequate breast-milk substitute should be available, and fed by cup, only to those infants who have to be fed on breast-milk substitutes. There should be no general distribution of breast-milk substitutes.

Those responsible for feeding a breast-milk substitute should be adequately informed and equipped to ensure its safe preparation and use. The use of infant-feeding bottles and artificial teats during emergencies should be actively discouraged.

Summary of key evidence

- In emergency settings, breast milk plays a particularly critical role for feeding and protecting possibly malnourished children in the unhygienic conditions that often prevail.
- Breast milk provides adequate nutrition and also protection from infections, especially diarrhoea, which is particularly problematic during emergencies.
- In emergency settings, where unsafe water, inadequate sanitation and lack of cooking fuel are common, artificial feeding carries increased risk of infection and mortality.

Key actions for implementation

- Train health/nutrition/community workers to promote, protect and support optimal infant and young child feeding as soon as possible after the onset of emergency.
- Integrate breastfeeding and infant and young child feeding training and support at all levels of health care.
- Set up areas for mothers/caregivers requiring individual support with breastfeeding and infant and young child feeding. Ensure that support for artificial feeding is provided in an area distinct from support for breastfeeding.

[a] The interventions presented in the section are not exhaustive and other nutrition actions through the life-course can be adapted as needed, to emergency settings.

Considerations

- Non-breastfed infants in emergency settings are a group that is particularly at risk of infection and malnutrition and should be provided special attention.
- Nutritional status should be continually monitored to identify malnourished children, so that their condition can be assessed and treated, and prevented from deteriorating further. The underlying causes of malnutrition should be investigated and corrected.
- Promoting optimal feeding for infants and young children in emergencies requires a flexible approach based on continual careful monitoring.
- Any support of artificial feeding in an emergency should be based on a needs assessment by skilled technical staff, including a risk analysis.

Contributes to global nutrition targets: #1 Stunting; #4 Children overweight; #5 Exclusive breastfeeding; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- HIV and infant feeding in emergencies: operational guidance. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/272862/9789241550321-eng.pdf?ua=1, accessed 10 May 2019).
- Infant and young child feeding in emergencies. Operational guidance for emergency relief staff and programme managers. Developed by the IFE Core group. Version 3.0. Geneva: World Health Organization; 2017 (https://www.ennonline.net/attachments/2671/Ops-G_2017_WEB.pdf, accessed 10 May 2019).
- Guiding principles for feeding infants and young children during emergencies. Geneva: World Health Organization; 2004 (https://apps.who.int/iris/bitstream/handle/10665/42710/9241546069.pdf?ua=1, accessed 10 May 2019).

❑ Appropriate complementary foods and micronutrient supplementation for infants and children affected by an emergency

Applicable contexts/population groups: Emergency settings; infants and children aged 6–59 months

WHO recommendation

Infants from 6 months of age onwards and older children need hygienically prepared, and easy-to-eat and digest foods that nutritionally complement breast milk. This should occur in an environment that encourages frequent breastfeeding for children up to 2 years and beyond. The health and vigour of infants and children should be protected so that they are able to suckle frequently and well, and maintain their appetite for complementary foods.

Caregivers need secure uninterrupted access to appropriate ingredients with which to prepare and feed nutrient-dense foods to older infants and young children. Caregivers should be supported and their coping capacity promoted as an essential part of fostering good feeding practices.

For children aged 6–59 months, multiple micronutrient supplements may be necessary to meet their nutrition requirements where fortified foods are not being provided, in conjunction with other interventions to improve complementary foods and feeding practices. The recommended composition of a multi-micronutrient supplement is provided in the table below.

Recommended composition of a multi-micronutrient supplement for infants and children in emergency settings

Micronutrient	Content
Vitamin A	400.0 µg
Vitamin D	5.0 µg
Vitamin E	5.0 mg
Vitamin C	30.0 mg
Thiamine (vitamin B_1)	0.5 mg
Riboflavin (vitamin B_2)	0.5 mg
Niacin (vitamin B_3)	6.0 mg
Vitamin B_6	0.5 mg
Vitamin B_{12}	0.9 µg
Folic acid	150.0 µg
Iron	10.0 mg
Zinc	4.1 mg
Copper	0.56 mg
Selenium	17.0 µg
Iodine	90.0 µg

Summary of key evidence

- In emergency settings, ensuring the nutritional quality of foods used for complementary feeding is critical; the period when complementary feeding begins is high risk for infection – and thus development of undernutrition – and is exacerbated by the unhygienic conditions (i.e. unsafe water, poor food hygiene practices, limited sanitation) frequently found in emergency settings.
- Nutrient-rich foods are needed to meet the high nutrient requirements of this age group, and in emergency settings, where access to a variety of nutrient-dense foods is limited, micronutrient-fortified foods and/or micronutrient supplements are frequently needed to meet the nutrient requirements for growth and development.

Key actions for implementation

- Train health/nutrition/community workers to promote, protect and support optimal infant and young child feeding as soon as possible after the onset of emergency.
- Integrate breastfeeding and infant and young child feeding training and support at all levels of health care.
- Ensure all complementary feeding interventions protect and support appropriate practices by providing context-specific advice and support, including how to adapt the foods available to feed different age groups, and hygienic food preparation and storage.
- Ensure complementary feeding interventions comply with the WHO *Guidance on ending inappropriate promotion of foods for infants and young children* (referenced at the end of this section). This requires that all information or messages concerning the use of complementary food products should include a statement on the importance of breastfeeding up to 2 years or beyond, the importance of not introducing complementary feeding before 6 months of age, and the appropriate age of introduction of this food (this must not be less than 6 months); and be easily understood by parents and other caregivers, with all required label information being visible and legible.
- Pay special attention to the nutritional value of the food ration distributed to infants and young children, as the nutritional composition of the general food ration may not meet the nutrient needs of infants and young children.
- Nutrient-dense foods should be chosen for infants and children and may come from basic food aid commodities from the general ration, with supplements of inexpensive locally available foods; micronutrient-fortified blended foods (e.g. corn–soy blend); and/or additional nutrient-rich foods in supplementary feeding programmes.
- If a population is completely dependent on food aid, a micronutrient-fortified food should also be included in the general ration for older infants and young children.
- Provide the necessary information and support to ensure the correct preparation of unfamiliar infant complementary foods provided through food programmes and to ensure that all food can be prepared hygienically.

Considerations

- Non-breastfed infants in emergency settings are a group that is particularly at risk of infection and malnutrition and should be provided special attention.
- Nutritional status should be continually monitored to identify malnourished children, so that their condition can be assessed and treated, and prevented from deteriorating further. The underlying causes of malnutrition should be investigated and corrected.

Contributes to global nutrition targets: #1 Stunting; #4 Children overweight; #6 Wasting

Contributes to global noncommunicable disease targets: #7 Diabetes and obesity

WHO guidelines and recommendations

- Infant and young child feeding in emergencies. Operational guidance for emergency relief staff and programme managers. Developed by the IFE Core group. Version 3.0. Geneva: World Health Organization; 2017 (https://www.ennonline.net/attachments/2671/Ops-G_2017_WEB.pdf, accessed 10 May 2019).
- Guidance on ending inappropriate promotion of foods for infants and young children: implementation manual. Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/260137/9789241513470-eng.pdf, accessed 10 May 2019).
- Joint statement by the World Health Organization, the World Food Programme and the United Nations Children's Fund. Preventing and controlling micronutrient deficiencies in populations affected by an emergency. Geneva: World Health Organization; 2007 (https://www.who.int/nutrition/publications/micronutrients/WHO_WFP_UNICEFstatement.pdf?ua=1, accessed 10 May 2019).
- Food and nutrition needs in emergencies. Geneva: World Health Organization; 2004 (https://apps.who.int/iris/bitstream/handle/10665/68660/a83743.pdf?ua=1, accessed 10 May 2019).

B. Preventing and controlling micronutrient deficiencies in emergencies

❑ Nutritional support and micronutrient supplementation for pregnant and lactating women affected by an emergency

Applicable contexts/population groups: Emergency settings; pregnant and lactating women

WHO recommendation

Pregnant and lactating women in emergency settings should be provided with fortified blended food commodities, *in addition to* the basic general ration, that are designed to provide 10–12% (up to 15%) of energy from protein and 20–25% of energy from fat. The fortified blended food should be fortified to meet two thirds of the daily requirements for all micronutrients.

Pregnant and lactating women in emergency settings should receive a multiple micronutrient supplement that provides one recommended nutrient intake (RNI) daily, throughout the duration of the emergency, regardless of whether they receive fortified rations or not. The recommended micronutrient formula for pregnant and lactating women is provided in the table below.

Recommended micronutrient formula for pregnant and lactating women in emergency settings

Micronutrient	Content
Vitamin A	800.0 µg
Vitamin D	5.0 µg
Vitamin E	15.0 mg
Vitamin C	55.0 mg
Thiamine (vitamin B_1)	1.4 mg
Riboflavin (vitamin B_2)	1.4 mg
Niacin (vitamin B_3)	18.0 mg
Vitamin B_6	1.9 mg
Vitamin B_{12}	2.6 µg
Folic acid	600.0 µg
Iron	27.0 mg
Zinc	10.0 mg
Copper	1.15 mg
Selenium	30.0 µg
Iodine	250.0 µg

Iron and folic acid supplements for pregnant women, if already provided, should continue.
Women should be ensured access to sufficient drinking water (extra 1 L of clean water per day).

Summary of key evidence

- Pregnant and lactating women are one of the groups that are most vulnerable to nutritional deficiencies because of their relatively greater nutrient needs – for energy, protein and micronutrients – to support their growth and development, as well as that of the fetus, during pregnancy. For a lactating mother, her micronutrient status determines the health and development of her breast-fed infant, especially during the first 6 months of life.

- In emergencies, where food crops and livelihoods are lost, food supplies are interrupted or limited, and infectious diseases increase, the nutritional status of pregnant and lactating women is at even greater risk.
- Fortified blended foods, micronutrient supplements and access to safe drinking water should be provided to pregnant and lactating women in emergencies. While fortified foods in a general ration may help to meet the micronutrient needs of some of the population, the needs of pregnant and lactating women may not be met and additional micronutrient supplementation is recommended.

Key actions for implementation

- Food rations targeted to pregnant and lactating women should be provided using the same distribution mechanism as the general ration, or through maternal and child health facilities as a blanket supplementary feeding ration.
- Provide the multiple micronutrient supplements to pregnant and lactating women until the emergency is over. At this time, assess the micronutrient status of the population, to determine whether further micronutrient interventions are needed.
- Monitor the distribution of food rations, including distribution at the household level.
- Monitor supplement delivery, to assess coverage and continue to support existing micronutrient programmes (e.g. iron and folic acid).
- Monitor the health of pregnant women, to ensure they are protected from nutrient deficiencies but also from excessive consumption.

Considerations

- In malaria-endemic areas, pregnant women can be administered sulfadoxine–pyrimethamine through clinics at the beginning of the second and third trimesters. Pregnant women should be encouraged to use an insecticide-treated bednet during pregnancy. Women should be advised to seek immediate medical attention for episodes of fever.
- In areas where infection with soil-transmitted helminths is endemic, pregnant women should be provided with antihelminthics in the second and third trimesters (see "Preventive deworming for pregnant women after the first trimester").

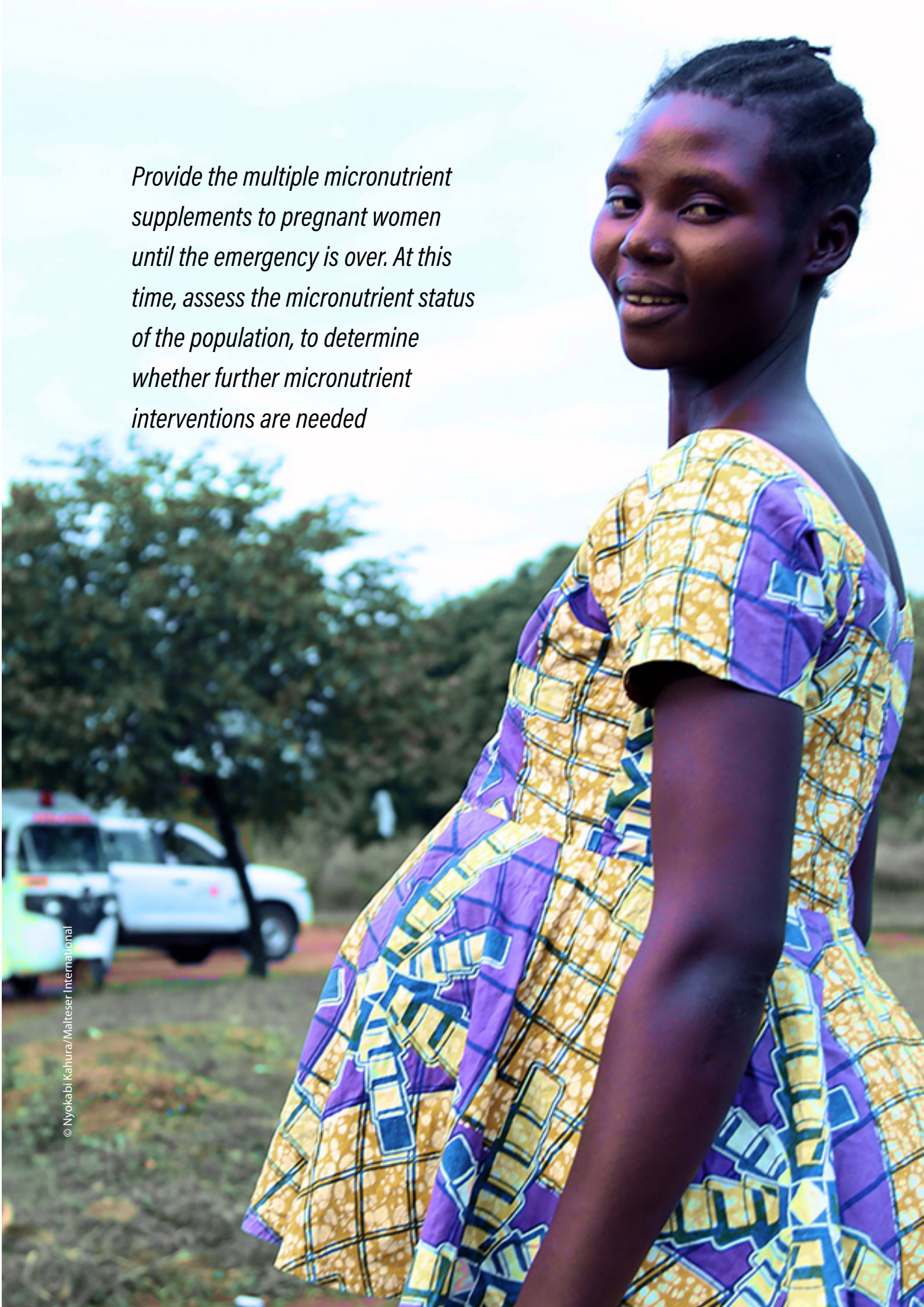
Contributes to global nutrition targets: #1 Stunting; #2 Anaemia; #3 Low birth weight; #6 Wasting

Contributes to global noncommunicable disease targets: —

WHO guidelines and recommendations

- Joint statement by the World Health Organization, the World Food Programme and the United Nations Children's Fund. Preventing and controlling micronutrient deficiencies in populations affected by an emergency. Geneva: World Health Organization; 2007 (https://www.who.int/nutrition/publications/micronutrients/WHO_WFP_UNICEFstatement.pdf?ua=1, accessed 10 May 2019).
- Food and nutrition needs in emergencies. Geneva: World Health Organization; 2004 (https://apps.who.int/iris/bitstream/handle/10665/68660/a83743.pdf?ua=1, accessed 10 May 2019).

