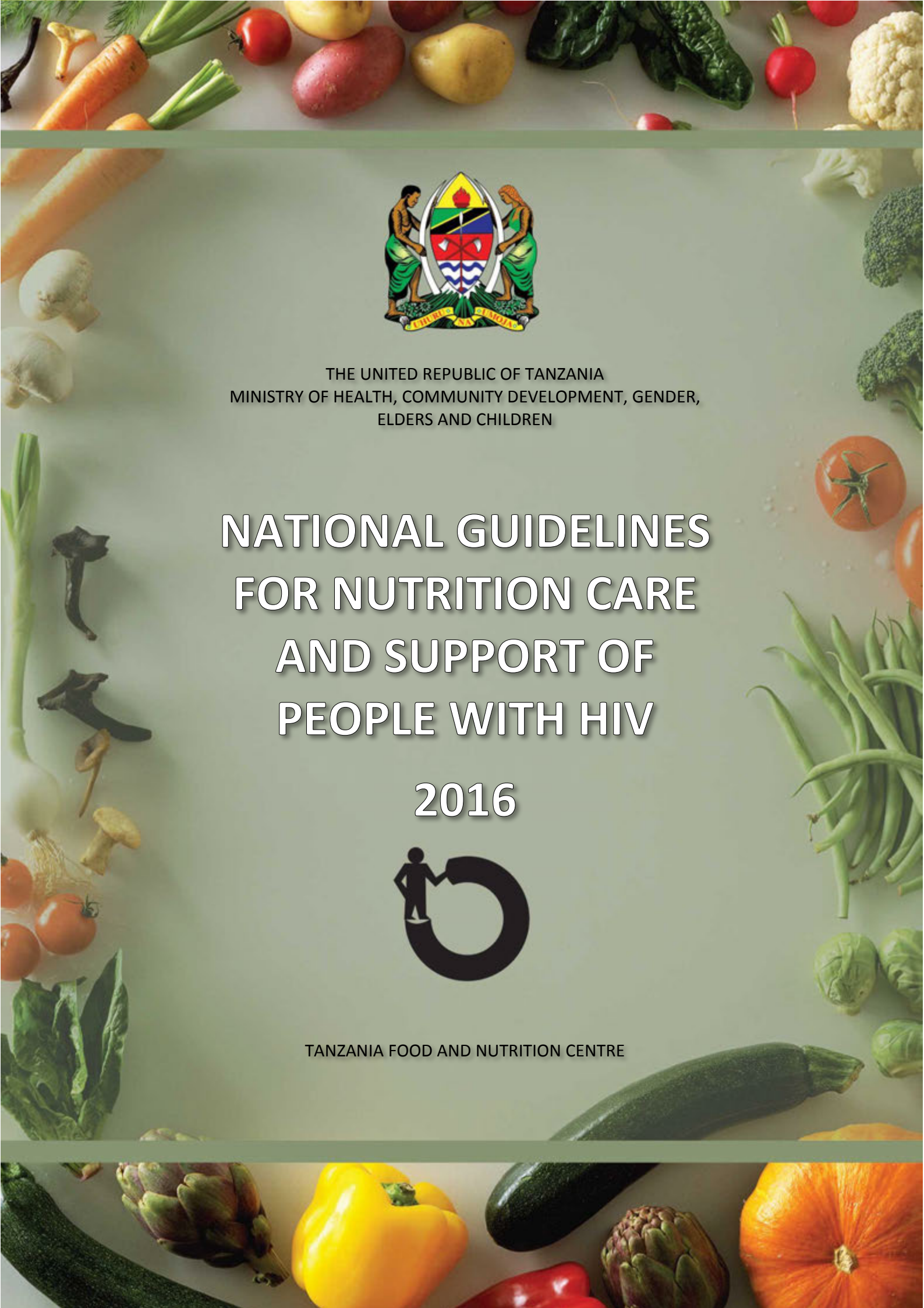

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF HEALTH, COMMUNITY DEVELOPMENT, GENDER,
ELDERS AND CHILDREN

NATIONAL GUIDELINES FOR NUTRITION CARE AND SUPPORT OF PEOPLE WITH HIV

2016

TANZANIA FOOD AND NUTRITION CENTRE

National Guidelines for Nutrition Care and Support of People with HIV

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TFNC is a government institution under the Ministry of Health, Community Development, Gender, Elders and Children, established by Act of Parliament Number 24 of 1973. It is a semiautonomous institution whose authority is a Governing Board representing ministries/sectors that are stakeholders in the national effort to eliminate malnutrition.

NATIONAL GUIDELINES FOR NUTRITION CARE AND SUPPORT OF PEOPLE WITH HIV

2016

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Preface

HIV continues to be a major health problem in Tanzania. Based on the Tanzania HIV/AIDS and Malaria Indicator Survey 2011/12, HIV prevalence in people 15–49 years of age was 5.1 percent in 2012. Individuals, families and communities experience the devastating impact of HIV infection. AIDS is a major cause of morbidity and mortality in all sectors and at all levels and deprives the nation of its young and productive people.

Various efforts have been undertaken by stakeholders from various sectors to address the epidemic. Such efforts include services for provider-initiated HIV counselling and testing (PICT), prevention of mother-to-child transmission of HIV (PMTCT) and home-based care. HIV care and treatment centres and Reproductive and Child Health Services provide most of these services. Efforts have been directed toward changing behaviour to prevent HIV transmission, treating opportunistic infections and providing antiretroviral therapy (ART) to prolong the lives of people with HIV, improve their quality of life and mitigate the socio-economic impact of the epidemic.

Good nutrition is a key component of care and support for people with HIV. Good nutrition helps strengthen the immune system and thus decrease vulnerability to opportunistic infections. This, in turn, improves quality of life and delays the progression of HIV to AIDS. Maintaining good nutrition also helps increase the effectiveness of antiretroviral therapy and adherence to medication regimens. It is therefore important to ensure that people with HIV receive proper nutritional care and support.

The integration of nutrition assessment, counselling and support (NACS) into routine HIV services requires the support of the government, nongovernmental organisations, development partners, community-based organisations, communities and the private sector. Leaders and decision-makers at various levels need to be committed to this course of action.

These guidelines highlight the principles of nutritional management of HIV. They are a useful reference for health care facilities and other groups and individuals that provide HIV care and support services. The public, too, will find the guidelines useful.

Mpoki

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Finally, we would like to acknowledge the tireless work of TFNC in compiling material and coordinating the process that led to the production of these guidelines.

Prof. Muhammad Bakari Kambi
Chief Medical Officer

Abbreviations and Acronyms

µg	Microgram(s)
AIDS	Acquired immune deficiency syndrome
ART	Antiretroviral therapy
ARV	Antiretroviral medication
AUC	Area under the plasma concentration-time curve
BMI	Body mass index
CDC	U.S. Centers for Disease Control and Prevention
cm	Centimetre(s)
CMV	Cytomegalovirus
COUNSENUTH	Centre for Counselling on Nutrition and Health
CTC	HIV care and treatment centre
FANTA	Food and Nutrition Technical Assistance Project
FAO	Food and Agriculture Organization of the United Nations
FBF	Fortified-blended food
g	Gram(s)
GMP	Growth monitoring and promotion
HAART	Highly active ART
HBC	Home-based care
HIV	Human immunodeficiency virus
IMAM	Integrated Management of Acute Malnutrition
IU	International unit
kcal	Kilocalorie(s)
LDL	Low-density lipoprotein
M&E	Monitoring and evaluation
MAM	Moderate acute malnutrition
mg	Milligram(s)
MOHCDGEC	Ministry of Health, Community Development, Gender, Elders and Children
MUAC	Mid-upper arm circumference
NACP	National AIDS Control Programme
NGO	Nongovernmental organisation
MVC	Most vulnerable child(ren)

PMTCT	Prevention of mother-to-child transmission of HIV
RCHS	Reproductive and Child Health Services
RDA	Recommended dietary allowance
RUTF	Ready-to-use therapeutic food
SAM	Severe acute malnutrition
STI	Sexually transmitted infection
TACAIDS	Tanzania Commission for AIDS
TB	Tuberculosis
TDHS	Tanzania Demographic and Health Survey
TFNC	Tanzania Food and Nutrition Centre
THMIS	Tanzania HIV and Malaria Indicator Survey
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNICEF	United Nations Children´s Fund
WAZ	Weight-for-age z-score
WHO	World Health Organisation
WHZ	Weight-for-height z-score

Glossary

AIDS	A group of illnesses caused by HIV that weaken the immune system; the last and most severe stage of the clinical spectrum of HIV-related diseases
Antioxidant	A substance (e.g., vitamin E, vitamin C, zinc, selenium) that prevents and repairs cell damage caused by free radicals (by-products of the body's use of oxygen)
Antiretroviral	A medication used for HIV prophylaxis or treatment (not a cure)
Balanced diet	A diet containing a variety of foods in proportions that are sufficient to meet the body's nutritional needs
Bioavailability	The degree to which a nutrient is absorbed or becomes available after intake
Body mass index	A statistical measure of the body based on weight and height, calculated by dividing weight in kilograms (kg) by height in metres (m) squared, or (kg/m^2)
Calorie	A measurement of the energy content of food. A calorie is the amount of energy needed to increase the temperature of 1 g of water by 1^o Celsius. Calories are so small that they are expressed in 1,000 calorie units known as kilocalories (kcal)
CD4 cells	Specialised white blood cells which signal to other cells in the immune system to protect the body from bacteria or viruses. HIV attacks these types of cells and uses them to make more copies of HIV, weakening the immune system and making it unable to protect the body from illness and infection.
CD4 count	The number of CD4 cells in a cubic millilitre of blood
Complementary feeding	Feeding a child semi-solid or solid foods in addition to breast milk from the sixth month of life until the child is fully weaned
Continuum of care	An integrated system of care that follows client over time through health services from the health facility to the community and home
Diet	The amount and kind of food and drink a person consumes day to day

Dietary fibre	The non-digestible carbohydrates and lignin found in plants that facilitate emptying of the bowel
Enzyme	A chemical substance that speeds up or slows down the rate of a chemical reaction without being altered in the process
Exclusive breastfeeding	Feeding an infant only breast milk and no other liquids or solids, not even water, for the first 6 months of life
Fermentation	Subjecting foods to processing involving the action of bacteria, for example yoghurt, *togwa* and fermented porridge
HIV	Human immunodeficiency virus, a retrovirus which infects human cells and uses nutrients and energy in the cells to grow, damaging the immune system
Lactation	The process of producing and secreting breast milk
Lactic acidaemia	Acidosis caused by accumulation of lactic acid more rapidly than it can be metabolised. It may occur spontaneously or in association with diseases such as diabetes mellitus, leukaemia or liver failure
Lactic acidosis	A condition caused by build-up of lactic acid in the body, leading to acidification of blood. This is a side effect of nucleoside analogue reverse transcriptase inhibitors (NRTIs).
Legumes	Also known as pulses, plants (e.g., beans and peas) which are high in protein and contain many of the essential amino acids
Macronutrients	Nutrients needed in large amounts for proper body functioning, including carbohydrates, protein and fats
Malabsorption	Failure of the digestive tract to absorb nutrients into the body
Malnutrition	The result of food intake that does not meet the body's needs, either inadequate intake (resulting in **undernutrition**) or excess intake (resulting in **overnutrition**)
Meal	Food served or eaten at a given time during the day (e.g., breakfast, lunch, supper)
Metabolism	The continuous physical and chemical processes taking place in living cells, including the release of energy from food

Micronutrients	Nutrients needed in small amounts for proper body functioning, including vitamins and minerals
Mixed feeding	Feeding an infant under 6 months breast milk along with other foods or liquids
Mortality rate	The ratio of the total number of deaths to the total population in an area over a specified time, often expressed as the number of deaths per 1,000 people per year
Nutrient	A chemical substance or component in food that is released during digestion and helps maintain, repair or build body tissues and regulate body functions
Nutrition	The intake of food and drink and the chemical and physical processes that break down food and release nutrients needed for development, growth, energy, reproduction, immunity, warmth, movement, work and cell maintenance, replacement and repair
Nutritional status	A measurement of the extent to which a person's physiological needs for nutrients are met
Nutritional supplements	Products containing vitamins, minerals, herbs, amino acids or other substances such as enzymes, organ tissues, metabolites, extracts or concentrates
Opportunistic infection	An infection which takes advantage of weakness in the immune system. People with HIV are vulnerable to opportunistic infections as tuberculosis, bacterial pneumonia, candidiasis, herpes simplex and Kaposi's sarcoma.
Replacement feeding	Feeding an infant who is not breastfed either breast milk substitutes (including infant formula) or other milk products, foods or beverages which are marketed or otherwise represented to be suitable for infants as a partial or total replacement for breast milk
Snack	A small quantity of food which is readily available, can be eaten without much preparation and is usually eaten between meals
Specialised food products	Products specially formulated to treat malnutrition, including ready-to-use therapeutic food (RUTF) to treat severe malnutrition and fortified-blended foods (FBF) to treat moderate malnutrition. These are prescribed by medical specialists and are not for general consumption.

Vertical transmission	Transmission of HIV from an HIV-positive mother to her infant during labour, delivery or breastfeeding
Viral load	The amount of HIV in the blood. The higher the viral load, the higher the risk of disease progression to AIDS.

Chapter 1. HIV and Nutrition Situation in Tanzania

HIV remains the greatest threat to health and socio-economic development and the leading cause of death among young people in Tanzania. The Tanzania Health and Malaria Indicator Survey (THMIS) Report 2011/12 reported that 5.1 percent of Tanzanians 15-49 years of age were HIV positive, a decline from 5.7 percent in 2007/08. HIV prevalence was higher in urban areas (7 percent) than in rural areas (4 percent) and higher in the Tanzania mainland (5 percent) than in Zanzibar (1 percent). Mother-to-child transmission accounted for an estimated 18 percent of all new infections. HIV incidence and prevalence have declined and stabilized, but there is still wide variation among regions and across social and age groups. According to the Tanzania Commission for AIDS (TACAIDS, 2014), the predominant mode of HIV transmission in 2013 was unprotected heterosexual sex, accounting for 80 percent of all infections. Of the 78,843 new HIV infections in 2013, 45.1 percent were among males and 54.9 percent among females. HIV prevalence has generally remained disproportionally higher among women in all age groups than in men.

Major nutrition problems in Tanzania are stunting, wasting, underweight, iron deficiency anaemia, iodine deficiency disorders and vitamin A deficiency. These problems affect mainly children under 5 and pregnant and lactating women.

The 2014 National Nutrition Survey (NNS) found that 34.7 percent of children under 5 were stunted, 0.9 percent were severely malnourished and 13.4 percent were underweight. About 72 percent of children under 5 had received vitamin A supplementation in the six months before the survey and 70.6 percent had received deworming. The survey found that 98.4 percent of children 0–23 months of age had ever been breastfed and 50.8 percent had been breastfed within 1 hour of birth, but less than 42 percent of infants under 6 months of age had been exclusively breastfed (less than 20 percent in Zanzibar). Nationally, 89.5 percent of children received timely complementary feeding from 6–8 months of age, but only 24.5 percent of children 6–23 months of age received foods from four or more of the five food groups and only 20 percent received a minimum acceptable diet. All forms of malnutrition were high during the first 2 years of life. Among women 15–49 years of age, 5.5 percent were underweight, 20 percent were overweight and 9.7 percent were obese. Less than one-third (30.9 percent) had not taken iron-folic acid during pregnancy. At the national level, 62.2 percent used iodized salt, and only 11.7 reported using soap for handwashing at least at two critical times during the previous 24 hours.

The 2010 Tanzania Demographic and Health Survey (TDHS) showed that 60.8 percent of children under 5 were covered with vitamin A supplementation, but 33.0 percent of children in this age group had vitamin A deficiency. Anaemia affects all population groups, especially women and children. The TDHS 2010 found that 40 percent of women of reproductive age were anaemic. UNICEF (nd) estimates that about one-third of women 15−49 years are deficient in iron, vitamin A and iodine. Fortification of salt with iodine is the most common method of preventing iodine deficiency. The TDHS 2010 reported that 80 percent of children in urban areas and 49 percent in rural areas lived in households that used adequately iodised salt.

1.1. Government Response to HIV and Nutrition

The commitment of the Government of the Republic of Tanzania to the fight against HIV is shown in the following milestones:

- National Guidelines for Nutrition Care and Support for People Living with HIV (2003 and 2009)
- Health Sector HIV/AIDS Strategic Plan (2013)
- Health Sector Strategy on HIV and AIDS (HSHS III) 2013–2017/18)
- National Multi-sectoral Strategic Framework (2013/14–2017/18)

The national response to HIV has included the establishment of the following institutions, programmes and services for coordination and implementation of HIV mitigation actions:

- Tanzania Commission for AIDS (TACAIDS)
- National AIDS Control Programme (NACP)
- Care and treatment clinics (CTCs)
- Paediatric AIDS services
- Prevention of mother-to-child transmission of HIV (PMTCT) services
- Elimination of mother-to-child transmission of HIV (eMTCT) services

Other actions include:

- Nationwide HIV prevention campaigns
- HIV counselling and testing (HCT) services
- Treatment of sexually transmitted infections (STIs)
- Actions against stigma and discrimination
- Dispensing of antiretroviral medications (ARVs)
- Treatment of opportunistic infections

HIV interventions and mitigation strategies and approaches require the participation of all government ministries, the private sector, religious groups and civil society. The Health Sector HIV and AIDS Strategic Plan (HSHSP, 2013–17), a subset of the Health Sector Strategic Plan III and the National Multisector Strategic Plan III, is designed to support universal access to HIV prevention, care, treatment and support. Scaling up antiretroviral therapy (ART) has been a major part of the national strategy since 2005. In 2012, the estimated ART coverage was 68 percent.[1] The Ministry of Health, Community Development, Gender, Elders and Children (MOHCDGEC) provides HIV services in coordination with the NACP and through the delivery of TB, nutrition and Reproductive and Child Health Services (RCHS).

The National HIV/AIDS Council Strategic Framework 2011–2015 highlights the importance of promoting appropriate nutrition and positive living actions as core

[1] http://www.cdc.gov/globalaids/global-hiv-aids-at-cdc/countries/tanzania/default.html

interventions in the care and treatment of people with HIV. Nutrition care and support has been integrated into all national HIV policy documents, guidelines and programmes, including HIV care and treatment (HCT), PMTCT, home-based care (HBC) and monitoring and reporting of the health sector response to HIV.

1.2. National Guidelines for Nutrition Care and Support of People with HIV

These guidelines were developed to assist all stakeholders in implementing nutrition-related interventions for people with HIV. Since the second edition in 2009, the HIV environment has changed significantly. HIV prevalence has decreased, but more people are living with HIV and are on ART. Treatment can cause side effects that affect food intake. The effects of long-term ART on nutritional status have emerged, requiring updated guidance.

Efforts to improve nutrition in the country have also evolved. They include the SUN Movement, National Development Vision 2025, National Nutrition Strategy 2011/12-2015/16 and other nationwide strategies and efforts to improve the nutritional status of people with HIV.

The 2016 edition of the National Guidelines for Nutrition Care and Support of People with HIV includes updated global and national guidance as well as references to more recent publications.

The purpose of the guidelines review was to provide appropriate, consistent and up-to-date information on nutrition care for people with HIV and to harmonise nutrition programming and support services. The objectives of the guidelines are to provide:

1. Harmonized guidance for nutrition care and support for people with HIV in different age groups, sectors, agencies and communities
2. A framework for planning, implementation and monitoring and evaluation of nutrition care and support for people with HIV
3. Knowledge and skills to help front-line service providers deliver quality nutrition care and support for people with HIV
4. Guidance on continuum of care for malnourished people with HIV at both the health facility and community levels

1.3. Use of the Guidelines

These guidelines target policy makers, programme managers, counsellors, service providers, caregivers, journalists, communication specialists and trainers in the HTC, PMTCT, HBC and RCHS programmes. They can also be used to develop messages for behaviour change at various levels, as well as in monitoring and evaluation of nutrition components of HIV services.

Details on specific topics can be found in other national guidelines from the MOHCDGEC, TFNC or TACAIDS. Efforts to manage malnutrition in people with HIV

should go hand in hand with efforts to curb the underlying causes of malnutrition and prevent the spread of HIV.

Any adaptation should be done with the collaboration and consent of the MOHCDGEC and TFNC.

The guidelines are divided into 10 chapters, followed by references and annexes.

- Chapter 1 introduces the HIV and nutrition situation in Tanzania.
- Chapter 2 gives an overview of the relationship between nutrition and HIV.
- Chapter 3 explains the energy and nutrient requirements for people with and without HIV.
- Chapter 4 describes recommended nutrition interventions for adolescents and adults with HIV.
- Chapter 5 describes recommended nutrition interventions for infants and young children born to HIV-positive mothers and for HIV-affected children.
- Chapter 6 explains how to manage interactions between antiretroviral medications and food.
- Chapter 7 explains how to manage HIV-related symptoms through diet.
- Chapter 8 covers the important issue of food and water safety and hygiene for people with HIV with weakened immune systems.
- Chapter 9 discusses continuum of care between clinical services and communities to ensure comprehensive care and support for malnourished people with HIV.
- The final chapter (10) discusses monitoring and evaluation (M&E) of the use of these guidelines.

Chapter 2. Relationship between Nutrition and HIV

The human immunodeficiency virus (HIV) is a retrovirus that attacks the immune system and impairs the body's ability to fight infection. Some people with HIV do not show symptoms or become ill for years. This phase of the disease is called the asymptomatic phase. During the asymptomatic phase, the immune system becomes progressively weaker and other viruses and bacteria can take advantage of the 'opportunity' presented by the weakened immune system to cause other illnesses such as pneumonia or tuberculosis (TB). These opportunistic infections (OIs) are a clear indication of a weakened immune system. Once OIs are evident, a person is said to have acquired immune deficiency syndrome (AIDS), which is the end-stage of HIV infection. The relationship between nutrition and HIV is described below.

2.1. Effects of HIV on Nutrition

HIV affects nutritional status early in the course of the infection, even before other symptoms appear. HIV has direct and indirect effects on nutrition. The **direct effects** of HIV on nutrition are increased energy requirements, reduced food intake and poor absorption of nutrients.

Increased energy needs. When a person is infected with HIV, the immune system becomes highly active, depleting energy stores. HIV also alters metabolism (the way the body processes and uses nutrients), further increasing energy needs.

Reduced food intake. Despite their increased energy needs, people with HIV may not be able to eat enough nutritious food to stay healthy because of symptoms of HIV. These symptoms, including mouth or throat sores, fever and side effects of medications such as nausea, vomiting, depression and fatigue, which may cause loss of appetite.

Poor nutrient absorption. HIV and OIs damage the lining of the gastrointestinal tract, which interferes with nutrient absorption. As a result, the body cannot digest and use food properly, leading to wasting. Vomiting and diarrhoea caused by OIs also affect nutrient absorption and cause nutrient loss. HIV and inflammation lead to dysregulation of cytokines (small proteins that are important for fighting infection) and disturbance of the antioxidant defence system (oxidative stress), which also increase energy needs.

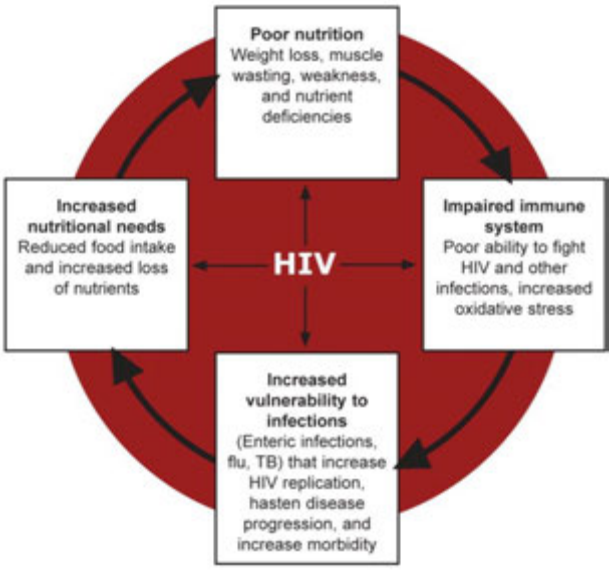
HIV has negative **indirect effects** on nutrition by making people with HIV too weak or ill to work, grow food, shop or cook nutritious meals. Savings and other assets may be depleted by health care costs. HIV-affected children may have to drop out of school to take care of sick family members or earn income for their households, reducing their future earning potential.

Figure 1 shows how malnutrition and HIV aggravate each other in a vicious cycle.

1. HIV attacks and destroys the cells of the immune system, weakening its ability to fight HIV and other infections.

2. A weak immune system allows HIV replication to increase and HIV to progress faster to AIDS.
3. HIV increases energy needs, but HIV and OIs reduce appetite, decrease nutrient absorption and make the body use nutrients faster than usual to fight infection.
4. This leads to malnutrition, which makes the body more vulnerable to infections, and the cycle continues.

Figure 1. Vicious cycle of malnutrition and HIV



Source: Food and Agriculture Organization of the United Nations (FAO). 2002. *Living Well with HIV/AIDS: A Manual on Nutritional Care and Support for People Living with HIV/AIDS*. Rome.

This cycle usually contributes to weight loss and wasting in adult AIDS patients. Decreased food intake is the most important cause of malnutrition and wasting. Other causes are malabsorption of nutrients and changes in metabolism.

If the vicious cycle is not broken, immune function and clinical status continue to deteriorate, contributing to repeated illness and eventual death.

2.2. Effects of Nutrition on HIV

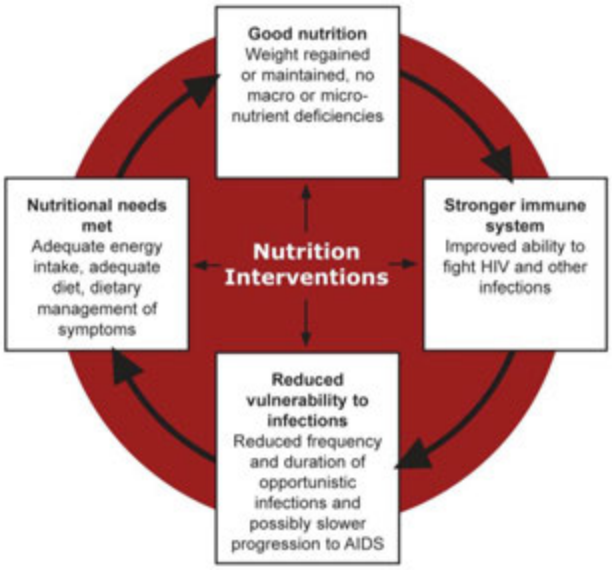
Progression from HIV to AIDS depends on health and nutritional status before and during HIV infection. Good health and nutrition can help delay the progression and improve quality of life. This is why nutrition care and support are an important part of HIV care and treatment. Good nutrition helps prevent malnutrition and wasting, strengthens the body's ability to fight OIs and improves the effectiveness of ART.

Figure 2 shows the relationship between good nutrition and HIV.

1. Good nutrition helps people with HIV regain or maintain healthy weight and strengthens the immune system.
2. A stronger immune system is better able to fight HIV and other infections.

3. Fewer infections mean better appetite, better nutrient absorption and utilisation and adequate energy intake, and the cycle continues.

Figure 2. The benefits of good nutrition for people with HIV



Source: FAO. 2002. *Living Well with HIV/AIDS: A Manual on Nutritional Care and Support for People Living with HIV/AIDS*. Rome.

It is important to identify and treat malnutrition promptly in people with HIV. Timely improvement of nutritional status can help strengthen the immune system, prevent weight loss and delay progression of HIV to AIDS.

Chapter 3. Nutritional Requirements of People with HIV

Nutritional needs depend on age, physiological conditions such as pregnancy and breastfeeding, infection and level of activity. Most people with HIV lose weight, and weight loss is associated with mortality in people with HIV. Adequate nutrition at all times is important to prevent weight loss, fight infection and build and maintain muscle mass.

Opportunistic infections, anxiety and stress about HIV infection and its consequences further weaken the already compromised immune system of people with HIV, requiring increased immune-boosting nutrients. When the body fails to get enough energy and nutrients from food, it turns to fat, protein and carbohydrate reserves stored in the body. Protein loss results in breakdown of muscle tissue, weight loss and wasting.

Food contains the nutrients that the body needs for:

- Developing; growing; and maintaining, replacing and repairing cells and tissues
- Resisting and fighting infection
- Producing energy, warmth, movement and work

The nutrients the body needs to function properly are carbohydrates, protein, fats, vitamins and minerals. Some of these nutrients (carbohydrates, proteins and fats) are needed in large amounts. These are referred to as **macronutrients**. Others (vitamins and minerals) are needed in smaller amounts and are referred to as **micronutrients**. Adequate amounts of water are also needed to remove toxins and enhance the body's function.

3.1. Energy Requirements

Energy requirements depend on age, physiological condition such as pregnancy and breastfeeding, level of activity and the presence of infections. The World Health Organisation (WHO) recommends that people with HIV consume more energy to meet the increased nutritional needs resulting from HIV, opportunistic infections and the metabolic changes caused by HIV. Energy requirements vary based on the stage of the infection (viral load). HIV-positive children or adults with no symptoms (asymptomatic) need to consume **10 percent** more energy than healthy HIV-negative children or adults of the same age, sex and physical activity. HIV-positive children or adults with symptoms (symptomatic) need to consume **20–30 percent** more energy than healthy HIV-negative children or adults of the same age, sex and physical activity. HIV-positive children who are losing weight needs to consume **50–100 percent** more energy (WHO 2009b). Table 1 summarises the energy requirements for healthy and HIV-positive children, adolescents and adults.

Table 1. Daily energy requirements of people with HIV (kcal/day)

Age group	Healthy	HIV positive		
		Asymptomatic	Symptomatic	If losing weight (children)
Children				
		10% more energy	20% more energy (20–30% for children)	50–100% more energy
6–11 months	680	760	830	150–200 kcal/kg of body weight/day
12–23 months	900	990	1,080	150–200 kcal/kg of body weight/day
2–5 years	1,260	1,390	1,510	150–200 kcal/kg of body weight/day
6–9 years	1,650	1,815	1,980	75–100 kcal/kg of body weight/day
10 to 14 years	2,020	2,220	2,420	60–90 kcal/kg of body weight/day
15 to 17 years	2,800	3,080	3,360	—
Adults				
Men and non-pregnant/ lactating women	2,000–2,580	2,200–2,838	2,400–3,612	—
Pregnant/lactating women	2,460–2,570	2706–2,829	3,444–3,961	

Source: Adapted from WHO. 2009b. *Nutritional Care and Support for People Living with HIV/AIDS: A Training Course. Participant's Manual*. Geneva: WHO.

3.2. Protein Requirements

The human protein requirement is 12–15 percent of energy intake per day. The recommended dietary allowance (RDA) for protein for healthy adults is 0.8 g per kg of ideal body weight per day. The RDA increases by 30 g of protein per day during pregnancy and 20 g per day during lactation (WHO et al. 2007). Below are the protein requirements per kg of body weight for different groups:

- 1.50 g per kg of body weight per day for infants
- 1.10 g per kg of body weight per day for children 1–3 years
- 0.95 g per kg of body weight per day for children 4–13 years
- 0.85 g per kg of body weight per day for adolescents 14–18 years
- 0.80 g per kg of body weight per day for adults
- 1.10 g per kg of body weight per day for pregnant women (using pre-pregnancy weight) and lactating women

According to WHO (2003), people with HIV should consume the same proportion of protein in their diet as HIV-negative people of the same age, sex and physical activity level. However, the amount of protein that people with HIV consume as part of their increased energy intake may also increase. If energy intake is insufficient, the body uses protein to provide energy. This means that less protein is available to maintain muscle tissue, strengthen the immune system and (in children) nurture growth and development. People with HIV need adequate energy intake at all times, especially during infections and symptomatic periods of HIV, so that their bodies can use protein to build or maintain their lean muscle and strengthen their immune systems. Combining sources of protein (meat, dairy and legumes) helps ensure adequate intake of essential amino acids, which maintain body cell functions.