Provide the multiple micronutrient supplements to pregnant women until the emergency is over. At this time, assess the micronutrient status of the population, to determine whether further micronutrient interventions are needed



PRIORITIZING ESSENTIAL NUTRITION ACTIONS IN A NATIONAL NUTRITION STRATEGY: A FRAMEWORK FOR ACTION

The checklists provided in this document aim to provide guidance to decision-makers regarding the breadth of essential nutrition actions recommended for different age and physiological groups, including interventions that are essential across settings, and those that are applicable only in particular contexts or situations (e.g. emergency settings, or where a condition has reached a certain established level for action). However, in many cases, decision-makers will need to prioritize interventions because of limited financial and/or human resources. Prioritizing from the list of essential nutrition actions, and ultimately developing and implementing a national nutrition strategy and policy, benefits from a systematic, evidence-based, transparent and stakeholder-informed process. This section outlines a framework for prioritizing actions based on the WHO publications *Strategizing national health in the 21st century: a handbook (24)* and the WHO Stepwise framework for preventing chronic diseases *(25)*. Other publications also exist, including *Managing programmes to improve child health (26)*. While these publications were developed for national health planning, and as a planning tool for development of policy on chronic diseases, respectively, they have been adapted here for a broader range of nutrition concerns addressed by the essential nutrition actions outlined in this document. These include key nutrition-specific activities that need to be implemented to optimize nutrition and health outcomes, and many nutrition-sensitive actions required from other sectors. However, this document does not cover the entire range of nutrition-sensitive interventions necessary to provide a comprehensive approach to ensuring good nutrition and healthy diets. The steps discussed next focus on prioritization of essential nutrition actions based on the nutrition situation. The actions still need to be placed in the context of a comprehensive multisectoral strategy to effectively protect and promote nutrition and healthy diets. The role and need for participation of other sectors and stakeholders in the process of developing a nutrition strategy is identified throughout the steps outlined.

1. Assess the situation, estimate needs and advocate for action

The initial step in prioritizing nutrition interventions is to conduct a situation analysis to assess the nutrition situation and to understand underlying factors related to food, health and care. It is equally important to map the "nutrition landscape", i.e. the current established policies, programmes and interventions implemented by various stakeholders and the (positive and negative) roles they have played in creating the current situation. Once the nutritional concerns are identified and the nutrition landscape has been mapped, it is important to create consensus among stakeholders on priority concerns and actions to be taken. Upstream advocacy on the outcomes of the situation analysis is crucial, ideally also through identified champions, to create awareness among and win support from policy-makers.

Situation analysis: assess the country situation and determine the magnitude and severity of the nutritional problems

In order to prioritize nutrition actions, country decision-makers will need to perform a situation analysis to assess the magnitude, nature and severity of the nutritional concerns that exist. They also need to understand the existing readiness (i.e. commitments and capacities) to scale up nutrition progammes, in terms of strengths, weaknesses and opportunities for enhanced action in nutrition. The WHO Landscape Analysis country assessment tools *(27)* provide policy-makers with a systematic approach to determining the readiness of a country to accelerate nutrition action. *Commitment* entails the political commitment; policies and regulations; resource mobilization; partners; coordination; and protocols in support of the nutrition programmes, whereas *capacities* encompass the human resources for nutrition; quality of services

in facilities; information and management systems; supplies; and materials for information, education and communication. A situation analysis, and the information it generates, lays the base for establishing a coherent, comprehensive and needs-based plan for prioritizing actions in nutrition. It also establishes transparency in nutrition actions, allows for accountability, and facilitates later monitoring and evaluation. The situation analysis should be guided by the criteria listed next *(24)*.

- ***Participatory and inclusive***, *including all relevant stakeholders:* obtaining buy-in and establishing trust between stakeholders as part of the situation analysis – particularly those from other sectors who may be involved in implementing nutrition-sensitive interventions – can lead to improved implementation of policies and programmes in the future. Policies are better designed when a broad range of expertise and experience is consulted, because of the different information and experiences each stakeholder group can provide, but it is critical to safeguard public health against vested interests. While this document focuses primarily on nutrition-specific actions, there are multiple sectors that will need to be involved in the development of a nutrition strategy, and their participation should be included from the start of this process. Stakeholders to include in the situation analysis include those from nutrition-sensitive sectors such as water, sanitation and hygiene; infectious diseases; noncommunicable diseases; reproductive health; urban planning; food and agriculture; trade; industry; and information, as well as multilateral and nongovernmental organizations; academia; programme implementers on the ground; and representatives of end-users in the population.
- ***Analytical***, *based on a causal framework for malnutrition:* situation analysis should attempt to understand the current situation regarding malnutrition and underlying causal factors related to food, health and care for the major forms of malnutrition present in the country (including commercial, biological, environmental, cultural and socioeconomic factors), as well as how current actions, policies and plans, and contextual conditions have contributed (positively or negatively) to the particular conditions of concern. Understanding what is and is not working – and potential reasons for success/failure – in terms of current efforts in nutrition and healthy diets, will be helpful for prioritizing actions going forward.
- ***Relevant***, *focusing on issues that affect the nutrition and health status of the population:* performing a situation analysis helps to ensure that the solutions proposed and prioritized are rooted in the needs of the population. A stakeholder-driven situation analysis, in which participants have a voice in the information-gathering and decision-making process, should help to ensure that prioritization is transparent and actions are aimed at priority nutrition problems.
- ***Comprehensive***, *assessing the range of nutrition problems present as well as the range of responses that may be needed:* in many countries, problems related to undernutrition (wasting, stunting, micronutrient deficiencies) coexist with those related to overweight, obesity and diet-related noncommunicable disease, in the same communities, the same households, and even in the same individuals. This "double-burden" of malnutrition may have both similar and different causal factors, as well as similar and distinct solutions. Common solutions are so-called "double-duty" actions, which are interventions that can address both types of malnutrition simultaneously (e.g. exclusive breastfeeding), integrate policies and programmes, and retrofit past interventions in nutrition to address the entire spectrum of malnutrition *(28)*.
- ***Evidence-based***, *utilizing a range of data, including both qualitative and quantitative information not only on outcomes, but also processes/inputs:* national or regional nutrition and health surveys that collect anthropometric data on women and children (including forms of undernutrition such as stunting and wasting, underweight in women, but also overweight and obesity among children

and adults) and information on infant feeding practices (e.g. breastfeeding and complementary feeding); anaemia and micronutrient deficiencies (e.g. iron, iodine, vitamin A, zinc); dietary practices; and challenges in the larger food environment (e.g. inappropriate marketing practices) can be used to assess nutritional concerns affecting the population and, potentially, identify particularly vulnerable groups (e.g. based on geography or ethnicity) within the population that are inequitably affected. Ideally, disaggregated of data are useful to assess trends in nutrition indicators and problems (e.g. rising rates of obesity) and where additional interventions may be needed (e.g. marginalized populations). In addition to data on nutrition conditions, the situation analysis should also aim to gain an understanding of the population perspective on what they view as the most pressing nutritional needs, as well as issues relating to the acceptability of particular interventions (from the perspective of users and implementers) that may need to be addressed to improve and ensure the effectiveness of interventions.

Upstream advocacy for action: disseminate results and develop a communication strategy

The technical results of the situation analysis should be synthesized and translated into clear messages that can be directed and disseminated to different policy-makers and their partners/counterparts, so that they are informed of the current state of malnutrition – and the subsequent implications in terms of health costs, economic development or relevant mortality/disability outcomes – as well as the interventions that exist to address these problems. This should include translating the findings of the situation analysis into simple language, to disseminate to decision-makers and leaders in communities, districts and regions. Further communication work could also be targeted at the larger population (i.e. the right-holders) or their representatives, through population-friendly messages via traditional and social media, so that they can advocate for services *(24)*.

2. Prioritize nutrition problems and actions

The challenge of priority-setting is to decide how limited funds should be used to meet health and nutrition goals, and make those decisions in a systematic, evidence-based and transparent way. Prioritization includes prioritizing both identification of nutrition problems and actions to address particular nutrition problems *(24)*. For either process, difficult decisions need to be made when resources are limited, and priority-setting should be guided by how well nutrition problems or interventions meet particular criteria established and deemed important by the stakeholder group. However, there is no "best practice" as to how these criteria should inform priority-setting *(29)*. For nutrition actions, the WHO global nutrition targets 2025 *(5)* and the diet-related noncommunicable disease targets *(7)* can be used to initially identify priority nutrition concerns for action, and the *Comprehensive implementation plan on maternal, infant and young child nutrition (30)*, the Framework for Action of the Second International Conference on Nutrition (ICN2) *(31)* and the eLENA library *(8)* can be used to prioritize relevant actions, but other criteria that reflect the context and constraints of a particular setting may be needed. Agreeing upon set criteria against which prioritization will occur, and against which collected evidence will be weighed, allows for an explicit process that is transparent and less subject to influences and special interests that may not have population health and nutrition outcomes as their primary goal. The Evidence-Informed Policy Network (EVIPnet) *(32)* has pioneered an approach to placing evidence at the heart of policy-making. Using evidence briefs for policy that draw on both local research and systematic reviews, and followed by

policy dialogues to discuss briefs among health policy-makers and stakeholders, researchers engage with policy-makers and policy-makers view evidence.

Some example criteria that may be considered when setting priorities for nutrition problems or actions include those listed next *(24)*.

- ***Burden:*** the burden of a problem can be assessed from data on a particular condition's epidemiology (i.e. the "public health need" of a condition), for example, the number (or prevalence) of individuals affected, the number (or prevalence) of individuals at risk, or trends in recent years. Burden also encompasses a condition's severity (acute or chronic conditions, effects on disability or mortality) and urgency (e.g. conditions such as severe acute malnutrition in settings that are prone to famine). It is also important to include the public's perception of the burden of a particular condition, as it demonstrates the perspective of users of the health system and what they see as the most pressing issues.
- ***Equity, equality and human rights considerations***: the concept of fairness – the principle that all members of society should have access to adequate health and nutrition care – in priority-setting includes principles of equity and equality and is a value judgement agreed upon by government and society. For example, focusing on minority populations or groups with lower socioeconomic status, with poorer health and nutrition status as well as a history of marginalization and discrimination in terms of access to nutrition services, might be prioritized, based on the concept of fairness.
- ***Cost:*** cost considerations include issues of both affordability and efficiency. The OneHealth Tool *(33)* facilitates sector-wide strategic health planning, where countries may cost and plan their nutrition programmes, as well as estimating their health and nutrition impact (e.g. expected reduction in wasting and stunting from implementing different packages with nutrition interventions). Factors such as economic feasibility and sustainability must be considered as part of cost considerations. The OneHealth Tool is designed to ensure strategic, integrated planning in the health sector. It identifies health-system bottlenecks for scaling up nutrition and health programmes. This facilitates development of human resources and systems-strengthening, rather than creating siloed approaches, which in turn fosters sustainability. The analysis of readiness (i.e. commitments and capacities) helps to further determine the feasibility of implementing the planned nutrition programmes.
- ***Effectiveness:*** effectiveness considers how well a specific nutrition problem can be solved by a particular intervention. In the case of the essential nutrition actions included in this document, these interventions have been developed using the best scientific evidence available, as part of the WHO guideline development process, but for some interventions there may be limited data on implementation at the local level and adaptation to particular contexts may be needed. Acceptability (see below) is a component of effectiveness that needs to be considered when implementing globally recommended interventions for the local context.
- ***Acceptability:*** acceptability may refer to how well a community/target population accepts (and practises) a chosen nutrition intervention, as well as whether health/nutrition service providers are willing to carry out an intervention. Acceptability is strongly related to the feasibility and effectiveness of an intervention and needs to be part of the data-gathering process in the situation analysis.

There are many different approaches, methods and tools for priority-setting.[1] It is recommended to use a combination of approaches simultaneously, to allow examination of priorities from different angles: some methods for priority-setting are

[1] While a review of priority-setting approaches, methods and tools is outside the scope of this document, these have been reviewed in Part 4 of the WHO publication, *Strategizing national health in the 21st century: a handbook (24)*, with additional details provided in Annexes 4.1 and 4.2.

more technical (such as burden of disease or mortality analyses, or cost effectiveness) and may focus primarily on one criterion for priority-setting, while others include more value-based elements (assessing how prioritization addresses such principles as equity, human rights or fairness) *(24)*. An additional framework for priority-setting of nutrition interventions may be a stepwise approach, where "core" interventions that are feasible to implement with existing resources are prioritized for implementation first, with other interventions included in later steps of implementation *(34)*.

3. Translate priorities into policy and action: establish and operationalize a national nutrition strategy

Once priority nutrition conditions and interventions have been established, they should be concretized in the form of a nutrition strategy or action plan, which will provide the direction and vision, as well as overall goals and objectives, to drive future actions to improve nutrition. Such strategic planning should be followed by operationalization of the strategy, in the form of operational planning. A brief outline of this process is provided next.

- ***Stakeholder engagement:*** similar to previous steps in the process of developing a national nutrition strategy, engaging a broad range of stakeholders (including politicians and policy-makers from health and nutrition, as well as other sectors previously mentioned – clients/citizens including civil society and nongovernmental organizations, the private sector and academic/research institutes; and health/nutrition providers or programme implementers) in strategic development will result in a more effective process, both in terms of planning the right activities, but also for ensuring effective and coordinated implementation. Stakeholder engagement may be necessary. However, it is important to ensure public health is safeguarded from undue influence by real, perceived or potential conflicts of interest. The Landscape analysis country assessment described earlier *(27)* contributes to creating a common understanding of the existing commitment and capacities and serves as a first step for agreement around shared recommendations for scaling up the essential nutrition actions.
- ***Strategic planning and policy development:*** strategic planning involves translating priorities into a written policy. Its aim is to maintain focus on priority areas and actions identified in the priority-setting process, identify roles and responsibilities of different actors, and link activities with resources. A nutrition strategy should establish a consensus-based vision for prevention and treatment of all forms of malnutrition in the country, in a defined time period that reflects the agreed-upon priorities of the right-holders, service providers and the government and its partners, and provides a basis for action. This process may benefit from upholding a few guiding principles, including a comprehensive, integrated and intersectoral approach, and a life-course perspective (as was outlined in the Introduction). Basic steps within the strategic planning and policy development process include:
  - *setting goals*: goals are broad statements of the overall outcome that the nutrition strategy aims to achieve in a medium- to long-term period: for example, "Reduce malnutrition in all of its forms across the life-course by strengthening and expanding preventive and treatment services in nutrition";
  - *setting objectives and making SMART (specific, measurable, achievable, relevant, time-bound) commitments*: objectives are statements of desired future states or conditions that result from implemented activities and that contribute to achieving a goal. For example, continuing with the example goal to "Reduce malnutrition in all of its forms across the life-course by strengthening and expanding preventive and treatment services in nutrition", an objective or SMART commitment could be "Reduce anaemia in women of reproductive

age by 5 percentage points in the next 5 years". Objectives should be *specific* (who/what/when?) *measurable* (how will progress be measured?), *achievable* (is it possible to achieve?), *relevant* (does the objective relate to the overall goal?) and *time-bound* (is there a specified time for achievement?). Under the United Nations Decade of Action on Nutrition 2016–2025 *(35)*, countries are encouraged to formulate and adopt SMART commitments based on the 60 recommended policy options and strategies in the ICN2 Framework for Action *(31)*. The Food and Agriculture Organization of the United Nations and WHO have developed a resource guide to support Member States and regional and global communities to make existing commitments more ambitious, or to make additional SMART commitments where needed *(36)*. Objectives or commitments should reflect the priorities identified in the priority-setting process. While this document has solely focused on nutrition-specific interventions, objectives (and subsequent activities) outlined in a national nutrition strategy must keep in mind the intersectoral nature of interventions needed to address nutrition, including actions from other sectors, such as infectious disease, noncommunicable disease, reproductive health, child health, education, agriculture and food processing, trade, information, environment, urban planning and education;

- *defining broad activity areas*: broad activity areas should be established in the nutrition strategy, which will then lay a base for more detailed implementation plans in the operational plan. This includes identifying target populations or geographic areas, organizations and sectors to be involved, as well as outlining an overall path for the activities that minimizes barriers and reaches those most affected. Returning to the past example of anaemia in women as it relates to the essential nutrition actions in this document, broad activity areas could include implementing intermittent iron supplementation for adolescent girls through reproductive health services; implementing training in nutritional counselling for health-care workers; and implementing deworming campaigns targeting adolescent girls and women through school-, work- or health-centre-based initiatives.

Operational planning and implementation

Operational plans define, in practical terms, the actions that need to be implemented by practitioners and programmes to produce the desired outputs as laid out in the strategic plan. Whereas strategic plans address *what* and *why,* operational plans need to address *how* – identifying the resources required and describing specific activities and those responsible for which actions – over a shorter period of time than strategic plans (generally one year), so that day-to-day implementation can occur. Operational planning should occur in concert with budgeting, and any unit that plans activities and has a budget should have an operational plan. Participation of individuals working "on the ground" who will implement the activities should be engaged in the operational planning process. Operational plans should include:

- a description of the activities (intervention, target group, setting, supplies needed, etc.) and a statement linking activities to the objective to which they are aimed;
- the timing and sequencing of activities;
- the quantity of activity;
- the agency, team and staff member(s) responsible for the activity;
- the resources required (financial, human – including capacity) and their origin;
- a monitoring plan (monitoring is discussed in the next section).

4. Monitoring and evaluation

Monitoring is the process of collecting data on an ongoing basis, to analyse the progress of implementation of activities, and also identify problems that can be relatively quickly corrected. Evaluation builds upon monitoring data, and may require additional data, to periodically assess whether the desired outcomes (impacts) of the intervention/strategy have been achieved. A monitoring and evaluation plan for a malnutrition strategy should include the items listed next.

- ***Monitoring and evaluation framework:*** also known as a logic framework (i.e. logframe) or logic model, the monitoring and evaluation framework should depict graphically the relationships between a strategy's "inputs" (i.e. the resources invested in the strategy), activities, outputs (the direct results of the programme's activities), and the intended changes or benefits (outcomes) to be seen in the target population(s). In other words, a logic model is a visual representation of the interrelated pathways through which the strategy and its associated activities are intended to achieve its outcomes *(37, 38)*.
- ***A set of core indicators with well-defined baselines and targets:*** core indicators should be measures of inputs, processes/activities, outputs and outcomes of a given programme or strategy. It is essential to have *specific*, *well-defined* indicators that are *measurable* and that can be *reliably assessed* (i.e. data sources exist and are accessible), in order to assess progress, set targets and identify problems. The logic model can be used as a template for developing indicators that reflect the entire process of inputs resulting in programme activities that lead to expected effects.
    - *Inputs* are the resources available to and invested in the strategy, including personnel, equipment, costs, expenditures, funding, infrastructure, and indirect and direct support from partners.
    - *Activities* are actions, events and programmes/interventions that are carried out. These activities may relate to policies, products and supplies, delivery systems, quality control and planning behaviour change.
    - *Outputs* are either products or direct services resulting from the programme activities, which in turn can affect access to and coverage of an intervention, or knowledge and appropriate use of an intervention by health personnel.
    - *Outcomes* are the expected benefits or changes among programme participants, either during or after the programme. These changes can be in behaviours, knowledge, skills, intake of micronutrients, nutritional status, health conditions or functions.
- ***Defined data sources for each indicator:*** another critical piece of a monitoring and evaluation plan is delineating how monitoring data will be collected and by whom, and how data flow (to programme management and back to service providers as needed) will occur.
- ***Data analysis and synthesis plans and data quality-assurance processes:*** analysis plans should include how and by whom data will be analysed, as well as how decisions based on collected data will be made. Data quality checks can include processes for checking for errors and inconsistencies and reviewing reports.
- ***Evaluation components:*** programme evaluation, as previously described, is a periodic assessment of the impact of a programme on defined outcomes, which should be discussed and planned during the preliminary stages of programme development. (Programme evaluation should include process and outcome evaluation, and also assess possible barriers to programme implementation.) Evaluation can use monitoring data, but may also require additional data. A full

review of evaluation methods and design is outside the scope of this document, but guides to planning and implementing evaluations are available elsewhere *(37, 39)*. The objectives of the evaluation and necessary design should be clear and well understood by all relevant stakeholders, from the very start of the programme.

- ***Plans for communication and dissemination of evaluation results:*** communication of evaluation results to decision-makers in government, and stakeholders, as well as externally to the media and the population at large, is a critical component of monitoring and evaluation and should be built into monitoring and evaluation plans and budgets. Effective and planned communication of evaluation findings – whether through written reports, short communications or oral presentations – helps to ensure that evaluation results are understood and read, and the resulting recommendations are taken up in the future. Specific communication experience may be useful in tailoring messages for particular groups, as well as utilizing the diverse media tools currently available.

SUMMARY AND CONCLUSION

This document aims to provide the broad range of essential nutrition actions needed to combat malnutrition in all its forms, in a format that makes identification of relevant interventions accessible and clear to the user. Nevertheless, in many settings, decisions will need to be made on which interventions and nutritional conditions are prioritized for implementation. There are multiple considerations for and approaches to guiding this process. Concretizing priorities in the form of a nutrition strategy and SMART commitments in the context of the United Nations Decade of Action on Nutrition 2016–2025 *(35)* will provide a vision for subsequent action in nutrition, which should be tightly linked to a monitoring and evaluation plan to allow for corrections, as well as dissemination of findings.

REFERENCES

1. Framework on integrated, people-centred health services. In: Sixty-ninth World Health Assembly, Geneva, 23–28 May 2015. Geneva: World Health Organization; 2016 (A69/39; http://apps.who.int/gb/ebwha/pdf_files/WHA69/A69_39-en.pdf?ua=1&ua=1, accessed 11 May 2019).

2. Transforming our world. The 2030 Agenda for Sustainable Development. New York: United Nations; 2015 (A/RES/70.1; https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf, accessed 11 May 2019).

3. United Nations. Sustainable Development Goals: 17 goals to transform our world (http://www.un.org/sustainabledevelopment/, accessed 2 May 2019).

4. Declaration of Astana. In: Global Conference on Primary Health Care, Astana, Kazakhstan, 25–26 October 2018. Geneva: World Health Organization/United Nations Children's Fund; 2018 (https://www.who.int/docs/default-source/primary-health/declaration/gcphc-declaration.pdf, accessed 11 May 2019).

5. World Health Organization. Global targets 2025. To improve maternal, infant and young child nutrition (https://www.who.int/nutrition/global-target-2025/en/, accessed 2 May 2019).

6. Resolution adopted by the General Assembly on 1 April 2016: United Nations Decade of Action on Nutrition (2016–2025). In: United Nations General Assembly 70th session, 2015–2016. New York, New York: United Nations; 2016 (A/RES/70/259; http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/70/259, accessed 2 May 2019).

7. Evidence-based nutrition interventions included in the WHO e-Library of Evidence for Nutrition Actions (eLENA) that may contribute to the achievement of the WHO global nutrition and diet-related NCD targets. Geneva: World Health Organization; working document (https://www.who.int/elena/titles/summary_eLENA_interventions_global_targets.pdf?ua=1, accessed 2 May 2019).

8. World Health Organization. E-Library of Evidence for Nutrition Actions (eLENA). About eLENA (http://www.who.int/elena/about/en/, accessed 2 May 2019).

9. Essential nutrition actions: improving maternal, newborn, infant and young child health and nutrition. Geneva: World Health Organization; 2013 (http://apps.who.int/iris/bitstream/10665/84409/1/9789241505550_eng.pdf?ua=1, accessed 2 May 2019).

10. Guyon A, Quinn V, Nielsen J, Stone-Jimenez M. Essential nutrition actions and essential hygiene actions framework. Washington (DC): CORE Group; 2015 (https://www.fsnnetwork.org/essential-nutrition-actions-and-essential-hygiene-actions-framework, accessed 2 May 2019).

11. Global Nutrition Report 2016. From promise to impact: ending malnutrition by 2030. Washington (DC): International Food Policy Research Institute; 2016 (https://globalnutritionreport.org/reports/2016-global-nutrition-report/, accessed 2 May 2019).

12. Forouzanfar MH, Alexander L, Anderson HR, Bachman VF, Biryukov S, Brauer M et al. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet. 2015;386(10010):2287–323. doi:10.1016/s0140-6736(15)00128-2.

13. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, De Onis M et al.; Maternal and Child Nutrition Study Group. Maternal and child undernutrition and overweight in low-income and middle-income countries. Lancet. 2013;382(9890):427–51. doi:10.1016/S0140-6736(13)60937-X.

14. Levels and trends in child malnutrition. UNICEF/WHO/World Bank Group joint child malnutrition estimates: key findings of the 2019 edition. Geneva: World Health Organization; 2019 (https://www.who.int/nutgrowthdb/jme-2019-key-findings.pdf?ua=1, accessed 2 May 2019).

15. World Health Organization. Obesity and overweight (http://www.who.int/mediacentre/factsheets/fs311/en/, accessed 2 May 2019).

16. Kassebaum NJ, Jasrasaria R, Naghavi M, Wulf SK, Johns N, Lozano R et al. A systematic analysis of global anemia burden from 1990 to 2010. Blood. 2014;123(5):615–24. doi:10.1182/blood-2013-06-508325.

17. Stevens GA, Finucane MM, De-Regil LM, Paciorek CJ, Flaxman SR, Branca F et al. Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data. Lancet Glob Health. 2013;1(1):e16–e25. doi:10.1016/s2214-109x(13)70001-9.

18. World Health Organization. Global Health Observatory (https://www.who.int/gho/en/, accessed 11 July 2019).

19. Nutritional anaemias: tools for effective prevention and control. Geneva: World Health Organization; 2017 (https://www.who.int/nutrition/publications/micronutrients/anaemias-tools-prevention-control/en/, accessed 23 May 2019).

20. Global action plan for the prevention and control of noncommunicable diseases 2013–2020. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/94384/9789241506236_eng.pdf?sequence=1, accessed 2 May 2019).

21. World Health Organization. Nutrition. Historical highlights of Decade of Action (https://www.who.int/nutrition/decade-of-action/historical_highlights/en/, accessed 2 May 2019).

22. World Health Organization Model List of Essential Medicines, 21st list, 2019. Geneva: World Health Organization; 2019. Licence: CC BY-NC-SA 3.0 IGO. (https://apps.who.int/iris/bitstream/handle/10665/325771/WHO-MVP-EMP-IAU-2019.06-eng.pdf?sequence=1&isAllowed=y, accessed 11 July 2019)

23. World Health Organization Model List of Essential Medicines for Children, 7th list, 2019. Geneva: World Health Organization; 2019. Licence: CC BY-NC-SA 3.0 IGO. (https://apps.who.int/iris/bitstream/handle/10665/325772/WHO-MVP-EMP-IAU-2019.07-eng.pdf?sequence=1&isAllowed=y, accessed 11 July 2019)

24. Schmets G, Rajan D, Kadandale S, editors. Strategizing national health in the 21st century: a handbook. Geneva: World Health Organization; 2016 (https://www.who.int/healthsystems/publications/nhpsp-handbook/en/, accessed 11 May 2019).

25. Epping-Jordan JE, Galea G, Tukuitonga C, Beaglehole R. Preventing chronic diseases: taking stepwise action. Lancet. 2005;366(9497):71. doi:10.1016/s0140-6736(05)67342-4.

26. Managing programmes to improve child health. Geneva: World Health Organization; 2009 (https://www.who.int/maternal_child_adolescent/documents/9789241598729/en/, accessed 11 May 2019).

27. Landscape analysis on countries' readiness to accelerate action in nutrition. Country assessment tools. Geneva: World Health Organization; 2012 (reprinted 2014) (https://apps.who.int/iris/bitstream/handle/10665/84760/9789241503587_eng.pdf?ua=1, accessed 11 May 2019).

28. Double-duty actions for nutrition. Policy brief. Geneva: World Health Organization; 2017 (WHO/NMH/NHD/17.2; https://apps.who.int/iris/bitstream/handle/10665/255414/WHO-NMH-NHD-17.2-eng.pdf?ua=1, accessed 13 May 2019).

29. Kaplan W, Wirtz VJ, Mantel-Teeuwisse A, Stolk P, Duthey B, Laing R. Priority medicines for Europe and the World. 2013 update. Geneva: World Health Organization; 2013 (https://www.who.int/medicines/areas/priority_medicines/MasterDocJune28_FINAL_Web.pdf?ua=1, accessed 13 May 2019).

30. Comprehensive implementation plan on maternal, infant and young child nutrition. Geneva: World Health Organization; 2014 (WHO/NMH/NHD/14.1; https://apps.who.int/iris/bitstream/handle/10665/113048/WHO_NMH_NHD_14.1_eng.pdf?ua=1, accessed 13 May 2019).

31. Second International Conference on Nutrition. Rome, 19–21 November 2014. Conference outcome document: Framework for Action. Rome: Food and Agriculture Organization of the United Nations; 2014 (ICN2 2014/3. Corr.1; http://www.fao.org/3/a-mm215e.pdf, accessed 13 May 2019).

32. World Health Organization. Evidence-Informed Policy Network (https://www.who.int/evidence/en/, accessed 13 May 2019).

33. World Health Organization. Cost effectiveness and strategic planning. OneHealthTool (https://www.who.int/choice/onehealthtool/en/, accessed 13 May 2019).

34. Preventing chronic diseases: a vital investment. Geneva: World Health Organization; 2005 (https://www.who.int/chp/chronic_disease_report/contents/en/, accessed 13 May 2019).

35. World Health Organization. Decade of Action on Nutrition. The April 2016 proclamation (https://www.who.int/nutrition/decade-of-action/information_flyer/en/, accessed 13 May 2019).

36. Strengthening nutrition action. A resource guide for countrires based on the policy recommendations of the Second International Conference on Nutrition (ICN2). Rome: Food and Agriculture Organization of the United Nations and World Health Organization; 2018 (http://www.fao.org/3/ca1505en/CA1505EN.pdf, accessed 13 May 2019).

37. Centers for Disease Control and Prevention. Framework for program evaluation in public health. MMWR Recomm Rep. 1999;48(RR-11):1–40.

38. De-Regil LM, Pena-Rosas JP, Flores-Ayala R, del Socorro Jefferds ME. Development and use of the generic WHO/CDC logic model for vitamin and mineral interventions in public health programmes. Public Health Nutr. 2014;17(3):634–9. doi:10.1017/s1368980013000554.

39. US Department of Health and Human Services, Centers for Disease Control and Prevention, Office of the Director, Office of Strategy and Innovation. Introduction to program evaluation for public health programs: a self-study guide. Atlanta (GA): Centers for Disease Control and Prevention; 2011 (https://www.cdc.gov/eval/guide/cdcevalmanual.pdf, accessed 13 May 2019).

ANNEX 1.