3.3. Fat Requirements

Dietary fat is a good source of essential fatty acids and concentrated energy. People with HIV LHIV without fat malabsorption or diarrhoea can consume fat to help meet their increased energy needs. The recommended fat intake for a healthy adult is 20–35 percent of total calories, with less than 10 percent from saturated fats and 6–10 percent from polyunsaturated fats. WHO (2003) does not recommend that people with HIV eat a higher percentage of fat in their total diet than healthy HIV-negative people. However, the amount of fat they need to maintain the proportion of energy derived from fat will increase proportionally with increased energy intake. People on ART or with persistent diarrhoea may need to eat less fat.

3.4. Micronutrient (Vitamin and Mineral) Requirements

Many vitamins and minerals are important for people with HIV because of their role in immune system functioning. HIV causes the body to release pro-oxidant cytokines and other reactive oxygen species that increase utilisation of the antioxidant vitamins A, C and E as well as B_6 and B_{12} folic acid and the minerals that form antioxidant enzymes (zinc, selenium, iron, manganese, copper), depleting the body of nutrients that prevent tissue damage and help fight infections. This increase in pro-oxidants (referred to as ´oxidative stress´) is thought to increase the rate of HIV replication and viral load.

WHO does not recommend that people with HIV consume more micronutrients than the recommended dietary allowance (RDA). Annex 2 shows daily micronutrient requirements for adolescents, adults and children.

Eating a variety of foods from all food groups is the best way to ensure adequate intake of vitamins and minerals. Annex 1 lists the functions and food sources of macronutrients and micronutrients and consequences of deficiencies. Annex 2 lists micronutrient requirements.

If vulnerable groups such as children and pregnant and lactating women cannot consume enough vitamins and minerals through diet, they may need multiple micronutrient supplements. Correcting vitamin and mineral deficiencies may help

slow disease progression from HIV to AIDS, but results from several studies raise concerns that some micronutrient supplements (vitamin A, zinc and iron) may speed up disease progression rather than improving the immune system.

3.5. Healthy Eating for People with HIV

A healthy diet means eating a variety of food from all the main food groups below to ensure the body gets the nutrients it needs to stay strong and fight infections.

1. **Cereals, green bananas, roots and tubers** (carbohydrates for energy). Examples: maize, rice, millet, cassava, taro *(magimbi)*, white potatoes, yams, sweet potatoes

2. **Pulses, nuts and animal-source food** (protein for building and repairing cells and tissues). Examples: Beans, peas, groundnuts, cashew nuts, meat, fish, eggs, milk, sardines and insects (*senene* and *kumbikumbi*)

3. **Fruit** (vitamins and minerals to strengthen the immune system). Examples: Pawpaw, mangoes, oranges, pineapple and baobab fruit, *mabungo* and *ukwaju*)

4. **Vegetables** (vitamins and minerals to strengthen the immune system). Examples are amaranth, sweet potato leaves, cassava leaves, pumpkin leaves, okra, pumpkins, tomatoes, *mlenda, mchunga, figiri* and *mwidu.*

5. **Sugar, honey, fats and oil** (energy, flavour, absorption of fat-soluble vitamins A, D, E and K; eat in small amounts). Examples: Butter, ghee, coconut oil, sunflower oil, palm oil; sugar and honey

High intake of sugar, fat and salt is associated with increased risk of chronic non-communicable diseases including diabetes, coronary heart disease and hypertension. These foods should be eaten in moderation.

Other important food substances are dietary **fibre** and **water**. Dietary fibre is a component of food that cannot be broken down fully by digestive enzymes. Food high in dietary fibre enhances bowel function and can prevent and treat constipation. Dietary fibre is associated with preventing cancer of the large intestine. Good sources of dietary fibre are fruits, vegetables, legumes and unprocessed cereals.

Water is an essential component of the diet, important to transport nutrients and remove body wastes and toxins. Water helps metabolic activities of all cells, lubricates moving parts of the body and helps regulate body temperature.

Box 1. Ways for people with HIV to ensure a healthy diet.

1. Eat high-energy foods such as avocado, groundnuts, sugar cane, honey and margarine and add fats or oils to food in moderation.
2. Eat frequently throughout the day in small meals to maximise energy intake, especially if appetite is a problem.
3. Include foods from all the food groups in each meal.
4. Eat snacks of fruits, cooked or roasted groundnuts or porridge at least twice a day to increase energy and nutrient intake.
5. Eat fermented foods such as *togwa* or yoghurt to improve taste and prevent the growth of diarrhoea-causing germs.
6. Eat germinated foods to activate proteins and essential fatty acids.
7. Eat fortified foods such as vitamin A-fortified household sugar and iodised salt to improve micronutrient intake.
8. Eat locally available, affordable foods that are easy to prepare and provide essential nutrients. Unrefined and unprocessed foods are more nutrient dense than refined and processed foods.
9. Drink plenty of fluids, including boiled or treated water, natural fruit juice, milk, fermented non-alcoholic drinks, coconut water and soups to avoid dehydration and clear toxins from the body. Dehydration decreases muscle strength and coordination and increases the risk of cramps, heat exhaustion and life-threatening heat stroke.
10. Seek prompt treatment of infections, which can affect food intake and utilisation.
11. Avoid alcohol, which interferes with food intake, digestion and absorption and decreases the effectiveness of ARVs.
12. Avoid ´empty calories´ in sodas and other sweetened or coloured drinks.

Chapter 4. Nutrition Care and Support for Adolescents and Adults with HIV

People with HIV need care and support to improve their nutrition at all stages of HIV infection. Good nutrition helps strengthen the immune system and can delay the progression of HIV to AIDS, making it possible for people with HIV to remain productive. Adolescents have special nutritional needs. Puberty and the final growth spurt of childhood increase demand for energy, protein, vitamins and minerals. Adolescent girls are at higher risk of anaemia because of menstruation. Pregnant and lactating women also have special nutritional needs and risk transmission of HIV to their infants unless they follow special precautions.

Nutrition care and support for adolescents and adults with HIV aims to:

1. Ensure adequate nutrient intake by improving eating habits to build stores of essential nutrients needed for the immune system to function effectively.
2. Prevent nutritional deficiencies.
3. Prevent loss of weight and muscle mass.
4. Improve uptake of and response and adherence to ART.
5. Prevent food- and water-borne illnesses.
6. Minimise the nutritional impact of secondary infections.
7. Manage HIV-related symptoms and medication side effects that affect food intake.
8. Promote a sense of well-being, self-esteem and a positive attitude, which improve the quality of life.

To achieve these goals, any programme working with people with HIV should include the following **minimum nutrition package**, which provides food and nutrition interventions as part of a clinical package of HIV care and treatment and has strong links to community-based services:

1. Nutrition assessment
2. Nutrition education and counselling
3. Therapeutic and/or supplementary feeding
4. Referral to follow-up care and other needed services such as food security and social safety net programmes (e.g., food support and cash transfers)

4.1. Nutrition Assessment

Nutrition assessment is critical for people with HIV because:

- Nutritional status is a sensitive indicator of well-being and helps identify problems early for quick response.
- Nutrition assessment measures changes in nutritional status to monitor progress.

- Nutrition assessment helps determine which nutrition interventions that people with HIV need, such as counselling, treatment of malnutrition or referral.

Different types of nutrition assessment are used for adolescents and adults with HIV.

4.1.1. Clinical assessment

Clinical assessment at a health facility includes taking a medical history of opportunistic infections and co-illnesses (such as diabetes and TB) and medical complications that can affect food intake and absorption (such as diarrhoea, nausea, vomiting, anorexia, mouth and throat sores and oral thrush). Diarrhoea (loose or watery stools three times or more in 24 hours) is common in people with HIV. Acute diarrhoea occurs suddenly and lasts for a short time. Persistent diarrhoea lasts for more than 2 weeks.

Clinical assessment also includes assessing for signs of nutrient deficiencies such as palm or tongue pallor (indicating anaemia), goitre (indicating iodine deficiency) and Bitot's spots in the eyes and corneal ulcers or scarring (indicating vitamin A deficiency). Other clinical signs of malnutrition are wasting and hair colour changes. Bilateral pitting oedema is a sign of severe acute malnutrition (SAM), although it is rare in adults.

It is also important to ask about medications and alternative therapies that people with HIV are taking. Some medications interfere with food absorption, digestion, metabolism or utilisation. Some foods and alternative therapies may interfere with the effectiveness of ART.

4.1.2. Anthropometric assessment

Anthropometric assessment is measuring the size, weight and proportions of the human body. Common anthropometric measurements for adolescents and adults include:

- **Height or length.** Height is the distance from the bottom of the feet to the top of the head measured in children over 24 months, adolescents and adults standing erect. Length is measured in children who are under 24 months or measure less than 87 cm. Height and length are needed for anthropometric indices including weight-for-height and height-for-age.
- **Weight**. Loss of body weight is strongly correlated with HIV. Unintentional weight loss of more than 6 kg in 2–3 months is a sign of the onset of AIDS. People with symptoms of AIDS should be weighed every month. People without symptoms of AIDS should be weighed every 3 months. HIV-positive people with severe acute malnutrition (SAM) should be weighed every 2 weeks, and HIV-positive people with moderate acute malnutrition (MAM) should be weighed every month.
- **Body mass index (BMI)**. BMI measures thinness in adults 18 years and older. It is not used for pregnant women and women up to 6 months post-partum because their weight gain is not linked to their nutritional status. People with HIV can lose muscle faster than weight, and weight loss does not indicate the amount of

muscle loss, which is associated with higher mortality and morbidity. Therefore, BMI is important to assess the nutritional status of people with HIV. BMI is calculated by dividing weight in kg by height in metres squared. It can also be found on the BMI chart in Annex 3.

Table 2 shows BMI cutoffs for nutritional status.

Table 2. BMI cutoffs for adults

SAM	MAM	Normal	Overweight	Obesity
< 16.0	≥ 16.0 to < 18.5	≥ 18.5 to < 25.0	≥ 25.0 to < 30.0	≥ 30.0

- **BMI-for-age.** BMI can be used for adults because most people over 18 years of age have finished their physical development. However, adolescents are still growing and developing. Therefore, age and sex have to be considered when using BMI to determine nutritional status in adolescents up to 18 years of age. BMI-for-age is expressed in z-scores, which are measured in standard deviations. Standard deviations describe how far and in what direction a person's anthropometric measurement deviates from the median for people of the same age and sex. Annex 4 contains BMI and BMI-for-age look-up tables for adolescent girls and boys and instructions for finding BMI-for-age. Table 3 shows BMI-for-age z-scores used to classify nutritional status in adolescents.

Table 3. BMI-for-age cutoffs for adolescents

SAM	MAM	Normal	Overweight	Obesity
Less than –3	–3 to less than –2	–2 to less than +1	+1 to less than +2	+2 and greater

- **Mid-upper arm circumference (MUAC)** is used to assess the nutritional status of adolescents and adults who are pregnant or up to 6 months post-partum or who have non-nutritional oedema, as their weight does not necessarily indicate their nutritional status. MUAC is also used to assess the nutritional status of people who cannot stand up to have their weight and height measured. MUAC can also be used to measure nutritional status in people on ARVs that can cause lipodystrophy (a disorder of fat metabolism involving loss of fat from or deposition of fat in tissue). Table 4 shows MUAC cutoffs used to classify nutritional status in adolescents and adults.

Table 4. MUAC cutoffs for adolescents and adults

Age group	SAM	MAM	Normal
10–14 years	Less than 16.0 cm	16.0 to less than 18.5 cm	18.5 cm and above
15 years and older	Less than 18.5 cm	18.5 to less than 22.0 cm	22.0 cm and above

Pregnant/post-partum women	Less than 19.0 cm	19.0 to less than 23.0 cm	23.0 cm and above

4.1.3. Biochemical assessment

Biochemical assessment is the interpretation of laboratory tests that detect nutrient deficiencies. Where available, tests for blood, protein (serum albumin), micronutrients (vitamin B_{12}, iron, zinc, folic acid and iodine) and lipids (cholesterol and triglycerides) can be used to monitor the nutritional status of people with HIV. Haemoglobin level is one of the indicators used to monitor anaemia.

4.1.4. Dietary assessment

Information about the types and amounts of food eaten, appetite, food habits and eating behaviours helps identify food availability, traditional food taboos and economic factors that affect food intake**.** Dietary assessment also helps to identify reasons for inadequate food intake during illness and side effects of medications.

4.2. Nutrition Education and Counselling

Nutrition education and counselling can improve eating behaviours and nutritional status. Correct and relevant nutrition information helps people with HIV make rational nutrition choices.

Nutrition education provides information to groups of people on topics of common interest. Topics should be based on the identified needs and characteristics (location, age, culture, socioeconomic status) of the intended audience. Possible topics for nutrition education are:

- The relationship between nutrition and HIV
- Increased energy needs of people with HIV
- Healthy eating and lifestyles for people with HIV
- Food and water safety and hygiene
- Dietary management of HIV-related symptoms and medication side effects

Nutrition counselling is non-directive, non-judgemental, dynamic, empathetic interpersonal communication which helps someone learn how to use information to improve nutrition. Counselling facilitates problem-solving and decision-making and empowers people to analyse their situation, make informed choices and commit to actions to address their problems. Nutrition counsellors need both knowledge of nutrition and effective communication skills. Counselling messages for people with HIV vary depending on individual nutritional status, stage of HIV infection, ARV use, conditions or complications and socio-economic situation. Nutrition counselling can be done in a health facility or during home visits. Nutrition counselling can help people on ART manage food-medication interactions and medication side effects and improve ART efficacy, tolerance and adherence.

Counselling should be done in a private space, and counsellors should ensure that information is kept confidential.

Box 2 lists counselling messages to help people with HIV maintain good nutritional status and a healthy lifestyle.

Box 2. Critical Nutrition Actions for people with HIV

1. **Get weighed regularly and have weight recorded.** People with HIV that are enrolled in care and treatment should be weighed during every clinical visit. Others can be weighed regularly in home-based care or other community-based programmes and support groups.
2. **Eat a variety of foods and increase your intake of nutritious foods.** No single food (except breast milk for infants under 6 months of age) provides all the nutrients the body needs to stay healthy. Combining foods from different food groups improves nutrient content and facilitates absorption.
3. **Drink plenty of boiled or treated water.** Water helps avoid dehydration and rids the body of toxins. People with HIV should also drink other fluids such as natural fruit juice, milk, fermented non-alcoholic drinks (*togwa* and yoghurt), coconut water and soups. Boil drinking water or treat it using a chlorine solution or water filter. Store drinking water safely in a covered container with a narrow neck.
4. **Maintain food hygiene and water safety.** People with HIV are at high risk of infections from contaminated water. Boil or treat water used for drinking or making juices and store it in clean containers. Wash hands properly before preparing, serving and eating food and dispose of garbage and faeces safely.
5. **Avoid habits that can lead to poor nutrition and health.** Use condoms to minimize the risk of HIV re-infection and sexually transmitted infections. Avoid alcohol, which interferes with food digestion, absorption and utilisation and the effectiveness of some medications, as well as increasing risky behaviours. Avoid smoking, which reduces appetite and increases the risk of cancer and respiratory infections. Avoid sweetened, coloured drinks or processed foods sold in shops, as they have little nutritional value and can even harm your health. Get enough rest, as too little sleep affects appetite and strength.
6. **Get exercise as often as possible.** Regular exercise such as walking and light housework builds and strengthens muscle, improves appetite, manages stress and improves health and alertness. Weight-bearing exercises help enhance and maintain muscle mass. Massage therapy for bed-bound clients can help relieve aching muscles and prevent muscle loss.
7. **Maintain good sanitation and hygiene**. To avoid food- and water-borne infections that cause nutrient and weight loss, wash your hands with flowing water and soap after using the toilet and before handling, preparing and eating food and giving medicine. Prepare and store food so that it does not become contaminated. Avoid buying food on the street, as it may not be prepared or stored hygienically. Dispose of garbage and faeces safely.

Box 2. Critical Nutrition Actions for People with HIV, continued

8. **Prevent and seek early treatment of infections and manage symptoms through diet.** Illness reduces appetite and affects digestion and food absorption and utilisation. Treating illness late worsens nutritional status. Always seek advice from a health care provider on taking traditional remedies or nutrition supplements, as these may affect how other medications work and produce side effects. Dietary management can make symptoms less severe and help you continue eating.
9. **Manage medication and food interactions and side effects through diet.** Some medications have to be taken with food and some without. If you don't follow directions, the medications will not work properly. Ask your health care provider how to manage any side effects of medications you are taking by changing your diet.
10. **Take all medications as advised by your health care provider.** If you miss doses or stop taking them, your body can become resistant. The medications will be less effective, and you may need stronger ones. Good adherence to ARV prophylaxis and treatment facilitates maximum viral suppression and reduces the risk of HIV transmission from mother to child.
11. **Avoid stress and seek psychosocial support.** Psychological support is an important component of nutritional care and support because depression, stress and stigma can affect appetite. Ask your health care provider to refer you to spiritual support or a support group for people with HIV. This can help encourage a positive attitude toward illness and help you overcome feelings of guilt, fear and denial.

Prevention messages and strategies can be included in counselling, support groups, peer-led interventions and HBC. Drawing on the leadership of people with HIV strengthens these interventions and provides further support for HIV-positive people. Referral to income-generation activities or programmes to empower women and girls increases the likelihood that people with HIV will have the means to change high-risk behaviours.

4.3. Nutrition Support

Nutrition support for adolescents and adults with HIV may include specialised food products to treat malnutrition, micronutrient supplementation, enteral or parenteral feeding of clients who cannot take food orally and/or point-of-use water purification tablets.

4.3.1. Specialised food products

Specialised food products are specially designed to treat malnutrition. They are prescribed to clinically malnourished people according to strict eligibility criteria to

improve health and nutritional status. These products are designed to be dense in energy, protein and micronutrients; safe; palatable; easy to use; easy to deliver within the health and other systems; and not easily shared with other household members. They must meet high safety standards. Specialised food products include:

1. Therapeutic milks
   - F-100 and F-75 and modified formats
   - For inpatient treatment of SAM
2. Ready-to-use therapeutic food (RUTF)
   - Packaged in 92-gram sachets providing 500 kcal each (or 543 kcal/100 g)
   - For inpatient and outpatient treatment of SAM
3. Fortified-blended food (FBF)
   - Nutrient dense and fortified with vitamin and mineral premix to provide at least 50 percent of the daily energy requirements and protein to provide 12–15 percent of total energy needs
   - For outpatient treatment of moderate acute malnutrition (MAM)

The amount and combination of specialised food products to prescribe to people with HIV depend on individual nutritional status. The food should be provided in a way that minimises dependency, based on clearly defined entry and exit criteria that are communicated to clients and posted where clients can easily see them.

Although people with HIV may need other food support, specialised food products are prescribed only for *nutritional therapy and rehabilitation*. Health service providers should promote consumption of local foods and an adequate and varied diet for a healthy and productive life and should refer people with HIV to other available services for household food support.

Table 5 lists specialised food product entry and exit criteria and quantities for treatment of malnutrition in adolescents and adults. Inpatient treatment of SAM has three phases: Stabilisation, transition and rehabilitation.

Table 5. Specialised food products to treat malnourished adolescents and adults

Group	Entry criteria	Product	Transition/exit criteria
Adolescents 15–17 years	**SAM** Confirmed unintentional weight loss of more than 10% since the last visit **Bilateral pitting oedema** **OR MUAC** less than 18.5 cm **OR BMI** less than 16.0	**Inpatient** Stabilisation: 50 kcal of F-75/kg of body weight/day Transition: 50 kcal of F-100/kg of body weight/day Rehabilitation: 3 packets of RUTF/day **PLUS** 300 g of FBF/day **Outpatient** 3 packets of RUTF/day **PLUS** 300 g of FBF/day	**MUAC** ≥ 18.5 cm

Group	Entry criteria	Product	Transition/exit criteria
	MAM Confirmed unintentional weight loss of more than 5% since last visit **MUAC** 18.5 to less than 22.0 cm **OR BMI** 16.0 to less than 18.5	300 g of FBF/day	**MUAC** ≥ 22.0 cm
Adults (non-pregnant/≤ 6 months post-partum)	**SAM** **Bilateral pitting oedema** **OR MUAC** less than 18.5 cm **OR BMI** less than 16.0	**Inpatient** Stabilisation: 53 ml of F-75 **OR** 40 kcal of F-75/kg of body weight/day Transition: 50 ml of F-100 OR 40 kcal of F-75/kg of body weight/day Rehabilitation: 3 packets of RUTF/day **PLUS** 300 g of FBF/day **Outpatient** 3 packets of RUTF/day **PLUS** 300 g of FBF/day	**MUAC** ≥ 19.0 cm **OR BMI** ≥ 16.0 and < 18.5 **OR** sustained weight gain
	MAM **MUAC** 18.5 to less than 22.0 cm **OR BMI** 16.0 to less than 18.5	300 g of FBF/day	**MUAC** 22.0 cm or greater **OR BMI** 18.5 or greater for two consecutive visits
Pregnant women and women ≤ 6 months post-partum	**SAM** **Bilateral pitting oedema** **OR MUAC** less than 19.0 cm	**Inpatient** Stabilisation: 53 ml of F-75 OR 50 kcal of F-75/kg body weight/day Transition: 40 kcal of F-100/kg body weight/day Rehabilitation: 3 packets of RUTF/day **PLUS** 300 g of FBF/day **Outpatient** 3 packets of RUTF/day **PLUS** 300 g of FBF/day	**MUAC** 19.0 cm or greater
	MAM **Poor weight gain** **OR MUAC** 19.0 to less than 23.0 cm	300 g of FBF/day	**MUAC** 23.0 cm or greater **OR** over 6 months post-partum

4.3.2. Micronutrient supplementation

Whenever possible, people with HIV should meet their vitamin and mineral needs from their diet by eating a variety of fruits and vegetables. Non-pregnant/post-partum adults with HIV should consume no more than 1 RDA of micronutrients. HIV-positive people who do not get enough micronutrients from their diet or who live in areas where anaemia and vitamin A deficiency are common should take daily multiple micronutrient supplements according to government protocols and the directions of health care providers.

Multiple micronutrient supplements work better than individual micronutrients taken separately. Excessive use of some micronutrients (e.g., vitamins A and D) can be toxic. Intestinal upsets and kidney stones have been reported in people taking high doses. Oral or intravenous micronutrient supplementation may be considered for people with HIV who are severely deficient and have severe diarrhoea, intolerance, or severe malnutrition. People with HIV that are consuming specialised food products to treat acute malnutrition should consult health care providers before taking additional micronutrient supplements to avoid over-supplementation.

4.3.3. Enteral and parenteral nutrition support

Rapid and unintentional weight loss, malabsorption, recurring infections and nutritional deficiencies are common problems for people with HIV. If they cannot take food orally, other options should be considered to help prevent malnutrition associated with these problems.

Enteral feeding may include both oral and tube feeding for people whose oral intake is inadequate. It can be used as the sole source of nutrition for people who have problems chewing and swallowing because of painful sores in the mouth. A qualified health service provider should ensure that the client's gut is working before using enteral feeding and should calculate the enteral formula on the basis of the client's dietary requirements.

Parenteral feeding is the provision of nutrients directly into the circulatory system through the veins. Parenteral nutrition should be administered only if a patient has a non-functional or extremely compromised gastrointestinal tract. Parenteral nutrition may be administered to people with AIDS, major intestinal disorders, intractable vomiting, acute pancreatitis, cytomegalovirus (CMV) infection of the bowel, Mycobacterium avium-intracellulari (MAI) infection of the gastrointestinal tract, persistent diarrhoea, severe protein-energy malnutrition and/or intolerance for enteral feeding. As with enteral nutrition, nutrient requirements should be calculated on an individual basis.

Enteral and parenteral nutrition are usually undertaken only in a hospital setting. Parenteral nutrition in particular requires close monitoring and evaluation by trained staff.

People with HIV should receive **thorough nutrition assessment** before beginning enteral or parenteral feeding. Fluid, energy, protein and micronutrient requirements should be assessed because the HIV-infected patient may be dehydrated and/or have protein-energy malnutrition.

Both forms of nutrition support require **ongoing management and monitoring** to reduce complications and undesirable side effects.

Hospital guidelines should be followed for enteral or parenteral nutrition support.

4.4. Nutrition Care and Support of HIV-Positive Pregnant and Lactating Women

The recommended increase in energy intake for HIV-positive pregnant and lactating women is the same as for non-pregnant and non-lactating adults with HIV—10 percent increase if asymptomatic and 20–30 percent increase if symptomatic.

Table 6 lists the extra energy and protein requirements for healthy, non-HIV-positive women during pregnancy and lactation. Because pregnant and lactating women with HIV need to consume additional energy, their total protein intake will increase proportionally. This protein should be consumed through a normal diet.

Table 6. Increased protein requirements during pregnancy and lactation

Group	Time	Increased protein requirements
Pregnant	1st trimester	1 g/day
	2nd trimester	10 g/day
	3rd trimester	31 g/day
Lactating		19 g/day for the first 6 months
		13 g/day after 6 months

Source: WHO. 2007. *Protein and Amino Acid Requirements in Human Nutrition. Report of a Joint WHO/FAO/UNU Consultation*. WHO Technical Report Series 935. Geneva: WHO.

Pregnant women are particularly vulnerable to iron deficiency. Anaemia during pregnancy is a risk factor for infant and maternal morbidity and mortality. To prevent anaemia, women should take iron and folic acid supplements during pregnancy and lactation, regardless of their HIV status. In some cases, however, excessive amounts of iron can contribute to disease progression. Table 7 shows the micronutrient supplementation protocol for pregnant and post-partum women.

Table 7. Micronutrient supplementation for pregnant women

Purpose	Micronutrient	Dosage	Frequency	Duration
To reduce the risk of low birth weight, maternal anaemia and iron deficiency	Elemental iron	30–60 mg	Daily	Throughout pregnancy, beginning as early as possible
	Folic acid	400 µg	Twice daily	
To prevent night blindness*	Vitamin A	Up to 10,000 IU		Daily, at least 12 weeks during pregnancy until delivery
		Up to 25,000 IU		Weekly, at least 12 weeks during pregnancy until delivery

Source: WHO. 2013. *Essential Nutrition Actions: Improving Maternal, Newborn, Infant and Young Child Health and Nutrition*. Geneva: WHO.
*Where the prevalence of night blindness is 5 percent or higher in pregnant women or children 24–59 months of age
Note: Vitamin A supplementation in HIV-positive pregnant women is not recommended as a public health intervention for reducing the risk of mother-to-child transmission of HIV.

4.5. Nutrition Care and Support for Elderly People with HIV

A therapeutic high-energy protein diet may be appropriate for elderly people with HIV, whether or not they are on ART. Nutritionists and dieticians can advise on individual requirements. Because weight is a significant factor in HIV care and treatment, overweight or obese elderly clients may need to reduce their weight until they are within the normal BMI range of 18.5–24.9.

Hypoglycaemia is common in elderly people with or without HIV. It is important to assess this condition in people with HIV because of the following nutritional considerations:

- Quantity and timing of consumption of food and drinks containing carbohydrates
- Timing of meals in relation to medication
- Effects of alcohol on hypoglycaemia

Older people are at greater risk of dehydration. Older people with HIV that have uncontrolled diabetes may be at even higher risk of dehydration as a result of polyuria. Monitoring, fluids and modified treatment are needed to limit symptoms of hypoglycaemia.

Chapter 5. Nutrition Care and Support of Infants and Young Children Born to HIV-Positive Mothers

All children are vulnerable to malnutrition because their mental and physical development depends on an adequate diet, nurturing childcare practices and safe food and water. Children of HIV-positive mothers and children whose families are affected by HIV are even more vulnerable to malnutrition because of mother-to-child transmission of HIV and the social and economic consequences of HIV on households. As for adolescents and adults, food and nutrition interventions for children should be part of a clinical package of HIV care and treatment with strong links to community-based services.

5.1. Nutrition Assessment

The following types of nutrition assessment are used for children:

5.1.1. Clinical assessment

Clinical assessment includes checking for medical complications in children (bilateral pitting oedema, wasting, anorexia/poor appetite, persistent diarrhoea, nausea, vomiting, severe dehydration, severe anaemia, high fever, rapid breathing or convulsions). It also includes checking for signs of nutrient deficiencies (hair colour changes; dry or flaking skin; pallor of the palms, nails or mucous membranes; lack of fat under the skin) and any medications children are taking that may affect nutritional status.

Bilateral pitting oedema is a sign of SAM in children regardless of anthropometric measurements. Oedema is the abnormal accumulation of fluid in the interstitial spaces of tissues. It is caused by either too much fluid moving from the blood vessels into the tissues or not enough fluid moving from the tissues back into the blood vessels. This fluid imbalance can cause swelling in one or more parts of the body. Only oedema that begins in *both* feet or legs in which pressing on the skin leaves a depression in the tissues is bilateral pitting (nutritional) oedema.

Malnutrition in young children may appear as kwashiorkor, marasmus or a combination of the two. The causes of *kwashiorkor* are debated. *Marasmus* is caused by decreased food intake and/or illness, resulting in wasting. Signs of both kwashiorkor and marasmus can appear together in marasmic kwashiorkor. Table 8 lists signs for each condition.

Table 8. Signs of kwashiorkor, marasmus and marasmic kwashiorkor

Signs of kwashiorkor	Signs of marasmus	Marasmic kwashiorkor
Bilateral pitting oedema beginning in the feet and lower legs	Sometimes oedema	Bilateral pitting oedema
No weight loss	Severe wasting, emaciated appearance, 'old man face'	Severe wasting
Loss of muscle mass	Loss of muscle mass and subcutaneous fat (dry, loose skin on the upper arm, sagging skin on buttocks and thighs looking like 'baggy pants', drawn-in 'old man' face	Muscle wasting
Poor appetite	Appetite	Poor appetite
Lethargy or apathy	Active, may be alert	Lethargy
Changes in hair colour and/or texture	Sometimes hair without pigment	
Skin flaking or lesions	Dry, peeling skin	
Protruding belly		
	Dehydration	Dehydration (thirst, shrunken eyes)
Irritability	Irritability or apathy	

5.1.2. Anthropometric assessment for children includes:

- **Length** measured for children under 2 years of age or less than 87 centimetres long and **height** measured for children 2 years of age and older or taller than 87 cm
- **Weight** measured for infants using a balance beam scale or Seca scale (weighing infants with caregivers and subtracting the caregivers' weight), for children weighing up to 25 kg using a hanging scale and weighing pants or for older children using a Seca scale
- **Weight-for-age**, an anthropometric index that compares the weight of a child under 5 to the weight of a child of the same age and sex in the 2006 WHO Child Growth Standards. Weight-for-age is measured in z-scores. This nutrition index is measured in Reproductive and Child Health (RCH) Clinics and plotted on the RCH Card in Annex 6. Children with weight-for-age z-score (WAZ) between 60 and 80 percent are moderately underweight, and children falling below 60 percent are severely underweight. Table 9 shows WAZ cutoffs for nutritional status.

Table 9. WAZ cutoffs for children 0–59 months of age

SAM	MAM	Normal	Overweight	Obesity
Less than –3	–3 to less than –2	–2 to +2	Greater than +2 to +3	Greater than +3

- **Weight-for-height z-score (WHZ)** is an anthropometric index for children 0–59 months of age that compares a child's weight to the weight of a child of the same length/height and sex in the WHO Child Growth Standards. Weight-for-height is measured in z-scores. Table 10 shows WHZ cutoffs for nutritional status.

Table 10. WHZ cutoffs for children 0–59 months of age

SAM	MAM	Normal	Overweight	Obesity
Less than –3	–3 to less than –2	–2 to +2	Greater than +2 to +3	Greater than +3

- **BMI-for-age** can be used as an indicator of nutritional status in children 5–14 years of age. Table 11 shows BMI-for-age cutoffs for nutritional status in children over 5 years of age. See Annex 4 for BMI and BMI-for-age look-up tables for boys and girls and instructions for finding BMI-for-age.

Table 11. BMI-for-age cutoffs for children

SAM	MAM	Normal	Overweight	Obesity
Less than –3	–3 to less than –2	–2 to +1	Greater than +1 to + 2	Greater than +2

- **Mid-upper arm circumference (MUAC)** is used to measure nutritional status in children older than 6 months. Table 12 shows MUAC cutoffs for nutritional status in children.

Table 12. MUAC cutoffs for children

Age group	SAM	MAM	Normal
0–59 months	Less than 11.5 cm	11.5 to less than 12.5 cm	12.5 cm and above
5–9 years	Less than 13.5 cm	13.5 to less than 14.5 cm	14.5 cm and above
10–14 years	Less than 16.0 cm	16.0 to less than 18.5 cm	18.5 cm and above

5.1.3. Biochemical assessment

Biochemical assessment is the interpretation of laboratory tests that detect nutrient deficiencies, for example, iron deficiency anaemia, in children.

5.1.4. Dietary assessment

Dietary assessment of children involves asking caregivers about infant and young child feeding practices—how many breastfeeds or meals and snacks children are fed, the types and amounts of foods eaten, appetite and eating behaviours—and older children about types and quantities of food eaten.

5.2. Nutrition Education and Counselling

Nutrition education and counselling can help mothers or caregivers improve infant and young child feeding practices and child nutritional status. **Nutrition education** can focus on:

- The importance of a balanced diet
- Infant feeding in the context of HIV
- The relationship between nutrition and HIV
- Increased energy needs of people with HIV
- Food and water safety and hygiene
- Dietary management of HIV-related symptoms and medication side effects

Nutrition counselling helps mothers or caregivers make informed choices about infant and child feeding to improve their children's nutritional status. Nutrition counselling of caregivers can be done in a health facility or during home visits. Counselling of parents or caregivers should be private and confidential, although it is important to involve both mothers and fathers and other caregivers (e.g., grandmothers and older children who take care of younger siblings).

5.2.1. Feeding Infants Born to HIV-Positive Mothers for the First 6 Months of Life

HIV-positive mothers can transmit HIV to their children during pregnancy, labour, delivery or breastfeeding. Without any interventions, the rate of transmission is 10-35 percent. This rate can be reduced to less than 5 percent if pregnant women are tested for HIV before pregnancy, during pregnancy and after delivery and enrolled in PMTCT if they test positive. They should be supported to practice appropriate infant feeding and adhere to PMTCT Option B+ guidelines (http://www.who.int/hiv/topics/mtct/en/).

Exclusive breastfeeding is feeding infants breast milk alone and no other foods or liquids, even water, for the first 6 months of life. Exclusive breastfeeding carries a lower risk of HIV transmission than mixed feeding (feeding breast milk and other liquids, foods or milks during the first 6 months of life). Strategies and policies that support exclusive breastfeeding for the first 6 months of life in Tanzania include the Baby-Friendly Hospital Initiative (BFHI), adopted in 1992, Article 33 of the 2004 Employment and Labour Relations Act and the Tanzania Food, Drugs and Cosmetics

(Marketing of Foods and Designated Products for Infants and Young Children) Regulations of 2013.

ARVs provided to either HIV-positive pregnant women or their HIV-exposed infants can significantly reduce the risk of postnatal transmission of HIV through breastfeeding. Tanzania has adopted the following 2010 WHO recommendations:

- HIV-positive mothers whose infants are HIV negative or of unknown status should breastfeed exclusively for the first 6 months, introduce appropriate complementary foods thereafter and continue to breastfeed for the first 12 months of life. Both mothers and infants should receive ARVs to reduce the risk of HIV transmission during the breastfeeding period, according to national guidelines. Breastfeeding should stop at 12 months, and mothers should be supported to provide a nutritionally adequate and safe diet without breast milk.
- HIV-positive mothers whose infants are known to be HIV positive should breastfeed exclusively for the first 6 months of life and continue breastfeeding as per recommendations for the general population up to 2 years or beyond.

To help HIV-positive mothers breastfeed exclusively, health care providers should:

- Support them to initiate breastfeeding within 1 hour after delivery and feed their infants colostrum, the nutritious 'first milk'.
- Support them to position and attach their infants properly at the breast to reduce the risk of cracked nipples associated with HIV transmission during breastfeeding.
- Counsel them to empty one breast before offering the other one.
- At each contact, encourage them to breastfeed exclusively, feeding no other foods or liquids except breast milk, not even water, explaining that breast milk contains all the nutrients and water an infant needs for the first 6 months of life.
- Counsel them to seek immediate medical attention for sore or cracked nipples or mouth lesions or thrush in their infants.
- Help them solve common breastfeeding difficulties, such as 'insufficient milk' and crying of their babies.
- Encourage them to attend well-baby under-5 clinics for infant growth monitoring and promotion (GMP).
- Show them how to express and discard milk from cracked nipples and from breasts affected by sores, nipple trauma, engorgement and mastitis.
- Encourage them to adhere to ART and seek medical advice immediately for any illness.
- Counsel them to stop breastfeeding immediately if they develop symptoms of full-blown AIDS during the breastfeeding period.
- Counsel them to stop breastfeeding gradually over 1 month and continue taking ARV prophylaxis along with their infants until 1 week after breastfeeding is fully stopped.

- Counsel them on the importance of continuing Cotrimoxazole prophylaxis.

To avoid undermining optimal breastfeeding practices among the general population, health care providers should:

- Counsel mothers who are HIV negative on ways to prevent HIV infection.
- Inform pregnant and post-partum women that the only way to know their HIV status is by being tested.
- Offer HIV counselling and testing to all mothers attending antenatal, labour and postnatal clinics and to their partners.
- Inform pregnant and post-partum women that HIV can be transmitted through breast milk, but that the risk of transmission can be significantly reduced through appropriate breastfeeding techniques and the use of ARVs.
- Inform mothers that infections such as mastitis and sexually transmitted infections can increase the risk of mother-to-child transmission of HIV.
- Encourage mothers to discuss HIV with their partners and practice safe sex at all times to reduce the risk of (re)infection.

HIV-positive mothers may consider expressing and heat-treating breast milk as a short term feeding strategy if they have temporary breast problems such as mastitis, nipple fissures and sores or if ARVs are temporarily unavailable.

Exclusive replacement feeding is feeding infants ***only*** commercial infant formula, with no other foods or liquids, including breast milk, for the first 6 months of life. HIV-positive mothers should feed their infants commercial infant formula **only** if the following conditions can be met (WHO 2010):

1. Safe water and sanitation are ensured in the household and in the community.
2. The mothers or caregivers can reliably provide sufficient formula milk to support normal growth and development of the infants.
3. The mothers or caregivers can prepare formula cleanly and frequently enough so that it is safe and carries a low risk of causing diarrhoea and malnutrition.
4. The mothers or caregivers can feed infant formula milk exclusively in the first 6 months.
5. Families are supportive of this practice.
6. The mothers or caregivers can access health care that offers comprehensive child health services.

If HIV-positive mothers meet the above conditions for exclusive replacement feeding, health care providers should:

- Show them or other caregivers how to prepare the formula accurately and safely.
- Assess and address any difficulties the mothers or caregivers may have.
- Counsel on the risks of mixed feeding.
- Counsel to introduce appropriate complementary feeding once the infants reach the age of 6 months.

5.2.2. Feeding HIV-Exposed Children 6–23 Months of Age

Breast milk can meet all of an infant's nutritional needs only for the first 6 months of life. After that, other foods need to be added to the diet. The transition from exclusive breastfeeding (or exclusive replacement feeding) to family foods is called ***complementary feeding***. Complementary feeding usually lasts between the ages of 6 and 18–24 months.

When HIV-positive mothers decide to stop breastfeeding at any time after 6 months, they should wean their infants gradually, over 1 month. At the age of 6 months, they should provide their infants with safe and adequate complementary foods to enable normal growth and development. Many infants become malnourished during complementary feeding because of discontinued breastfeeding, inadequate food quality and quantity and infections from contaminated food, water and feeding utensils.

HIV-positive children without symptoms need to consume 10 percent more **energy** than uninfected children of the same age, sex and activity level to maintain growth. Symptomatic children need to consume 20 percent more energy, and HIV-positive children who are losing weight need to consume 50–100 percent more energy. Stunted growth and failure to thrive are common in HIV-positive children. Children with HIV also have more frequent common infections such as diarrhoea, ear infections, pneumonia, fever, chronic gastroenteritis and TB. These can affect nutrient intake, leading to malnutrition and higher risk of death. Poor appetite, inability to suckle, swallowing difficulties and nausea increase the risk of malnutrition for HIV-positive children.

Health care providers should counsel mothers or caregivers of HIV-affected or HIV-positive children to:

- Increase the **amount** and density (thickness) of foods as children get older, gradually feeding more solids and adding foods from all the food groups, particular animal-source foods, vegetables and fruits.
- Feed children **actively** (slowly and patiently, making eye contact, whenever children are hungry).
- Practice good hygiene and safe food and water preparation to avoid infections.
- Add margarine or oil to food to increase energy intake.
- Enrich porridge with milk, sugar, pounded groundnuts, bean powder, or soya beans and oil.
- Feed infants mashed fruits and vegetables such as ripe bananas, avocadoes and pumpkin as often as possible to increase energy and nutrient intake.
- Serve and feed children on separate plates to ensure adequate intake.
- De-worm children every 6 months.
- Seek medical care as soon as possible if a child has an infection.
- Continue feeding children during and after illness to recover lost weight.
- Make sure children receive regular immunisations.

5.2.3. Feeding HIV-Positive Children 2–5 Years of Age

Children in this age group require increased energy and nutrients from family foods because they are growing and developing rapidly. Children who are left to eat by themselves or share the food of older children are at higher risk of malnutrition. To ensure that children grow and develop well, caregivers should:

- Increase the quantity and frequency of meals, feeding at least five times a day (three main meals and two nutritious snacks between meals).
- Feed a balanced diet with foods from all food groups.
- Enrich food by adding milk, oil, nuts, margarine, germinated flour, honey or sugar to increase energy density.
- Provide plenty of boiled or treated water for drinking.
- Give children other fluids such as natural fruit juices, milk, coconut water, soups and non-alcoholic fermented beverages (*togwa* and yoghurt).
- Feed young children actively (responsively), encouraging them gently to eat and maintaining eye contact.
- Continue feeding children during and after illness to help them recover lost weight.
- Practice good hygiene and sanitation. Chronic childhood exposure to microbes in faeces causes an intestinal infection called environmental enteropathy that diverts energy from growth, reduces the ability to absorb nutrients and leads to stunting.

5.2.4. Feeding HIV-Exposed Children 6–9 Years of Age

School-age children are physically active and growing and developing rapidly, requiring increased energy and nutrients. Many children go to school without breakfast, and many schools do not provide mid-day meals, increasing the risk of malnutrition in this age group. The risk of malnutrition is compounded by the risk of water-borne illness due to lack of clean and safe water for drinking. To ensure that children grow and develop well, caregivers should:

- Feed a balanced diet with foods from all food groups.
- Provide children with a nutritious breakfast before school and a nutritious lunch to take to school if there is no school feeding programme.
- Enrich foods by adding milk, oil, nuts, honey, margarine or butter.
- Give plenty of fluids including natural fruit juices, milk, coconut water, soups and non-alcoholic fermented beverages such as *togwa* and yoghurt.
- Practice good food and water sanitation and hygiene.
- Make sure the child receives vitamin A supplementation, de-worming and all vaccines as per the national schedule for children. BCG vaccine is contraindicated in children with symptoms of HIV.
- Use health and other related services such as RCHS and HBC.
- Continue feeding children during and after illness.

5.3. Nutrition Support

Nutrition support for children born to HIV-positive mothers and other HIV-affected children may include specialised food products to treat malnutrition, micronutrient supplements and point-of-use water purification tablets provided to caregivers.

5.3.1. Specialised food products

Specialised food products are not appropriate for infants under 6 months of age. They are not nutritionally adequate for this age group and can interfere with exclusive breastfeeding.

Specialised food products provided to acutely malnourished children include:

1. Therapeutic milks F-100 and F-75 and modified formats for inpatient treatment of SAM
2. RUTF packaged in 92-gram sachets providing 500 kcal each (or 543 kcal/100 g) for inpatient and outpatient treatment of SAM
3. FBF for outpatient treatment of MAM

Table 13 provides guidance for treatment of malnourished children with specialised food products. HIV-positive children with SAM should be treated using the same approach as HIV-negative children with SAM.

Table 13. Specialised food products to treat malnourished children 0 months to 14 years

Entry criteria	Product	Transition/exit criteria
SAM **Bilateral pitting oedema** **OR severe visible wasting** **OR MUAC** 6–59 months: < 11.5 cm 5–9 years: < 13.5 cm 10–14 years: < 16.0 cm **OR WHZ OR BMI-for-age** < −3	**0– less than 6 months** **Inpatient** Stabilisation: If no oedema, 130 ml of F-100-Diluted/kg of body weight/day. If oedema, F-75 according to SAM protocol Transition and rehabilitation: F-100-Diluted according to SAM protocol (F-100-Diluted if < 6 months of age) **6 months–14 years** **Inpatient** Stabilisation: 130 ml of F-75/kg of body weight/day (100 ml if severe oedema) Transition: Days 1 and 2: Same amount of F-100; Day 3: Increase each feed by 10 ml until child reaches rehabilitation phase	**6–59 months:** No bilateral pitting oedema for two consecutive visits, **MUAC** ≥ 11.5 cm, **WHZ** ≥ – 2 **OR** 15% weight gain on two consecutive visits **AND** appetite **AND** medical problems stabilised or subsiding **AND** continued weight gain of more than 5 g/kg of body weight/day

Moderate acute malnutrition (MAM) Confirmed weight loss of more than 5% since last visit **OR MUAC** 6–59 months: ≥ 11.5 to < 12.5 cm 5–9 years: ≥ 13.5 to < 14.5 cm 10–14 years: ≥ 16.0 to < 18.5 cm **OR WHZ OR BMI-for-age** −3 to <–2	If the child was treated for SAM, 1 packet of RUTF per day **PLUS** 100 g of FBF/day for children 6 months to 9 years of age 200 g of FBF/day for children 10–14 years of age for 1 month If the child was NOT treated for SAM, only FBF as above (no RUTF)	**6–59 months**: **MUAC** ≥ 12.5 cm **OR WHZ OR BMI-for-age** ≥ −2 for two consecutive visits **5–9 years**: **MUAC** ≥ 14.5 cm **10–14 years**: **MUAC** ≥ 18.5 cm

5.3.2. Micronutrient supplementation

Micronutrient intake for HIV-positive children is recommended at the same level as that for uninfected children. Table 14 shows the recommended protocol for vitamin A supplementation of children 6–59 months of age. There are no data on the efficacy of other micronutrient supplements for HIV-positive children.

Table 14. Micronutrient supplementation for children 6–59 months of age

Age	Dosage		
	Purpose	Dosage	Frequency
Vitamin A			
0–less than 6 months	To reduce the risk of death from measles	50,000 international units (IU)	Once*
6–11 months	Routine supplementation	100,000 IU (blue capsule)	Once
	To reduce the risk of death from measles	100,000 IU (blue capsule)	Once*
12–59 months	Routine supplementation	200,000 IU (red capsule)	Every 4–6 months
	To reduce the risk of death from measles	200,000 IU (red capsule)	Once*
Iron			
6–23 months	To prevent iron deficiency	2 mg/kg of body weight/day	From 6 to 23 months, for 3 months duration**
Zinc			
0–less than 6 months		10 mg	Daily for 10–14 days

6–59 months	To reduce the duration and severity of diarrhoea and likelihood of infections	20 mg	

Source: WHO. 2013. *Essential Nutrition Actions: Improving Maternal, Newborn, Infant and Young Child Health and Nutrition*. Geneva: WHO.

*Children from areas of known vitamin A deficiency or where measles case fatality is likely to be more than 1% should receive 2 doses, given 24 hours apart, to help prevent eye damage and blindness. Children with clinical signs of vitamin A deficiency (e.g., Bitot's spots), should receive a third dose 4–6 weeks later.

**Where the diet does not include fortified foods or the prevalence of anaemia in children at approximately 1 year of age is above 40 percent

Annex 9 is a simple algorithm for management of acute malnutrition in children 6 months to 14 years of age.

Chapter 6. Nutrition and Antiretroviral Therapy

There is no cure for HIV, but antiretroviral medications can mitigate the effects of HIV by lowering the viral load, thus reducing morbidity and mortality.

ART improves quality of life and survival for people with HIV. Optimal timing of ART initiation is important to reduce the risk of death, disease progression including TB and serious adverse events. WHO recommends initiating ART for:

- All adolescents and adults in WHO stages 3 and 4, regardless of CD4 cell count
- All adolescents and adults with CD4 count < 350 cells/mm^3, regardless of clinical symptoms

ARVs are divided into the following types:

- Non-nucleoside reverse transcriptase inhibitors
- Nucleoside reverse transcriptase inhibitors
- Protease inhibitors
- Fusion inhibitors (entry inhibitors)

ARVs are usually given in combination (combination therapy) to produce a synergistic effect. This is currently the recommended method of treating HIV-infected clients.

6.1. Medication-Food Interactions

ARVs can negatively change the way the body uses fat, protein and energy. Some ARVs affect nutrient availability, absorption and utilisation. Some foods reduce the effectiveness of certain ARVs and other medications by interfering with their absorption, metabolism, distribution and excretion. ARV side effects can reduce food intake, absorption of nutrients and adherence to the medications. Side effects may be a sign of an opportunistic infection (OI) or other problems requiring medical treatment.

People with HIV can usually manage metabolic changes and other side effects without stopping treatment by making changes in their diets. Health care providers should give people with HIV updated information on medication-food interactions to mitigate such interactions and side effects. Table 15 lists ARVs used in Tanzania along with guidance on how to take them and possible side effects.

Table 15. Nutrition guidance for ARVs

Medication	Nutrition guidance	Possible side effects
Antiretroviral medications (ARVs)		
Nucleoside and nucleotide reverse transcriptase inhibitors (NRTIs)		
Abacavir (ABC)	Take with or without food, but taking with food reduces side effects. Alcohol increases levels of side effects.	Nausea, vomiting, fever, allergic reaction, anorexia, abdominal pain, diarrhoea, anaemia, rash, hypotension, pancreatitis, dyspnea, weakness and insomnia, cough, headache
Emtricitabine (FTC)	Take with or without food.	
Lamivudine (3TC)	Take with or without food. Avoid alcohol.	Nausea, vomiting, headache, dizziness, diarrhoea, anaemia, abdominal pain, nasal symptoms, cough, fatigue, pancreatitis
Tenofovir (TDF)	Take with or without food.	Headache, diarrhoea, nausea, vomiting, abdominal pain, rash, headache, flatulence, anorexia, dizziness, insomnia, depression, sweating, renal function impairment
Zidovudine (ZDV, AZT)	Take with or without food, but NOT a high-fat meal. Avoid alcohol.	Anorexia, anaemia, nausea, vomiting, bone marrow suppression, headache, fatigue, constipation, fever, dizziness, dyspnea, insomnia, muscle pain, rash
Non-nucleoside reverse transcriptase inhibitors (NNRTIs)		
Efavirenz (EFZ)	Take with or without food, but NOT with a high-fat meal. Take just before bedtime. Avoid alcohol.	Elevated blood cholesterol levels, elevated triglycerides, rash, dizziness, anorexia, nausea, vomiting, diarrhoea, dyspepsia, abdominal pain, flatulence
Nevirapine (NVP)	Take with or without food. Avoid St. John's wort.	Nausea, vomiting, rash, fever, headache, skin reactions, fatigue, stomatitis, abdominal pain, drowsiness,

Medication	Nutrition guidance	Possible side effects
		paresthaesia, high hepatoxicity
Protease inhibitors (PIs)		
Atazanavir (IDV)	Take with food.	Gastrointestinal complaints, renal toxicity (especially when renal function is already reduced)
Lopinavir/ Ritonavir (LPV/r)	Take with or without food. Avoid St. John´s wort.	Nausea, vomiting, weakness, diarrhoea, headache, dizziness, abdominal pain, fever, diabetes, anorexia, hepatitis, jaundice
Nelfinavir (NFV)	Take with meal or light snack. Avoid St. John´s wort.	Diarrhoea, flatulence, nausea, abdominal pain, rash; possible increased risk of lipodystrophy
Ritonavir (RTV)	Take with food. Avoid St. John´s wort.	Nausea, vomiting, diarrhoea, hepatitis, jaundice, weakness, anorexia, abdominal pain, fever, diabetes, headache, dizziness, possible increased risk of lipodystrophy
Once daily single tablet regimen		
Atripla (Efavirenz, Emtricitabine, Tenofovir (EFV/FTC/TDF)	Take on an empty stomach, preferably at bedtime. Avoid alcohol.	See above for Efavirenz, Emtricitabine and Tenofovir.
TLE Fixed Dose Combination (Efavirenz, Lamivudine, Tenofovir)	Take with or without food.	See above for Efavirenz, Lamivudine and Tenofovir.
Atanazavir/Ritonavir /Tenofovir (ATV/r/FTC/TDF)	Take with food.	See above for Atanazavir, Ritonavir and Tenofovir.

Medication	Nutrition guidance	Possible side effects
Antibacterial medications for TB		
Isoniazid	Take on an empty stomach, 1 hour before or 2 hours after a meal. This medication increases the body's requirement for pyroxidine, folate, niacin and magnesium.	Hepatitis, constipation, anaemia, fatigue
Rifampicin	Take on an empty stomach, 1 hour before or 2 hours after a meal. Supplement with 10 mg vitamin B6 daily. Do not take with alcohol.	Gastrointestinal irritation, anaemia, jaundice, pancreatitis, altered taste, anorexia

6.2. Counselling Messages on Nutrition and ART

People on ART need counselling on appropriate and adequate nutrition to achieve the full benefits of their medications. Below are key counselling messages on nutrition and ART.

1. **HIV affects nutrition.**
   - HIV increases the body's nutritional requirements.
   - HIV leads to opportunistic infections, which are often associated with increased nutrition requirements and decreased food intake.
   - Increased nutrient requirements coupled with poor food intake and absorption may lead to poor nutritional status.
2. **Good nutrition for people on antiretroviral medications (ARVs) can:**
   - Strengthen the body's ability to fight disease.
   - Reduce opportunistic infections and slow progression of HIV to AIDS.
   - Improve the effectiveness of ART.
   - Help in management of side effects.
3. **ARVs may cause side effects such as nausea, vomiting, or diarrhoea.**
   - Not everyone experiences medication side effects, and they usually stop after 6 weeks when the body gets used to the ARVs.
   - ARV side effects can reduce food intake or nutrient absorption.
   - Not all symptoms are the result of medication side effects. Symptoms may instead be a sign of an infection or other problem that requires medical treatment.

4. **Food and ARVs can interact**
   - Some ARVs affect the availability, absorption and utilisation of nutrients.
   - Some foods taken with ARVs may reduce ARV effectiveness and worsen side effects.
   - Some ARVs require drinking plenty of boiled or treated water to avoid side effects or complications that can affect important body organs such as the kidneys.
5. **Diet can help maximise the effectiveness of ARVs, ensure good nutrition and minimise side effects.**
   - Take ARVs as prescribed, completing the full course and following the recommended timing and dosage. Taking ARVs irregularly or at smaller amounts than prescribed reduces the ART effectiveness and can lead to ARV-resistant strains of HIV.
   - Follow your health care providers' recommendations for when to take ARVs in relation to meals.
   - Change your lifestyle by avoiding alcohol, which can interfere with the effectiveness of ARVs, getting exercise to reduce fat accumulation and improve blood triglyceride levels and stopping smoking, which is a risk factor for non-communicable diseases.

6.3. Herbal Treatments and Diet Supplements

Some people with HIV take herbal and traditional medicines to treat various ailments. Herbs can enhance the taste and smell of food and improve appetite, but they may also interfere with the effects of ARVs, have negative effects on the body and/or restrict food intake. Many traditional medicines have not been subjected to formal clinical research and may interact with ARVs. Moreover, their toxicity and effect on the course of HIV infection are unknown.

People with HIV can use herbal and traditional medicines as long as these preparations:

- Do not interfere with ART (e.g., high doses of garlic may reduce the effectiveness of Saquinavir and St. John's wort reduces the effectiveness of Nevirapine, Indinavir and Ritonavir)
- Are used as supplements and not as replacements for standard therapy
- Can prevent, alleviate, or cure symptoms (e.g., lower blood pressure, increase energy, improve digestion, reduce severity of diarrhoea, or reduce depression)
- Are not toxic and do not overburden the body's ability to metabolise and eliminate them

Health care providers should ask people with HIV whether they are taking herbs and traditional therapies and advise them about any harmful effects these may have. (For example, fasting can cause weight loss). They should also inform clients about the benefits and negative side effects of herbal preparations.

Dietary supplements are available as single or multiple micronutrients, alone or with herbal formulations. Dietary supplements should not replace other food. Taking several of these formulations at the same time may increase the risk of overload and side effects. This risk is greater for fat-soluble vitamins (vitamins A, D, E and K) than for water-soluble vitamins. People with HIV should consult medical staff or nutritionists before taking any supplements.

Chapter 7. Dietary Management of HIV-Related Symptoms and Medication Side Effects

HIV can cause symptoms that affect eating and digestion, causing weight loss and weakening the immune system. Different complications associated with HIV may require different dietary management strategies, and recommendations for one symptom or side effect may create problems for another. Health care providers should ask people with HIV what symptoms they are experiencing before providing dietary advice. Many symptoms can be managed by changing eating habits. Below is a list of HIV-related symptoms and ways to manage them through diet.

7.1. HIV-Related Symptoms

Anorexia (appetite loss)

- Stimulate appetite by eating favourite foods.
- Eat small amounts of energy-dense food more often.
- Avoid strong-smelling foods.
- If you don't like the taste or smell or a certain food, try alternative foods, for example, eating fish, chicken, beans or dairy products instead of meat.
- Use spices such as garlic, cinnamon and ginger to improve flavour, stimulate appetite and help digestion.
- Add a small amount of fat or oil to food to increase its energy content and make it easier to swallow.
- Drink plenty of fluids such as boiled or treated water between meals rather than during meals.
- Drink lemon juice in boiled or treated water to stimulate appetite.
- Get physical exercise to stimulate appetite.
- Rinse your mouth and brush your teeth regularly.
- Avoid alcohol, which reduces appetite.
- If appetite loss is a result of illness, seek medical treatment.
- Add sugar to bitter or unpleasant-tasting foods.

Diarrhoea (three or more watery or loose stools in 24 hours)

- Eat small amounts of food frequently.
- Continue to eat after each episode of diarrhoea to recover weight and replace lost nutrients.
- Drink plenty of fluids (boiled or treated water, rice soup/porridge, coconut water, fruit juice or herbal tea) to avoid dehydration.
- Drink between meals rather than during meals.
- Eat slowly and chew well to facilitate digestion.

- Avoid acidic fruits such as oranges, tangerines and pineapples, which can irritate the stomach.
- Eat foods rich in fibre (millet, banana, green bananas, cassava, peas and lentils) to prevent diarrhoea.
- Eat fermented foods such as sour milk, yoghurt or *togwa*.
- Eat easily digestible foods such as rice, bread, millet or maize porridge, potatoes, sweet potatoes and crackers.
- Eat soft or mashed fruits and vegetables such as bananas, squash, cooked and mashed green bananas, mashed sweet potato and mashed carrots.
- Eat vegetable soups made of carrots, pumpkins, spinach or amaranth to replace the minerals lost through diarrhoea (avoid acidic vegetables such as onions and tomatoes).
- Avoid caffeinated drinks (coffee, tea and cola), which inhibit the absorption of some vitamins and minerals and cause the body to lose water.
- Avoid strong spices such as curry and chili, which can irritate the gut.
- Avoid alcohol, which causes the body to lose water.
- Avoid fatty foods, fried foods and extra oil, lard or butter.
- Avoid gas-forming foods such as cabbage, onions, green peppers and carbonated soft drinks.
- Prepare food fresh whenever possible. If you have to eat leftovers, reheat them thoroughly to avoid infection.
- Go to a health care facility if you have little or no urine, fainting, dizziness, shortness of breath, bloody stools, high fever, vomiting, severe abdominal pain or diarrhoea for more than 3 days.

Fever

- Eat energy- and nutrient-rich foods such as soups made of maize, potatoes carrots, *togwa* or germinated porridge.
- Drink plenty of fluids such as boiled or treated water, citrus fruit juice, lemon tea or coconut water to prevent dehydration.
- Eat small, frequent meals as tolerated.
- Go to a health care facility if you have severe body pain, yellow eyes, severe diarrhoea, convulsions, seizures or fever that lasts several days and is not relieved with aspirin or Panadol.

Nausea and vomiting

- Eat small amounts of food frequently and chew food properly to facilitate digestion. An empty stomach makes nausea worse.
- Eat soups, unsweetened porridge and fruits such as bananas.
- Eat lightly salted and dry foods such as crackers to calm the stomach.
- Drink plenty of fluids including boiled or treated water, soup, juices, coconut water, herbal teas or lemon juice in hot water after meals and between meals.

- Avoid spicy, strong-flavoured foods.
- Avoid fatty and sugary foods.
- Avoid coffee, tea and alcohol, which interfere with the absorption of nutrients.
- Avoid lying down immediately after eating—wait at least 20 minutes.
- Avoid food and smells that trigger nausea.
- Try eating sour or salty foods or drinking lemon juice in hot boiled or treated water, herbal teas or ginger drinks to reduce nausea.
- Try smelling fresh orange or lemon peel to reduce nausea.
- Eat in the open air or increase the room ventilation when preparing food or eating.
- Sit up or lie on a high pillow when eating and wait at least 1 hour after eating before lying down to avoid vomiting.

Thrush or mouth sores

- Eat small amounts of food frequently. Avoid an empty stomach, which makes nausea worse.
- Eat soft, mashed or moist foods such as potatoes, pumpkin, avocado, pawpaw, bananas, carrots, scrambled eggs and porridge.
- Eat foods cold or at room temperature.
- Avoid spicy, salty or sticky foods that may irritate mouth sores.
- Avoid very hot or very cold food and drinks.
- Avoid sour citrus fruits and juices such as oranges, tangerines and pineapples, which may irritate mouth sores.
- Avoid sugary foods that cause yeast to grow. If you eat sugary foods or drink sugary drinks, rinse your mouth thoroughly with boiled or treated water afterwards.
- Avoid rough, coarse, hard or dry foods such as chips, crisps, roasted maize, popcorn or raw vegetables.
- Drink plenty of fluids including boiled or treated water, soups and non-sour fruit juices.
- Avoid alcohol, which can irritate the membranes of the mouth.
- Use a spoon or cup to eat small amounts of foods.
- Drink sour milk to prevent yeast from growing.
- Rinse your mouth with boiled warm, salty water after eating to reduce irritation and keep infected areas clean so yeast cannot grow.

Constipation

- Eat high-fibre foods such as green vegetables, legumes, maize, millet, whole wheat bread, green vegetables and washed fruits with the peel.
- Drink plenty of liquids, including boiled or treated water, fruit juices, coconut water, *togwa* and soups.
- Avoid processed and refined foods.

- Avoid cleansing practices such as enemas and medications.
- Increase physical activity.