WHO publications related to essential nutrition actions

I. Multisectoral actions for healthier populations

A. Healthy diet

- Healthy diet. Geneva: World Health Organization; 2018 (Fact sheet no. 394; https://www.who.int/nutrition/publications/nutrientrequirements/healthy_diet_fact_sheet_394.pdf?ua=1, accessed 10 May 2019).
- Guideline: sugars intake for adults and children. Geneva: World Health Organization; 2015 (https://apps.who.int/iris/bitstream/handle/10665/149782/9789241549028_eng.pdf?sequence=1, accessed 10 May 2019).
- Guideline: potassium intake for adults and children. Geneva: World Health Organization; 2012 (reprinted 2014) (https://apps.who.int/iris/bitstream/handle/10665/77986/9789241504829_eng.pdf?sequence=1, accessed 10 May 2019).
- Guideline: sodium intake for adults and children. Geneva: World Health Organization; 2012 (reprinted 2014) (https://apps.who.int/iris/bitstream/handle/10665/77985/9789241504836_eng.pdf?sequence=1, accessed 10 May 2019).
- Set of recommendations on the marketing of foods and non-alcoholic beverages to children. Geneva: World Health Organization; 2010 (https://apps.who.int/iris/bitstream/handle/10665/44416/9789241500210_eng.pdf?sequence=1, accessed 14 May 2019).
- Vitamin and mineral requirements in human nutrition, 2nd ed. Report of a joint WHO/FAO expert consultation, Bangkok, Thailand, 21–30 September 1998. Geneva: World Health Organization and Food and Agriculture Organization of the United Nations; 2004 (https://apps.who.int/iris/bitstream/handle/10665/42716/9241546123.pdf?ua=1, accessed 11 May 2019).
- Diet, nutrition and the prevention of chronic diseases. Report of a joint WHO/FAO expert consultation. Geneva: World Health Organization; 2003 (WHO Technical Report Series No 916; https://apps.who.int/iris/bitstream/handle/10665/42665/WHO_TRS_916.pdf, accessed 11 May 2019).
- Protein and amino acid requirements in human nutrition. Report of a joint WHO/FAO/UNU expert consultation. Geneva: World Health Organization; 2002 (WHO Technical Report Series No 935; https://apps.who.int/iris/bitstream/handle/10665/43411/WHO_TRS_935_eng.pdf?ua=1, accessed 11 May 2019).
- Human energy requirements. Report of a joint FAO/WHO/UNU expert consultation. Rome, 17–24 October 2001. Rome: Food and Agriculture Organization of the United Nations; 2002 (FAO Food and Nutrition Report Series 1; http://www.fao.org/3/a-y5686e.pdf, accessed 11 May 2019).

B. Fortification of condiments and staple foods with micronutrients

- Guideline: fortification of rice with vitamins and minerals as a public health strategy. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/272535/9789241550291-eng.pdf?ua=1, accessed 10 May 2019).

- WHO guideline: fortification of maize flour and corn meal with vitamins and minerals. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/251902/9789241549936-eng.pdf?sequence=1, accessed 11 May 2019).
- Guideline: fortification of food-grade salt with iodine for the prevention and control of iodine deficiency disorders. Geneva: World Health Organization; 2014 (https://apps.who.int/iris/bitstream/handle/10665/136908/9789241507929_eng.pdf?sequence=1, accessed 11 May 2019).
- Recommendations on wheat and maize flour fortification. Meeting report: interim consensus statement. Geneva: World Health Organization; 2009 (WHO/NMH/NHD/MNM/09.1; https://www.who.int/nutrition/publications/micronutrients/wheat_maize_fort.pdf, accessed 11 July 2019).
- Allen L, de Benoist B, Dary O, Hyrrell R, editors. Guidelines on food fortification with micronutrients. Geneva: World Health Organization and Food and Agriculture Organization of the United Nations; 2006 (https://apps.who.int/iris/bitstream/handle/10665/43412/9241594012_eng.pdf?ua=1, accessed 11 May 2019).

II. Nutrition through the life-course

1. Infants

A. Optimal timing of umbilical cord clamping

- Guideline: delayed umbilical cord clamping for improved maternal and infant health and nutrition outcomes. Geneva: World Health Organization; 2014 (https://apps.who.int/iris/bitstream/handle/10665/148793/9789241508209_eng.pdf?ua=1, accessed 10 May 2019).
- Beyond survival: integrated delivery care practices for long-term maternal and infant nutrition, health and development, 2nd ed. Washington (DC): Pan American Health Organization; 2013 (https://www.paho.org/hq/dmdocuments/2013/BeyondSurvival.pdf, accessed 11 May 2019).
- WHO recommendations for the prevention and treatment of postpartum haemorrhage. Geneva: World Health Organization; 2012 (https://apps.who.int/iris/bitstream/handle/10665/75411/9789241548502_eng.pdf?sequence=1, accessed 11 May 2019).
- Guidelines on basic newborn resuscitation. Geneva: World Health Organization; 2012 (https://apps.who.int/iris/bitstream/handle/10665/75157/9789241503693_eng.pdf?sequence=1, accessed 11 May 2019).

B. Protecting, promoting and supporting breastfeeding

- Guideline: counselling of women to improve breastfeeding practices. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/280133/9789241550468-eng.pdf?ua=1, accessed 10 May 2019).
- Implementation guidance: protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services – the revised Baby-friendly Hospital Initiative. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/272943/9789241513807-eng.pdf?ua=1, accessed 11 May 2019).
- Guideline: protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services. Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/259386/9789241550086-eng.pdf?sequence=1, accessed 11 May 2019).

- The International Code of Marketing of Breast-milk Substitutes. Frequently asked questions, 2017 update. Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/254911/WHO-NMH-NHD-17.1-eng.pdf?ua=1, accessed 11 May 2019).
- WHO recommendations on postnatal care of the mother and newborn. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/97603/9789241506649_eng.pdf?sequence=1, accessed 11 May 2019).
- World Health Organization, United Nations Children's Fund. Baby-Friendly Hospital Initiative: revised, updated and expanded for integrated care. Geneva: World Health Organization; 2009 (https://www.who.int/nutrition/publications/infantfeeding/bfhi_trainingcourse/en/, accessed 11 May 2019).
- World Health Organization, United Nations Children's Fund. Acceptable medical reasons for use of breast-milk substitutes. Geneva: World Health Organization; 2009 (WHO/NMH/NHD/09.01; WHO/FCH/CAH/09.01; https://apps.who.int/iris/bitstream/handle/10665/69938/WHO_FCH_CAH_09.01_eng.pdf?ua=1, accessed 11 May 2019).
- The optimal duration of exclusive breastfeeding. Report of an expert consultation, Geneva, Switzerland, 28–30 March 2001. Geneva: World Health Organization; 2001 (WHO/NHD/01.09; WHO/FCH/CAH/01.24; https://apps.who.int/iris/bitstream/handle/10665/67219/WHO_NHD_01.09.pdf?ua=1, accessed 11 May 2019).
- International Code of Marketing and Breast-milk Substitutes. Geneva: World Health Organization; 1981 (https://apps.who.int/iris/bitstream/handle/10665/40382/9241541601.pdf?sequence=1, accessed 11 May 2019).

C. Care of low-birth-weight and very low-birth-weight infants

- WHO recommendations on interventions to improve preterm birth outcomes. Geneva: World Health Organization; 2015 (https://apps.who.int/iris/bitstream/handle/10665/183037/9789241508988_eng.pdf?sequence=1, accessed 10 May 2019).
- Guidelines on optimal feeding of low birth-weight infants in low- and middle-income countries. Geneva: World Health Organization; 2011 (https://www.who.int/maternal_child_adolescent/documents/9789241548366.pdf?ua=1, accessed 11 May 2019).
- Kangaroo mother care: a practical guide. Geneva: World Health Organization; 2003 (https://www.who.int/reproductivehealth/publications/maternal_perinatal_health/9241590351/en/, accessed 11 May 2019).

D. Assessment and management of wasting

- Guideline. Assessing and managing children at primary health care facilities to prevent overweight and obesity in the context of the double burden of malnutrition. Updates for the Integrated Management of Children Illness (IMCI). Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/259133/9789241550123-eng.pdf, accessed 10 May 2019).
- Guideline: updates on the management of severe acute malnutrition in infants and children. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/95584/9789241506328_eng.pdf?sequence=1, accessed 11 May 2019).
- Pocketbook of hospital care for children: guidelines for the management of common children illnesses, 2nd ed (Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/81170/9789241548373_eng.pdf?sequence=1), accessed 16 May 2019).

- WHO child growth standards and the identification of severe acute malnutrition in infants and children. A joint statement by the World Health Organization and United Nations Children's Fund. Geneva: World Health Organization; 2009 (https://apps.who.int/iris/bitstream/handle/10665/44129/9789241598163_eng.pdf?ua=1, accessed 10 May 2019).

- WHO child growth standards. Growth velocity based on weight, length and head circumference. Methods and development. Geneva: World Health Organization; 2009 (https://www.who.int/childgrowth/standards/velocity/tr3_velocity_report.pdf, accessed 10 May 2019).

- Management of severe malnutrition: a manual for physicians and other senior health workers. Geneva: World Health Organization; 1999 (https://apps.who.int/iris/bitstream/handle/10665/41999/a57361.pdf?sequence=1, accessed 10 May 2019).

E. Vitamin A supplementation for infants under 6 months of age

- Guideline: neonatal vitamin A supplementation. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44626/9789241501798_eng.pdf?sequence=1, accessed 10 May 2019).

- Guideline: vitamin A supplementation in infants 1–5 months of age: Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44628/9789241501811_eng.pdf?sequence=1, accessed 11 May 2019).

2. Children

A. Appropriate complementary feeding

- Guiding principles for feeding non-breastfed children 6–24 months of age. Geneva: World Health Organization; 2005 (https://apps.who.int/iris/bitstream/handle/10665/43281/9241593431.pdf?sequence=1, accessed 10 May 2019).

- Pan American Health Organization, World Health Organization. Guiding principles for complementary feeding of the breastfed child. Washington (DC): Pan American Health Organization; 2003 (https://www.who.int/nutrition/publications/guiding_principles_compfeeding_breastfed.pdf, accessed 10 May 2019).

B. Growth monitoring and assessment

- Guideline. Assessing and managing children at primary health care facilities to prevent overweight and obesity in the context of the double burden of malnutrition. Updates for the Integrated Management of Children Illness (IMCI). Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/259133/9789241550123-eng.pdf, accessed 10 May 2019).

- WHO child growth standards and the identification of severe acute malnutrition in infants and children. A joint statement by the World Health Organization and United Nations Children's Fund. Geneva: World Health Organization; 2009 (https://apps.who.int/iris/bitstream/handle/10665/44129/9789241598163_eng.pdf?ua=1, accessed 10 May 2019).

C. Assessment and management of wasting

- Guideline. Assessing and managing children at primary health care facilities to prevent overweight and obesity in the context of the double burden of malnutrition. Updates for the Integrated Management of Children Illness (IMCI). Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/259133/9789241550123-eng.pdf, accessed 10 May 2019).

- Guideline. Updates on the management of severe acute malnutrition in infants and children. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/95584/9789241506328_eng.pdf?ua=1, accessed 10 May 2019).
- Pocketbook of hospital care for children. Guidelines for the management of common children illnesses, 2nd ed. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/81170/9789241548373_eng.pdf?sequence=1, accessed 11 May 2019).
- Technical note: supplementary foods for the management of moderate acute malnutrition in infants and children 6–59 months of age. Geneva: World Health Organization; 2012 (https://apps.who.int/iris/bitstream/handle/10665/75836/9789241504423_eng.pdf?sequence=1, accessed 11 May 2019).
- IMAI district clinician manual: hospital care for adolescents and adults. Guidelines for the management of common illnesses with limited resources. Geneva: World Health Organization; 2011 (https://www.who.int/hiv/pub/imai/imai2011/en/, accessed 11 May 2019).
- WHO child growth standards and the identification of severe acute malnutrition in infants and children. A joint statement by the World Health Organization and United Nations Children's Fund. Geneva: World Health Organization; 2009 (https://apps.who.int/iris/bitstream/handle/10665/44129/9789241598163_eng.pdf?ua=1, accessed 10 May 2019).
- Management of severe malnutrition: a manual for physicians and other senior health workers. Geneva: World Health Organization; 1999 (https://apps.who.int/iris/bitstream/handle/10665/41999/a57361.pdf?sequence=1, accessed 11 May 2019).

D. Iron-containing micronutrient supplementation

- WHO guideline: use of multiple micronutrient powders for point-of-use fortification of foods consumed by infants and young children aged 6–23 months and children aged 2–12 years. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/252540/9789241549943-eng.pdf?ua=1, accessed 7 May 2019).
- Guideline: daily iron supplementation in infants and children. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/204712/9789241549523_eng.pdf?sequence=1, accessed 11 May 2019).
- Guideline: Intermittent iron supplementation in preschool and school-age children. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44648/9789241502009_eng.pdf?sequence=1, accessed 11 May 2019).

E. Vitamin A supplementation

- Guideline: vitamin A supplementation for infants and children 6–59 months of age. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44664/9789241501767_eng pdf;jsessionid=8588A6A1ABE288A2F7F3E5047E71E1D6?sequence=1, accessed 10 May 2019).

F. Iodine supplementation

- Joint statement by the World Health Organization and the United Nations Children's Fund. Reaching optimal iodine nutrition in pregnant and lactating women and young children. Geneva: World Health Organization; 2007 (https://www.who.int/nutrition/publications/micronutrients/WHOStatement__IDD_pregnancy.pdf, accessed 10 May 2019).

G. Zinc supplementation in the management of diarrhoea

- Ending preventable child deaths from pneumonia and diarrhea by 2025. The Integrated Global Action Plan for Pneumonia and Diarrhoea (GAPPD). Geneva: World Health Organization/ The United Nations Children's Fund; 2013 (https://apps.who.int/iris/bitstream/handle/10665/79200/9789241505239_eng.pdf;jsessionid=342A1A224BAB99DCFACCAD5F941388DF?sequence=1, accessed 10 May 2019).

3. Adolescents

A. Iron-containing micronutrient supplementation

- Guideline: implementing effective actions for improving adolescent nutrition. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/260297/9789241513708-eng.pdf?sequence=1, accessed 10 May 2019).
- Guideline. Daily iron supplementation in adult women and adolescent girls. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/204761/9789241510196_eng.pdf?sequence=1, accessed 10 May 2019).
- Guideline: intermittent iron and folic acid supplementation in menstruating women. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44649/9789241502023_eng.pdf, accessed 10 May 2019).

4. Adults

A. Nutritional care for women during pregnancy and postpartum

- WHO recommendation. Calcium supplementation during pregnancy for the prevention of pre-eclampsia and its complications. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/277235/9789241550451-eng.pdf, accessed 10 May 2019).
- WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/250796/9789241549912-eng.pdf?sequence=1, accessed 10 May 2019).
- WHO recommendations on postnatal care of the mother and newborn. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/97603/9789241506649_eng.pdf?sequence=1, accessed 8 July 2019).
- Guideline. Iron supplementation in postpartum women. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/249242/9789241549585-eng.pdf?sequence=1, accessed 11 May 2019).
- Guideline: use of multiple micronutrient powders for point-of-use fortification of foods consumed by pregnant women. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/204639/9789241549516_eng.pdf?sequence=1, accessed 11 May 2019).
- Guideline: vitamin A supplementation in postpartum women. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44623/9789241501774_eng.pdf?sequence=1, accessed 11 May 2019).

B. Iron-containing micronutrient supplementation

- Guideline. Daily iron supplementation in adult women and adolescent girls. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/204761/9789241510196_eng.pdf?sequence=1, accessed 10 May 2019).
- Guideline: intermittent iron and folic acid supplementation in menstruating women. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44649/9789241502023_eng.pdf?sequence=1, accessed 11 May 2019).

C. Iodine supplementation

- Joint statement by the World Health Organization and the United Nations Children's Fund. Reaching optimal iodine nutrition in pregnant and lactating women and young children. Geneva: World Health Organization; 2007 (https://www.who.int/nutrition/publications/micronutrients/WHOStatement__IDD_pregnancy.pdf, accessed 10 May 2019).