Bloating or heartburn

- Eat small, frequent meals.
- Eat slowly and chew food properly to facilitate digestion.
- Eat boiled or steamed foods instead of fried foods.
- Avoid gas-forming foods such as beans, cabbage, onions and carbonated drinks.
- Drink plenty of fluids including boiled or treated water.
- Do not eat within 1 hour of bedtime so food can digest before you sleep.
- Avoid acidic juices and soups such as citrus fruit juice and tomato soup.
- Avoid alcohol, coffee and spices such as curry and chilli, which stimulate gastric acid.

Loss of taste or taste changes

- Eat small amounts of food more often.
- Get regular physical exercise to increase appetite.
- Use salt, spices, herbs and lemon to enhance the flavour of food.
- Chew food well and move it around in the mouth to stimulate receptors.

Anaemia

- Eat iron-rich animal-source foods such as eggs, *dagaa*, fish, meat and liver, which contain iron that is easily absorbed in the gut.
- Eat iron-rich plant-source foods such as amaranth, spinach, cassava leaves, sweet potato leaves, pumpkin leaves, beans, peas, pigeon peas, nuts and fortified cereals.
- Eat fruits rich in vitamin C such as guava, oranges, tangerines, baobab fruit, tamarind, passion fruit and pineapple with meals to enhance iron absorption.
- Ask your health care provider if you should take a daily iron tablet. If so, take it with a source of vitamin C, such as tomatoes or orange juice, to help absorption.
- Drink plenty of fluids, including boiled or treated water, to avoid constipation.
- Avoid tea or coffee, which inhibit iron absorption.
- Seek treatment for malaria and hookworm.

Muscle wasting

- Eat a variety of nutritious foods more often.
- Increase protein in your diet by eating more meat, fish, eggs, beans, lentils and nuts.
- Increase the energy density of food by adding fat, oil, sugar, honey, oil seeds, nuts, milk or eggs.

- Eat more starchy foods (maize, rice, porridge).
- Eat snacks (nuts, fruit, roasted bananas, cassava or potatoes) between meals.
- Drink boiled or treated water and other fluids before or after meals but not with meals.
- Drink non-alcoholic fermented foods such as *togwa* and sour milk to improve absorption of nutrients.
- Add lime or lemon juice or their grated rind to fatty foods to enhance fat digestion and absorption.
- Chew food well before swallowing to ease digestion.
- Do regular weight-bearing exercise to build muscles and help your body use protein better.

Skin rashes, sores and dry patches

- Eat foods rich in vitamin A, C and folate such as liver, dairy products, kidney, eggs, fish, dark green leafy vegetables, pumpkin, red palm oil, carrots, avocado, yellow sweet potatoes and fruit.
- Eat foods rich in B vitamins such as beans, whole grain cereals, brown bread, fish, meat and organ meat.

7.2. Complications Associated with Long-Term ART

Abnormal blood sugar levels (dysglycaemia), or **disorders of glucose metabolism**, are usually diagnosed through periodic fasting glucose determinations or a 2-hour oral glucose tolerance test. Mild cases respond to dietary intervention.

- Increase exercise.
- Avoid refined carbohydrates, sugars and poor-quality fats.

Dyslipidaemia (high blood cholesterol) is associated with an increased risk of coronary or cerebral vascular morbidity and mortality.

- Increase exercise.
- Eat more fruits, vegetables and fish.
- Avoid processed foods, sugar and fats.
- Stop smoking.
- Avoid alcohol.

Lipodystrophy is a disturbance in the way the body produces, uses and distributes fat. People with HIV on ART may show changes in body shape from changes in fat distribution. **Lipoatrophy**, or subcutaneous fat loss, is most common in the face, extremities and buttocks. **Lipohypertrophy**, or increased deposit of fat, can appear as a 'paunch' on the stomach, a 'buffalo hump' on the back or on the breasts. Suggested diet-related management of lipodystrophy includes:

- Eat more fibre, fruits and vegetables.

- Reduce fat intake.
- Replace saturated fats with omega-3 polyunsaturated fats (e.g., fish oil).
- Seek advice from appropriate health care providers.

Osteopenia refers to early signs of bone loss that can turn into **osteoporosis**, a disease that weaken bones. This has been described in patients on combined ART, who are advised to:

- Increase exercise.
- Eat more calcium-rich foods (green vegetables, fruits and dairy products) or take calcium supplements.
- Reduce intake of salt, sweet carbonated drinks, and caffeine.
- Stop smoking.

Annex 5 includes recipes for food and drinks to help manage HIV-related symptoms.

Chapter 8. Food and Water Safety and Hygiene

Safe food and water contains no dangerous germs or toxic chemicals at levels that could damage health. Diarrhoea is the most common symptom of illness from contaminated food and water. Anyone can get sick from food- or water-borne illnesses. Healthy people sometimes have stomach pains, diarrhoea, nausea, or vomiting from eating contaminated or spoiled food or drinking unclean water.

Food and water safety are important for people with HIV because their low immunity puts them at higher risk of infection. They also experience more severe symptoms from food- and water-borne illnesses, such as meningitis, which affect nutrient intake and absorption and increase the need for nutrients to fight infection. People with HIV may also have a hard time recovering from illness. Food- and water-borne illnesses can cause weight loss and further lower the body's resistance to other infections.

8.1. Causes of Food- and Water-Borne Illness

Humans carry germs (bacteria, viruses, yeasts, moulds and parasites) in their mouths and intestines and on their skin, hands and fingernails. Germs are commonly found in human and animal faeces, soil (1 teaspoon of soil contains more than 1 billion germs) and contaminated food and water. Most of these germs do not change the appearance, taste, or smell of food or water.

Poor water, sanitation and hygiene (WASH) practices can lead to a gut disorder called environmental enteropathy, which results from exposure to microbes in faeces. This leads to a sub-clinical infection characterized by inflammation and flattening of the villi (finger-like projections that protrude from the lining of the intestine to collect nutrients from food). This limits the body's ability to absorb nutrients while increasing exposure to toxic microbes. These structural changes in the gut also divert energy from fighting infection.

Hands are one of the most common ways to move germs. Raw and under-cooked chicken, meat, fish and eggs; milk; contaminated raw vegetables; raw and smoked fish and unsafe water are ideal places for germs to multiply.

Toxins are another cause of food and water contamination. These include natural toxins, metals and environmental pollutants; chemicals used for treating animals; improperly used pesticides; chemicals used for cleaning; and some food additives. Aflatoxin, a natural toxin which may be caused by mould growing on maize and groundnuts stored in damp places, may have harmful effects on the liver that can lead to cancer. If not processed well, some cassava varieties may cause cyanide poisoning, which in severe cases may lead to kidney failure and death. Washing and peeling fruits and vegetables may reduce exposure to chemicals found on the surface of foods, and appropriate storage can help avoid or reduce the formation of some natural toxins.

People who live or eat food grown near highways or roads may have increased levels of lead from fuel exhaust in their bodies. Lead is toxic to many organs and tissues and interferes with the development of the nervous system, causing learning and behavioural problems in children. People can also be exposed to lead from contaminated water, soil, food and products such as paint. Cookware and utensils glazed with materials containing heavy metals such as lead or cadmium can cause chemical poisoning. Chemicals used for cleaning can be toxic. It is important to read

8.2. Food Safety

and understand the instructions on the labels of these products.

No food is 100 percent safe at all times, but people with HIV and caregivers of HIV-affected children can reduce the risk of disease from contaminated food by following the simple rules below.

1. **Wash hands properly**—this is one of the most effective ways to prevent disease occurrence and transmission. Handwashing is a simple action that everyone does every day, but it has to be done correctly to prevent infection.
    - Wet hands and lather them with soap or ash.
    - Rub hands together and scrub all surfaces, including under the nails.
    - Rinse hands well under clean running water.
    - Shake off the excess water (cloths or towels used by other people can quickly become contaminated with germs).
    - Wash hands *before* handling or preparing food, cooking, eating, breastfeeding, giving or taking medicine or caring for a sick person.
    - Wash hands *after* handling or preparing food, using the toilet, sneezing or blowing your nose, changing or cleaning an infant, touching animals or caring for a sick person.

2. **Keep food preparation areas and utensils clean.**
    - Wash all surfaces and equipment used for preparing or serving food with soap and water or bleach.
    - Protect kitchen areas, food and utensils from insects and other animals.

3. **Separate raw and cooked food.**
    - Separate raw meat, poultry, fish and seafood from other foods.
    - Use separate equipment and utensils such as knives and cutting boards for handling raw foods.
    - Store foods in covered containers to avoid contact between raw and cooked foods.

4. **Eat clean and safe food.**
    - Wash fruits and vegetables well in clean, safe water.
    - Throw away bruised, mouldy or rotten fruit or vegetables.

- Do not buy or eat cracked eggs.
- Do not eat raw eggs, meat or fish.
- When cooking meat or poultry, make sure juices are clear and not pink.
- Bring soups and stews to a boil.
- Keep food covered to keep flies and other insects away from it.
- Reheat cooked food thoroughly, bringing it to a boil or heating it until too hot to touch.
- Drink pasteurised milk or boil unpasteurised milk before using.
- Cover all wounds to prevent contamination of food during preparation and handling.
- Avoid eating food prepared on the street because vendors may not prepare the food hygienically.

5. **Store food properly.**
    - Keep food storage areas dry and clean.
    - Do not eat packaged food that has passed its expiry date.
    - Do not eat food from dented or bulging tins.
    - Do not leave cooked food out at room temperature for more than 2 hours.
    - Do not eat food that has been frozen, thawed and then refrozen.
    - Serve freshly prepared food to people with HIV and to infants and young children—do not store it after cooking.
6. **Bury or burn garbage** or dispose of it as far away from the home as possible.

8.3. Water Safety

Contaminated water is an especially serious health risk for people with HIV because they are highly vulnerable to infection. Flies, cockroaches and rodents can contaminate drinking water. People can reduce the risk of disease from contaminated water by following the simple rules below.

1. **Boil or treat water** used for drinking, preparing food and taking medicines.
    - If water looks dirty, have it settle until it is clear and pour it into a new container, leaving the dirt behind OR filter it through a clean cloth.
    - Then boil the water until large bubbles appear OR treat the water with chlorine or another disinfectant recommended by the health service provider to destroy germs.
2. **Store water safely.**
    - Store cooled boiled water or treated water in a safe container with a small opening, a tight-fitting lid and if possible a tap (spigot) to protect the water from contamination.
    - Clean water containers regularly with soap and clean water.

- Use a ladle to scoop water out of containers such as pots or buckets with wide openings that expose the water to bacteria.
- Do not drink boiled water that has been stored for more than 24 hours, as it can easily become contaminated again.

Chapter 9. Continuum of Care for People with HIV

Continuum of care is an integrated system that follows clients over time from health facilities to the community and home and back to health facilities. This ensures that people receive all the medical, social and other services they need and do not relapse into malnutrition once they recover from treatment. A strong continuum of care between clinical services and HIV-affected households ensures comprehensive care and support for malnourished people with HIV and allows faster recovery from malnutrition.

Many malnourished people with HIV are not detected because they may not realise the importance of nutrition, know the signs of malnutrition or go to health facilities for nutrition or other services. They may be reluctant to seek care because of the stigma associated with HIV. They may not know about existing services, or they may live far from health facilities. Some health care providers may not know why nutrition is important for people with HIV or how to identify the signs of malnutrition.

Nutrition care is important in both the early and late stages of HIV infection to restore immunity and strength and maximise the effectiveness of ART. Many families care for people with HIV at home. This is not an easy task. Caregivers need support to make sure people with HIV eat an adequate diet, take medications as directed and attend follow-up clinic visits.

People with HIV can face loss of income, high medical expenses, stress, depression and isolation. Family members, community and religious leaders, volunteers, government officials, NGOs and other community groups can provide essential support to help them maintain a healthy nutritional status.

9.1. Community Mobilisation

Community mobilisation is an essential component of both care and support of people with HIV and management of malnutrition. It extends the continuum of care from ART and PMTCT services to community-based services for referral and follow-up. Community members and groups can screen people for malnutrition, raise awareness of the importance of nutrition and ways to prevent malnutrition and follow up people on ARVs to ensure they adhere to their medications and seek treatment for infections. Outpatient care without community outreach does not result in high service coverage or uptake.

Community care and support can help people with HIV and their families address their psychosocial, emotional, social, spiritual, health and material needs and serve as a link between health facility care and the social welfare sector.

Community mobilisation can:

- Increase understanding of the importance of nutrition for people with HIV.
- Raise awareness of available HIV and nutrition services.

- Find acutely malnourished people and refer them for care and HIV testing if their status is unknown.
- Increase client coverage and follow-up.
- Allow early detection and follow-up of malnourished people with HIV to improve clinical outcomes and relieve the pressure on inpatient services.
- Provide an alternative source of nutrition information and counselling for people with HIV that may not visit health facilities because of HIV-related stigma.

Community volunteers, community extension workers and HBC providers can link prevention and treatment of malnutrition for HIV-positive people and HIV-exposed children to increase coverage and follow-up of these groups. HBC provides care and support outside the hospital to people with prolonged illness and their families. HBC can be provided through clinics, NGOs, community support groups or social welfare services. These community workers can improve nutritional status by:

- Measuring mid-upper arm circumference (MUAC) and checking for bilateral pitting oedema.
- Counselling on how to improve diet and manage symptoms of illness and medication side effects through diet.
- Demonstrating preparation and use of specialised food products.
- Demonstrating how to prepare healthy meals using available foods.
- Encouraging people with HIV to return for scheduled health facility visits.
- Counselling people on the importance of HIV testing, ART and adherence to prescribed ART regimens.
- Providing nutrition education in community meetings, including distributing nutrition education materials.

To increase the coverage and uptake of nutrition services and help improve clinical outcomes for people with HIV, local government authorities (LGAs) can:

- Disseminate information on how to prevent new HIV infections.
- Disseminate messages to reduce stigma and discrimination against people with HIV.
- Sensitise communities on the importance of seeking nutrition services.
- Facilitate monitoring of food security in households affected by HIV.
- Include nutrition-related actions in annual plans and budgets.
- Map places where people with HIV can access food, health, agricultural extension, financial and social services.
- Coordinate and facilitate the work of extension staff in providing technical support to improve food security in households with HIV-positive people.
- Mobilise resources and support to implement activities to improve the nutritional status of people with HIV.
- Build the capacity of ward and village governments to improve the nutritional status of HIV-positive people and HIV-exposed children.

- Coordinate stakeholders in implementing guidelines and policies to improve nutrition.
- Report on the local nutrition and HIV situation to communities and to higher levels of government.

Networks and support groups can encourage members to practice healthy nutrition behaviours and refer malnourished members to HIV and nutrition services or to other support in the community. Local media can inform communities about nutrition services and disseminate messages on the importance of good nutrition for people with HIV.

Client follow-up starts from the time the client and health care provider agree on a return date and ends when the client is lost to follow-up, moves or dies. Follow-up involves providing required services to clients after the first service delivery contact, including ensuring that they are able to follow recommended treatment and advice.

Health facility follow-up. People with HIV need regular follow-up in health facilities to:

- Assess nutritional status.
- Assess ART eligibility.
- Check CD4 count and other biochemical reactions.
- Manage side effects of medications.
- Screen for, treat and counsel on management of anaemia and opportunistic infections.
- Assess response to treatment and adherence to medication.
- Provide nutrition counselling based on assessment results.
- Refill prescriptions for ART.

Community follow-up. Community workers can support and reinforce needed health facility follow-up of people with HIV to improve clinical outcomes by:

- Screening children and adults with HIV for malnutrition
- Encouraging people with HIV to return for scheduled health facility visits
- Counselling on the importance of taking ARVs as directed
- Counselling on how to manage medication-related side effects and symptoms of opportunistic infections through diet
- Encouraging family members to be tested for HIV if they do not know their status

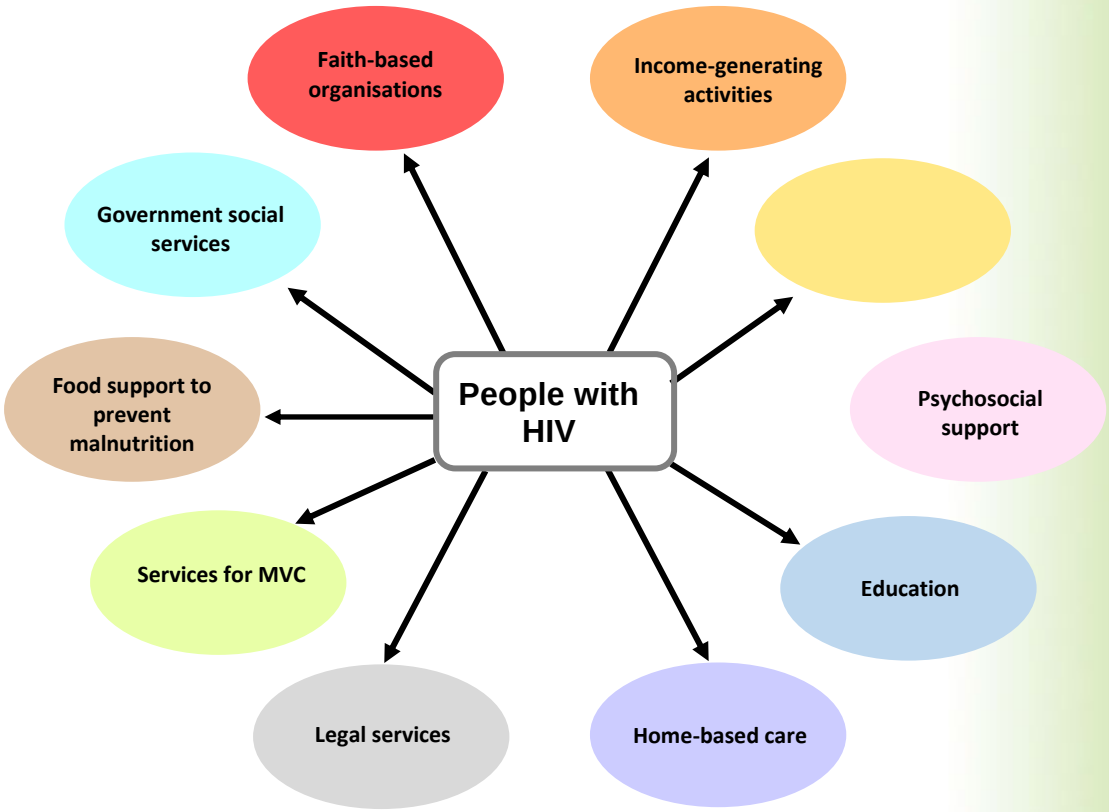
Referral is sending or directing a client to seek care or services that are not offered at the current contact point. Most admissions into health facility nutrition care may come through community referrals. Establishing or strengthening referral linkages between health facilities and community support services ensures that malnourished people with HIV receive the care and support they need to improve clinical and nutrition outcomes.

Health care providers can refer People with HIV to needed support in the catchment communities of their facilities. These services can include food support, spiritual care, legal services, psychosocial support, economic strengthening, livelihood and food security (ES/L/FS) support and services to mitigate gender-based violence.

Community workers can refer people with HIV that show signs of acute malnutrition or medical complications to health facilities for further assessment and treatment. Community referral and follow-up can ensure that people with HIV receive early treatment for opportunistic infections, timely treatment of malnutrition and interventions to reduce transmission of HIV from mother to child.

Strong referral links require an inventory of community support services available in the vicinity of ART clinics. Types of support are shown in figure 3.

Figure 3. Types of support services available in health facility catchment areas



HIV places additional demands on individuals and households to meet nutritional requirements. It increases health costs and exposes poor households to additional economic risks. Economic strengthening, livelihoods and food security (ES/L/FS) support is an important component of extending the continuum of care. Better nutrition prevents relapse into clinical care, improves economic resilience to shocks and reduces exposure to additional risk. Groups of people with HIV that are most vulnerable to the nutritional effects of food insecurity are children under 5, women of childbearing age, the elderly, people with disabilities and orphans.

The 1996 World Food Summit defined food security as 'all people at all times having access to safe and sufficient food to meet their dietary needs for a productive and healthy life'. Household food security depends on income and assets, including land and other productive resources. HIV affects the four components of food security listed below (FAO 2008):

- **Availability:** A reliable and consistent supply of food
- **Access:** Enough resources to buy appropriate foods for an adequate diet
- **Utilisation:** The body's optimal use of the nutrients in food
- **Stability:** Ability to access and utilise food over time, depending on weather, the political situation, economic factors, unemployment and food prices

HIV-affected households may be food insecure because:

- Illness and weakness make it difficult to work, reducing food production and earnings.
- Caregivers of people with HIV have less time for food production or income generating activities.
- Households may spend their assets, savings and income on health care instead of nutritious food or productive activities.
- HIV-affected households may reduce food intake or skip meals.
- HIV-affected households may lose part of their land or livestock and have to grow less labour-intensive crops, affecting household food consumption.
- Farming families may shift to non-labour intensive activities to compensate for labour lost to AIDS.
- Children may be forced to prepare food if women have to care for sick family members, leading to compromised nutrition.
- Premature death of people with HIV can mean loss of knowledge about food production and other livelihood strategies.
- Economic pressures may lead to poverty and risky survival strategies such as selling sex for food and money, sending children to work, crime and drug abuse.
- Inter-generational knowledge of crop and livestock production and other livelihood strategies is lost when people with HIV die prematurely.

Actions to improve food security

Actions to improve food security and nutritional status of HIV-positive people and HIV-affected families can be implemented at the household, community and national levels. These may include dietary diversification, increased production of nutritious, low-cost and low-labour-intensive crops, income generation activities and gardening and livestock rearing for food and income. The following nutrition actions can help people with HIV and families affected by HIV improve their food security:

- **Households**
  - Distribute food equitably among household members.
  - Improve food preparation to minimize nutrient loss and enhance nutrient bioavailability.
  - Store and process food to minimize post-harvest losses.
  - Practice good food and water safety and hygiene.
  - Buy locally available and seasonal nutritious foods, which may be cheaper.
  - Garden, raise small livestock and poultry or engage in off-farm activities such as petty business and handicrafts.
  - Seek assistance from government or other institutions, including civil society organizations.

- **Ward Development Committees (WDCs)**
  - Initiate and monitor actions to improve household food security for HIV-affected households.
  - Include actions to improve household food security in ward development plans and budgets;
  - Coordinate and support extension staff to provide technical support to improve food security in households with people with HIV.
  - Ensure implementation of policies and legislation aimed at improving household food security for people with HIV.

- **District Councils**
  - Build ward and village government capacity to implement actions to improve household food security for people with HIV.
  - Support implementation of government policies, guidelines, legislation and actions to improve household food security.
  - Mobilise resources and collaborate with partners in planning and implementing actions for improving household food security.
  - Provide quality health, agricultural extension, financial and other social services.
  - Coordinate government and partner actions aimed at improving household food security to avoid duplication of efforts.
  - Link villages and wards to community food assistance, health, social and financial support.

- Supervise and facilitate monitoring and evaluation of household food security.

- **National Government**
  - Formulate policies, guidelines, legislation and actions to improve household food security.
  - Build the capacity of regional and district implementers and institutions to strengthen actions to improve household food security.
  - Mobilise resources for improving household food security.
  - Coordinate partner planning, budgeting and monitoring of actions to improve household food security.
  - Facilitate provision of quality health, nutrition, agricultural extension, financial and other social services.
  - Facilitate supportive supervision of district monitoring and evaluation of household food security actions.

- **Development partners and community-based organisations**
  - Refer food-insecure and resource-poor clients to ES/L/FS services to help them improve their diet.
  - Promote consumption of locally available, nutritious foods.
  - Provide education on how to store and process food to minimize post-harvest losses.
  - Refer vulnerable people with HIV who depend on agriculture to programmes that link to markets for labour-saving technologies such as safe and efficient stoves, efficient and hygienic food preservation methods, lighter agricultural tools and crops that require less tillage.
  - Link people with HIV to village support systems that provide labour for land clearing, ploughing, weeding, harvesting and food storage.
  - Provide food support to HIV-affected households.
  - Help HIV-affected households plan for the 'hungry season' when supplies of some foods are low or non-existent.
  - Include nutrition education for people with HIV in community-based gardening and poultry and small livestock-rearing initiatives.

Some HIV-affected households may need ***food support*** to prevent malnutrition. Food support can also act as an incentive to promote use of HIV services. Food support can encourage most vulnerable children (MVC) to attend school rather than working to earn income. Food aid is a short- to medium-term intervention. Food support may be provided as 'dry rations' or 'wet rations'. 'Dry rations' are given to households. If the food is sold, shared or split, it may not reach the most vulnerable household members. 'Wet rations' are food that has been prepared in a central place such as a school or camp to be eaten as a meal or snack.

TFNC's Household Food Security Tool in Annex 10 is used to identify households that are eligible for food support. This tool, dietary assessment and other tools can be used to measure the following household food security indicators:

- Insufficient food produced in the household to meet nutritional requirements
- Only a small portion of produce left for consumption
- Disproportionate share of income spent on food
- Inadequate amount of calories consumed by household members
- Inadequate food stock in the household
- Dependency on income from HIV-positive household members
- Small income from labour-intensive sources
- Sale of livestock and household assets
- Visible signs of malnutrition

Food support ration sizes are calculated by considering:

- The average household requirement, including increased energy needs of pregnant and lactating women, children under 5 and HIV-positive members
- Quantities to provide 30–40 percent of energy needs for targeted beneficiaries
- Food losses (wastage, spoilage, sharing, sale, theft)

Other support to improve food security includes cash transfers and income-generating activities. Cash transfers can help reduce high-risk sexual behaviours and help pay for transport to health facilities and the purchase of nutritious food. Community-based food security initiatives such as gardening, livestock rearing and other income-generating activities avoid or reduce dependency on food or cash support. Food security support should be integrated into local services as much as possible. However, these services should not overtask staff and resources or distract from their original responsibilities. Recipients and families should be oriented on the purpose of the food security support.

Chapter 10. Monitoring and Evaluating the Use of the Guidelines

It is important to assess the use and effectiveness of the guidelines in meeting their objectives (see Section 1.2. *National Guidelines for Nutrition Care and Support of People with HIV*) in order to improve nutrition programming and increase awareness of the importance of nutrition interventions for people with HIV in Tanzania. This can be done by monitoring the dissemination and operationalisation of these guidelines as well as the quality of nutrition service delivery.

10.1. Indicators

The indicators suggested below can be used to monitor and evaluate progress in implementing the activities outlined in these guidelines:

- Availability of the guidelines at various service levels
- Number of people oriented in the use of the guidelines
- Number of health facilities and community programmes implementing nutrition services in accordance with the guidelines
- The most useful elements of the guidelines and gaps that need to be addressed
- Behaviour change among people with HIV and their caregivers as a result of the recommended nutrition interventions
- Nutritional status of people with HIV who received nutrition care and support in accordance with the guidelines
- The effectiveness of different approaches to integrating nutrition into HIV services and programs
- Barriers and challenges to implementation of activities outlined in the guidelines

The questionnaire in Annex 11 can be used to evaluate the use of the guidelines.

10.2. Data Collection

Health facility and community nutrition data on people with HIV should be collected routinely using standardised and approved national monitoring tools. Nutrition data can also be collected through surveys, periodic performance reports, activity reports, monitoring visits and other reliable and appropriate methods.

The evaluation of the implementation of the guidelines can also focus on their impact on the nutritional status and clinical outcomes of people with HIV that are receiving nutrition care and support. Table 16 suggests input, output, outcome and impact indicators for monitoring and evaluating the operationalisation and effectiveness of the *National Guidelines for Nutrition Care and Support for People with HIV*.

Table 16. Proposed indicators to monitor and evaluate implementation of the guidelines

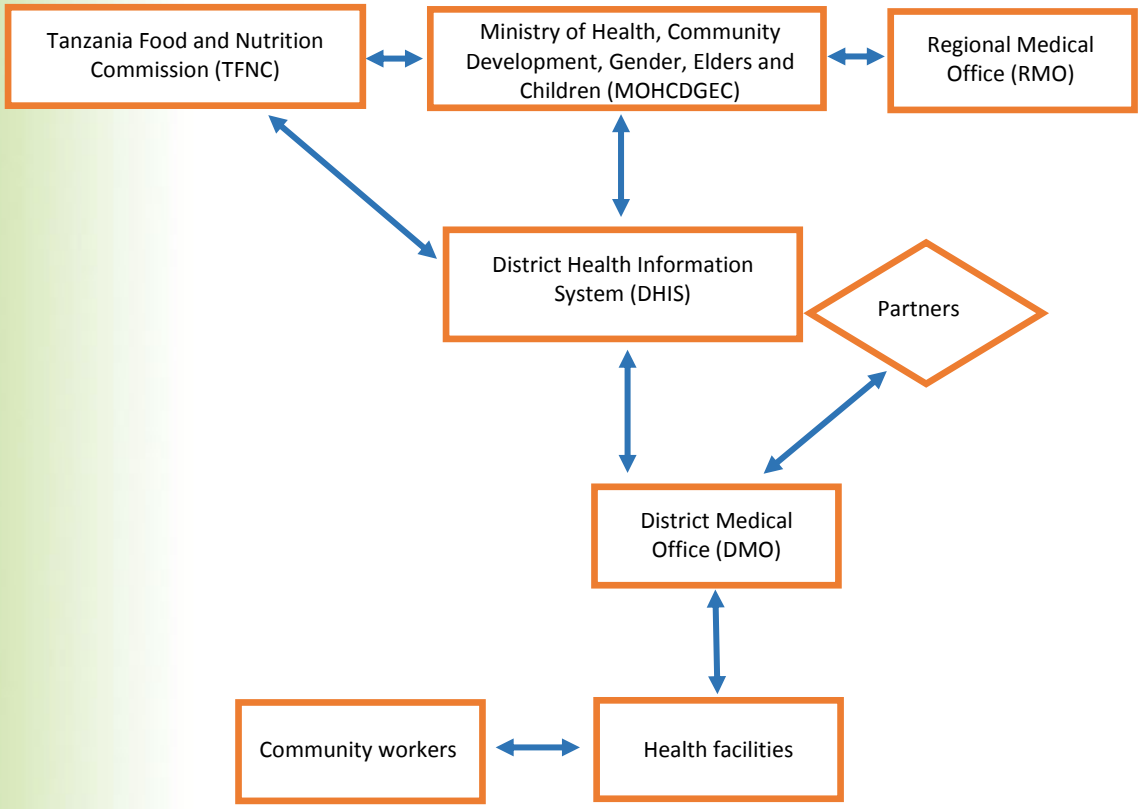
Input indicators	• Number of sites with updated guidelines • Number of sites with supplies • Number of sites with functional nutrition assessment equipment • Number of CTC sites with integrated nutrition services
Output indicators	• Number or proportion of staff oriented on the use of the guidelines • Number or proportion of people with HIV and MVC receiving nutrition assessment • Number or proportion of clients receiving nutrition education or counselling • Number of counselling or behaviour change messages developed on nutrition and HIV • Number of people with HIV and MVC receiving nutrition follow-up • Number or proportion of malnourished people with HIV and MVC referred to nutrition support • Number or proportion of people with HIV and MVC receiving nutrition support • Number or proportion of sites collecting nutrition data • Number or proportion of sites submitting nutrition reports on time
Outcome indicators	• Behaviour change among people with HIV • Frequency of meals • Diversity of meals (number of different types of foods consumed) • Successful management of HIV-related symptoms through diet • Successful management of food-medication interactions through timing of meals
Impact indicator	• Number or proportion of people with HIV that have improved nutritional status

10.3. Reporting

Facility-based service providers and community workers should report accurate information on client nutrition assessment, nutritional status and treatment interventions using the nationally approved reporting tools and system. Community workers should report information on nutrition screening and referral to their catchment area health facilities. Progress can also be shared during meetings of technical working group/consultative groups on nutrition and HIV.

Figure 4 shows the flow of data from communities and health facilities to the national level.