5. Older persons

A. Nutritional care for at-risk older persons

- Integrated care for older people. Guidelines on community-level interventions to manage declines in intrinsic capacity. Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/258981/9789241550109-eng.pdf?sequence=1, accessed 10 May 2019).

6. Specific conditions

A. Nutritional care for persons living with HIV

- Guideline. Updates on HIV and infant feeding. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/246260/9789241549707-eng.pdf?sequence=1, accessed 10 May 2019).
- WHO guidelines on HIV and infant feeding 2010. An updated framework for priority action. Geneva: World Health Organization; 2012 (https://apps.who.int/iris/bitstream/handle/10665/75152/FWC_MCA_12.1_eng.pdf?sequence=1, accessed 12 May 2019).
- HIV and infant feeding in emergencies: operational guidance. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/272862/9789241550321-eng.pdf?ua=1, accessed 10 May 2019).
- Guidelines for an integrated approach to the nutritional care of HIV-infected children (6 months – 14 years). Geneva: World Health Organization; 2009 (https://apps.who.int/iris/handle/10665/44043, accessed 12 May 2019).
- Guideline: vitamin A supplementation in pregnancy for reducing the risk of mother-to-child transmission of HIV. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/bitstream/handle/10665/44627/9789241501804_eng.pdf?sequence=1, accessed 12 May 2019).
- International Code of Marketing and Breast-milk Substitutes. Geneva: World Health Organization; 1981 (https://apps.who.int/iris/bitstream/handle/10665/40382/9241541601.pdf?sequence=1, accessed 11 May 2019).

B. Nutritional care for persons with tuberculosis

- Guidance for national tuberculosis programmes on the management of tuberculosis in children, 2nd ed. Geneva: World Health Organization; 2014 (https://apps.who.int/iris/bitstream/handle/10665/112360/9789241548748_eng.pdf?sequence=1, accessed 12 May 2019).
- Guideline: nutritional care and support for patients with tuberculosis. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/94836/9789241506410_eng.pdf?sequence=1, accessed 12 May 2019).
- Guideline. Updates on the management of severe acute malnutrition in infants and children. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/95584/9789241506328_eng.pdf?ua=1, accessed 10 May 2019).
- WHO child growth standards and the identification of severe acute malnutrition in infants and children. A joint statement by the World Health Organization and United Nations Children's Fund. Geneva: World Health Organization; 2009 (https://apps.who.int/iris/bitstream/handle/10665/44129/9789241598163_eng.pdf?ua=1, accessed 10 May 2019).
- Global strategy for infant and young child feeding. Geneva: World Health Organization; 2003 (https://apps.who.int/iris/bitstream/handle/10665/42590/9241562218.pdf?sequence=1, accessed 12 May 2019).
- Division of Child Health and Development. Update. Breastfeeding and maternal tuberculosis. A statement prepared jointly by the Division of Child Health and Development, the Global Tuberculosis Programme, the Global Programme for Vaccines and Immunization and Reproductive Health (Technical Support) of the World Health Organisation. Geneva: World Health Organization; 1998 (https://www.who.int/maternal_child_adolescent/documents/pdfs/breastfeeding_and_maternal_tb.pdf, accessed 12 May 2019).

C. Preventive chemotherapy for the control of soil-transmitted helminth infection (deworming)

- Guideline: preventive chemotherapy to control soil-transmitted helminth infections in at-risk population groups. Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/258983/9789241550116-eng.pdf?sequence=1, accessed 12 May 2019).
- WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/250796/9789241549912-eng.pdf?sequence=1, accessed 10 May 2019).

D. Nutritional care for persons with Ebola virus disease

- Clinical management of patients with viral haemorrhagic fever: a pocket guide for the front-line health workers. Interim emergency guidance for country adaptation. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/205570/9789241549608_eng.pdf, accessed 12 May 2019).
- Interim guideline: nutritional care of children and adults with Ebola virus in treatment centres. Geneva: World Health Organization; 2014 (WHO/NMH/NHD/EPG/14.8; https://apps.who.int/iris/bitstream/handle/10665/145403/WHO_NMH_NHD_EPG_14.8_eng.pdf?ua=1, accessed 12 May 2019).

E. Nutritional care for persons with viral haemorrhagic disease (including Ebola, Marburg, Lassa and Crimean-Congo haemorrhagic fever)

- Clinical management of patients with viral haemorrhagic fever: a pocket guide for the front-line health workers. Interim emergency guidance for country adaptation. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/205570/9789241549608_eng.pdf, accessed 12 May 2019).

- Interim guideline: nutritional care of children and adults with Ebola virus in treatment centres. Geneva: World Health Organization; 2014 (WHO/NMH/NHD/EPG/14.8; https://apps.who.int/iris/bitstream/handle/10665/145403/WHO_NMH_NHD_EPG_14.8_eng.pdf?ua=1, accessed 12 May 2019).

F. Nutritional care for infants in the context of Zika virus transmission

- Guideline. Infant feeding in areas of Zika virus transmission. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/bitstream/handle/10665/208875/9789241549660_eng.pdf?sequence=1, accessed 10 May 2019).

- Global strategy for infant and young child feeding. Geneva: World Health Organization; 2003 (https://apps.who.int/iris/bitstream/handle/10665/42590/9241562218.pdf?sequence=1, accessed 9 May 2019).

- WHO Toolkit for the care and support of people affected by complications associated with Zika virus. Geneva: World Health Organization; 2017. License: CC BY-NC-SA 3.0 IGO. (https://apps.who.int/iris/bitstream/handle/10665/255718/9789241512718-eng.pdf;jsessionid=36690213E424BF3EDA92C8E5F96B677D?sequence=1, accessed 8 August 2019).

- Psychosocial support for pregnant women and for families with microcephaly and other neurological complications in the context of Zika virus: Interim guidance for health-care providers. WHO/ZIKV/MOC/16.6. Geneva: World Health Organization, 2016. (https://apps.who.int/iris/bitstream/handle/10665/204492/WHO_ZIKV_MOC_16.6_eng.pdf?sequence=1, accessed 5 August 2019)

G. Feeding of infants of mothers who are carriers of chronic hepatitis B

- Hepatitis B vaccines: WHO position paper – July 2017. Wkly Epidemiol Rec. 2017;92(27):369–92 (https://apps.who.int/iris/bitstream/handle/10665/255841/WER9227.pdf, accessed 23 May 2019).

- Global strategy for infant and young child feeding. Geneva: World Health Organization; 2003 (https://apps.who.int/iris/bitstream/handle/10665/42590/9241562218.pdf?sequence=1, accessed 9 May 2019).

- Hepatitis B and breastfeeding. A statement prepared jointly by the Global Programme for Vaccines and Immunization (GPV) and the Divisions of Child Health and Development (CHD), and Reproductive Health (Technical Support) (RHT) World Health Organization. Geneva: World Health Organization; 1996 (https://www.who.int/maternal_child_adolescent/documents/pdfs/hepatitis_b_and_breastfeeding.pdf, accessed 10 May 2019).

H. Feeding of infants in settings with an ongoing pandemic of influenza A (H1N1) virus transmission

- Pregnancy and pandemic influenza A (H1N1) 2009: information for programme managers and clinicians. Geneva: World Health Organization; 2010 (https://www.who.int/csr/resources/publications/swineflu/h1n1_guidance_pregnancy.pdf, accessed 10 May 2019).

- Global strategy for infant and young child feeding. Geneva: World Health Organization; 2003 (https://apps.who.int/iris/bitstream/handle/10665/42590/9241562218.pdf?sequence=1, accessed 9 May 2019).

I. Vitamin A supplementation for infants and children with measles

- Treating measles in children. Geneva: World Health Organization; 2004 (WHO/EPI/TRAM/97.02; https://www.who.int/immunization/programmes_systems/interventions/TreatingMeaslesENG300.pdf, accessed 11 May 2019).

- Vitamin A supplements: a guide to their use in the treatment and prevention of vitamin A deficiency and xerophthalmia, 2nd ed. Geneva: World Health Organization; 1997 (https://apps.who.int/iris/bitstream/handle/10665/41947/9241545062.pdf, accessed 11 May 2019).

III. Nutrition in emergencies[a]

A. Infant and young child feeding in emergencies

- HIV and infant feeding in emergencies: operational guidance. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/handle/10665/272862/9789241550321-eng.pdf?ua=1, accessed 10 May 2019).

- Infant and young child feeding in emergencies. Operational guidance for emergency relief staff and programme managers. Developed by the IFE Core group. Version 3.0. Geneva: World Health Organization; 2017 (https://www.ennonline.net/attachments/2671/Ops-G_2017_WEB.pdf, accessed 10 May 2019).

- Guiding principles for feeding infants and young children during emergencies. Geneva: World Health Organization; 2004 (https://apps.who.int/iris/bitstream/handle/10665/42710/9241546069.pdf?ua=1, accessed 10 May 2019).

- Guidance on ending inappropriate promotion of foods for infants and young children: implementation manual. Geneva: World Health Organization; 2017 (https://apps.who.int/iris/bitstream/handle/10665/260137/9789241513470-eng.pdf, accessed 10 May 2019).

- Joint statement by the World Health Organization, the World Food Programme and the United Nations Children's Fund. Preventing and controlling micronutrient deficiencies in populations affected by an emergency. Geneva: World Health Organization; 2007 (https://www.who.int/nutrition/publications/micronutrients/WHO_WFP_UNICEFstatement.pdf?ua=1, accessed 10 May 2019).

- Food and nutrition needs in emergencies. Geneva: World Health Organization; 2004 (https://apps.who.int/iris/bitstream/handle/10665/68660/a83743.pdf?ua=1, accessed 10 May 2019).

B. Preventing and controlling micronutrient deficiencies in emergencies

- Joint statement by the World Health Organization, the World Food Programme and the United Nations Children's Fund. Preventing and controlling micronutrient deficiencies in populations affected by an emergency. Geneva: World Health Organization; 2007 (https://www.who.int/nutrition/publications/micronutrients/WHO_WFP_UNICEFstatement.pdf?ua=1, accessed 10 May 2019).

- Food and nutrition needs in emergencies. Geneva: World Health Organization; 2004 (https://apps.who.int/iris/bitstream/handle/10665/68660/a83743.pdf?ua=1, accessed 10 May 2019).

[a] The interventions presented in the section are not exhaustive and other nutrition actions through the life-course can be adapted as needed, to emergency settings.

ANNEX 2.

Nutrition-related health products included in the essential nutrition actions and the *WHO model list of essential medicines (22)* and *WHO model list of essential medicines for children (23)*

Nutrition-related health product	Target group	Essential nutrition actions	***WHO model list of essential medicines (22)* (EML) or *WHO model list of essential medicines for children (23)* (EML for children)**
I. MULTISECTORAL INTERVENTIONS FOR HEALTHIER POPULATIONS			
B. Fortification of condiments and staple foods with micronutrients			
Food fortification with micronutrients	All population groups	*Universal salt iodization* *Fortification of maize flour and corn meal with vitamins and minerals* *Fortification of rice with with vitamins and minerals* *Fortification of wheat flour with vitamins and minerals*	
II. NUTRITION THROUGH THE LIFE-COURSE			
2. Children			
C. Assessment and management of wasting[a]			
F-75 therapeutic milk F-100 therapeutic milk	Infants and children aged 6–59 months	*Inpatient management of infants and children aged 6–59 months with severe acute malnutrition (undernutrition)* **WHO recommendation** F-75 therapeutic milk is recommended for use as the therapeutic food in the stabilization phase of inpatient management of children with severe acute malnutrition. F-100 therapeutic milk may be used as the therapeutic food in the rehabilitation phase of inpatient management of children with severe acute malnutrition. Inpatient care treatment guidelines are outlined in the WHO Guideline. Updates on the management of severe acute malnutrition in infants and children. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/95584/9789241506328_eng.pdf?ua=1) and the Pocketbook of hospital care for children: guidelines for the management of common children illnesses, 2nd ed. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/81170/9789241548373_eng.pdf?sequence=1).	

[a] WHO's has developed a drug kit for severe acute malnutrition with medical complications (SAM/MC). The kit is a standard kit designed to provide medical treatment for 50 children under five suffering from severe malnutrition with medical complications. (https://www.who.int/emergencies/kits/sam/en/, accessed 8 August 2019)

Nutrition-related health product	Target group	Essential nutrition actions	***WHO model list of essential medicines (22)* (EML) or *WHO model list of essential medicines for children (23)* (EML for children)**
Ready-to-use therapeutic foods	Infants and children aged 6–59 months	*Outpatient management of infants and children aged 6–59 months with severe acute malnutrition (undernutrition)* **WHO recommendation** Ready-to-use therapeutic foods are recommended for use during the rehabilitation phase of inpatient or outpatient management of children with severe acute malnutrition. Outpatient care treatment guidelines are outlined in the WHO Guideline. Updates on the management of severe acute malnutrition in infants and children. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/95584/9789241506328_eng.pdf?ua=1) and the Pocketbook of hospital care for children: guidelines for the management of common children illnesses, 2nd ed. Geneva: World Health Organization; 2013 (https://apps.who.int/iris/bitstream/handle/10665/81170/9789241548373_eng.pdf?sequence=1).	
Supplementary foods	Infants and children aged 6–59 months	*Management of infants and children aged 6–59 months with moderate acute malnutrition (undernutrition)* **WHO recommendation** Infants and children aged 6–59 months with moderate acute malnutrition need to consume nutrient-dense foods to meet their extra needs for weight and height gain and functional recovery. Dietary management of these children should be based on the optimal use of locally available foods; in settings where the available foods will not meet the requirements of children with moderate acute malnutrition, specially formulated supplementary foods can be used.	