Figure 4. Data flow from communities and health facilities to national level



Nutrition data should be analysed at various levels (site, council/district, regional and national) and used to inform:

- Service delivery improvement
- Client management and follow-up
- Management decision-making
- Planning and programming
- Resource allocation

Each level should provide appropriate and timely feedback to the reporting entity on any action needed.

References

Food and Agriculture Organization of the United Nations (FAO). 2008. *An Introduction to the Basic Concepts of Food Security*. Food Security Information for Actions: Practical Guides. Available at: http://www.fao.org/docrep/013/al936e/al936e00.pdf.

International Centers for AIDS and Treatment Programs and Ministry of Health and Social Welfare. 2008 (draft). *Management of TB/HIV Co-infected Patients: Manual for Healthcare Workers at TB Clinics and HIV Care and Treatment Centers*.

Joint United Nations Programme on HIV/AIDS (UNAIDS). 2015. *UNAIDS Terminology Guidelines*. Geneva: UNAIDS.

Lönnroth, K., B.G. Williams, P. Cegielski and C. Dye. 2010. "A Consistent Log-Linear Relationship between Tuberculosis Incidence and Body Mass Index". *International Journal of Epidemiology* 39(1):149–55.

Papathakis, P. and E. Piwoz. 2008. *Nutrition and Tuberculosis: A Review of the Literature and Considerations for TB Control Programs*. Washington, DC: USAID.

Tanzania Commission for AIDS (TACAIDS). 2014. National HIV and AIDS Response Report 2013: Tanzania Mainland. Dar es Salaam: TACAIDS.

_____, Zanzibar AIDS Commission (ZAC), National Bureau of Statistics (NBS), Office of the Chief Government Statistician (OCGS) and ICF International. 2013. *Tanzania HIV/AIDS and Malaria Indicator Survey 2011–12*. Dar es Salaam: TACAIDS, ZAC, NBS, OCGS and ICF International.

Tanzania Food and Nutrition Centre (TFNC). 2015. *Nutrition Assessment, Counselling and Support (NACS): Job Aids for Facility-Based Providers.* Dar es Salaam: TFNC.

_____. 2015. *Nutrition Assessment, Counselling and Support (NACS): Reference Manual for Facility-Based Service Providers*. Dar es Salaam: TFNC.

_____. 2014. *Tanzania National Nutrition Survey 2014: Final Report*. Dar es Salaam: TFNC.

_____. 2009. *National Guidelines for Nutrition Care and Support for People h HIV*. Dar es Salaam: TFNC.

United Nations Children's Fund (UNICEF). nd. Tanzania Nutrition Overview. http://www.unicef.org/tanzania/nutrition.html.

United Republic of Tanzania Ministry of Health. 1997. *Micronutrient Deficiency Control: Policy Guidelines for Supplementation*. Dar es Salaam: MOH.

United Republic of Tanzania Ministry of Health and Social Welfare (MOHSW). 2013. *Tanzania National Guidelines for Comprehensive Care Services for PMTCT and Keeping Mothers Alive (Option B+)*. Dar es Salaam: MOHSW.

_____. 2012. Tanzania National Guidelines for the Management of HIV and AIDS, 4th edition. Dar es Salaam: MOHSW.

_____. 2009. *Essential Package of Nutrition Interventions at District Level*. Dar es Salaam: MOHSW.

_____. 2008. *Integrated Management of Acute Malnutrition: National Guidelines*. Dar es Salaam: MOHSW.

_____. 2007. *Prevention of Mother-to-Child Transmission of HIV: National Guidelines*. Dar es Salaam: MOHSW.

_____ and National AIDS Control Programme. 2010. *National Guidelines for Home-Based Care Services*.

United Republic of Tanzania National AIDS Control Programme (NACP). 2012. *National Guidelines for the Management of HIV and AIDS*. Dar es Salaam: NACP.

_____. 2011. *HIV/AIDS/STI Surveillance Report No. 22*. Dar es Salaam: NACP.

United Republic of Tanzania National Institute of Statistics and ICR Macro. 2011. *Tanzania Demographic and Health Survey 2010*. Dar es Salaam and Calverton, MD, USA.

United Republic of Tanzania Prime Minister's Office. 2013. Tanzania Third National Multi-sectoral Strategic Framework for HIV and AIDS (2013/14–2017/18). Dar es Salaam: Tanzania Commission for AIDS (TACAIDS).

Victor, R, et al. 2013. "Determinants of Breastfeeding Indicators among Children less than 24 Months of Age in Tanzania: A Secondary Analysis of the 2010 Tanzania Demographic and Health Survey". *BMJ Open* Jan 7:3(1).

WHO. 2013. *Essential Nutrition Actions: Improving Maternal, Newborn, Infant and Young Child Health and Nutrition*. Geneva: WHO.

_____. 2010. *Guidelines on HIV and Infant Feeding 2010: Principles and Recommendations for Infant Feeding in the Context of HIV and a Summary of Evidence*. Geneva.

_____. 2009a. *Global Tuberculosis Control 2009: Epidemiology, Strategy, Financing*. Geneva.

_____. 2009b. *Nutritional Care and Support for People Living with HIV/AIDS: A Training Course. Participant's Manual*. Geneva: WHO.

_____. 2006. *Infant and Young Child Feeding Counseling: An Integrated Course. Trainer's Manual.* Geneva: WHO.

_____. 2004. *Vitamin and Mineral Requirements in Human Nutrition*. Second edition. Geneva: WHO.

_____. 2003. *Nutrient Requirements for People Living with HIV/AIDS. Report of a Technical Consultation, May 13–15, 2003*. Geneva.

_____. 1995. *Physical status: The Use and Interpretation of Anthropometry*. Report of a WHO Expert Committee, WHO Technical Report Series 845. Geneva: WHO.

WHO, FAO and UNU. 2007. *Protein and Amino Acid Requirements in Human Nutrition*. *Report of a Joint FAO/WHO/UNU Expert Consultation*. WHO Technical Report Series 935. Geneva: WHO.

Annex 1. Nutrient Roles, Sources and Effects of Deficiencies

Nutrient	Role	Major sources	Effects of deficiencies
Carbohydrates	Main source of energy in the diet; excess is used to build fat stores and (to a smaller degree) cells; prevention of constipation, coronary heart disease and diabetes	Cereals, cooking bananas, legumes, roots and tubers	Weakness, loss of subcutaneous fat, muscle wasting
Protein	Building, repairing and maintaining body tissues; resistance to infection	Meat, fish, poultry, eggs, dairy products, legumes, nuts	Wasting, impaired immunity, bilateral pitting oedema, anaemia
Fat	Storage of excess energy; maintenance of body temperature; cell function; absorption, transport and utilisation of vitamins A, D, E and K	Oil seeds, margarine, butter, nuts, meat, poultry, dairy products, fish	Flaky and scaly skin, hair loss, impaired immunity, wasting, anaemia, hypothermia (sub-normal body temperature)
Vitamin A	Vision; maintenance of epithelial cells, mucous membranes and skin; reproduction; growth and function of T and B cells for immunity; skin health; immunity; prevention of tissue damage	Breast milk (especially colostrum), dairy products, dark green leafy vegetables, orange and yellow vegetables and fruits, fish oil	Night blindness (total blindness if not treated), skin infections, reduced resistance to infection, growth retardation in children
Vitamin B1 (thiamine)	Energy metabolism, appetite, nervous system function	Whole grain cereals, meat, poultry, fish, liver, milk, eggs, oil seeds and legumes	Beriberi, fatigue, appetite loss, nausea, numbness in hands and feet
Vitamin B2 (riboflavin)	Energy metabolism, vision, skin health	Milk, meat, fish, liver, green leafy vegetables, whole grain cereals, legumes	Rough skin, light hypersensitivity, cracked lips or mouth corners

Nutrient	Role	Major sources	Effects of deficiencies
Vitamin B3 (niacin)	Energy metabolism, skin, nervous and digestive systems	Eggs, meat, poultry, groundnuts, whole grain cereals (except maize and sorghum), fish, milk, unpolished rice, cassava, sweet potations, beans	Weakness, anorexia, sore mouth, diarrhoea, indigestion, skin eruptions, confusion, pellagra (lesions on skin exposed to sun), appetite loss, headache, fatigue, irritability, depression
Vitamin B6 (pyridoxine)	Metabolism, fat and protein absorption, production of red blood cells	Sweet potatoes, white beans, maize, liver, avocados, cabbage, meat, fish, avocados, bananas,	Anaemia, irritability, depression, muscle twitching, convulsions, skin lesions, mouth sores
Vitamin B9 (folic acid)	Building of new cells, especially red blood cells	Liver, kidneys, dark green leafy vegetables, fish, legumes, groundnuts, oil seeds	Bleeding gums, anaemia, poor hearing, birth defects, diarrhoea, fatigue, confusion, frequent infections, muscle and joint pain, depression
Vitamin B12 (cobalamin)	Development of new cells, especially red blood cells, maintenance of nerve cells	Meat, fish, chicken, liver, eggs, cheese, milk, fermented foods	Anaemia, numbness, cold limbs, weakness, appetite loss, nerve problems, confusion, ringing in the ears, fatigue
Vitamin C (ascorbic acid)	Use of calcium to build bones and blood vessels, non-haem iron absorption, immune function, antioxidant effect, protein metabolism	Citrus fruits, guavas, green leafy vegetables, tomatoes, wild fruits, baobab, tamarind, guava, peppers, potatoes, yams, cooking bananas	Anaemia, mouth corner sores, bleeding gums, muscle and joint pain, rough skin, poor wound healing, depression, appetite loss, fatigue, immune suppression
Vitamin D (calcipherol)	Absorption and use of calcium and phosphorous to build healthy bones and teeth, growth	Sunlight, milk products, fish oil, eggs, liver, vitamin D-fortified foods	Improper formation of bones and teeth

Nutrient	Role	Major sources	Effects of deficiencies
Vitamin E (tocopherol)	Immune function, reproduction, slowing of aging process, prevention or delay of oxidative damage	Green leafy vegetables, vegetable oils, whole grain cereals, butter, liver, egg yolks, milk fat, nuts, seeds	Anaemia, weakness, leg cramps, fatigue, oxidative stress, immune suppression, dry hair, muscle weakness, hearing problems
Calcium	Formation of bones and teeth, heart and muscle function, blood clotting and immune defense	Milk products, green leafy vegetables, dried fish with bones, legumes, millet, oil seeds, okra	Rickets in children and osteoporosis in adults, delayed blood clotting
Flourine	Hardening of bones and teeth	Water	Weak bones and teeth, dental caries Note: Excessive fluoride can discolour teeth.
Iodine	Brain and nervous system development and functioning, energy use, growth and development, reproduction	Seafood, iodised salt, plants grown in iodine-rich soil (in lowlands)	Goitre, cretinism, impaired brain function, dwarfism, abortion
Iron	Oxygen exchange in blood, cell metabolism, antioxidant effect, energy production	Haem iron (high absorption): Red meat, liver, fish, poultry, shellfish Non-haem iron (low absorption): Eggs, legumes, green leafy vegetables, peanuts, some cereals and dried fruits, iron fortified foods	Iron deficiency anaemia, fatigue, dizziness, headache, infection, decreased tolerance of cold, irritability, pallor
Magnesium	Muscle and nerve function; release of energy from fats, protein and carbohydrates; bone development, bone and teeth maintenance	Cereals, dark green leafy vegetables, seafood, nuts, whole grain cereals, okra, legumes	Spasms, muscle cramps and weakness, tremors, abnormal skin sensations, constipation, growth retardation

Nutrient	Role	Major sources	Effects of deficiencies
Selenium	Prevention of heart muscle impairment, prevention or delay of oxidative damage	Seafood, liver, meat, carrots, onions, garlic, milk, egg yolks, whole grain cereals	Weakness, pancreas damage, heart disease, immune suppression, oxidative stress, joint deformation in children, skin and hair colour changes, impaired hearing, slow growth
Zinc	Immune function, digestion, enzyme formation, wound healing, vitamin A metabolism, antioxidant effect, growth and development, normal development of male organs	Meat, organ meat, chicken, fish, whole grain cereals, legumes, vegetables, milk products	Impaired smell and taste, appetite loss, anaemia, slow growth, infertility, mental changes (apathy), diarrhoea, poor wound healing, skin problems, ringing in the ears

Annex 2. Micronutrient Requirements

Adolescents and adults (per day)				
Micronutrient	**Women (non-pregnant/non-lactating)**	**Pregnant women**	**Lactating women**	**Men**
Vitamin A (mg recommended equivalent [RE])	500	800	850	600
Vitamin B1 (mg)	1.1	1.4	1.5	1.2
Vitamin B2 (mg)	1.1	1.4	1.6	1.3
Vitamin B3 (mg)	14	18	17	16
Vitamin B6 (mg)	1.3–1.5	1.9	2.0	1.3–1.7
Vitamin B12 (µg)	2.4	2.6	2.8	2.4
Vitamin C (mg)	45	55	70	45
Vitamin D (µg)	5	5	5	5
Vitamin E (mg)	5	7.5	7.5	10
Vitamin K (µg)	55	55	55	65
Calcium (mg)	1,000–1,300	1,200	1,000	1,000–1,300
Folic acid (mg dietary folate equivalents [DFE])	400	600	500	400
Iodine (µg)	150	200	200	150
Iron (mg) (based on 12% bioavailability)	20	20	32	9
Magnesium (mg)	220	220	270	260
Selenium (µg)	26	42	0–6 months: 35, 7–12 months: 42	34
Zinc (mg) (moderate bioavailability)	4.9 (7.2 for adolescents)	1st trimester: 5.5, 2nd trimester: 7.0, 3rd trimester: 10.0	0–3 months: 9.5, 4–6 months: 8.8 7–12 months: 7.2	7.0

Children (per day)					
Micronutrient	**0–6 months**	**7–12 months**	**1–3 years**	**4–6 years**	**7–9 years**
Vitamin A (mg RE)	375	400			
Vitamin B1 (mg)	0.2	0.3	0.5	0.6	0.9
Vitamin B2 (mg)	0.3	0.4	0.5	0.6	0.9
Vitamin B3 (mg)	2	4	6	8	12
Vitamin B6 (mg)	0.1	0.3	0.5	0.6	1.0
Vitamin B12 (µg)	0.4	0.7	0.9	1.2	1.8
Vitamin C (mg)	25	30	30	30	35
Vitamin D (µg)	5	5	5	5	5
Vitamin E (mg)	2.7	2.7	5.0	5.0	7.0
Vitamin K (µg)	5	10	15	20	25
Calcium (mg)	300 (breastfed) 400 (formula fed)	400	500	600	700
Folic acid (mg DFE)	80	80	150	200	300
Iodine (µg)	90	90	90	90	120 (6–12 years)
Iron (mg) (based on 12% bioavailability)	Neonatal stores sufficient for 1st 6 months)	7.7	4.8	5.3	7.4
Magnesium (mg)	26 (breastfed), 36 (formula fed)	54	60	76	100
Selenium (µg)	6	10	17	22	21
Zinc (mg) (moderate bioavailability)	2.8	4.1	4.1	4.8	5.6

Source: Adapted from WHO and FAO. 2004. *Vitamin and Mineral Requirements in Human Nutrition*. Second edition. Geneva: WHO.

Annex 3. Body Mass Index Chart for Adolescents and Adults

Body mass index (BMI) = $\frac{\text{weight (kg)}}{\text{height (m)}^2}$

BMI is measured for adolescents 15–17 years of age and adults (non-pregnant/post-partum).

1. On the chart on the next page, find height in the left-hand column, or y-axis (1 metre = 100 cm).
2. Find weight in the bottom row, or x-axis.
3. Find the point where the two lines meet. This is the BMI for that height and weight.
4. If the height or weight is an odd number, then find the point where all the lines meet (two or four cells) and use an average value. For example, if height is 191 cm and weight is 60 kg, find the point where 190 and 192 (on the y axis) and 60 (on the x axis) meet. The cells contain 16 and 17, so use a BMI of 16.5 (the average of 16 and 17).

Red shows severe acute malnutrition (BMI less than 16.0).

Yellow shows moderate malnutrition (BMI 16.0 to less than 18.5).

Green shows normal nutritional status (BMI 18.5 to less than 25.0).

Light purple shows overweight (BMI 25.0 to less than 30.0).

Dark purple shows obesity (BMI 30.0 or greater).

Height (cm)																																											
200	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	20	21	21	22	22	23	23	24	24	25	25	26	26	27	27	28	28	29	29
198	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	20	21	21	22	22	23	23	24	24	25	26	26	27	27	28	28	29	29	30
196	8	9	9	10	10	11	11	12	12	13	14	14	15	15	16	16	17	17	18	18	19	19	20	20	21	21	22	22	23	23	24	24	25	26	26	27	27	28	28	29	29	30	30
194	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	18	18	19	19	20	20	21	21	22	22	23	23	24	24	25	26	26	27	27	28	28	29	29	30	30	31
192	9	9	10	10	11	11	12	13	13	14	14	15	15	16	16	17	17	18	18	19	20	20	21	21	22	22	23	23	24	24	25	25	26	27	27	28	28	29	29	30	30	31	31
190	9	10	10	11	11	12	12	13	13	14	14	15	16	16	17	17	18	18	19	19	20	20	21	22	22	23	23	24	24	25	25	26	27	27	28	28	29	30	30	30	31	32	32
188	9	10	10	11	11	12	12	13	14	14	15	15	16	16	17	18	18	19	19	20	20	21	22	22	23	23	24	24	25	25	26	27	27	28	28	29	29	30	31	31	32	32	33
186	9	10	10	11	12	12	13	13	14	14	15	16	16	17	17	18	18	19	20	20	21	21	22	23	23	24	24	25	25	26	27	27	28	28	29	29	30	31	31	32	32	33	34
184	10	10	11	11	12	12	13	14	14	15	15	16	16	17	17	17	18	19	19	20	21	21	22	22	23	24	24	25	25	26	27	27	28	28	29	30	30	31	31	32	32	33	34
182	10	10	11	11	12	13	13	14	14	15	16	16	17	18	18	19	19	20	21	21	22	22	23	24	24	25	25	26	27	27	28	28	29	30	30	31	31	32	33	33	34	34	35
180	10	10	11	12	12	13	14	14	15	15	16	17	17	18	19	19	20	20	21	22	22	23	23	24	25	25	26	27	27	28	28	29	30	30	31	31	32	33	33	34	35	35	36
178	10	10	11	12	13	13	14	15	15	16	16	17	18	18	19	20	20	21	21	22	22	23	24	25	25	26	27	27	28	28	29	30	30	31	32	32	33	33	34	35	35	36	37
176	10	11	12	12	13	14	14	15	15	16	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	26	27	28	28	29	30	30	31	32	32	33	34	34	35	36	36	37	37
174	10	11	12	13	13	14	15	15	16	17	17	18	18	19	20	20	21	22	22	23	24	24	25	26	26	27	28	28	29	30	30	31	32	32	33	34	34	35	36	36	37	38	38
172	11	11	12	13	14	14	15	16	16	17	18	18	19	20	20	21	22	22	23	24	24	25	26	26	27	28	28	29	30	30	30	31	32	32	33	34	34	35	36	37	38	39	39
170	11	12	12	13	14	15	15	16	17	17	18	19	19	20	21	21	22	23	24	24	25	26	26	27	28	28	29	30	30	31	32	33	33	34	35	35	36	37	37	38	39	39	40
168	11	12	13	13	14	15	16	16	17	18	18	19	20	21	21	22	23	23	24	25	26	26	27	28	28	29	30	30	31	32	33	33	34	35	35	36	37	38	38	39	40	40	41
166	12	12	13	14	15	15	16	17	17	18	19	20	20	21	22	22	23	24	25	25	26	27	28	28	29	30	30	31	32	33	33	34	35	36	36	37	38	38	39	40	41	41	42
164	12	13	13	14	15	16	16	17	18	19	19	20	21	22	22	23	24	25	25	26	27	28	28	29	30	30	31	32	33	33	34	35	36	36	37	38	38	39	40	41	42	42	43
162	12	13	14	14	15	16	17	18	18	19	20	21	21	22	23	24	24	25	26	27	27	28	29	30	30	31	32	33	34	34	35	36	37	37	38	39	39	40	41	42	43	43	44
160	13	13	14	15	16	16	17	18	19	20	20	21	22	23	23	24	25	26	27	27	28	29	30	30	31	32	33	34	34	35	36	37	38	38	39	40	41	41	42	43	44	45	45
158	13	14	14	15	16	17	18	18	19	20	21	22	22	23	24	25	26	26	27	28	29	30	30	31	32	33	34	34	35	36	37	38	38	39	40	41	42	42	43	44	45	46	46
156	13	14	15	16	16	17	18	19	20	21	21	22	23	24	25	25	26	27	28	29	30	30	31	32	33	34	35	35	36	37	38	39	39	40	41	42	43	44	44	45	46	47	48
154	14	14	15	16	17	18	19	19	20	21	22	23	24	24	25	26	27	28	29	30	30	31	32	33	34	35	35	36	37	38	39	40	40	41	42	43	44	45	46	46	47	48	49
152	14	15	16	16	17	18	19	20	21	22	23	23	24	25	26	27	28	29	29	30	31	32	33	34	35	35	36	37	38	39	40	41	42	42	43	44	45	46	47	48	48	49	50
150	14	15	16	17	18	18	19	20	21	22	23	24	25	26	27	27	28	29	30	31	31	32	33	34	36	36	37	38	39	40	41	41	42	43	44	45	45	46	47	48	49	50	51
148	15	16	16	17	18	19	20	21	22	23	23	24	25	26	27	28	29	30	31	32	33	33	34	35	36	37	38	39	40	41	42	42	43	44	44	45	46	47	48	49	50	51	52
146	15	16	17	18	19	20	21	22	23	23	24	25	26	27	28	29	31	32	33	34	35	35	35	36	37	38	39	40	41	42	43	43	44	45	46	46	47	48	49	50	51	52	53
144	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	36	37	38	39	40	41	42	43	43	44	45	46	46	47	48	49	50	51	52	53	54
Weight (kg)	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114	116

Annex 4. BMI-for-Age Look-up Tables

To find BMI-for-age:

1. First find the child's or adolescent's BMI on the **BMI look-up tables**.
2. Then use the **BMI-for-age look-up tables** to find the child's or adolescent's age in the left-hand column (you may have to round up or down).
3. Trace your finger across the page until you see the range that includes the child's or adolescent's BMI.
4. Find the child's or adolescent's nutritional status at the top of the column.

BMI look-up tables for children and adolescents 5–17 years of age (85–125 cm tall)

Height (cm)	Weight (kg) 10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
125	6.4	7.0	7.7	8.3	9.0	9.6	10.2	10.9	11.5	12.2	12.8	13.4	14.1	14.7	15.4	16.0	16.6	17.3	17.9	18.6	19.2	19.8	20.5	21.1	21.8	22.4	23.0	23.7	24.3	25.0	25.6	26.2	26.9	27.5	28.2	28.8	29.4	30.1
124	6.5	7.2	7.8	8.5	9.1	9.8	10.4	11.1	11.7	12.4	13.0	13.7	14.3	15.0	15.6	16.3	16.9	17.6	18.2	18.9	19.5	20.2	20.8	21.5	22.1	22.8	23.4	24.1	24.7	25.4	26.0	26.7	27.3	28.0	28.6	29.3	29.9	30.6
123	6.6	7.3	7.9	8.6	9.3	9.9	10.6	11.2	11.9	12.6	13.2	13.9	14.5	15.2	15.9	16.5	17.2	17.8	18.5	19.2	19.8	20.5	21.2	21.8	22.5	23.1	23.8	24.5	25.1	25.8	26.4	27.1	27.8	28.4	29.1	29.7	30.4	31.1
122	6.7	7.4	8.1	8.7	9.4	10.1	10.7	11.4	12.1	12.8	13.4	14.1	14.8	15.5	16.1	16.8	17.5	18.1	18.8	19.5	20.2	20.8	21.5	22.2	22.8	23.5	24.2	24.9	25.5	26.2	26.9	27.5	28.2	28.9	29.6	30.2	30.9	31.6
121	6.8	7.5	8.2	8.9	9.6	10.2	10.9	11.6	12.3	13.0	13.7	14.3	15.0	15.7	16.4	17.1	17.8	18.4	19.1	19.8	20.5	21.2	21.9	22.5	23.2	23.9	24.6	25.3	26.0	26.6	27.3	28.0	28.7	29.4	30.1	30.7	31.4	32.1
120	6.9	7.6	8.3	9.0	9.7	10.4	11.1	11.8	12.5	13.2	13.9	14.6	15.3	16.0	16.7	17.4	18.1	18.8	19.4	20.1	20.8	21.5	22.2	22.9	23.6	24.3	25.0	25.7	26.4	27.1	27.8	28.5	29.2	29.9	30.6	31.3	31.9	32.6
119	7.1	7.8	8.5	9.2	9.9	10.6	11.3	12.0	12.7	13.4	14.1	14.8	15.5	16.2	16.9	17.7	18.4	19.1	19.8	20.5	21.2	21.9	22.6	23.3	24.0	24.7	25.4	26.1	26.8	27.5	28.2	29.0	29.7	30.4	31.1	31.8	32.5	33.2
118	7.2	7.9	8.6	9.3	10.1	10.8	11.5	12.2	12.9	13.6	14.4	15.1	15.8	16.5	17.2	18.0	18.7	19.4	20.1	20.8	21.5	22.3	23.0	23.7	24.4	25.1	25.9	26.6	27.3	28.0	28.7	29.4	30.2	30.9	31.6	32.3	33.0	33.8
117	7.3	8.0	8.8	9.5	10.2	11.0	11.7	12.4	13.1	13.9	14.6	15.3	16.1	16.8	17.5	18.3	19.0	19.7	20.5	21.2	21.9	22.6	23.4	24.1	24.8	25.6	26.3	27.0	27.8	28.5	29.2	30.0	30.7	31.4	32.1	32.9	33.6	34.3
116	7.4	8.2	8.9	9.7	10.4	11.1	11.9	12.6	13.4	14.1	14.9	15.6	16.3	17.1	17.8	18.6	19.3	20.1	20.8	21.6	22.3	23.0	23.8	24.5	25.3	26.0	26.8	27.5	28.2	29.0	29.7	30.5	31.2	32.0	32.7	33.4	34.2	34.9
115	7.6	8.3	9.1	9.8	10.6	11.3	12.1	12.9	13.6	14.4	15.1	15.9	16.6	17.4	18.1	18.9	19.7	20.4	21.2	21.9	22.7	23.4	24.2	25.0	25.7	26.5	27.2	28.0	28.7	29.5	30.2	31.0	31.8	32.5	33.3	34.0	34.8	35.5
114	7.7	8.5	9.2	10.0	10.8	11.5	12.3	13.1	13.9	14.6	15.4	16.2	16.9	17.7	18.5	19.2	20.0	20.8	21.5	22.3	23.1	23.9	24.6	25.4	26.2	26.9	27.7	28.5	29.2	30.0	30.8	31.5	32.3	33.1	33.9	34.6	35.4	36.2
113	7.8	8.6	9.4	10.2	11.0	11.7	12.5	13.3	14.1	14.9	15.7	16.4	17.2	18.0	18.8	19.6	20.4	21.1	21.9	22.7	23.5	24.3	25.1	25.8	26.6	27.4	28.2	29.0	29.8	30.5	31.3	32.1	32.9	33.7	34.5	35.2	36.0	36.8
112	8.0	8.8	9.6	10.4	11.2	12.0	12.8	13.6	14.3	15.1	15.9	16.7	17.5	18.3	19.1	19.9	20.7	21.5	22.3	23.1	23.9	24.7	25.5	26.3	27.1	27.9	28.7	29.5	30.3	31.1	31.9	32.7	33.5	34.3	35.1	35.9	36.7	37.5
111	8.1	8.9	9.7	10.6	11.4	12.2	13.0	13.8	14.6	15.4	16.2	17.0	17.9	18.7	19.5	20.3	21.1	21.9	22.7	23.5	24.3	25.2	26.0	26.8	27.6	28.4	29.2	30.0	30.8	31.7	32.5	33.3	34.1	34.9	35.7	36.5	37.3	38.1
110	8.3	9.1	9.9	10.7	11.6	12.4	13.2	14.0	14.9	15.7	16.5	17.4	18.2	19.0	19.8	20.7	21.5	22.3	23.1	24.0	24.8	25.6	26.4	27.3	28.1	28.9	29.8	30.6	31.4	32.2	33.1	33.9	34.7	35.5	36.4	37.2	38.0	38.8
109	8.4	9.3	10.1	10.9	11.8	12.6	13.5	14.3	15.2	16.0	16.8	17.7	18.5	19.4	20.2	21.0	21.9	22.7	23.6	24.4	25.3	26.1	26.9	27.8	28.6	29.5	30.3	31.1	32.0	32.8	33.7	34.5	35.4	36.2	37.0	37.9	38.7	39.6
108	8.6	9.4	10.3	11.1	12.0	12.9	13.7	14.6	15.4	16.3	17.1	18.0	18.9	19.7	20.6	21.4	22.3	23.1	24.0	24.9	25.7	26.6	27.4	28.3	29.1	30.0	30.9	31.7	32.6	33.4	34.3	35.2	36.0	36.9	37.7	38.6	39.4	40.3
107	8.7	9.6	10.5	11.4	12.2	13.1	14.0	14.8	15.7	16.6	17.5	18.3	19.2	20.1	21.0	21.8	22.7	23.6	24.5	25.3	26.2	27.1	28.0	28.8	29.7	30.6	31.4	32.3	33.2	34.1	34.9	35.8	36.7	37.6	38.4	39.3	40.2	41.1
106	8.9	9.8	10.7	11.6	12.5	13.3	14.2	15.1	16.0	16.9	17.8	18.7	19.6	20.5	21.4	22.2	23.1	24.0	24.9	25.8	26.7	27.6	28.5	29.4	30.3	31.1	32.0	32.9	33.8	34.7	35.6	36.5	37.4	38.3	39.2	40.0	40.9	41.8
105	9.1	10.0	10.9	11.8	12.7	13.6	14.5	15.4	16.3	17.2	18.1	19.0	20.0	20.9	21.8	22.7	23.6	24.5	25.4	26.3	27.2	28.1	29.0	29.9	30.8	31.7	32.7	33.6	34.5	35.4	36.3	37.2	38.1	39.0	39.9	40.8	41.7	42.6
104	9.2	10.2	11.1	12.0	12.9	13.9	14.8	15.7	16.6	17.6	18.5	19.4	20.3	21.3	22.2	23.1	24.0	25.0	25.9	26.8	27.7	28.7	29.6	30.5	31.4	32.4	33.3	34.2	35.1	36.1	37.0	37.9	38.8	39.8	40.7	41.6	42.5	43.5
103	9.4	10.4	11.3	12.3	13.2	14.1	15.1	16.0	17.0	17.9	18.9	19.8	20.7	21.7	22.6	23.6	24.5	25.5	26.4	27.3	28.3	29.2	30.2	31.1	32.0	33.0	33.9	34.9	35.8	36.8	37.7	38.6	39.6	40.5	41.5	42.4	43.4	44.3
102	9.6	10.6	11.5	12.5	13.5	14.4	15.4	16.3	17.3	18.3	19.2	20.2	21.1	22.1	23.1	24.0	25.0	26.0	26.9	27.9	28.8	29.8	30.8	31.7	32.7	33.6	34.6	35.6	36.5	37.5	38.4	39.4	40.4	41.3	42.3	43.3	44.2	45.2
101	9.8	10.8	11.8	12.7	13.7	14.7	15.7	16.7	17.6	18.6	19.6	20.6	21.6	22.5	23.5	24.5	25.5	26.5	27.4	28.4	29.4	30.4	31.4	32.3	33.3	34.3	35.3	36.3	37.3	38.2	39.2	40.2	41.2	42.2	43.1	44.1	45.1	46.1
100	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0	45.0	46.0	47.0
99	10.2	11.2	12.2	13.3	14.3	15.3	16.3	17.3	18.4	19.4	20.4	21.4	22.4	23.5	24.5	25.5	26.5	27.5	28.6	29.6	30.6	31.6	32.6	33.7	34.7	35.7	36.7	37.8	38.8	39.8	40.8	41.8	42.9	43.9	44.9	45.9	46.9	48.0
98	10.4	11.5	12.5	13.5	14.6	15.6	16.7	17.7	18.7	19.8	20.8	21.9	22.9	23.9	25.0	26.0	27.1	28.1	29.2	30.2	31.2	32.3	33.3	34.4	35.4	36.4	37.5	38.5	39.6	40.6	41.6	42.7	43.7	44.8	45.8	46.9	47.9	48.9
97	10.6	11.7	12.8	13.8	14.9	15.9	17.0	18.1	19.1	20.2	21.3	22.3	23.4	24.4	25.5	26.6	27.6	28.7	29.8	30.8	31.9	32.9	34.0	35.1	36.1	37.2	38.3	39.3	40.4	41.4	42.5	43.6	44.6	45.7	46.8	47.8	48.9	50.0
96	10.9	11.9	13.0	14.1	15.2	16.3	17.4	18.4	19.5	20.6	21.7	22.8	23.9	25.0	26.0	27.1	28.2	29.3	30.4	31.5	32.6	33.6	34.7	35.8	36.9	38.0	39.1	40.1	41.2	42.3	43.4	44.5	45.6	46.7	47.7	48.8	49.9	51.0
95	11.1	12.2	13.3	14.4	15.5	16.6	17.7	18.8	19.9	21.1	22.2	23.3	24.4	25.5	26.6	27.7	28.8	29.9	31.0	32.1	33.2	34.3	35.5	36.6	37.7	38.8	39.9	41.0	42.1	43.2	44.3	45.4	46.5	47.6	48.8	49.9	51.0	52.1
94	11.3	12.4	13.6	14.7	15.8	17.0	18.1	19.2	20.4	21.5	22.6	23.8	24.9	26.0	27.2	28.3	29.4	30.6	31.7	32.8	34.0	35.1	36.2	37.3	38.5	39.6	40.7	41.9	43.0	44.1	45.3	46.4	47.5	48.7	49.8	50.9	52.1	53.2
93	11.6	12.7	13.9	15.0	16.2	17.3	18.5	19.7	20.8	22.0	23.1	24.3	25.4	26.6	27.7	28.9	30.1	31.2	32.4	33.5	34.7	35.8	37.0	38.2	39.3	40.5	41.6	42.8	43.9	45.1	46.2	47.4	48.6	49.7	50.9	52.0	53.2	54.3
92	11.8	13.0	14.2	15.4	16.5	17.7	18.9	20.1	21.3	22.4	23.6	24.8	26.0	27.2	28.4	29.5	30.7	31.9	33.1	34.3	35.4	36.6	37.8	39.0	40.2	41.4	42.5	43.7	44.9	46.1	47.3	48.4	49.6	50.8	52.0	53.2	54.3	55.5
91	12.1	13.3	14.5	15.7	16.9	18.1	19.3	20.5	21.7	22.9	24.2	25.4	26.6	27.8	29.0	30.2	31.4	32.6	33.8	35.0	36.2	37.4	38.6	39.9	41.1	42.3	43.5	44.7	45.9	47.1	48.3	49.5	50.7	51.9	53.1	54.3	55.5	56.8
90	12.3	13.6	14.8	16.0	17.3	18.5	19.8	21.0	22.2	23.5	24.7	25.9	27.2	28.4	29.6	30.9	32.1	33.3	34.6	35.8	37.0	38.3	39.5	40.7	42.0	43.2	44.4	45.7	46.9	48.1	49.4	50.6	51.9	53.1	54.3	55.6	56.8	58.0
89	12.6	13.9	15.1	16.4	17.7	18.9	20.2	21.5	22.7	24.0	25.2	26.5	27.8	29.0	30.3	31.6	32.8	34.1	35.3	36.6	37.9	39.1	40.4	41.7	42.9	44.2	45.4	46.7	48.0	49.2	50.5	51.8	53.0	54.3	55.5	56.8	58.1	59.3
88	12.9	14.2	15.5	16.8	18.1	19.4	20.7	22.0	23.2	24.5	25.8	27.1	28.4	29.7	31.0	32.3	33.6	34.9	36.2	37.4	38.7	40.0	41.3	42.6	43.9	45.2	46.5	47.8	49.1	50.4	51.7	52.9	54.2	55.5	56.8	58.1	59.4	60.7
87	13.2	14.5	15.9	17.2	18.5	19.8	21.1	22.5	23.8	25.1	26.4	27.7	29.1	30.4	31.7	33.0	34.4	35.7	37.0	38.3	39.6	41.0	42.3	43.6	44.9	46.2	47.6	48.9	50.2	51.5	52.8	54.2	55.5	56.8	58.1	59.5	60.8	62.1
86	13.5	14.9	16.2	17.6	18.9	20.3	21.6	23.0	24.3	25.7	27.0	28.4	29.7	31.1	32.4	33.8	35.2	36.5	37.9	39.2	40.6	41.9	43.3	44.6	46.0	47.3	48.7	50.0	51.4	52.7	54.1	55.4	56.8	58.1	59.5	60.8	62.2	63.5
85	13.8	15.2	16.6	18.0	19.4	20.8	22.1	23.5	24.9	26.3	27.7	29.1	30.4	31.8	33.2	34.6	36.0	37.4	38.8	40.1	41.5	42.9	44.3	45.7	47.1	48.4	49.8	51.2	52.6	54.0	55.4	56.7	58.1	59.5	60.9	62.3	63.7	65.1