<table>
<tr><th>Nutrition-related health product</th><th>Target group</th><th>Essential nutrition actions</th><th>WHO model list of essential medicines (22) (EML) or WHO model list of essential medicines for children (23) (EML for children)</th></tr>
<tr><td colspan="4">D. Iron-containing micronutrient supplementation</td></tr>
<tr><td>Multiple micronutrient powders</td><td>Infants and young children aged 6–23 months</td><td>Provision of iron-containing micronutrient powders for point-of-use fortification of foods for infants and young children aged 6–23 months
<table>
<tr><th colspan="2">Suggested scheme for point-of-use fortification with iron-containing micronutrient powders of foods consumed by infants and young children aged 6–23 months</th></tr>
<tr><td>Composition per sachet[a]</td><td>Iron: 10–12.5 mg of elemental iron[b]
Vitamin A: 300 µg of retinol
Zinc: 5 mg of elemental zinc
With or without other micronutrients to achieve 100% of the recommended nutrient intake[c]</td></tr>
<tr><td>Regimen</td><td>Programme target of 90 sachets/doses over a 6-month period</td></tr>
<tr><td>Target group</td><td>Infants and young children aged 6–23 months, starting at the same time as weaning foods are introduced into the diet</td></tr>
<tr><td>Settings</td><td>Areas where the prevalence of anaemia in children aged under 2 years or under 5 years is 20% or higher</td></tr>
</table>
[a] MNPs are generally packaged in small sachets that are temperature- and moisture-resistant, easy to transport and store, and have a long shelf-life
[b] 12.5 mg of elemental iron equals 37.5 mg of ferrous fumarate or 62.5 mg of ferrous sulfate heptahydrate or equivalent amounts in other iron compounds. In children aged 6–12 months, sodium iron EDTA (NaFeEDTA) is generally not recommended. If NaFeEDTA is selected as a source of iron, the EDTA intake (including other dietary sources) should not exceed 1.9 mg EDTA/kg/day.
[c] Recommended nutrient intake (RNI). Multiple micronutrient powders can be formulated with or without other vitamins and minerals in addition to iron, vitamin A and zinc, to achieve 100% of the recommended nutrient intake, and also taking into consideration the technical and sensory properties.</td><td>EML for children
27. VITAMINS AND MINERALS
multiple micronutrient powder
Sachets containing:
- iron (elemental) 12.5 mg (as coated ferrous fumarate)
- zinc (elemental) 5 mg
- vitamin A 300 micrograms
- with or without other micronutrients at recommended daily values</td></tr>
</table>

<table>
<tr><th>Nutrition-related health product</th><th>Target group</th><th>Essential nutrition actions</th><th>WHO model list of essential medicines (22) (EML) or WHO model list of essential medicines for children (23) (EML for children)</th></tr>
<tr><td></td><td>Children aged 2–12 years</td><td>Provision of iron-containing micronutrient powders for point-of-use fortification of foods for infants and children aged 2–12 years
<table>
<tr><th colspan="2">Suggested scheme for point-of-use fortification of foods with iron-containing micronutrient powders in children aged 2–12 years</th></tr>
<tr><td>Composition per sachet[a]</td><td>Iron: 10–12.5 mg of elemental iron for children aged 2–4 years and 12.5–30 mg of elemental iron for children aged 5–12 years[b]
Vitamin A: 300 µg of retinol
Zinc: 5 mg of elemental zinc
With or without other micronutrients to achieve 100% of the recommended nutrient intake[c]</td></tr>
<tr><td>Regimen</td><td>Programme target of 90 sachets/doses over a 6-month period</td></tr>
<tr><td>Target group</td><td>Children aged 2–12 years</td></tr>
<tr><td>Settings</td><td>Areas where the prevalence of anaemia in children under 5 years of age is 20% or higher</td></tr>
</table>
[a] NPs are generally packaged in small sachets that are temperature- and moisture-resistant, easy to transport and store, and have a long shelf-life; where feasible, likely consumption from other sources, including home diets and fortified foods, should be taken into consideration for eastablishing the composition of the sachet.
[b] 1, i.e. 12.5 mg of elemental iron equals 37.5 mg of ferrous fumarate or 62.5 mg of ferrous sulfate heptahydrate or equivalent amounts in other iron compounds. If sodium iron EDTA (NaFeEDTA) is selected as a source of iron, the dose of elemental iron should be reduced by 3–6 mg due to its higher bioavailability. The appropriate range of NaFeEDTA is an area of research need.
[c] Recommended nutrient intake (RNI). Multiple micronutrient powders can be formulated with or without other vitamin and minerals in addition to iron, vitamin A and zinc to achieve 100% of the recommended nutrient intake and also taking into consideration the technical and sensory properties.</td><td>EML for children
27. VITAMINS AND MINERALS
multiple micronutrient powder
Sachets containing:
- iron (elemental) 12.5 mg (as coated ferrous fumarate)
- zinc (elemental) 5 mg
- vitamin A 300 micrograms
- with or without other micronutrients at recommended daily values</td></tr>
</table>

<table>
<tr><th>Nutrition-related health product</th><th>Target group</th><th>Essential nutrition actions</th><th>WHO model list of essential medicines (22) (EML) or WHO model list of essential medicines for children (23) (EML for children)</th></tr>
<tr><td>Iron supplementation</td><td>Infants and children aged 6–23 months</td><td>Daily iron supplementation for infants and young children aged 6–23 months
<table>
<tr><th colspan="2">Suggested scheme for daily iron supplementation for infants and young children aged 6–23 months</th></tr>
<tr><td>Supplement composition</td><td>10–12.5 mg elemental iron[a]</td></tr>
<tr><td>Supplement form</td><td>Drops/syrups</td></tr>
<tr><td>Frequency</td><td>Daily</td></tr>
<tr><td>Duration</td><td>Three consecutive months in a year</td></tr>
<tr><td>Target group</td><td>Infants and young children (6–23 months of age)</td></tr>
<tr><td>Settings</td><td>Where the prevalence of anaemia in infants and young children is 40% or higher[b]</td></tr>
</table>
[a] 10–12.5 mg of elemental iron equals 50–62.5 mg of ferrous sulfate heptahydrate, 30–37.5 mg of ferrous fumarate or 83.3–104.2 mg of ferrous gluconate.
[b] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).</td><td>EML for children
10. MEDICINES AFFECTING THE BLOOD
10.1 Antianaemia medicines
ferrous salt
Oral liquid: equivalent to 25 mg iron (as sulfate)/mL
Tablet: equivalent to 60 mg iron</td></tr>
</table>

Nutrition-related health product	Target group	Essential nutrition actions	*WHO model list of essential medicines (22)* (EML) or *WHO model list of essential medicines for children (23)* (EML for children)
	Children aged 2–12 years	*Daily iron supplementation for children aged 2–12 years*	**EML for children** 10. MEDICINES AFFECTING THE BLOOD 10.1 Antianaemia medicines **ferrous salt** **Oral liquid:** equivalent to 25 mg iron (as sulfate)/mL **Tablet:** equivalent to 60 mg iron

Suggested schemes for daily iron supplementation for children aged 24–59 months and 5–12 years

Target group	Preschool-age children (24–59 months)	School-age children (5–12 years of age)
Supplement composition	30 mg of elemental iron[a]	30–60 mg of elemental iron[b]
Supplement form	Drops/syrups/tablets	Tablets or capsules
Frequency	Daily	Daily
Duration	Three consecutive months per year	Three consecutive months per year
Settings	Where the prevalence of anaemia in preschool-age children is 40% or higher[c]	Where the prevalence of anaemia in school-age children is 40% or higher[c]

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

[b] 30–60 mg of elemental iron equals 150–300 mg of ferrous sulfate heptahydrate, 90–180 mg of ferrous fumarate, or 250–500 mg of ferrous gluconate.

[c] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).

Nutrition-related health product	Target group	Essential nutrition actions	*WHO model list of essential medicines (22)* (EML) or *WHO model list of essential medicines for children (23)* (EML for children)
	Children aged 2–12 years	*Intermittent iron supplementation for children aged 2–12 years*	**EML for children** 10. MEDICINES AFFECTING THE BLOOD 10.1 Antianaemia medicines **ferrous salt** **Oral liquid:** equivalent to 25 mg iron (as sulfate)/mL **Tablet:** equivalent to 60 mg iron

Suggested schemes for intermittent iron supplementation for children aged 24–59 months and 5–12 years

Target group	Preschool-age children (24–59 months)	School-age children (5–12 years)
Supplement composition	25 mg of elemental iron[a]	45 mg of elemental iron[b]
Supplement form	Drops/syrups	Tablets/capsules
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	
Settings	Where the prevalence of anaemia in preschool or school-age children is 20% or higher[c]	

[a] 25 mg of elemental iron equals 75 mg of ferrous fumarate, 125 mg of ferrous sulfate heptahydrate or 210 mg of ferrous gluconate.

[b] 45 mg of elemental iron equals 135 mg of ferrous fumarate, 225 mg of ferrous sulfate heptahydrate or 375 mg of ferrous gluconate.

[c] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).

<table>
<tr><th>Nutrition-related health product</th><th>Target group</th><th>Essential nutrition actions</th><th>WHO model list of essential medicines (22) (EML) or WHO model list of essential medicines for children (23) (EML for children)</th></tr>
<tr><td colspan="4">E. Vitamin A supplementation</td></tr>
<tr><td>Vitamin A supplementation</td><td>Infants and children aged 6–59 months</td><td>High-dose vitamin A supplementation for infants and children aged 6–59 months
<table>
<tr><th colspan="3">Suggested vitamin A supplementation scheme for infants and children aged 6–59 months</th></tr>
<tr><td>Target group</td><td>Infants aged 6–11 months (including HIV-positive infants)</td><td>Children aged 12–59 months (including HIV-positive children)</td></tr>
<tr><td>Dose</td><td>100 000 IU (30 mg RE) vitamin A</td><td>200 000 IU (60 mg RE) vitamin A</td></tr>
<tr><td>Frequency</td><td>Once</td><td>Every 4–6 months</td></tr>
<tr><td>Route of administration</td><td colspan="2">Oral liquid, oil-based preparation of retinyl palmitate or retinyl acetate[a]</td></tr>
<tr><td>Settings</td><td colspan="2">Populations where the prevalence of night-blindness is 1% or higher in children aged 24–59 months, or where the prevalence of vitamin A deficiency (serum retinol 0.70 µmol/L or lower) is 20% or higher in infants and children aged 6–59 months</td></tr>
</table>
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 .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.</td><td>EML for children
27. VITAMINS AND MINERALS
retinol
Capsule: 100 000 IU; 200 000 IU (as palmitate)
Oral oily solution: 100 000 IU (as palmitate)/mL in multidose dispenser
Tablet (sugar-coated): 10 000 IU (as palmitate)
Water-miscible injection: 100 000 IU (as palmitate) in 2-mL ampoule</td></tr>
</table>

<table>
<tr><th>Nutrition-related health product</th><th>Target group</th><th>Essential nutrition actions</th><th>WHO model list of essential medicines (22) (EML) or WHO model list of essential medicines for children (23) (EML for children)</th></tr>
<tr><td colspan="4">F. Iodine supplementation</td></tr>
<tr><td>Iodine supplementation</td><td>Infants and young children aged 6–23 months</td><td>Iodine supplementation (or iodine-fortified complementary food for infants and young children aged 6–23 months
<table>
<tr><th colspan="3">WHO-recommended dosages of daily and annual iodine supplementation for infants and young children aged 6–23 months</th></tr>
<tr><th>Population group</th><th>Daily dose of iodine supplement (µg/day)</th><th>Single annual dose of iodized oil supplement (mg/year)</th></tr>
<tr><td>Infants and young children aged under 2 years[a,b]</td><td>90</td><td>200</td></tr>
</table>
[a] For children aged 0–5 months, iodine supplementation should be given through breast milk. This implies that the child is exclusively breastfed and that the lactating mother received iodine supplementation (see Iodine supplementation for non-pregnant women (15–49 years) and pregnant women "for recommended dosages for these groups").
[b] These figures for iodine supplements are given in situations where complementary food fortified with iodine is not available, in which case iodine supplementation is required for children aged 7–23 months.</td><td>EML and EML for children
27. VITAMINS AND MINERALS
iodine
Capsule: 190 mg
Iodized oil: 1 mL (480 mg iodine); 0.5 mL (240 mg iodine) in ampoule (oral or injectable); 0.57 mL (308 mg iodine) in dispenser bottle</td></tr>
</table>

Nutrition-related health product	Target group	Essential nutrition actions	*WHO model list of essential medicines (22)* (EML) or *WHO model list of essential medicines for children (23)* (EML for children)
G. Zinc supplementation in the management of diarrhoea			
Zinc supplementation	Infants and children with diarrhoea	*Zinc supplementation with increased fluids and continued feeding for management of diarrhoea in infants and children* **WHO recommendation** Mothers, other caregivers and health workers should provide children with diarrhoea with 20 mg per day of zinc supplementation (10 mg/day for children <6 months of age) for 10–14 days.	**EEML for children** 17. GASTROINTESTINAL MEDICINES 17.5 Medicines used in diarrhoea **oral rehydration salts – zinc sulfate** **Co-package containing:** ORS powder for dilution (see Section 17.5.1) – zinc sulfate solid oral dosage form 20 mg (see Section 17.5.2) 17.5.1 Oral rehydration **oral rehydration salts** Powder for dilution in 200 mL; 500 mL; 1 L. glucose: 75 mEq sodium: 75 mEq or mmol/L chloride: 65 mEq or mmol/L potassium: 20 mEq or mmol/L citrate: 10 mmol/L osmolarity: 245 mOsm/L glucose: 13.5 g/L sodium chloride: 2.6 g/L potassium chloride: 1.5 g/L trisodium citrate dihydrate*: 2.9 g/L * trisodium citrate dihydrate may be replaced by sodium hydrogen carbonate (sodium bicarbonate) 2.5 g/L. However, as the stability of this latter formulation is very poor under tropical conditions, it is recommended only when manufactured for immediate use. 17.5.2 Medicines for diarrhoea **zinc sulfate*** **Solid oral dosage form:** 20 mg * In acute diarrhoea, zinc sulfate should be used as an adjunct to oral rehydration salts

<table>
<tr><th>Nutrition-related health product</th><th>Target group</th><th>Essential nutrition actions</th><th>WHO model list of essential medicines (22) (EML) or WHO model list of essential medicines for children (23) (EML for children)</th></tr>
<tr><td colspan="4">3. Adolescents</td></tr>
<tr><td colspan="4">A. Iron-containing micronutrient supplementation</td></tr>
<tr><td>Intermittent iron and folic acid supplementation</td><td>Menstruating non-pregnant adolescent girls</td><td>Intermittent iron and folic acid supplementation for menstruating non-pregnant adolescent girls
<table><tr><th colspan="2">Suggested scheme for intermittent iron and folic acid supplementation for menstruating non-pregnant adolescent girls</th></tr><tr><td>Supplement composition</td><td>Iron: 60 mg of elemental iron[a]
Folic acid: 2800 µg (2.8 mg)</td></tr><tr><td>Supplement form</td><td>Tablets</td></tr><tr><td>Frequency</td><td>One supplement per week</td></tr><tr><td>Duration and time interval between periods of supplementation</td><td>3 months of supplementation followed by 3 months of no supplementation, after which the provision of supplements should restart</td></tr><tr><td>Target group</td><td>All menstruating non-pregnant adolescent girls</td></tr><tr><td>Settings</td><td>Populations where the prevalence of anaemia among non-pregnant women is 20% or higher[b]</td></tr></table>[a] 60 mg of elemental iron equals 300 mg of ferrous sulfate heptahydrate, 180 mg of ferrous fumarate or 500 mg of ferrous gluconate.
[b] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).</td><td>10. MEDICINES AFFECTING THE BLOOD
10.1 Antianaemia medicines
ferrous salt
Oral liquid: equivalent to 25 mg iron (as sulfate)/ mL.
Tablet: equivalent to 60 mg iron.
folic acid
Tablet: 400 micrograms*; 1 mg; 5 mg.
* periconceptual use for prevention of first occurrence of neural tube defects</td></tr>
</table>

<table>
<tr><th>Nutrition-related health product</th><th>Target group</th><th>Essential nutrition actions</th><th>WHO model list of essential medicines (22) (EML) or WHO model list of essential medicines for children (23) (EML for children)</th></tr>
<tr><td>Daily iron supplementation</td><td>Menstruating non-pregnant adolescent girls</td><td>Daily iron supplementation for menstruating non-pregnant adolescent girls
Suggested scheme for daily iron supplementation for menstruating non-pregnant adolescent girls
Supplement composition: 30–60 mg of elemental iron[a]
Supplement form: Tablets
Frequency: Daily
Duration: Three consecutive months per year
Target group: All menstruating non-pregnant adolescent girls
Settings: Where the prevalence of anaemia in non-pregnant women is 40% or higher[b]
[a] 30–60 mg of elemental iron equals 90–180 mg of ferrous fumarate, 150–300 mg of ferrous sulfate heptahydrate or 250–500 mg of ferrous gluconate.
[b] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).</td><td>EML
10. MEDICINES AFFECTING THE BLOOD
10.1 Antianaemia medicines
ferrous salt
Oral liquid: equivalent to 25 mg iron (as sulfate)/mL
Tablet: equivalent to 60 mg iron</td></tr>
</table>