BMI look-up tables for children and adolescents 5–17 years of age (126–167 cm tall)

Height (cm)	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69
167	9.0	9.3	9.7	10.0	10.4	10.8	11.1	11.5	11.8	12.2	12.5	12.9	13.3	13.6	14.0	14.3	14.7	15.1	15.4	15.8	16.1	16.5	16.9	17.2	17.6	17.9	18.3	18.6	19.0	19.4	19.7	20.1	20.4	20.8	21.2	21.5	21.9	22.2	22.6	22.9	23.3	23.7	24.0	24.4	24.7
166	9.1	9.4	9.8	10.2	10.5	10.9	11.2	11.6	12.0	12.3	12.7	13.1	13.4	13.8	14.2	14.5	14.9	15.2	15.6	16.0	16.3	16.7	17.1	17.4	17.8	18.1	18.5	18.9	19.2	19.6	20.0	20.3	20.7	21.0	21.4	21.8	22.1	22.5	22.9	23.2	23.6	24.0	24.3	24.7	25.0
165	9.2	9.6	9.9	10.3	10.7	11.0	11.4	11.8	12.1	12.5	12.9	13.2	13.6	14.0	14.3	14.7	15.1	15.4	15.8	16.2	16.5	16.9	17.3	17.6	18.0	18.4	18.7	19.1	19.5	19.8	20.2	20.6	20.9	21.3	21.7	22.0	22.4	22.8	23.1	23.5	23.9	24.2	24.6	25.0	25.3
164	9.3	9.7	10.0	10.4	10.8	11.2	11.5	11.9	12.3	12.6	13.0	13.4	13.8	14.1	14.5	14.9	15.2	15.6	16.0	16.4	16.7	17.1	17.5	17.8	18.2	18.6	19.0	19.3	19.7	20.1	20.4	20.8	21.2	21.6	21.9	22.3	22.7	23.1	23.4	23.8	24.2	24.5	24.9	25.3	25.7
163	9.4	9.8	10.2	10.5	10.9	11.3	11.7	12.0	12.4	12.8	13.2	13.5	13.9	14.3	14.7	15.1	15.4	15.8	16.2	16.6	16.9	17.3	17.7	18.1	18.4	18.8	19.2	19.6	19.9	20.3	20.7	21.1	21.5	21.8	22.2	22.6	23.0	23.3	23.7	24.1	24.5	24.8	25.2	25.6	26.0
162	9.5	9.9	10.3	10.7	11.1	11.4	11.8	12.2	12.6	13.0	13.3	13.7	14.1	14.5	14.9	15.2	15.6	16.0	16.4	16.8	17.1	17.5	17.9	18.3	18.7	19.1	19.4	19.8	20.2	20.6	21.0	21.3	21.7	22.1	22.5	22.9	23.2	23.6	24.0	24.4	24.8	25.1	25.5	25.9	26.3
161	9.6	10.0	10.4	10.8	11.2	11.6	12.0	12.3	12.7	13.1	13.5	13.9	14.3	14.7	15.0	15.4	15.8	16.2	16.6	17.0	17.4	17.7	18.1	18.5	18.9	19.3	19.7	20.1	20.4	20.8	21.2	21.6	22.0	22.4	22.8	23.1	23.5	23.9	24.3	24.7	25.1	25.5	25.8	26.2	26.6
160	9.8	10.2	10.5	10.9	11.3	11.7	12.1	12.5	12.9	13.3	13.7	14.1	14.5	14.8	15.2	15.6	16.0	16.4	16.8	17.2	17.6	18.0	18.4	18.8	19.1	19.5	19.9	20.3	20.7	21.1	21.5	21.9	22.3	22.7	23.0	23.4	23.8	24.2	24.6	25.0	25.4	25.8	26.2	26.6	27.0
159	9.9	10.3	10.7	11.1	11.5	11.9	12.3	12.7	13.1	13.4	13.8	14.2	14.6	15.0	15.4	15.8	16.2	16.6	17.0	17.4	17.8	18.2	18.6	19.0	19.4	19.8	20.2	20.6	21.0	21.4	21.8	22.2	22.5	22.9	23.3	23.7	24.1	24.5	24.9	25.3	25.7	26.1	26.5	26.9	27.3
158	10.0	10.4	10.8	11.2	11.6	12.0	12.4	12.8	13.2	13.6	14.0	14.4	14.8	15.2	15.6	16.0	16.4	16.8	17.2	17.6	18.0	18.4	18.8	19.2	19.6	20.0	20.4	20.8	21.2	21.6	22.0	22.4	22.8	23.2	23.6	24.0	24.4	24.8	25.2	25.6	26.0	26.4	26.8	27.2	27.6
157	10.1	10.5	11.0	11.4	11.8	12.2	12.6	13.0	13.4	13.8	14.2	14.6	15.0	15.4	15.8	16.2	16.6	17.0	17.4	17.9	18.3	18.7	19.1	19.5	19.9	20.3	20.7	21.1	21.5	21.9	22.3	22.7	23.1	23.5	23.9	24.3	24.7	25.2	25.6	26.0	26.4	26.8	27.2	27.6	28.0
156	10.3	10.7	11.1	11.5	11.9	12.3	12.7	13.1	13.6	14.0	14.4	14.8	15.2	15.6	16.0	16.4	16.8	17.3	17.7	18.1	18.5	18.9	19.3	19.7	20.1	20.5	21.0	21.4	21.8	22.2	22.6	23.0	23.4	23.8	24.2	24.7	25.1	25.5	25.9	26.3	26.7	27.1	27.5	27.9	28.4
155	10.4	10.8	11.2	11.7	12.1	12.5	12.9	13.3	13.7	14.2	14.6	15.0	15.4	15.8	16.2	16.6	17.1	17.5	17.9	18.3	18.7	19.1	19.6	20.0	20.4	20.8	21.2	21.6	22.1	22.5	22.9	23.3	23.7	24.1	24.6	25.0	25.4	25.8	26.2	26.6	27.1	27.5	27.9	28.3	28.7
154	10.5	11.0	11.4	11.8	12.2	12.6	13.1	13.5	13.9	14.3	14.8	15.2	15.6	16.0	16.4	16.9	17.3	17.7	18.1	18.6	19.0	19.4	19.8	20.2	20.7	21.1	21.5	21.9	22.3	22.8	23.2	23.6	24.0	24.5	24.9	25.3	25.7	26.1	26.6	27.0	27.4	27.8	28.3	28.7	29.1
153	10.7	11.1	11.5	12.0	12.4	12.8	13.2	13.7	14.1	14.5	15.0	15.4	15.8	16.2	16.7	17.1	17.5	17.9	18.4	18.8	19.2	19.7	20.1	20.5	20.9	21.4	21.8	22.2	22.6	23.1	23.5	23.9	24.3	24.8	25.2	25.6	26.1	26.5	26.9	27.3	27.8	28.2	28.6	29.0	29.5
152	10.8	11.3	11.7	12.1	12.6	13.0	13.4	13.9	14.3	14.7	15.1	15.6	16.0	16.4	16.9	17.3	17.7	18.2	18.6	19.0	19.5	19.9	20.3	20.8	21.2	21.6	22.1	22.5	22.9	23.4	23.8	24.2	24.7	25.1	25.5	26.0	26.4	26.8	27.3	27.7	28.1	28.6	29.0	29.4	29.9
151	11.0	11.4	11.8	12.3	12.7	13.2	13.6	14.0	14.5	14.9	15.4	15.8	16.2	16.7	17.1	17.5	18.0	18.4	18.9	19.3	19.7	20.2	20.6	21.1	21.5	21.9	22.4	22.8	23.2	23.7	24.1	24.6	25.0	25.4	25.9	26.3	26.8	27.2	27.6	28.1	28.5	28.9	29.4	29.8	30.3
150	11.1	11.6	12.0	12.4	12.9	13.3	13.8	14.2	14.7	15.1	15.6	16.0	16.4	16.9	17.3	17.8	18.2	18.7	19.1	19.6	20.0	20.4	20.9	21.3	21.8	22.2	22.7	23.1	23.6	24.0	24.4	24.9	25.3	25.8	26.2	26.7	27.1	27.6	28.0	28.4	28.9	29.3	29.8	30.2	30.7
149	11.3	11.7	12.2	12.6	13.1	13.5	14.0	14.4	14.9	15.3	15.8	16.2	16.7	17.1	17.6	18.0	18.5	18.9	19.4	19.8	20.3	20.7	21.2	21.6	22.1	22.5	23.0	23.4	23.9	24.3	24.8	25.2	25.7	26.1	26.6	27.0	27.5	27.9	28.4	28.8	29.3	29.7	30.2	30.6	31.1
148	11.4	11.9	12.3	12.8	13.2	13.7	14.2	14.6	15.1	15.5	16.0	16.4	16.9	17.3	17.8	18.3	18.7	19.2	19.6	20.1	20.5	21.0	21.5	21.9	22.4	22.8	23.3	23.7	24.2	24.7	25.1	25.6	26.0	26.5	26.9	27.4	27.8	28.3	28.8	29.2	29.7	30.1	30.6	31.0	31.5
147	11.6	12.0	12.5	13.0	13.4	13.9	14.3	14.8	15.3	15.7	16.2	16.7	17.1	17.6	18.0	18.5	19.0	19.4	19.9	20.4	20.8	21.3	21.8	22.2	22.7	23.1	23.6	24.1	24.5	25.0	25.5	25.9	26.4	26.8	27.3	27.8	28.2	28.7	29.2	29.6	30.1	30.5	31.0	31.5	31.9
146	11.7	12.2	12.7	13.1	13.6	14.1	14.5	15.0	15.5	16.0	16.4	16.9	17.4	17.8	18.3	18.8	19.2	19.7	20.2	20.6	21.1	21.6	22.0	22.5	23.0	23.5	23.9	24.4	24.9	25.3	25.8	26.3	26.7	27.2	27.7	28.1	28.6	29.1	29.6	30.0	30.5	31.0	31.4	31.9	32.4
145	11.9	12.4	12.8	13.3	13.8	14.3	14.7	15.2	15.7	16.2	16.6	17.1	17.6	18.1	18.5	19.0	19.5	20.0	20.5	20.9	21.4	21.9	22.4	22.8	23.3	23.8	24.3	24.7	25.2	25.7	26.2	26.6	27.1	27.6	28.1	28.5	29.0	29.5	30.0	30.4	30.9	31.4	31.9	32.3	32.8
144	12.1	12.5	13.0	13.5	14.0	14.5	14.9	15.4	15.9	16.4	16.9	17.4	17.8	18.3	18.8	19.3	19.8	20.3	20.7	21.2	21.7	22.2	22.7	23.1	23.6	24.1	24.6	25.1	25.6	26.0	26.5	27.0	27.5	28.0	28.5	28.9	29.4	29.9	30.4	30.9	31.3	31.8	32.3	32.8	33.3
143	12.2	12.7	13.2	13.7	14.2	14.7	15.2	15.6	16.1	16.6	17.1	17.6	18.1	18.6	19.1	19.6	20.0	20.5	21.0	21.5	22.0	22.5	23.0	23.5	24.0	24.5	24.9	25.4	25.9	26.4	26.9	27.4	27.9	28.4	28.9	29.3	29.8	30.3	30.8	31.3	31.8	32.3	32.8	33.3	33.7
142	12.4	12.9	13.4	13.9	14.4	14.9	15.4	15.9	16.4	16.9	17.4	17.9	18.3	18.8	19.3	19.8	20.3	20.8	21.3	21.8	22.3	22.8	23.3	23.8	24.3	24.8	25.3	25.8	26.3	26.8	27.3	27.8	28.3	28.8	29.3	29.8	30.3	30.7	31.2	31.7	32.2	32.7	33.2	33.7	34.2
141	12.6	13.1	13.6	14.1	14.6	15.1	15.6	16.1	16.6	17.1	17.6	18.1	18.6	19.1	19.6	20.1	20.6	21.1	21.6	22.1	22.6	23.1	23.6	24.1	24.6	25.1	25.7	26.2	26.7	27.2	27.7	28.2	28.7	29.2	29.7	30.2	30.7	31.2	31.7	32.2	32.7	33.2	33.7	34.2	34.7
140	12.8	13.3	13.8	14.3	14.8	15.3	15.8	16.3	16.8	17.3	17.9	18.4	18.9	19.4	19.9	20.4	20.9	21.4	21.9	22.4	23.0	23.5	24.0	24.5	25.0	25.5	26.0	26.5	27.0	27.6	28.1	28.6	29.1	29.6	30.1	30.6	31.1	31.6	32.1	32.7	33.2	33.7	34.2	34.7	35.2
139	12.9	13.5	14.0	14.5	15.0	15.5	16.0	16.6	17.1	17.6	18.1	18.6	19.2	19.7	20.2	20.7	21.2	21.7	22.3	22.8	23.3	23.8	24.3	24.8	25.4	25.9	26.4	26.9	27.4	27.9	28.5	29.0	29.5	30.0	30.5	31.1	31.6	32.1	32.6	33.1	33.6	34.2	34.7	35.2	35.7
138	13.1	13.7	14.2	14.7	15.2	15.8	16.3	16.8	17.3	17.9	18.4	18.9	19.4	20.0	20.5	21.0	21.5	22.1	22.6	23.1	23.6	24.2	24.7	25.2	25.7	26.3	26.8	27.3	27.8	28.4	28.9	29.4	29.9	30.5	31.0	31.5	32.0	32.6	33.1	33.6	34.1	34.7	35.2	35.7	36.2
137	13.3	13.9	14.4	14.9	15.5	16.0	16.5	17.0	17.6	18.1	18.6	19.2	19.7	20.2	20.8	21.3	21.8	22.4	22.9	23.4	24.0	24.5	25.0	25.6	26.1	26.6	27.2	27.7	28.2	28.8	29.3	29.8	30.4	30.9	31.4	32.0	32.5	33.0	33.6	34.1	34.6	35.2	35.7	36.2	36.8
136	13.5	14.1	14.6	15.1	15.7	16.2	16.8	17.3	17.8	18.4	18.9	19.5	20.0	20.5	21.1	21.6	22.2	22.7	23.2	23.8	24.3	24.9	25.4	26.0	26.5	27.0	27.6	28.1	28.7	29.2	29.7	30.3	30.8	31.4	31.9	32.4	33.0	33.5	34.1	34.6	35.1	35.7	36.2	36.8	37.3
135	13.7	14.3	14.8	15.4	15.9	16.5	17.0	17.6	18.1	18.7	19.2	19.8	20.3	20.9	21.4	21.9	22.5	23.0	23.6	24.1	24.7	25.2	25.8	26.3	26.9	27.4	28.0	28.5	29.1	29.6	30.2	30.7	31.3	31.8	32.4	32.9	33.5	34.0	34.6	35.1	35.7	36.2	36.8	37.3	37.9
134	13.9	14.5	15.0	15.6	16.2	16.7	17.3	17.8	18.4	18.9	19.5	20.0	20.6	21.2	21.7	22.3	22.8	23.4	23.9	24.5	25.1	25.6	26.2	26.7	27.3	27.8	28.4	29.0	29.5	30.1	30.6	31.2	31.7	32.3	32.9	33.4	34.0	34.5	35.1	35.6	36.2	36.8	37.3	37.9	38.4
133	14.1	14.7	15.3	15.8	16.4	17.0	17.5	18.1	18.7	19.2	19.8	20.4	20.9	21.5	22.0	22.6	23.2	23.7	24.3	24.9	25.4	26.0	26.6	27.1	27.7	28.3	28.8	29.4	30.0	30.5	31.1	31.7	32.2	32.8	33.4	33.9	34.5	35.1	35.6	36.2	36.7	37.3	37.9	38.4	39.0
132	14.3	14.9	15.5	16.1	16.6	17.2	17.8	18.4	18.9	19.5	20.1	20.7	21.2	21.8	22.4	23.0	23.5	24.1	24.7	25.3	25.8	26.4	27.0	27.5	28.1	28.7	29.3	29.8	30.4	31.0	31.6	32.1	32.7	33.3	33.9	34.4	35.0	35.6	36.2	36.7	37.3	37.9	38.5	39.0	39.6
131	14.6	15.2	15.7	16.3	16.9	17.5	18.1	18.6	19.2	19.8	20.4	21.0	21.6	22.1	22.7	23.3	23.9	24.5	25.1	25.6	26.2	26.8	27.4	28.0	28.6	29.1	29.7	30.3	30.9	31.5	32.0	32.6	33.2	33.8	34.4	35.0	35.5	36.1	36.7	37.3	37.9	38.5	39.0	39.6	40.2
130	14.8	15.4	16.0	16.6	17.2	17.8	18.3	18.9	19.5	20.1	20.7	21.3	21.9	22.5	23.1	23.7	24.3	24.9	25.4	26.0	26.6	27.2	27.8	28.4	29.0	29.6	30.2	30.8	31.4	32.0	32.5	33.1	33.7	34.3	34.9	35.5	36.1	36.7	37.3	37.9	38.5	39.1	39.6	40.2	40.8
129	15.0	15.6	16.2	16.8	17.4	18.0	18.6	19.2	19.8	20.4	21.0	21.6	22.2	22.8	23.4	24.0	24.6	25.2	25.8	26.4	27.0	27.6	28.2	28.8	29.4	30.0	30.6	31.2	31.8	32.4	33.1	33.7	34.3	34.9	35.5	36.1	36.7	37.3	37.9	38.5	39.1	39.7	40.3	40.9	41.5
128	15.3	15.9	16.5	17.1	17.7	18.3	18.9	19.5	20.1	20.8	21.4	22.0	22.6	23.2	23.8	24.4	25.0	25.6	26.2	26.9	27.5	28.1	28.7	29.3	29.9	30.5	31.1	31.7	32.3	33.0	33.6	34.2	34.8	35.4	36.0	36.6	37.2	37.8	38.5	39.1	39.7	40.3	40.9	41.5	42.1
127	15.5	16.1	16.7	17.4	18.0	18.6	19.2	19.8	20.5	21.1	21.7	22.3	22.9	23.6	24.2	24.8	25.4	26.0	26.7	27.3	27.9	28.5	29.1	29.8	30.4	31.0	31.6	32.2	32.9	33.5	34.1	34.7	35.3	36.0	36.6	37.2	37.8	38.4	39.1	39.7	40.3	40.9	41.5	42.2	42.8
126	15.7	16.4	17.0	17.6	18.3	18.9	19.5	20.2	20.8	21.4	22.0	22.7	23.3	23.9	24.6	25.2	25.8	26.5	27.1	27.7	28.3	29.0	29.6	30.2	30.9	31.5	32.1	32.8	33.4	34.0	34.6	35.3	35.9	36.5	37.2	37.8	38.4	39.1	39.7	40.3	40.9	41.6	42.2	42.8	43.5
Weight (kg)	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**

BMI Look-Up Table for Children and Adolescents 5–17 Years (167–200 cm tall)