Nutrition-related health product	Target group	Essential nutrition actions	*WHO model list of essential medicines (22)* (EML) or *WHO model list of essential medicines for children (23)* (EML for children)
4. Adults			
A. Nutritional care of women during pregnancy and postpartum			
Intermittent iron and folic acid supplementation	Pregnant women	*Intermittent iron and folic acid supplementation for pregnant women* **WHO recommendation** Intermittent oral iron and folic acid supplementation with 120 mg of elemental iron[a] and 2800 µg (2.8 mg) of folic acid once weekly is recommended for pregnant women, to improve maternal and neonatal outcomes if daily iron is not acceptable due to side-effects, and in populations with an anaemia prevalence among pregnant women of less than 20%. [a] The equivalent of 120 mg of elemental iron is 600 mg ferrous sulfate heptahydrate, 360 mg ferrous fumarate or 1000 mg ferrous gluconate.	10. MEDICINES AFFECTING THE BLOOD 10.1 Antianaemia medicines **ferrous salt** **Oral liquid:** equivalent to 25 mg iron (as sulfate)/ mL. **Tablet:** equivalent to 60 mg iron. **folic acid** **Tablet:** 400 micrograms*; 1 mg; 5 mg. * periconceptual use for prevention of first occurrence of neural tube defects
Daily iron and folic acid supplementation	Pregnant women	*Daily iron and folic acid supplementation for pregnant women* **WHO recommendation** Daily oral iron and folic acid supplementation with 30–60 mg of elemental iron[a] and 400 µg (0.4 mg) of folic acid[b] is recommended for pregnant women, to prevent maternal anaemia, puerperal sepsis, low birth weight and preterm birth. In settings where anaemia in pregnant women is a severe public health problem (≥40% of pregnant women have anaemia with haemoglobin concentration <110 g/L), 60 mg of elemental iron is the preferred dose. [a] The equivalent of 60 mg of elemental iron is 300 mg ferrous sulfate heptahydrate, 180 mg ferrous fumarate or 500 mg of ferrous gluconate. [b] Folic acid should be commenced as early as possible (ideally before conception), to prevent neural tube defects.	**EML** 10. MEDICINES AFFECTING THE BLOOD 10.1 Antianaemia medicines ferrous salt + folic acid **Tablet:** equivalent to 60 mg iron + 400 µg folic acid (nutritional supplement for use during pregnancy)

Nutrition-related health product	Target group	Essential nutrition actions	*WHO model list of essential medicines (22)* (EML) or *WHO model list of essential medicines for children (23)* (EML for children)
Vitamin A supplementation	Pregnant women	*Vitamin A supplementation for pregnant women* **WHO recommendation** Vitamin A supplementation is only recommended for pregnant women in areas where vitamin A deficiency is a severe public health problem,[a] to prevent night-blindness. In such settings, vitamin A can be given daily or weekly. Existing WHO guidance suggests a dose of up to 10 000 IU vitamin A per day, or a weekly dose of up to 25 000 IU. [a] Vitamin A deficiency is a severe public health problem if >5% of women in a population have a history of night blindness in their most recent pregnancy in the previous 3–5 years that ended in a live birth, or if >20% of pregnant women have a serum retinol level <0.70 µmol/L.	**EML** 27. VITAMINS AND MINERALS **retinol** **Capsule:** 50 000 IU; 100 000 IU; 200 000 IU (as palmitate) **Oral oily solution:** 100 000 IU (as palmitate)/ mL in multidose dispenser **Tablet (sugar-coated):** 10 000 IU (as palmitate) **Water-miscible injection:** 100 000 IU (as palmitate) in 2- mL ampoule
Calcium supplementation	Pregnant women	*Calcium supplementation for pregnant women to reduce the risk of pre-eclampsia* **WHO recommendation** In populations with low dietary calcium intake,[a] daily calcium supplementation (1.5–2.0 g elemental calcium) is recommended for pregnant women, to reduce the risk of pre-eclampsia. [a] The target group for this recommendation comprises populations with observed low dietary calcium intake or those living in geographical areas where calcium-rich foods are not commonly available or consumed. In some studies, low dietary calcium intake has been defined as less than 900 mg per day. See "Considerations" in the main text for methods to determine calcium intake.	**EML** 27. VITAMINS AND MINERALS **calcium** **Tablet:** 500 mg (elemental)

<table>
<tr><th>Nutrition-related health product</th><th>Target group</th><th>Essential nutrition actions</th><th>WHO model list of essential medicines (22) (EML) or WHO model list of essential medicines for children (23) (EML for children)</th></tr>
<tr><td colspan="4">B. Iron-containing micronutrient supplementation</td></tr>
<tr><td>Iron and folic acid supplementation</td><td>Non-pregnant women</td><td>Intermittent iron and folic acid supplementation for non-pregnant women (15–49 years)
<table>
<tr><th colspan="2">Suggested scheme for intermittent iron and folic acid supplementation for non-pregnant women</th></tr>
<tr><td>Supplement composition</td><td>Iron: 60 mg of elemental iron[a]
Folic acid: 2800 µg (2.8 mg)</td></tr>
<tr><td>Supplement form</td><td>Tablets</td></tr>
<tr><td>Frequency</td><td>One supplement per week</td></tr>
<tr><td>Duration and time interval between periods of supplementation</td><td>3 months of supplementation followed by 3 months of no supplementation, after which the provision of supplements should restart</td></tr>
<tr><td>Target group</td><td>All non-pregnant women (15–49 years)</td></tr>
<tr><td>Settings</td><td>Populations where the prevalence of anaemia in non-pregnant women is 20% or higher[b]</td></tr>
</table>
[a] 60 mg of elemental iron equals 300 mg of ferrous sulfate heptahydrate, 180 mg of ferrous fumarate or 500 mg of ferrous gluconate.
[b] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).</td><td>EML
10. MEDICINES AFFECTING THE BLOOD
10.1 Antianaemia medicines
ferrous salt
Oral liquid: equivalent to 25 mg iron (as sulfate)/ mL.
Tablet: equivalent to 60 mg iron.
folic acid
Tablet: 400 micrograms*; 1 mg; 5 mg.
* periconceptual use for prevention of first occurrence of neural tube defects</td></tr>
</table>

<table>
<tr><th>Nutrition-related health product</th><th>Target group</th><th>Essential nutrition actions</th><th>WHO model list of essential medicines (22) (EML) or WHO model list of essential medicines for children (23) (EML for children)</th></tr>
<tr><td></td><td></td><td>Daily iron supplementation for non-pregnant women (15–49 years)
<table><tr><th colspan="2">Suggested scheme for daily iron supplementation for non-pregnant women</th></tr><tr><td>Supplement composition</td><td>30–60 mg of elemental iron[a]</td></tr><tr><td>Supplement form</td><td>Tablets</td></tr><tr><td>Frequency</td><td>Daily</td></tr><tr><td>Duration</td><td>Three consecutive months per year</td></tr><tr><td>Target group</td><td>All non-pregnant women (15–49 years)</td></tr><tr><td>Settings</td><td>Where the prevalence of anaemia in women is 40% or higher[b]</td></tr></table>[a] 30–60 mg of elemental iron equals 90–180 mg of ferrous fumarate, 150–300 mg of ferrous sulfate heptahydrate or 250–500 mg of ferrous gluconate.
[b] In the absence of prevalence data in this group, consider proxies for high risk of anaemia. For the most recent estimates, visit the WHO-hosted Vitamin and Mineral Nutrition Information System (VMNIS) (http://www.who.int/vmnis/en/).</td><td>10. MEDICINES AFFECTING THE BLOOD
10.1 Antianaemia medicines
ferrous salt
Oral liquid: equivalent to 25 mg iron (as sulfate)/ mL.
Tablet: equivalent to 60 mg iron.</td></tr>
<tr><td colspan="4">C. Iodine supplementation</td></tr>
<tr><td>Iodine supplementation</td><td>Non-pregnant and pregnant women</td><td>Iodine supplementation for non-pregnant women (15–49 years) and pregnant women
<table><tr><th colspan="3">WHO-recommended dosages of daily and annual iodine supplementation[a] for non-pregnant and pregnant women</th></tr><tr><th>Population group</th><th>Daily dose of iodine supplement (µg/day)</th><th>Single annual dose of iodized oil supplement (mg/year)</th></tr><tr><td>Pregnant women</td><td>250</td><td>400</td></tr><tr><td>Non-pregnant women (15–49 years)</td><td>150</td><td>400</td></tr></table>[a] These figures for iodine supplementation are given in situations where 20% or fewer households have access to iodized salt and pregnant women are difficult to reach.</td><td>EML
27. VITAMINS AND MINERALS
iodine
Capsule: 190 mg.
Iodized oil: 1 mL (480 mg iodine); 0.5 mL (240 mg iodine) in ampoule (oral or injectable); 0.57 mL (308 mg iodine) in dispenser bottle</td></tr>
</table>

Nutrition-related health product	Target group	Essential nutrition actions	*WHO model list of essential medicines (22)* (EML) or *WHO model list of essential medicines for children (23)* (EML for children)
6. Specific conditions			
A. Nutritional care for persons living with HIV			
	Infants and children aged 6 months to 14 years living with HIV	*Nutritional care for infants and children aged 6 months to 14 years living with HIV* **WHO recommendation** Infants and children (aged 6 months to 14 years) 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 their nutritional status, and to ensure appropriate growth and development. Micronutrient intakes at recommended levels need to be assured in children living with HIV, through varied diets, fortified foods and micronutrient supplements, when adequate intakes cannot be guaranteed through local foods.	
B. Nutritional care for persons with tuberculosis			
	Pregnant women with active tuberculosis	*Nutritional assessment, counselling and management for pregnant women with active tuberculosis* **WHO recommendation** All individuals with active tuberculosis (TB) should receive: (i) an assessment of their nutritional status; and (ii) appropriate counselling based on their nutritional status at diagnosis and throughout treatment. All pregnant women with active TB should receive multiple micronutrient supplements that contain iron and folic acid and other vitamins and minerals, according to the United Nations Multiple Micronutrient Preparation, to complement their maternal micronutrient needs. For pregnant women with active TB in settings where calcium intake is low, calcium supplementation as part of antenatal care is recommended for the prevention of pre-eclampsia, particularly among those pregnant women at higher risk of developing hypertension, in accordance with WHO recommendations.	**EML** 27. VITAMINS AND MINERALS **calcium** **Tablet:** 500 mg (elemental)

Nutrition-related health product	Target group	Essential nutrition actions	*WHO model list of essential medicines (22)* (EML) or *WHO model list of essential medicines for children (23)* (EML for children)
C. Preventive chemotherapy for the control of soil-transmitted helminth infection (deworming)			
Deworming for soil-transmitted helminth infections	Children aged 12 months and older	*Preventive deworming for children aged 12 months and older* **WHO recommendation** Preventive chemotherapy (deworming), using annual or biannual[a] single-dose albendazole (400 mg)[b] or mebendazole (500 mg), is recommended as a public health intervention for all young children (12–23 months of age), preschool (24–59 months of age) and school-age children living in areas where the baseline prevalence of any soil-transmitted infection is 20% or more among children, in order to reduce the worm burden of soil-transmitted helminths. [a] Biannual administration is recommended where the baseline prevalence is over 50%. [b] A half-dose of albendazole (i.e. 200 mg) is recommended for children aged 12–23 months.	**EML for children** 6. ANTI-INFECTIVE MEDICINES 6.1 Anthelminthics 6.1.1 Intestinal anthelminthics **Albendazole and mebendazole** Albendazole **Tablet** (chewable): 400 mg Mebendazole **Tablet** (chewable): 100 mg; 500 mg
	Non-pregnant women	*Preventive deworming for non-pregnant women (15–49 years)* **WHO recommendation** Preventive chemotherapy (deworming), using annual or biannual[a] single-dose albendazole (400 mg) or mebendazole (500 mg), is recommended as a public health intervention for all non-pregnant women living in areas where the baseline prevalence of any soil-transmitted helminth infection is 20% or more among women, in order to reduce the worm burden of soil-transmitted helminths. [a] Biannual administration is recommended where the baseline prevalence is over 50%.	**EML** 6. ANTI-INFECTIVE MEDICINES 6.1 Anthelminthics 6.1.1 Intestinal anthelminthics **Albendazole and mebendazole** Albendazole **Tablet** (chewable): 400 mg Mebendazole **Tablet** (chewable): 100 mg; 500 mg

Nutrition-related health product	Target group	Essential nutrition actions	***WHO model list of essential medicines (22)* (EML) or *WHO model list of essential medicines for children (23)* (EML for children)**
	Pregnant women	*Preventive deworming for pregnant women after the first trimester* **WHO recommendation** Preventive chemotherapy (deworming), using single-dose albendazole (400 mg) or mebendazole (500 mg), is recommended as a public health intervention for pregnant women, after the first trimester, living in areas where both: (i) the baseline prevalence of hookworm and/or *T. trichiura* infection is 20% or higher among pregnant women, and (ii) anaemia is a severe public health problem, in order to reduce the worm burden of soil-transmitted helminths.	**EML for children** 6. ANTI-INFECTIVE MEDICINES 6.1 Anthelminthics 6.1.1 Intestinal anthelminthics **Albendazole and mebendazole** Albendazole **Tablet** (chewable): 400 mg Mebendazole **Tablet** (chewable): 100 mg; 500 mg
III. NUTRITION IN EMERGENCIES			
A. Infant and young child feeding in emergencies			
Multiple micronutrient supplements	Infants and children aged 6–59 months	*Ensure appropriate complementary foods and micronutrient supplementation for infants and children affected by an emergency* **WHO recommendation** For children aged 6–59 months, multiple micronutrient supplements may be necessary to meet their nutrition requirements where fortified foods are not being provided, in conjunction with other interventions to improve complementary foods and feeding practices. The recommended composition of a multi-micronutrient supplement is provided in the table below.	

Nutrition-related health product	Target group	Essential nutrition actions	*WHO model list of essential medicines (22)* (EML) or *WHO model list of essential medicines for children (23)* (EML for children)

Recommended composition of a multi-micronutrient supplement for infants and children in emergency settings

Micronutrient	Content
Vitamin A	400.0 µg
Vitamin D	5.0 µg
Vitamin E	5.0 mg
Vitamin C	30.0 mg
Thiamine (vitamin B_1)	0.5 mg
Riboflavin (vitamin B_2)	0.5 mg
Niacin (vitamin B_3)	6.0 mg
Vitamin B_6	0.5 mg
Vitamin B_{12}	0.9 µg
Folic acid	150.0 µg
Iron	10.0 mg
Zinc	4.1 mg
Copper	0.56 mg
Selenium	17.0 µg
Iodine	90.0 µg

Nutrition-related health product	Target group	Essential nutrition actions	*WHO model list of essential medicines (22)* (EML) or *WHO model list of essential medicines for children (23)* (EML for children)
B. Preventing and controlling micronutrient deficiencies in emergencies			
	Pregnant and lactating women	*Nutritional support and micronutrient supplementation for pregnant and lactating women affected by an emergency*	

WHO recommendation

Pregnant and lactating women in emergency settings should be provided with fortified blended food commodities, *in addition to* the basic general ration, that are designed to provide 10–12% (up to 15%) of energy from protein and 20–25% of energy from fat. The fortified blended food should be fortified to meet two thirds of the daily requirements for all micronutrients.

Pregnant and lactating women in emergency settings should receive a multiple micronutrient supplement that provides one recommended nutrient intake (RNI) daily, throughout the duration of the emergency, regardless of whether they receive fortified rations or not. The recommended micronutrient formula for pregnant and lactating women is provided in the table below.

Recommended micronutrient formula for pregnant and lactating women in emergency settings

Micronutrient	Content
Vitamin A	800.0 µg
Vitamin D	5.0 µg
Vitamin E	15.0 mg
Vitamin C	55.0 mg
Thiamine (vitamin B_1)	1.4 mg
Riboflavin (vitamin B_2)	1.4 mg
Niacin (vitamin B_3)	18.0 mg
Vitamin B_6	1.9 mg

Nutrition-related health product	Target group	Essential nutrition actions	*WHO model list of essential medicines (22)* (EML) or *WHO model list of essential medicines for children (23)* (EML for children)
	Pregnant women	**Recommended micronutrient formula for pregnant and lactating women in emergency settings** **Micronutrient** — **Content** Vitamin B_{12} — 2.6 µg Folic acid — 600.0 µg Iron — 27.0 mg Zinc — 10.0 mg Copper — 1.15 mg Selenium — 30.0 µg Iodine — 250.0 µg Iron and folic acid supplements for pregnant women, if already provided, should continue. Women should be ensured access to sufficient drinking water (extra 1 L of clean water per day).	