200	11.3	11.5	11.8	12.0	12.3	12.5	12.8	13.0	13.3	13.5	13.8	14.0	14.3	14.5	14.8	15.0	15.3	15.5	15.8	16.0	16.3	16.5	16.8	17.0	17.3	17.5	17.8	18.0	18.3	18.5	18.8	19.0	19.3	19.5	19.8	20.0	20.3	20.5	20.8	21.0	21.3	21.5	21.8	22.0	22.3	22.5	22.8	23.0	23.3	23.5	23.8	24.0
199	11.4	11.6	11.9	12.1	12.4	12.6	12.9	13.1	13.4	13.6	13.9	14.1	14.4	14.6	14.9	15.2	15.4	15.7	15.9	16.2	16.4	16.7	16.9	17.2	17.4	17.7	17.9	18.2	18.4	18.7	18.9	19.2	19.4	19.7	19.9	20.2	20.5	20.7	21.0	21.2	21.5	21.7	22.0	22.2	22.5	22.7	23.0	23.2	23.5	23.7	24.0	24.2
198	11.5	11.7	12.0	12.2	12.5	12.8	13.0	13.3	13.5	13.8	14.0	14.3	14.5	14.8	15.0	15.3	15.6	15.8	16.1	16.3	16.6	16.8	17.1	17.3	17.6	17.9	18.1	18.4	18.6	18.9	19.1	19.4	19.6	19.9	20.2	20.4	20.7	20.9	21.2	21.4	21.7	21.9	22.2	22.4	22.7	23.0	23.2	23.5	23.7	24.0	24.2	24.5
197	11.6	11.9	12.1	12.4	12.6	12.9	13.1	13.4	13.7	13.9	14.2	14.4	14.7	14.9	15.2	15.5	15.7	16.0	16.2	16.5	16.7	17.0	17.3	17.5	17.8	18.0	18.3	18.6	18.8	19.1	19.3	19.6	19.8	20.1	20.4	20.6	20.9	21.1	21.4	21.6	21.9	22.2	22.4	22.7	22.9	23.2	23.4	23.7	24.0	24.2	24.5	24.7
196	11.7	12.0	12.2	12.5	12.8	13.0	13.3	13.5	13.8	14.1	14.3	14.6	14.8	15.1	15.4	15.6	15.9	16.1	16.4	16.7	16.9	17.2	17.4	17.7	18.0	18.2	18.5	18.7	19.0	19.3	19.5	19.8	20.0	20.3	20.6	20.8	21.1	21.3	21.6	21.9	22.1	22.4	22.6	22.9	23.2	23.4	23.7	23.9	24.2	24.5	24.7	25.0
195	11.8	12.1	12.4	12.6	12.9	13.1	13.4	13.7	13.9	14.2	14.5	14.7	15.0	15.3	15.5	15.8	16.0	16.3	16.6	16.8	17.1	17.4	17.6	17.9	18.1	18.4	18.7	18.9	19.2	19.5	19.7	20.0	20.2	20.5	20.8	21.0	21.3	21.6	21.8	22.1	22.4	22.6	22.9	23.1	23.4	23.7	23.9	24.2	24.5	24.7	25.0	25.2
194	12.0	12.2	12.5	12.8	13.0	13.3	13.6	13.8	14.1	14.3	14.6	14.9	15.1	15.4	15.7	15.9	16.2	16.5	16.7	17.0	17.3	17.5	17.8	18.1	18.3	18.6	18.9	19.1	19.4	19.7	19.9	20.2	20.5	20.7	21.0	21.3	21.5	21.8	22.1	22.3	22.6	22.9	23.1	23.4	23.6	23.9	24.2	24.4	24.7	25.0	25.2	25.5
193	12.1	12.3	12.6	12.9	13.2	13.4	13.7	14.0	14.2	14.5	14.8	15.0	15.3	15.6	15.8	16.1	16.4	16.6	16.9	17.2	17.5	17.7	18.0	18.3	18.5	18.8	19.1	19.3	19.6	19.9	20.1	20.4	20.7	20.9	21.2	21.5	21.7	22.0	22.3	22.6	22.8	23.1	23.4	23.6	23.9	24.2	24.4	24.7	25.0	25.2	25.5	25.8
192	12.2	12.5	12.7	13.0	13.3	13.6	13.8	14.1	14.4	14.6	14.9	15.2	15.5	15.7	16.0	16.3	16.5	16.8	17.1	17.4	17.6	17.9	18.2	18.4	18.7	19.0	19.3	19.5	19.8	20.1	20.3	20.6	20.9	21.2	21.4	21.7	22.0	22.2	22.5	22.8	23.1	23.3	23.6	23.9	24.1	24.4	24.7	25.0	25.2	25.5	25.8	26.0
191	12.3	12.6	12.9	13.2	13.4	13.7	14.0	14.3	14.5	14.8	15.1	15.4	15.6	15.9	16.2	16.4	16.7	17.0	17.3	17.5	17.8	18.1	18.4	18.6	18.9	19.2	19.5	19.7	20.0	20.3	20.6	20.8	21.1	21.4	21.7	21.9	22.2	22.5	22.8	23.0	23.3	23.6	23.8	24.1	24.4	24.7	24.9	25.2	25.5	25.8	26.0	26.3
190	12.5	12.7	13.0	13.3	13.6	13.9	14.1	14.4	14.7	15.0	15.2	15.5	15.8	16.1	16.3	16.6	16.9	17.2	17.5	17.7	18.0	18.3	18.6	18.8	19.1	19.4	19.7	19.9	20.2	20.5	20.8	21.1	21.3	21.6	21.9	22.2	22.4	22.7	23.0	23.3	23.5	23.8	24.1	24.4	24.7	24.9	25.2	25.5	25.8	26.0	26.3	26.6
189	12.6	12.9	13.2	13.4	13.7	14.0	14.3	14.6	14.8	15.1	15.4	15.7	16.0	16.2	16.5	16.8	17.1	17.4	17.6	17.9	18.2	18.5	18.8	19.0	19.3	19.6	19.9	20.2	20.4	20.7	21.0	21.3	21.6	21.8	22.1	22.4	22.7	23.0	23.2	23.5	23.8	24.1	24.4	24.6	24.9	25.2	25.5	25.8	26.0	26.3	26.6	26.9
188	12.7	13.0	13.3	13.6	13.9	14.1	14.4	14.7	15.0	15.3	15.6	15.8	16.1	16.4	16.7	17.0	17.3	17.5	17.8	18.1	18.4	18.7	19.0	19.2	19.5	19.8	20.1	20.4	20.7	20.9	21.2	21.5	21.8	22.1	22.4	22.6	22.9	23.2	23.5	23.8	24.0	24.3	24.6	24.9	25.2	25.5	25.7	26.0	26.3	26.6	26.9	27.2
187	12.9	13.2	13.4	13.7	14.0	14.3	14.6	14.9	15.2	15.4	15.7	16.0	16.3	16.6	16.9	17.2	17.4	17.7	18.0	18.3	18.6	18.9	19.2	19.4	19.7	20.0	20.3	20.6	20.9	21.2	21.4	21.7	22.0	22.3	22.6	22.9	23.2	23.4	23.7	24.0	24.3	24.6	24.9	25.2	25.5	25.7	26.0	26.3	26.6	26.9	27.2	27.5
186	13.0	13.3	13.6	13.9	14.2	14.5	14.7	15.0	15.3	15.6	15.9	16.2	16.5	16.8	17.1	17.3	17.6	17.9	18.2	18.5	18.8	19.1	19.4	19.7	19.9	20.2	20.5	20.8	21.1	21.4	21.7	22.0	22.3	22.5	22.8	23.1	23.4	23.7	24.0	24.3	24.6	24.9	25.1	25.4	25.7	26.0	26.3	26.6	26.9	27.2	27.5	27.7
185	13.1	13.4	13.7	14.0	14.3	14.6	14.9	15.2	15.5	15.8	16.1	16.4	16.7	16.9	17.2	17.5	17.8	18.1	18.4	18.7	19.0	19.3	19.6	19.9	20.2	20.5	20.7	21.0	21.3	21.6	21.9	22.2	22.5	22.8	23.1	23.4	23.7	24.0	24.3	24.5	24.8	25.1	25.4	25.7	26.0	26.3	26.6	26.9	27.2	27.5	27.8	28.0
184	13.3	13.6	13.9	14.2	14.5	14.8	15.1	15.4	15.7	15.9	16.2	16.5	16.8	17.1	17.4	17.7	18.0	18.3	18.6	18.9	19.2	19.5	19.8	20.1	20.4	20.7	21.0	21.3	21.6	21.9	22.2	22.4	22.7	23.0	23.3	23.6	23.9	24.2	24.5	24.8	25.1	25.4	25.7	26.0	26.3	26.6	26.9	27.2	27.5	27.8	28.1	28.4
183	13.4	13.7	14.0	14.3	14.6	14.9	15.2	15.5	15.8	16.1	16.4	16.7	17.0	17.3	17.6	17.9	18.2	18.5	18.8	19.1	19.4	19.7	20.0	20.3	20.6	20.9	21.2	21.5	21.8	22.1	22.4	22.7	23.0	23.3	23.6	23.9	24.2	24.5	24.8	25.1	25.4	25.7	26.0	26.3	26.6	26.9	27.2	27.5	27.8	28.1	28.4	28.7
182	13.6	13.9	14.2	14.5	14.8	15.1	15.4	15.7	16.0	16.3	16.6	16.9	17.2	17.5	17.8	18.1	18.4	18.7	19.0	19.3	19.6	19.9	20.2	20.5	20.8	21.1	21.4	21.7	22.0	22.3	22.6	22.9	23.2	23.5	23.8	24.2	24.5	24.8	25.1	25.4	25.7	26.0	26.3	26.6	26.9	27.2	27.5	27.8	28.1	28.4	28.7	29.0
181	13.7	14.0	14.3	14.7	15.0	15.3	15.6	15.9	16.2	16.5	16.8	17.1	17.4	17.7	18.0	18.3	18.6	18.9	19.2	19.5	19.8	20.1	20.5	20.8	21.1	21.4	21.7	22.0	22.3	22.6	22.9	23.2	23.5	23.8	24.1	24.4	24.7	25.0	25.3	25.6	25.9	26.3	26.6	26.9	27.2	27.5	27.8	28.1	28.4	28.7	29.0	29.3
180	13.9	14.2	14.5	14.8	15.1	15.4	15.7	16.0	16.4	16.7	17.0	17.3	17.6	17.9	18.2	18.5	18.8	19.1	19.4	19.8	20.1	20.4	20.7	21.0	21.3	21.6	21.9	22.2	22.5	22.8	23.1	23.5	23.8	24.1	24.4	24.7	25.0	25.3	25.6	25.9	26.2	26.5	26.9	27.2	27.5	27.8	28.1	28.4	28.7	29.0	29.3	29.6
179	14.0	14.4	14.7	15.0	15.3	15.6	15.9	16.2	16.5	16.9	17.2	17.5	17.8	18.1	18.4	18.7	19.0	19.4	19.7	20.0	20.3	20.6	20.9	21.2	21.5	21.8	22.2	22.5	22.8	23.1	23.4	23.7	24.0	24.3	24.7	25.0	25.3	25.6	25.9	26.2	26.5	26.8	27.2	27.5	27.8	28.1	28.4	28.7	29.0	29.3	29.6	30.0
178	14.2	14.5	14.8	15.1	15.5	15.8	16.1	16.4	16.7	17.0	17.4	17.7	18.0	18.3	18.6	18.9	19.3	19.6	19.9	20.2	20.5	20.8	21.1	21.5	21.8	22.1	22.4	22.7	23.0	23.4	23.7	24.0	24.3	24.6	24.9	25.2	25.6	25.9	26.2	26.5	26.8	27.1	27.5	27.8	28.1	28.4	28.7	29.0	29.4	29.7	30.0	30.3
177	14.4	14.7	15.0	15.3	15.6	16.0	16.3	16.6	16.9	17.2	17.6	17.9	18.2	18.5	18.8	19.2	19.5	19.8	20.1	20.4	20.7	21.1	21.4	21.7	22.0	22.3	22.7	23.0	23.3	23.6	23.9	24.3	24.6	24.9	25.2	25.5	25.9	26.2	26.5	26.8	27.1	27.5	27.8	28.1	28.4	28.7	29.0	29.4	29.7	30.0	30.3	30.6
176	14.5	14.9	15.2	15.5	15.8	16.1	16.5	16.8	17.1	17.4	17.8	18.1	18.4	18.7	19.0	19.4	19.7	20.0	20.3	20.7	21.0	21.3	21.6	22.0	22.3	22.6	22.9	23.2	23.6	23.9	24.2	24.5	24.9	25.2	25.5	25.8	26.1	26.5	26.8	27.1	27.4	27.8	28.1	28.4	28.7	29.1	29.4	29.7	30.0	30.3	30.7	31.0
175	14.7	15.0	15.3	15.7	16.0	16.3	16.7	17.0	17.3	17.6	18.0	18.3	18.6	18.9	19.3	19.6	19.9	20.2	20.6	20.9	21.2	21.6	21.9	22.2	22.5	22.9	23.2	23.5	23.8	24.2	24.5	24.8	25.1	25.5	25.8	26.1	26.4	26.8	27.1	27.4	27.8	28.1	28.4	28.7	29.1	29.4	29.7	30.0	30.4	30.7	31.0	31.3
174	14.9	15.2	15.5	15.9	16.2	16.5	16.8	17.2	17.5	17.8	18.2	18.5	18.8	19.2	19.5	19.8	20.1	20.5	20.8	21.1	21.5	21.8	22.1	22.5	22.8	23.1	23.5	23.8	24.1	24.4	24.8	25.1	25.4	25.8	26.1	26.4	26.8	27.1	27.4	27.7	28.1	28.4	28.7	29.1	29.4	29.7	30.1	30.4	30.7	31.0	31.4	31.7
173	15.0	15.4	15.7	16.0	16.4	16.7	17.0	17.4	17.7	18.0	18.4	18.7	19.0	19.4	19.7	20.0	20.4	20.7	21.0	21.4	21.7	22.1	22.4	22.7	23.1	23.4	23.7	24.1	24.4	24.7	25.1	25.4	25.7	26.1	26.4	26.7	27.1	27.4	27.7	28.1	28.4	28.7	29.1	29.4	29.7	30.1	30.4	30.7	31.1	31.4	31.7	32.1
172	15.2	15.5	15.9	16.2	16.6	16.9	17.2	17.6	17.9	18.3	18.6	18.9	19.3	19.6	19.9	20.3	20.6	21.0	21.3	21.6	22.0	22.3	22.6	23.0	23.3	23.7	24.0	24.3	24.7	25.0	25.4	25.7	26.0	26.4	26.7	27.0	27.4	27.7	28.1	28.4	28.7	29.1	29.4	29.7	30.1	30.4	30.8	31.1	31.4	31.8	32.1	32.4
171	15.4	15.7	16.1	16.4	16.8	17.1	17.4	17.8	18.1	18.5	18.8	19.2	19.5	19.8	20.2	20.5	20.9	21.2	21.5	21.9	22.2	22.6	22.9	23.3	23.6	23.9	24.3	24.6	25.0	25.3	25.6	26.0	26.3	26.7	27.0	27.4	27.7	28.0	28.4	28.7	29.1	29.4	29.8	30.1	30.4	30.8	31.1	31.5	31.8	32.1	32.5	32.8
170	15.6	15.9	16.3	16.6	17.0	17.3	17.6	18.0	18.3	18.7	19.0	19.4	19.7	20.1	20.4	20.8	21.1	21.5	21.8	22.1	22.5	22.8	23.2	23.5	23.9	24.2	24.6	24.9	25.3	25.6	26.0	26.3	26.6	27.0	27.3	27.7	28.0	28.4	28.7	29.1	29.4	29.8	30.1	30.4	30.8	31.1	31.5	31.8	32.2	32.5	32.9	33.2
169	15.8	16.1	16.5	16.8	17.2	17.5	17.9	18.2	18.6	18.9	19.3	19.6	20.0	20.3	20.7	21.0	21.4	21.7	22.1	22.4	22.8	23.1	23.5	23.8	24.2	24.5	24.9	25.2	25.6	25.9	26.3	26.6	27.0	27.3	27.7	28.0	28.4	28.7	29.1	29.4	29.8	30.1	30.5	30.8	31.2	31.5	31.9	32.2	32.6	32.9	33.3	33.6
168	15.9	16.3	16.7	17.0	17.4	17.7	18.1	18.4	18.8	19.1	19.5	19.8	20.2	20.5	20.9	21.3	21.6	22.0	22.3	22.7	23.0	23.4	23.7	24.1	24.4	24.8	25.2	25.5	25.9	26.2	26.6	26.9	27.3	27.6	28.0	28.3	28.7	29.1	29.4	29.8	30.1	30.5	30.8	31.2	31.5	31.9	32.2	32.6	33.0	33.3	33.7	34.0
Weight (kg)	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**

BMI-for-Age Look-up Table, GIRLS 5–19 Years (WHO 2007)

Age (years:months)	Severe malnutrition < –3 SD (BMI)	Moderate malnutrition ≥ –3 to < –2 SD (BMI)	Normal ≥ –2 to ≤ +1 SD (BMI)	Overweight > +1 to ≤ +2 SD (BMI)	Obese > +2 SD (BMI)
5:1	less than 11.8	11.8–12.6	12.7–16.9	17.0–18.9	19.0 or higher
5:6	less than 11.7	11.7–12.6	12.7–16.9	17.0–19.0	19.1 or higher
6:0	less than 11.7	11.7–12.6	12.7–17.0	17.1–19.2	19.3 or higher
6:6	less than 11.7	11.7–12.6	12.7–17.1	17.2–19.5	19.6 or higher
7:0	less than 11.8	11.8–12.6	12.7–17.3	17.4–19.8	19.9 or higher
7:6	less than 11.8	11.8–12.7	12.8–17.5	17.6–20.1	20.2 or higher
8:0	less than 11.9	11.9–12.8	12.9–17.7	17.8–20.6	20.7 or higher
8:6	less than 12.0	12.0–12.9	13.0–18.0	18.1–21.0	21.1 or higher
9:0	less than 12.1	12.1–13.0	13.1–18.3	18.4–21.5	21.6 or higher
9:6	less than 12.2	12.2–13.2	13.3–18.7	18.8–22.0	22.1 or higher
10:0	less than 12.4	12.4–13.4	13.5–19.0	19.1–22.6	22.7 or higher
10:6	less than 12.5	12.5–13.6	13.7–19.4	19.5–23.1	23.2 or higher
11:0	less than 12.7	12.7–13.8	13.9–19.9	20.0–23.7	23.8 or higher
11:6	less than 12.9	12.9–14.0	14.1–20.3	20.4–24.3	24.4 or higher
12:0	less than 13.2	13.2–14.3	14.4–20.8	20.9–25.0	25.1 or higher
12:6	less than 13.4	13.4–14.6	14.7–21.3	21.4–25.6	25.7 or higher
13:0	less than 13.6	13.6–14.8	14.9–21.8	21.9–26.2	26.3 or higher
13:6	less than 13.8	13.8–15.1	15.2–22.3	22.4–26.8	26.9 or higher
14:0	less than 14.0	14.0–15.3	15.4–22.7	22.8–27.3	27.4 or higher
14:6	less than 14.2	14.2–15.6	15.7–23.1	23.2–27.8	27.9 or higher
15:0	less than 14.4	14.4–15.8	15.9–23.5	23.6–28.2	28.3 or higher
15:6	less than 14.5	14.5–15.9	16.0–23.8	23.9–28.6	28.7 or higher
16:0	less than 14.6	14.6–16.1	16.2–24.1	24.2–28.9	29.0 or higher
16:6	less than 14.7	14.7–16.2	16.3–24.3	24.4–29.1	29.2 or higher
17:0	less than 14.7	14.7–16.3	16.4–24.5	24.6–29.3	29.4 or higher
17:6	less than 14.7	14.7–16.3	16.4–24.6	24.7–29.4	29.5 or higher
18:0	less than 14.7	14.7–16.3	16.4–24.8	24.9–29.5	29.6 or higher

BMI-for-Age Look-up Table, BOYS 5–18 Years (WHO 2007)

Age (years:months)	Severe malnutrition < –3 SD (BMI)	Moderate malnutrition ≥ –3 to < –2 SD (BMI)	Normal ≥ –2 to ≤ +1 SD (BMI)	Overweight > +1 to ≤ +2 SD (BMI)	Obese > +2 SD (BMI)
5:1	less than 12.1	12.1–12.9	13.0–16.6	16.7–18.3	18.4 or higher
5:6	less than 12.1	12.1–12.9	13.0–16.7	16.8–18.4	18.5 or higher
6:0	less than 12.1	12.1–12.9	13.0–16.8	16.9–18.5	18.6 or higher
6:6	less than 12.2	12.2–13.0	13.1–16.9	17.0–18.7	18.8 or higher
7:0	less than 12.3	12.3–13.0	13.1–17.0	17.1–19.0	19.1 or higher
7:6	less than 12.3	12.3–13.1	13.2–17.2	17.3–19.3	19.4 or higher
8:0	less than 12.4	12.4–13.2	13.3–17.4	17.5–19.7	19.8 or higher
8:6	less than 12.5	12.5–13.3	13.4–17.7	17.8–20.1	20.2 or higher
9:0	less than 12.6	12.6–13.4	13.5–17.9	18.0–20.5	20.6 or higher
9:6	less than 12.7	12.7–13.5	13.6–18.2	18.3–20.9	21.0 or higher
10:0	less than 12.8	12.8–13.6	13.7–18.5	18.6–21.4	21.5 or higher
10:6	less than 12.9	12.9–13.8	13.9–18.8	18.9–21.9	22.0 or higher
11:0	less than 13.1	13.1–14.0	14.1–19.2	19.3–22.5	22.6 or higher
1:6	less than 13.2	13.2–14.1	14.2–19.5	19.6–23.0	23.1 or higher
12:0	less than 13.4	13.4–14.4	14.5–19.9	20.0–23.6	23.7 or higher
12:6	less than 13.6	13.6–14.6	14.7–20.4	20.5–24.2	24.3 or higher
13:0	less than 13.8	13.8–14.8	14.9–20.8	20.9–24.8	24.9 or higher
13:6	less than 14.0	14.0–15.1	15.2–21.3	21.4–25.3	25.4 or higher
14:0	less than 14.3	14.3–15.4	15.5–21.8	21.9–25.9	26.0 or higher
14:6	less than 14.5	14.5–15.6	15.7–22.2	22.3–26.5	26.6 or higher
15:0	less than 14.7	14.7–15.9	16.0–22.7	22.8–27.0	27.1 or higher
15:6	less than 14.9	14.9–16.2	16.3–23.1	23.2–27.4	27.5 or higher
16:0	less than 15.1	15.1–16.4	16.5–23.5	23.6–27.9	28.0 or higher
16:6	less than 15.3	15.3–16.6	16.7–23.9	24.0–28.3	28.4 or higher
17:0	less than 15.4	15.4–16.8	16.9–24.3	24.4–28.6	28.7 or higher
17:6	less than 15.6	15.6–17.0	17.1–24.6	24.7–29.0	29.1 or higher
18:0	less than 15.7	15.7–17.2	17.3–24.9	25.0–29.2	29.3 or higher

Annex 5. Recipes for Symptom Management

Name	Ingredients	Preparation	Benefits
Energy power drink	• 1 large garlic clove • ¼ teaspoon turmeric • 1 teaspoon finely chopped fresh ginger or ½ teaspoon ground ginger • ½ cup milk (replace with water if you have diarrhoea) • ½ cup water • 1 teaspoon honey or sugar	1. Boil all ingredients together. 2. Simmer for 10 minutes. 3. Cool slightly. 4. Add honey or sugar.	• Strengthens the immune system • Drink 1 cup daily (4 cups daily if sick).
Garlic drink	• 4 cloves garlic • 1 cup water • ¼ teaspoon ground cinnamon • 1 cup water	1. Chop garlic and add to boiling water. 2. Boil 10 minutes. 3. Cover and let cool. 4. Add honey or sugar to taste.	• Drink 1 cup in the morning, afternoon and evening to relieve sore throat.
Ginger drink	• 3 teaspoons powdered ginger or two large pieces of fresh ginger • 1 small piece pineapple • 2 teaspoons sugar • 4 cups boiled or treated water	1. Mix all the ingredients and put into a clean, covered container. 2. Leave in a warm place for 1 day. **OR** 3. Crush ginger in 4 cups of cold water and boil for 10 minutes. 4. Place in a clean, covered container. 5. Strain.	• Good for digestion
Ginger and cinnamon drink	• 1 tablespoon freshly pounded and chopped ginger • ¼ teaspoon ground cinnamon • Honey or sugar • 4 cups boiled or treated water	1. Bring water to a boil and add ginger. 2. Boil slowly for 10 minutes. 3. Add cinnamon and honey or sugar. 4. Cover and let stand for 5 minutes. 5. Strain before drinking.	• Good for sore throat

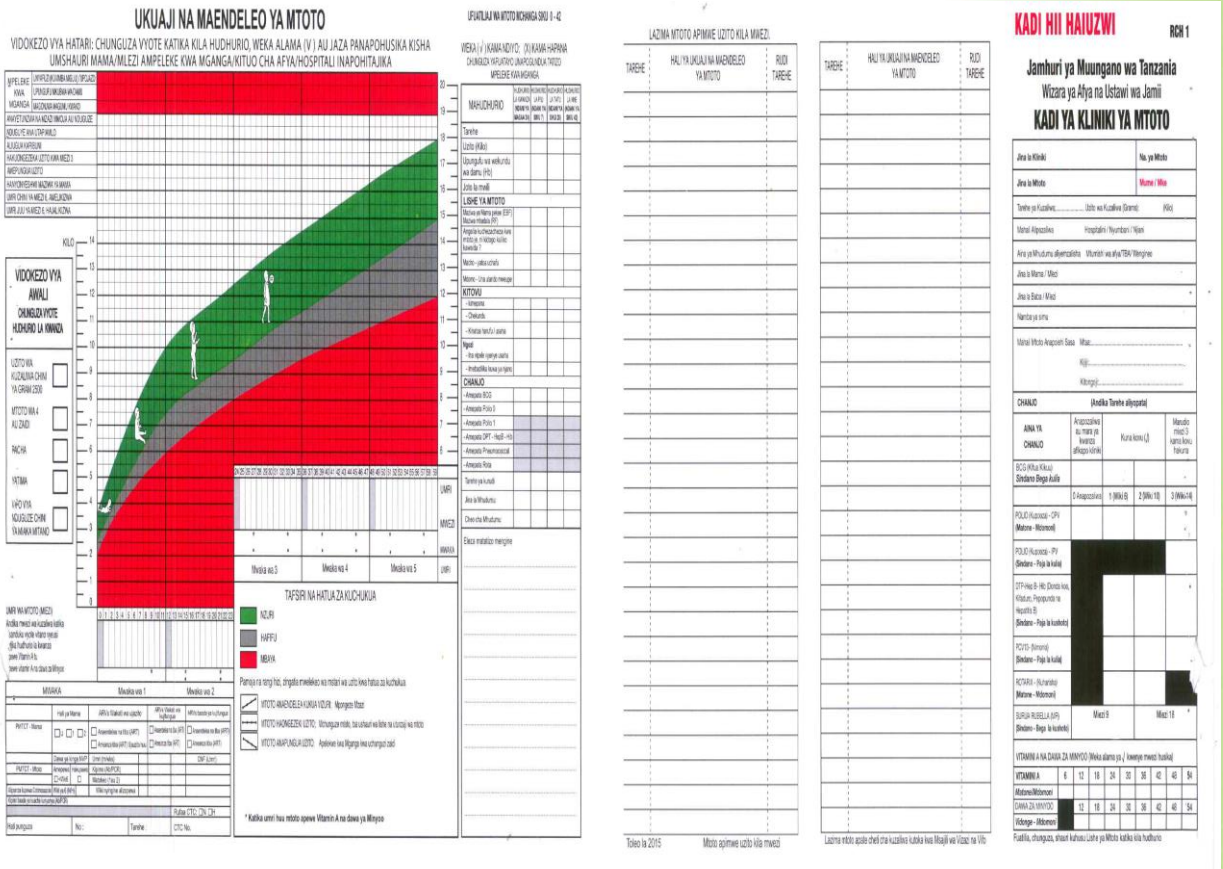
Name	Ingredients	Preparation	Benefits
Guava drink	• 1 guava, chopped • Juice of 1 lemon • 1 eucalyptus leaf • 1 cup water	1. Boil water. 2. Add guava, lemon juice and eucalyptus leaf. 3. Cover and let stand for 5 minutes.	• Drink 3 times a day to relieve a persistent cold.
Lemon drink	• 1 lemon • 1 cup water • Sugar or honey	1. Boil water and cool slightly. 2. Add lemon juice and sugar or honey to taste.	• Drink 1 cup of the warm mixture 3 times a day for flu.
Garlic drink	• 4 cloves garlic • 1 cup water	1. Boil the water and add the garlic. 2. Cover and leave for 5 minutes. 3. Strain and keep water that remains.	• Drink 1 cup 3 times a day for blocked or running nose.
Bean paste	• 1½ cups cooked beans • 1 medium onion, chopped • 1 teaspoon margarine • 1 tablespoon lemon juice • Water • Pinch of salt	1. Boil the beans until very soft and mash to make a smooth paste. 2. Add onion, margarine and lemon juice and mix. 3. Add salt to taste. Serve with boiled potatoes, cassava, or yams.	• Relieves nausea • Helps fever, cough, constipation, sore mouth and diarrhoea • Helps weight gain
Sour cabbage water	• 1 cup chopped raw cabbage • 3 cups boiled or treated water	1. Wash cabbage and soak in water. 2. Cover tightly and leave for 2–3 days. 3. Strain the water from the cabbage. 4. Discard the cabbage and store the water in a cool place or refrigerator. 5. Drink after bubbles start to form.	• Drink ½ cup every 8 hours for digestive problems
Sour water	• 1 cup millet, sorghum, or other grain • 3 cups boiled or treated water	1. Wash and soak grain in water. 2. Cover tightly and leave for 2–3 days. 3. Strain the water from the grain. Store the	• Helps weight gain • Drink ½ cup every 8 hours for diarrhoea, thrush and peptic ulcers. • Drink for 2 weeks after taking

Name	Ingredients	Preparation	Benefits
		sour water in a cool place or refrigerator. 4. After bubbles start to form, drink ½ cup every 8 hours.	antibiotics to restore friendly flora.
Oral rehydration drink	• 8 teaspoons sugar • ½ teaspoon salt • 1 litre boiled or treated water	1. Add salt and sugar to cooled water. 2. Stir or shake well.	• Good for diarrhoea
Togwa	• 1 cup maize or cassava flour • 1 cup power flour • 3 litres water	1. Add the maize or cassava flour to boiling water to prepare thick porridge. 2. Cool until lukewarm. 3. Add power flour and mix until the porridge turns watery. 4. Cover and leave overnight.	• Improves digestion and absorption of nutrients
Banana soup (*mtori*)	• 4 cooking bananas • ¼ kg meat, preferably with bones • Potatoes, yams, or pumpkin cut into pieces (optional) • 1 medium onion • 3 cups water • 1 tablespoon cooking oil • Salt	1. Wash meat, cut into small pieces and cook until tender. 2. Peel and slice bananas and wash in warm boiled or treated water. 3. Add banana and other ingredients to meat and simmer for ½ hour. Remove meat and mash the mixture thoroughly. 4. Add salt to taste.	• Provides energy • Helps weight gain • Relieves fatigue, stress and depression
Carrot soup	• 2 large carrots, chopped • 2 cups water • Pinch of cinnamon • Pinch of salt	1. Bring carrots to a boil in water. 2. Cook slowly until soft and then mash. 3. Add cinnamon and salt to taste.	• Helps prevent dehydration • Relieves diarrhoea
Potato soup	• 3 medium potatoes • 1 large carrot • 1 tablespoon maize flour • 3 cups water	1. Boil potatoes and carrots in water with salt. 2. Cook slowly until very soft.	• Good for weight gain and sore throat

Name	Ingredients	Preparation	Benefits
	• Pinch of salt	3. If too thin, mix maize flour with water, add to soup and stir until boiling.	
Rice porridge	• 1 cup rice • 3 cups water • Pinch of salt • Pinch of ground cinnamon • Sugar	1. Boil rice in water. 2. Add salt. 3. Cook slowly for 1 hour. 4. Add sugar and cinnamon to taste when serving.	• Good for diarrhoea
Rice soup	• 1 cup rice • 5 cups water • 1 clove garlic • 1 teaspoon ground cinnamon • Salt • Grated carrot or pumpkin (optional)	1. Boil rice. 2. Add garlic, cinnamon and salt to taste. 3. Cover the pot and cook slowly until the rice is tender. 4. Add grated carrot or pumpkin.	• Good for diarrhoea and other digestive problems
Bean porridge	• 1 cup dried beans • 2 tablespoons peanut paste • 4 cups water • Sugar or salt	1. Roast and pound the beans. 2. Boil the pounded beans in water until soft. 3. Mix in peanut paste. 4. Add sugar or salt to taste.	• Helps weight gain
Porridge enriched with power flour (*kimea*)	• Any porridge flour • 1 tablespoon raw power flour • Water • Sugar or salt	1. Prepare thick porridge. 2. Cool until lukewarm. 3. Add power flour while stirring until consistency is smooth and watery. 4. Boil mixture for a few minutes. 5. Add sugar or salt to taste.	• Provides energy • Improves digestion and absorption of nutrients
Baobab fruit porridge	• 1 baobab fruit • 2 cups water or milk • Sugar	1. Break the fruit. 2. Sieve to separate powder from seeds and threads. 3. Mix powder with water or milk.	• Good for colds and flu

Name	Ingredients	Preparation	Benefits
		4. Bring to a boil and then simmer for 20 minutes. 5. Add sugar to taste.	
Pumpkin stew	• ½ medium pumpkin, chopped • ½ kg beef, preferably with bones, cut into small pieces • Salt	1. Boil beef until tender. 2. Add pumpkin. 3. Cook slowly until very soft. 4. Add salt to taste.	• Good for diarrhoea
Rice or millet water	• 1 cup rice or millet • 4 cups water	1. Boil rice or millet in water until half done. 2. Strain off excess water and drink.	• Good for diarrhoea and fever
Rice porridge	• 1 cup rice • 3 cups water • Pinch of salt • Pinch of ground cinnamon • Sugar	1. Boil rice in water. 2. Add salt. 3. Cook slowly for 1 hour. 4. Add sugar and cinnamon to taste.	• Good for diarrhoea

Annex 6. RCH 1 Card



Annex 7. Weight-for-Length/Height Charts

Weight-for-height z-score (WHZ) compares a child's weight to the weight of a child of the same length/height and sex to classify the child's nutritional status.

Measure length for children under 2 years of age or less than 87 cm long. Measure height for children 2 years or older or 87 cm or taller. Recumbent length is on average 0.7 cm more than standing height. Although the difference is not important for individual children, correct by subtracting 0.7 cm from all lengths greater than 86.9 cm if height cannot be measured.

There are separate WHO Child Growth Standards for boys and girls.

To use the chart to classify children's nutritional status:

1. Find the correct table for the child's age (0–23 months or 24–59 months). Measure children 0–23 months of age or less than 87 cm long lying down (length). Measure children 24–59 months of age or taller than 87 cm standing up (height).
2. Find the figure closest to the child's length/height in the left-hand column.
3. If the child's length or height falls between two numbers, round up or down. For example, if the length is 45.2 cm, round down to 45 cm. If the length is 45.6 cm, round up to 46 cm.