ANNEX 3.

Essential nutrition actions and the global targets

Actions	Interventions	Stunting	Anaemia	Low birth weight	Children overweight	Exclusive breastfeeding	Wasting	premature mortality	Salt intake	Raised blood pressure	Diabetes and obesity
		Global nutrition targets 2025						Global noncommunicable disease targets 2025			
		1	2	3	4	5	6	1	4	6	7
I. MULTISECTORAL INTERVENTIONS FOR HEALTHIER POPULATIONS											
A. Healthy diet											
	Create a healthy food environment that enables people to adopt and maintain healthy dietary practices	x	x	x	x	x	x	x	x	x	x
B. Fortification of condiments and staple foods with micronutrients											
	Universal salt iodization		x	x					x		
	Fortification of maize flour and corn meal with vitamins and minerals		x	x							
	Fortification of rice with vitamins and minerals		x	x							
	Fortification of wheat flour with vitamins and minerals		x	x							
II. NUTRITION THROUGH THE LIFE-COURSE											
1. Infants											
A. Optimal timing of umbilical cord clamping											
	Optimal timing of umbilical cord clamping						x				
B. Protecting, promoting and supporting breastfeeding											
	Support early initiation, establishment and maintenance of breastfeeding and immediate skin-to-skin contact	x			x	x	x				x
	Optimize newborn feeding practices and address additional care needs of infants	x			x	x	x				x
	Create an enabling environment for breastfeeding in health facilities	x			x	x	x				x
	Enable exclusive breastfeeding for the first 6 months of life	x			x	x	x				x
	Enable continued breastfeeding	x			x	x	x				x

Actions	Interventions	Stunting	Anaemia	Low birth weight	Children overweight	Exclusive breastfeeding	Wasting	premature mortality	Salt intake	Raised blood pressure	Diabetes and obesity
		Global nutrition targets 2025						Global noncommunicable disease targets 2025			
		1	2	3	4	5	6	1	4	6	7
	Counsel women to improve breastfeeding practices	x			x	x	x				x
C. Care of low-birth-weight and very low-birth-weight infants											
	Optimal feeding of low-birth-weight and very low-birth-weight infants	x			x	x	x				x
	Enable kangaroo mother care for low-birth-weight infants	x			x	x	x				x
D. Assessment and management of wasting											
	Identify infants under 6 months of age with severe acute malnutrition (undernutrition)						x				
	Inpatient management of infants under 6 months of age with severe acute malnutrition (undernutrition)						x				
	Outpatient management of infants under 6 months of age with severe acute malnutrition (undernutrition)						x				
E. Vitamin A supplementation for infants under 6 months of age											
	Neonatal vitamin A supplementation (i.e. supplementation within the first 28 days of life) is not recommended										
	Vitamin A supplementation in infants aged 1–5 months is not recommended										
2. Children											
A. Appropriate complementary feeding											
	Enable feeding of appropriate complementary foods	x			x						x
B. Growth monitoring and assessment											
	Weight and height or length assessments for children under 5 years of age	x			x		x				x
	Nutrition counselling for children under 5 years of age	x			x		x				x
	Develop a management plan for overweight children under 5 years of age presenting to primary health-care facilities	x			x		x				x

Actions	Interventions	Stunting	Anaemia	Low birth weight	Children overweight	Exclusive breastfeeding	Wasting	premature mortality	Salt intake	Raised blood pressure	Diabetes and obesity
		Global nutrition targets 2025						Global noncommunicable disease targets 2025			
		1	2	3	4	5	6	1	4	6	7
C. Assessment and management of wasting											
	Identify infants and children aged 6–59 months with severe acute malnutrition (undernutrition)						x				
	Inpatient management of infants and children aged 6–59 months with severe acute malnutrition (undernutrition)						x				
	Outpatient management of infants and children aged 6–59 months with severe acute malnutrition (undernutrition)						x				
	Management of infants and children aged 6–59 months with moderate acute malnutrition (undernutrition)						x				
	Routine provision of supplementary foods to infants and children with moderate wasting presenting to primary health-care facilities is not recommended										
	Provision of supplementary foods for treating stunting among children who present to primary health-care facilities is not recommended										
D. Iron-containing micronutrient supplementation											
	Provision of iron-containing micronutrient powders for point-of-use fortification of foods for infants and young children aged 6–23 months										
	Provision of iron-containing multiple micronutrient powders for point-of-use fortification of foods for children aged 2–12 years										
	Daily iron supplementation for infants and young children aged 6–23 months		x								
	Daily iron supplementation for children aged 2–12 years		x								
	Intermittent iron supplementation for children aged 2–12 years		x								

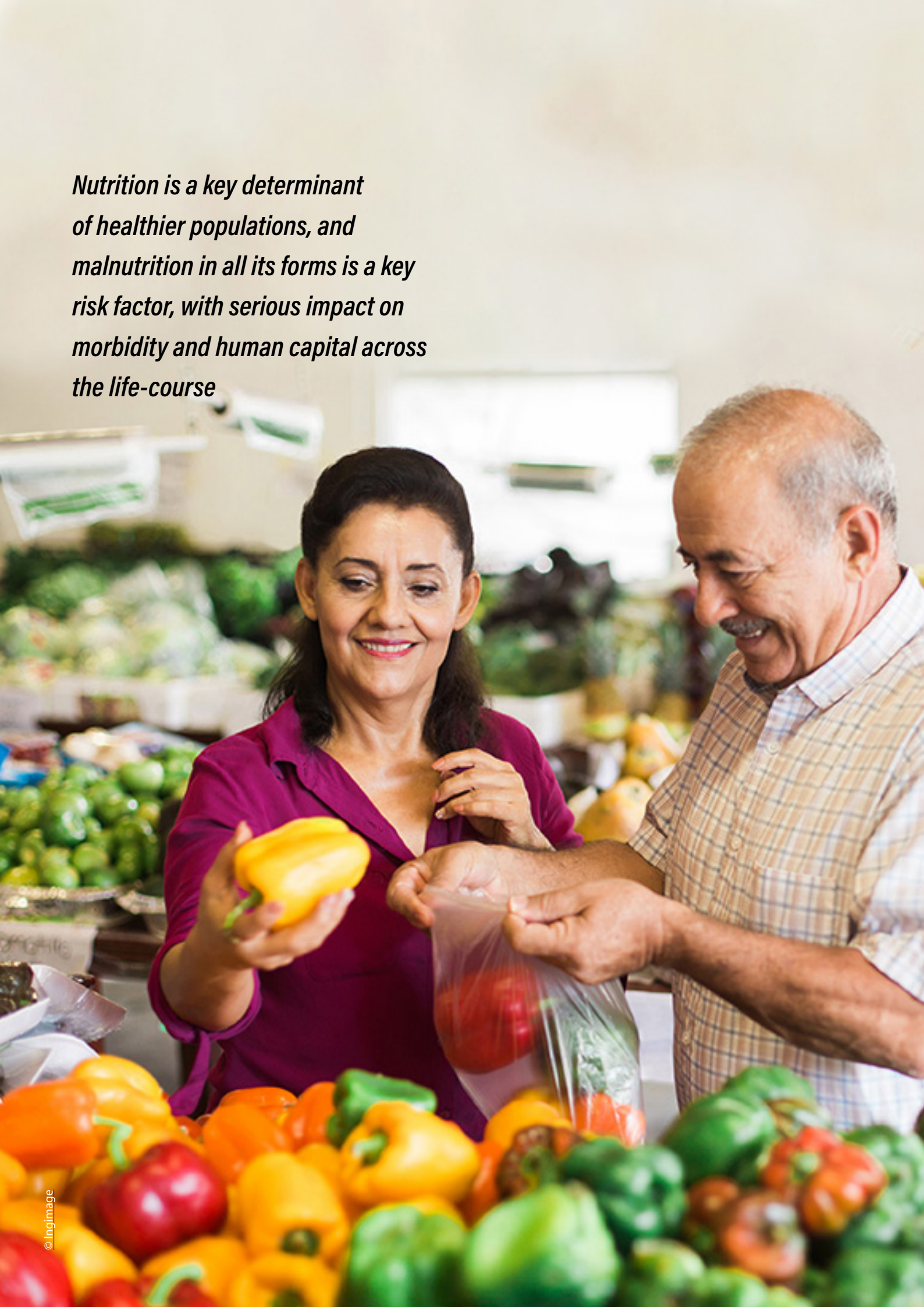
Actions	Interventions	Stunting	Anaemia	Low birth weight	Children overweight	Exclusive breastfeeding	Wasting	premature mortality	Salt intake	Raised blood pressure	Diabetes and obesity
		Global nutrition targets 2025						Global noncommunicable disease targets 2025			
		1	2	3	4	5	6	1	4	6	7
E. Vitamin A supplementation											
	High-dose vitamin A supplementation for infants and children aged 6–59 months	x									
F. Iodine supplementation											
	Iodine supplementation (or iodine-fortified complementary food) for infants and young children aged 6–23 months										
G. Zinc supplementation in the management of diarrhoea											
	Zinc supplementation with increased fluids and continued feeding for management of diarrhoea in children	x									
3. Adolescents											
A. Iron-containing micronutrient supplementation											
	Intermittent iron and folic acid supplementation for menstruating non-pregnant adolescent girls		x								
	Daily iron supplementation for menstruating non-pregnant adolescent girls		x								
4. Adults											
A. Nutritional care of women during pregnancy and postpartum											
	Nutritional counselling on healthy diet to reduce the risk of low birth weight	x	x	x			x				
	Energy and protein dietary supplements for pregnant women in undernourished populations	x	x	x			x				
	High-protein supplementation is not recommended										
	Daily iron and folic acid supplementation for pregnant women	x	x	x			x				
	Intermittent iron and folic acid supplementation for pregnant women	x	x	x			x				
	Vitamin A supplementation for pregnant women	x	x	x			x				
	Calcium supplementation for pregnant women to reduce the risk of pre-eclampsia									x	
	Vitamin B_6 (pyridoxine) supplementation is not recommended										

Actions	Interventions	Stunting	Anaemia	Low birth weight	Children overweight	Exclusive breastfeeding	Wasting	premature mortality	Salt intake	Raised blood pressure	Diabetes and obesity
		Global nutrition targets 2025						Global noncommunicable disease targets 2025			
		1	2	3	4	5	6	1	4	6	7
	Vitamin C and E supplementation is not recommended										
	Vitamin D supplementation is not recommended										
	Routine use of multiple micronutrient powders during pregnancy is not recommended as an alternative to standard iron and folic acid supplementation										
	Zinc supplementation is only recommended for pregnant women in the context of rigorous research										
	Multiple micronutrient supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes										
	Multiple micronutrient supplements that contain iron and folic acid may be considered for maternal health		x	x							
	Vitamin A supplementation for postpartum women is not recommended for the prevention of maternal and infant morbidity and mortality										
	Oral iron supplementation, either alone or in combination with folic acid		x								
B. Iron-containing micronutrient supplementation											
	Intermittent iron and folic acid supplementation for non-pregnant women (15–49 years)		x								
	Daily iron supplementation for non-pregnant women (15–49 years)		x								
C. Iodine supplementation											
	Iodine supplementation for non-pregnant women (15–49 years) and pregnant women										
5. Older persons											
A. Nutritional care for at-risk older persons											
	Oral supplemental nutrition with dietary advice for older people affected by undernutrition										

Actions	Interventions	Stunting	Anaemia	Low birth weight	Children overweight	Exclusive breastfeeding	Wasting	premature mortality	Salt intake	Raised blood pressure	Diabetes and obesity
		Global nutrition targets 2025						Global noncommunicable disease targets 2025			
		1	2	3	4	5	6	1	4	6	7
6. Specific conditions											
A. Nutritional care for persons living with HIV											
	Ensure optimal infant and young child feeding in the context of HIV	x			x	x	x				x
	Nutritional care for infants and children aged 6 months to 14 years living with HIV	x			x		x				x
	Vitamin A supplementation in pregnant women living with HIV is not recommended for reducing the risk of mother-to-child transmission of HIV										
B. Nutritional care for persons with tuberculosis											
	Nutritional assessment and counselling for persons with active tuberculosis						x				
	Nutritional assessment, counselling and management for pregnant women with active tuberculosis						x				
	Nutritional assessment, counselling and management for persons with active tuberculosis and moderate undernutrition						x				
	Nutritional assessment, counselling and management for persons with active tuberculosis and severe undernutrition						x				
	Ensure optimal infant feeding of infants of mothers infected with tuberculosis	x			x	x	x				x
C. Preventive chemotherapy for the control of soil-transmitted helminth infection (deworming)											
	Preventive deworming for children aged 12 months and older										
	Preventive deworming for non-pregnant women (15–49 years)										
	Preventive deworming for pregnant women after the first trimester										
D. Nutritional care for persons with Ebola virus disease											
	Optimal feeding of infants of mothers with Ebola virus disease	x			x	x	x				x
	Feeding protocols for adults and children older than 6 months with Ebola virus disease	x			x		x				x

Actions	Interventions	Stunting	Anaemia	Low birth weight	Children overweight	Exclusive breastfeeding	Wasting	premature mortality	Salt intake	Raised blood pressure	Diabetes and obesity
		Global nutrition targets 2025						Global noncommunicable disease targets 2025			
		1	2	3	4	5	6	1	4	6	7
E. Nutritional care for persons with viral haemorrhagic disease (including Ebola, Marburg, Lassa and Crimean-Congo haemorrhagic fever)											
	Optimal feeding of infants of mothers with viral haemorrhagic diseases (including Ebola, Marburg, Lassa and Crimean-Congo haemorrhagic fever)	x			x	x	x				x
	Feeding protocols for adults and children older than 6 months with viral haemorrhagic disease (including Ebola, Marburg, Lassa and Crimean-Congo haemorrhagic fever)	x			x		x				x
F. Nutritional care for infants in the context of Zika virus transmission											
	Optimal infant feeding in areas of Zika virus transmission	x			x	x	x				x
G. Feeding of infants of mothers who are carriers of chronic hepatitis B											
	Optimal feeding of infants of mothers who are carriers of chronic hepatitis B	x			x	x	x				x
H. Feeding of infants in settings with an ongoing pandemic of influenza A (H1N1) virus transmission											
	Optimal infant feeding in areas of pandemic influenza A (H1N1) virus transmission	x			x	x	x				x
I. Vitamin A supplementation for infants and children with measles											
	Vitamin A supplementation for infants and children with measles										
III. NUTRITION IN EMERGENCIES											
A. Infant and young child feeding in emergencies											
	Optimal infant and young child feeding in emergencies	x			x	x	x				x
	Ensure appropriate complementary food and micronutrient supplementation for infants and children affected by an emergency	x			x		x				x
B. Preventing and controlling micronutrient deficiencies in emergencies											
	Nutritional support and micronutrient supplementation for pregnant and lactating women affected by an emergency	x	x	x			x				

Nutrition is a key determinant of healthier populations, and malnutrition in all its forms is a key risk factor, with serious impact on morbidity and human capital across the life-course



UNITED NATIONS DECADE OF
ACTION ON NUTRITION
2016-2025

For more information, please contact:
Department of Nutrition for Health and Development
World Health Organization

Avenue Appia 20, CH-1211 Geneva 27,
Switzerland

Email: nutrition@who.int
www.who.int/nutrition

World Health Organization

ISBN 978924151585-6