BOYS 0–23 months, weight-for-length

Length (cm) ↓	SAM < –3	MAM ≥ –3 to < –2	Normal ≥ –2 to ≤ +2	Overweight > +2 to ≤ +3	Obesity > +3
	Weight (kg) →				
45	0–1.8	1.9	2.0–3.0	3.1–3.3	> 3.3
46	0–1.9	2.0–2.1	2.2–3.1	3.2–3.5	> 3.5
47	0–2.0	2.1–2.2	2.3–3.3	3.4–3.7	> 3.7
48	0–2.2	2.3–2.4	2.5–3.6	3.7–3.9	**> 3.9**
49	0–2.3	2.4–2.5	2.6–3.8	3.9–4.2	> 4.2
50	0–2.5	2.6–2.7	2.8–4.0	4.1–4.4	> 4.4
51	0–2.6	2.7–2.9	3.0–4.2	4.3–4.7	> 4.7
52	0–2.8	2.9–3.1	3.2–4.5	4.6–5.0	> 5.0
53	0–3.0	3.1–3.3	3.4–4.8	4.9–5.3	> 5.3
54	0–3.2	3.3–3.5	3.6–5.1	5.2–5.6	> 5.6
55	0–3.5	3.6–3.7	3.8–5.4	5.5–6.0	> 6.0
56	0–3.7	3.8–4.0	4.1–5.8	5.9–6.3	> 6.3
57	0–3.9	4.0–4.2	4.3–6.1	6.2–6.7	> 6.7
58	0–4.2	4.3–4.5	4.6–6.4	6.5–7.1	> 7.1
59	0–4.4	4.5–4.7	4.8–6.8	6.9–7.4	> 7.4
60	0–4.6	4.7–5.0	5.1–7.1	7.2–7.8	> 7.8
61	0–4.8	4.9–5.2	5.3–7.4	7.5–8.1	> 8.1
62	0–5.0	5.1–5.5	5.6–7.7	7.8–8.5	> 8.5
63	0–5.2	5.3–5.7	5.8–8.0	8.1–8.8	> 8.8
64	0–5.4	5.5–5.9	6.0–8.3	8.4–9.1	> 9.1
65	0–5.6	5.7–6.1	6.2–8.6	8.7–9.4	> 9.4
66	0–5.8	5.9–6.3	6.4–8.9	9.0–9.7	> 9.7
67	0–6.0	6.1–6.5	6.6–9.2	9.3–10.0	> 10.0
68	0–6.2	6.3–6.7	6.8–9.4	9.5–10.3	> 10.3
69	0–6.4	6.5–6.9	7.0–9.7	9.8–10.6	> 10.6
70	0–6.5	6.6–7.1	7.2–10.0	10.1–10.9	> 10.9
71	0–6.7	6.8–7.3	7.4–10.2	10.3–11.2	> 11.2
72	0–6.9	7.0–7.5	7.6–10.5	10.6–11.5	> 11.5
73	0–7.1	7.2–7.6	7.7–10.8	10.9–11.8	> 11.8
74	0–7.2	7.3–7.8	7.9–11.0	11.1–12.1	> 12.1
75	0–7.4	7.5–8.0	8.1–11.3	11.4–12.3	> 12.3
76	0–7.5	7.6–8.2	8.3–11.5	11.6–12.6	> 12.6
77	0–7.7	7.8–8.3	8.4–11.7	11.8–12.8	> 12.8
78	0–7.8	7.9–8.5	8.6–12.0	12.1–13.1	> 13.1
79	0–8.0	8.1–8.6	8.7–12.2	12.3–13.3	> 13.3
80	0–8.1	8.2–8.8	8.9–12.4	12.5–13.6	> 13.6
81	0–8.3	8.4–9.0	9.1–12.6	12.7–13.8	> 13.8
82	0–8.4	8.5–9.1	9.2–12.8	12.9–14.0	> 14.0
83	0–8.6	8.7–9.3	9.4–13.1	13.2–14.3	> 14.3
84	0–8.8	8.9–9.5	9.6–13.3	13.4–14.6	> 14.6
85	0–9.0	9.1–9.7	9.8–13.6	13.7–14.9	> 14.9
86	0–9.2	9.3–9.9	10.0–13.9	14.0–15.2	> 15.2

GIRLS 0–23 months, weight-for-length

Length (cm) ↓	SAM < –3	MAM ≥ –3 to < –2	Normal ≥ –2 to ≤ +2	Overweight > +2 to ≤ +3	Obesity > +3
	Weight (kg) →				
45	0–1.8	1.9–2.0	2.1–3.0	3.1–3.3	> 3.3
46	0–1.9	2.0–2.1	2.2–3.2	3.3–3.5	> 3.5
47	0–2.1	2.2–2.3	2.4–3.4	3.5–3.7	> 3.7
48	0–2.2	2.3–2.4	2.5–3.6	3.7–4.0	> 4.0
49	0–2.3	2.4–2.5	2.6–3.8	3.9–4.2	> 4.2
50	0–2.5	2.6–2.7	2.8–4.0	4.1–4.5	> 4.5
51	0–2.7	2.8–2.9	3.0–4.3	4.4–4.8	> 4.8
52	0–2.8	2.9–3.1	3.2–4.6	4.7–5.1	> 5.1
53	0–3.0	3.1–3.3	3.4–4.9	5.0–5.4	> 5.4
54	0–3.2	3.3–3.5	3.6–5.2	5.3–5.7	> 5.7
55	0–3.4	3.5–3.7	3.8–5.5	5.6–6.1	> 6.1
56	0–3.6	3.7–3.9	4.0–5.8	5.9–6.4	> 6.4
57	0–3.8	3.9–4.2	4.3–6.1	6.2–6.8	> 6.8
58	0–4.0	4.1–4.4	4.5–6.5	6.6–7.1	> 7.1
59	0–4.2	4.3–4.6	4.7–6.8	6.9–7.5	> 7.5
60	0–4.4	4.5–4.8	4.9–7.1	7.2–7.8	> 7.8
61	0–4.6	4.7–5.0	5.1–7.4	7.5–8.2	> 8.2
62	0–4.8	4.9–5.2	5.3–7.7	7.8–8.5	> 8.5
63	0–5.0	5.1–5.4	5.5–8.0	8.1–8.8	> 8.8
64	0–5.2	5.3–5.6	5.7–8.3	8.4–9.1	> 9.1
65	0–5.4	5.5–5.8	5.9–8.6	8.7–9.5	> 9.5
66	0–5.5	5.6–6.0	6.1–8.8	8.9–9.8	> 9.8
67	0–5.7	5.8–6.2	6.3–9.1	9.2–10.0	> 10.0
68	0–5.9	6.0–6.4	6.5–9.4	9.5–10.3	> 10.3
69	0–6.0	6.1–6.6	6.7–9.6	9.7–10.6	> 10.6
70	0–6.2	6.3–6.8	6.9–9.9	10.0–10.9	> 10.9
71	0–6.4	6.5–6.9	7.0–10.1	10.2–11.1	> 11.1
72	0–6.5	6.6–7.1	7.2–10.3	10.4–11.4	> 11.4
73	0–6.7	6.8–7.3	7.4–10.6	10.7–11.7	> 11.7
74	0–6.8	6.9–7.4	7.5–10.8	10.9–11.9	> 11.9
75	0–7.0	7.1–7.6	7.7–11.0	11.1–12.2	> 12.2
76	0–7.1	7.2–7.7	7.8–11.2	11.3–12.4	> 12.4
77	0–7.3	7.4–7.9	8.0–11.5	11.6–12.6	> 12.6
78	0–7.4	7.5–8.1	8.2–11.7	11.8–12.9	> 12.9
79	0–7.6	7.7–8.2	8.3–11.9	12.0–13.1	> 13.1
80	0–7.7	7.8–8.4	8.5–12.1	12.2–13.4	> 13.4
81	0–7.9	8.0–8.6	8.7–12.4	12.5–13.7	> 13.7
82	0–8.0	8.1–8.7	8.8–12.6	12.7–13.9	> 13.9
83	0–8.2	8.3–8.9	9.0–12.9	13.0–14.2	> 14.2
84	0–8.4	8.5–9.1	9.2–13.2	13.3–14.5	> 14.5
85	0–8.6	8.7–9.3	9.4–13.5	13.6–14.9	> 14.9
86	0–8.8	8.9–9.6	9.7–13.8	13.9–15.2	> 15.2

BOYS 0–23 months, weight-for-length

Length (cm)	SAM < –3	MAM ≥ –3 to < –2	Normal ≥ –2 to ≤ +2	Overweight > +2 to ≤ +3	Obesity > +3
	Weight (kg) →				
87	0–9.4	9.5–10.1	10.2–14.2	14.3–15.5	> 15.5
88	0–9.6	9.7–10.4	10.5–14.5	14.6–15.8	> 15.8
89	0–9.8	9.9–10.6	10.7–14.7	14.8–16.1	> 16.1
90	0–10.0	10.1–10.8	10.9–15.0	15.1–16.4	> 16.4
91	0–10.2	10.3–11.0	11.1–15.3	15.4–16.7	> 16.7
92	0–10.4	10.5–11.2	11.3–15.6	15.7–17.0	> 17.0
93	0–10.6	10.7–11.4	11.5–15.8	15.9–17.3	> 17.3
94	0–10.7	10.8–11.6	11.7–16.1	16.2–17.6	> 17.6
95	0–10.9	11.0–11.8	11.9–16.4	16.5–17.9	> 17.9
96	0–11.1	11.2–12.0	12.1–16.7	16.8–18.2	> 18.2
97	0–11.3	11.4–12.2	12.3–17.0	17.1–18.5	> 18.5
98	0–11.5	11.6–12.4	12.5–17.3	17.4–18.9	> 18.9
99	0–11.7	11.8–12.6	12.7–17.6	17.7–19.2	> 19.2
100	0–11.9	12.0–12.8	12.9–18.0	18.1–19.6	> 19.6

GIRLS 0–23 months, weight-for-length

Length (cm)	SAM < –3	MAM ≥ –3 to < –2	Normal ≥ –2 to ≤ +2	Overweight > +2 to ≤ +3	Obesity > +3
	Weight (kg) →				
87	0–9.0	9.1–9.8	9.9–14.1	14.2–15.5	> 15.5
88	0–9.2	9.3–10.0	10.1–14.4	14.5–15.9	> 15.9
89	0–9.4	9.5–10.2	10.3–14.7	14.8–16.2	> 16.2
90	0–9.6	9.7–10.4	10.5–15.0	15.1–16.5	> 16.5
91	0–9.8	9.9–10.6	10.7–15.3	15.4–16.9	> 16.9
92	0–10.0	10.1–10.8	10.9–15.6	15.7–17.2	> 17.2
93	0–10.1	10.2–11.0	11.1–15.9	16.0–17.5	> 17.5
94	0–10.3	10.4–11.2	11.3–16.2	16.3–17.9	> 17.9
95	0–10.5	10.6–11.4	11.5–16.5	16.6–18.2	> 18.2
96	0–10.7	10.8–11.6	11.7–16.8	16.9–18.6	> 18.6
97	0–10.9	11.0–11.9	12.0–17.1	17.2–18.9	> 18.9
98	0–11.1	11.2–12.1	12.2–17.5	17.6–19.3	> 19.3
99	0–11.3	11.4–12.3	12.4–17.8	17.9–19.6	> 19.6
100	0–11.5	11.6–12.5	12.6–18.1	18.2–20.0	> 20.0

BOYS, 24–59 months, weight-for-height

Height (cm)	SAM < –3	MAM ≥ –3 to < –2	Normal ≥ –2 to ≤ +2	Overweight > +2 to ≤ +3	Obesity > +3
	Weight (kg) →				
65	0–5.8	5.9–6.2	6.3–8.8	8.9–9.6	> 9.6
66	0–6.0	6.1–6.4	6.5–9.1	9.2–9.9	> 9.9
67	0–6.1	6.2–6.6	6.7–9.4	9.5–10.2	> 10.2
68	0–6.3	6.4–6.8	6.9–9.6	9.7–10.5	> 10.5
69	0–6.5	6.6–7.0	7.1–9.9	10.0–10.8	> 10.8
70	0–6.7	6.8–7.2	7.3–10.2	10.3–11.1	> 11.1
71	0–6.8	6.9–7.4	7.5–10.4	10.5–11.4	> 11.4
72	0–7.0	7.1–7.6	7.7–10.7	10.8–11.7	> 11.7
73	0–7.2	7.3–7.8	7.9–11.0	11.1–12.0	> 12.0
74	0–7.3	7.4–7.9	8.0–11.2	11.3–12.2	> 12.2
75	0–7.5	7.6–8.1	8.2–11.4	11.5–12.5	> 12.5
76	0–7.6	7.7–8.3	8.4–11.7	11.8–12.8	> 12.8
77	0–7.8	7.9–8.4	8.5–11.9	12.0–13.0	> 13.0
78	0–7.9	8.0–8.6	8.7–12.1	12.2–13.3	> 13.3
79	0–8.1	8.2–8.7	8.8–12.3	12.4–13.5	> 13.5
80	0–8.2	8.3–8.9	9.0–12.6	12.7–13.7	> 13.7
81	0–8.4	8.5–9.1	9.2–12.8	12.9–14.0	> 14.0
82	0–8.6	8.7–9.2	9.3–13.0	13.1–14.2	> 14.2
83	0–8.7	8.8–9.4	9.5–13.3	13.4–14.5	> 14.5
84	0–8.9	9.0–9.6	9.7–13.5	13.6–14.8	> 14.8
85	0–9.1	9.2–9.9	10.0–13.8	13.9–15.1	> 15.1
86	0–9.3	9.4–10.1	10.2–14.1	14.2–15.4	> 15.4
87	0–9.5	9.6–10.3	10.4–14.4	14.5–15.7	> 15.7
88	0–9.7	9.8–10.5	10.6–14.7	14.8–16.0	> 16.0

GIRLS, 24–59 months, weight-for-height

Height (cm)	SAM < –3	MAM ≥ –3 to < –2	Normal ≥ –2 to ≤ +2	Overweight > +2 to ≤ +3	Obesity > +3
	Weight (kg) →				
65	0–5.5	5.6–6.0	6.1–8.7	8.8–9.7	> 9.7
66	0–5.7	5.8–6.2	6.3–9.0	9.1–10.0	> 10.0
67	0–5.8	5.9–6.3	6.4–9.3	9.4–10.2	> 10.2
68	0–6.0	6.1–6.5	6.6–9.5	9.6–10.5	> 10.5
69	0–6.2	6.3–6.7	6.8–9.8	9.9–10.8	> 10.8
70	0–6.3	6.4–6.9	7.0–10.0	10.1–11.1	> 11.1
71	0–6.5	6.6–7.0	7.1–10.3	10.4–11.3	> 11.3
72	0–6.6	6.7–7.2	7.3–10.5	10.6–11.6	> 11.6
73	0–6.8	6.9–7.4	7.5–10.7	10.8–11.8	> 11.8
74	0–6.9	7.0–7.5	7.6–11.0	11.1–12.1	> 12.1
75	0–7.1	7.2–7.7	7.8–11.2	11.3–12.3	> 12.3
76	0–7.2	7.3–7.9	8.0–11.4	11.5–12.6	> 12.6
77	0–7.4	7.5–8.0	8.1–11.6	11.7–12.8	> 12.8
78	0–7.5	7.6–8.2	8.3–11.8	11.9–13.1	> 13.1
79	0–7.7	7.8–8.3	8.4–12.1	12.2–13.3	> 13.3
80	0–7.8	7.9–8.5	8.6–12.3	12.4–13.6	> 13.6
81	0–8.0	8.1–8.7	8.8–12.6	12.7–13.9	> 13.9
82	0–8.2	8.3–8.9	9.0–12.8	12.9–14.1	> 14.1
83	0–8.4	8.5–9.1	9.2–13.1	13.2–14.5	> 14.5
84	0–8.5	8.6–9.3	9.4–13.4	13.5–14.8	> 14.8
85	0–8.7	8.8–9.5	9.6–13.7	13.8–15.1	> 15.1
86	0–8.9	9.0–9.7	9.8–14.0	14.1–15.4	> 15.4
87	0–9.1	9.2–9.9	10.0–14.3	14.4–15.8	> 15.8
88	0–9.3	9.4–10.1	10.2–14.6	14.7–16.1	> 16.1

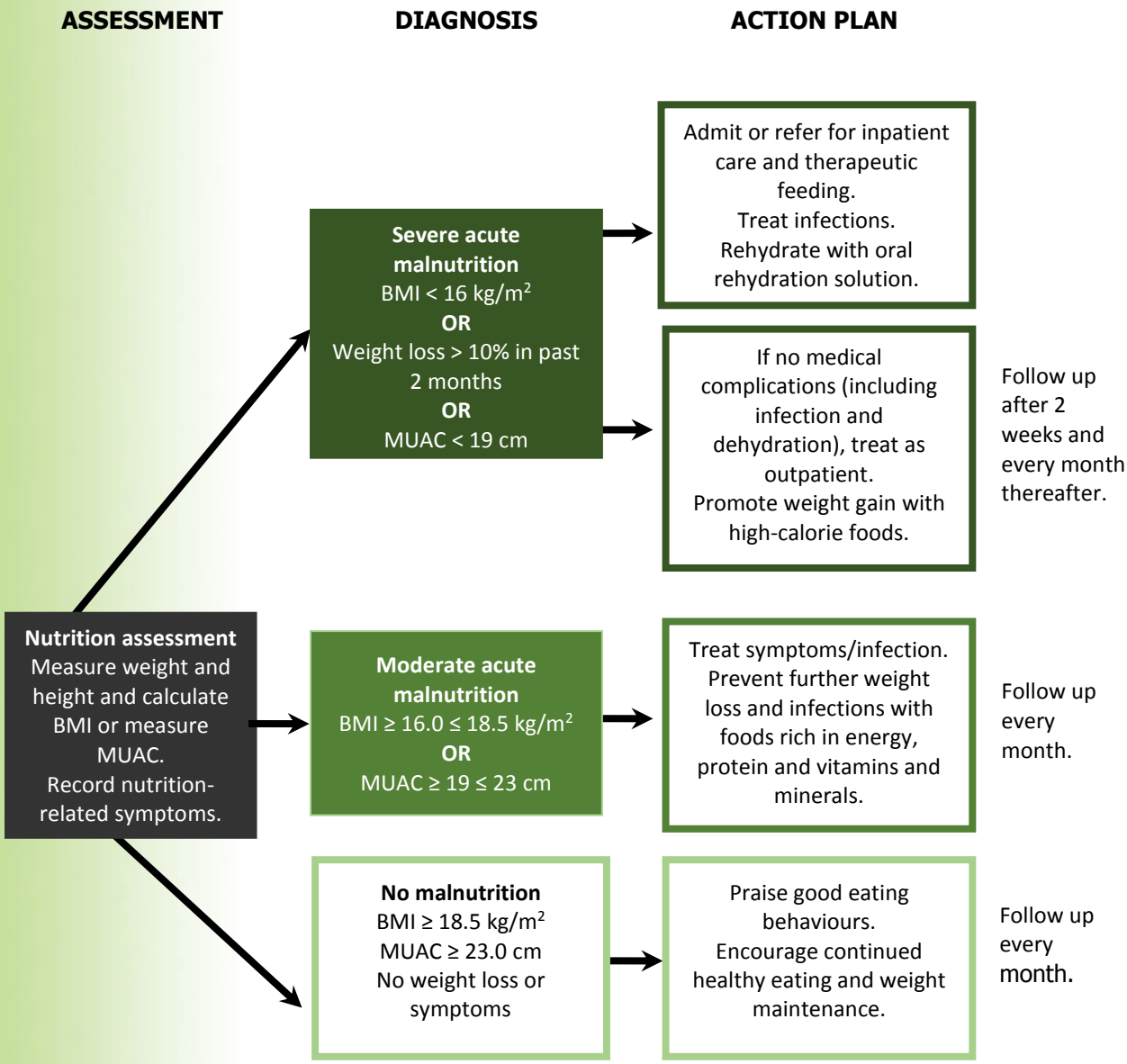
BOYS, 24–59 months, weight-for-height

Height (cm)	SAM < –3	MAM ≥ –3 to < –2	Normal ≥ –2 to ≤ +2	Overweight > +2 to ≤ +3	Obesity > +3
	Weight (kg) →				
89	0–9.9	10.0–10.7	10.8–14.9	15.0–16.3	> 16.3
90	0–10.1	10.2–10.9	11.0–15.2	15.3–16.6	> 16.6
91	0–10.3	10.4–11.1	11.2–15.5	15.6–16.9	> 16.9
92	0–10.5	10.6–11.3	11.4–15.8	15.9–17.2	> 17.2
93	0–10.7	10.8–11.5	11.6–16.0	16.1–17.5	> 17.5
94	0–10.9	11.0–11.7	11.8–16.3	16.4–17.8	> 17.8
95	0–11.0	11.1–11.9	12.0–16.6	16.7–18.1	> 18.1
96	0–11.2	11.3–12.1	12.2–16.9	17.0–18.4	> 18.4
97	0–11.4	11.5–12.3	12.4–17.2	17.3–18.8	> 18.8
98	0–11.6	11.7–12.5	12.6–17.5	17.6–19.1	> 19.1
99	0–11.8	11.9–12.8	12.9–17.9	18.0–19.5	> 19.5
100	0–12.0	12.1–13.0	13.1–18.2	18.3–19.9	> 19.9
101	0–12.2	12.3–13.2	13.3–18.5	18.6–20.3	> 20.3
102	0–12.4	12.5–13.5	13.6–18.9	19.0–20.7	> 20.7
103	0–12.7	12.8–13.7	13.8–19.3	19.4–21.1	> 21.1
104	0–12.9	13.0–13.9	14.0–19.7	19.8–21.6	> 21.6
105	0–13.1	13.2–14.2	14.3–20.1	20.2–22.0	> 22.0
106	0–13.3	13.4–14.4	14.5–20.5	20.6–22.5	> 22.5
107	0–13.6	13.7–14.7	14.8–20.9	21.0–22.9	> 22.9
108	0–13.8	13.9–15.0	15.1–21.3	21.4–23.4	> 23.4
109	0–14.0	14.1–15.2	15.3–21.8	21.9–23.9	> 23.9
110	0–14.3	14.4–15.5	15.6–22.2	22.3–24.4	> 24.4
111	0–14.5	14.6–15.8	15.9–22.7	22.8–25.0	> 25.0
112	0–14.8	14.9–16.1	16.2–23.1	23.2–25.5	> 25.5
113	0–15.1	15.2–16.4	16.5–23.6	23.7–26.0	> 26.0
114	0–15.3	15.4–16.7	16.8–24.1	24.2–26.6	> 26.6
115	0–15.6	15.7–17.0	17.1–24.6	24.7–27.2	> 27.2
116	0–15.9	16.0–17.3	17.4–25.1	25.2–27.8	> 27.8
117	0–16.1	16.2–17.6	17.7–25.6	25.7–28.3	> 28.3
118	0–16.4	16.5–17.9	18.0–26.1	26.2–28.9	> 28.9
119	0–16.7	16.8–18.2	18.3–26.6	26.7–29.5	> 29.5
120	0–17.0	17.1–18.5	18.6–27.2	27.3–30.1	> 30.1

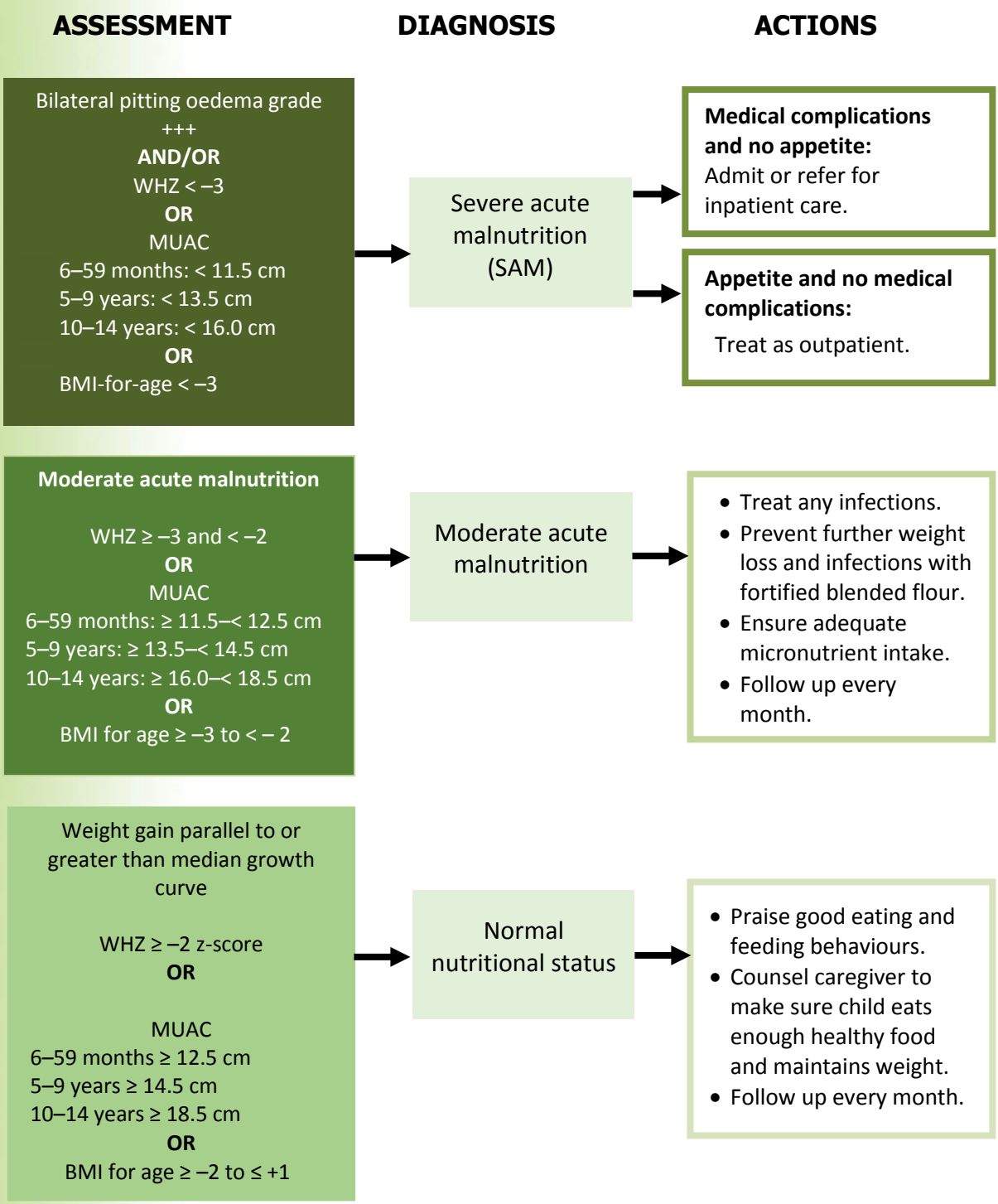
GIRLS, 24–59 months, weight-for-height

Height (cm)	SAM < –3	MAM ≥ –3 to < –2	Normal ≥ –2 to ≤ +2	Overweight > +2 to ≤ +3	Obesity > +3
	Weight (kg) →				
89	0–9.5	9.6–10.3	10.4–14.9	15.0–16.4	> 16.4
90	0–9.7	9.8–10.5	10.6–15.2	15.3–16.8	> 16.8
91	0–9.9	10.0–10.8	10.9–15.5	15.6–17.1	> 17.1
92	0–10.1	10.2–11.0	11.1–15.8	15.9–17.4	> 17.4
93	0–10.3	10.4–11.2	11.3–16.1	16.2–17.8	> 17.8
94	0–10.5	10.6–11.4	11.5–16.4	16.5–18.1	> 18.1
95	0–10.7	10.8–11.6	11.7–16.7	16.8–18.5	> 18.5
96	0–10.8	10.9–11.8	11.9–17.0	17.1–18.8	> 18.8
97	0–11.0	11.1–12.0	12.1–17.4	17.5–19.2	> 19.2
98	0–11.2	11.3–12.2	12.3–17.7	17.8–19.5	> 19.5
99	0–11.4	11.5–12.4	12.5–18.0	18.1–19.9	> 19.9
100	0–11.6	11.7–12.7	12.8–18.4	18.5–20.3	> 20.3
101	0–11.9	12.0–12.9	13.0–18.7	18.8–20.7	> 20.7
102	0–12.1	12.2–13.2	13.3–19.1	19.2–21.1	> 21.1
103	0–12.3	12.4–13.4	13.5–19.5	19.6–21.6	> 21.6
104	0–12.5	12.6–13.7	13.8–19.9	20.0–22.0	> 22.0
105	0–12.8	12.9–13.9	14.0–20.3	20.4–22.5	> 22.5
106	0–13.0	13.1–14.2	14.3–20.8	20.9–23.0	> 23.0
107	0–13.3	13.4–14.5	14.6–21.2	21.3–23.5	> 23.5
108	0–13.6	13.7–14.8	14.9–21.7	21.8–24.0	> 24.0
109	0–13.8	13.9–15.1	15.2–22.1	22.2–24.5	> 24.5
110	0–14.1	14.2–15.4	15.5–22.6	22.7–25.1	> 25.1
111	0–14.4	14.5–15.7	15.8–23.1	23.2–25.7	> 25.7
112	0–14.7	14.8–16.1	16.2–23.6	23.7–26.2	> 26.2
113	0–15.0	15.1–16.4	16.5–24.2	24.3–26.8	> 26.8
114	0–15.3	15.4–16.7	16.8–24.7	24.8–27.4	> 27.4
115	0–15.6	15.7–17.1	17.2–25.2	25.3–28.1	> 28.1
116	0–15.9	16.0–17.4	17.5–25.8	25.9–28.7	> 28.7
117	0–16.2	16.3–17.7	17.8–26.3	26.4–29.3	> 29.3
118	0–16.5	16.6–18.1	18.2–26.9	27.0–29.9	> 29.9
119	0–16.8	16.9–18.4	18.5–27.4	27.5–30.6	> 30.6
120	0–17.2	17.3–18.8	18.9–28.0	28.1–31.2	> 31.2

Annex 8. Algorithm for Management of Acute Malnutrition in Adults



Annex 9. Algorithm for Management of Acute Malnutrition in Children



Annex 10. Household Food Security Tool

Jamhuri ya Muungano wa Tanzania

Mfumo wa Uchambuzi wa Uhakika wa Chakula na Lishe (MUCHALI)

HOUSEHOLD QS

Household Questionnaire for Council with Potential Food Production Deficit

Completed by ……. Date ……	Checked by……. Date ……

Region …… Council…… Division……

Ward …… Village……..

VILLAGE CATEGORY: ☐ **Acute** ☐ **Moderate** ☐ **Normal** **(Tick only one box.)**

A. HOUSEHOLD CHARACTERISTICS

1. Indicate the wealth status of this household ***(obtained from village officials/key informants).*** **Tick only one box**

Resource weak	Middle	Better off

2. Indicate the general description of the household.

a) Sex of head of household **(tick only one box.)**	**Female**		**Male**	
b) Education level of head of household **(tick only one box.)**	None	Primary	Secondary	Post-secondary
c) Total number of people eating from the same pot in this household (HH size). **Probe and write the number (e.g., 7)**				

B. FOOD SECURITY SITUATION OF THE HOUSEHOLD

3. What is the food production situation of your household from the current production year, and what was it last year and normally? ***Tick only one for each category.***

Last production year			Current production year			Normally		
Surplus	**Sufficient**	**Deficit**	**Surplus**	**Sufficient**	**Deficit**	**Surplus**	**Sufficient**	**Deficit**

4. During the past market year (last year), did your household run out of food before this year's harvests (from both *vuli* and *masika* or *msimu* season)? **Tick only ONE.**

Yes	
No	

If the answer is "No" to QUESTION 4, skip question 5.

5. **If the answer is "Yes"** to question 4, how did your household cope with the shortfall? **Tick all that apply. Probe for remarks**.

Options	Tick	Remarks
Sold more livestock than normal to buy food		
Worked for food		
Borrowed food		
Got food aid (free food distribution)		
Begged food		
Bought food at subsidized prices		
Received food gifts		
Reduced the number of meals per day		
Reduced the size of meals		
Changed the composition of meals		
Changed to less preferred foods		
Consumed wild foods		
Stopped children from going to school		
Migrated temporarily from the village		
Other (specify)……		

6. Did your household receive seed assistance for planting in the last production year?

Yes	
No	

If the answer is "No" to QUESTION 6, skip question 7.

7. **If the answer is "Yes"** to question 6, what types of seed did you receive and when?

Type of seed (e.g., sorghum)	Kg received	Month received

8. In the current market year, which month ***before the next harvest*** will your household start facing food shortages, and how does it compare to last year and normal? **Tick 1 month only for each.**

Period	Month											
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
This 13 market year												
Last market year												
Normally												

C. LIVESTOCK PRODUCTION

9. Does your household own any livestock?

Yes	
No	

If the answer is "No" to QUESTION 9, skip question 10.

10. **If the answer is "Yes"** to question 9 above, complete the following table.

Type	Current Number	Number sold since July this year	Number slaughtered since July this year	Number died since July this year
Cattle				
Sheep				
Goats				
Poultry				
Pigs				
Other (specify)				

D. FISH PRODUCTION

11. Does your household own any fishing vessels/gear?

Yes	
No	

12. **If the answer is "Yes"** to question 11 above, please state on number and type of fishing vessel/gear available.

_____

_____

E. INCOME SOURCES FOR HOUSEHOLD

13. What are the **four main sources of cash income** from all household members (including spouse and eligible children)? **Tick only four from the list and rank those four main sources in order of importance: *1=most important, 2=second most important and 3=third most important and 4=fourth most important.***

	Source	Tick and rank the main 4.
1	Sale of food crops	
2	Sale of cash crops	
3	Sale of horticultural crops	
4	Sale of livestock	
5	Sale of fish/dagaa	
6	Agricultural labour (on farm)	
7	Sale of livestock products	
8	Livestock labour (e.g., herding, milking…)	
9	Non-farm labour (porter)	
10	Wages/salary	
11	Handicrafts (baskets/mats)	
12	Mining (kokoto, chumvi, madini, etc.)	
13	Remittance	
14	Sale of charcoal	
15	Sale of firewood	
16	Tailoring	
17	Mama/lishe	
18	Kiosk/shop	
19	Machinga	
20	Sale of timber	
21	Masonry	
22	Carpentry	
23	Brick making	
24	Local brewing	
25	Sale of water	
26	Sale of honey	
27	Sale of wild foods (vegetables/fruits)	
28	Begging (omba omba)	
29	Others (specify)……	

14. Can you **now** easily get work (agricultural, livestock or non-farm) in this village or neighbouring areas?

Type of work	Within		Outside	
	Yes	No	Yes	No
Agricultural labour				
Livestock labour (e.g., herding, milking, collecting pasture…)				
Fishing-related activities				
Non-farm labour				

F. HOUSEHOLD EXPENDITURE AND MARKETS

15. What proportion of your total income obtained last month did you spend buying **STAPLE** foods?

0% (none)	25% (one-quarter)	50% (one-half)	75% (three-quarters)	More than 75%

16. Are nearby market/shop supplies of required **STAPLE** food commodities for your households adequate?

Yes	
No	

17. **If the answer is "No" to QUESTION 16** above, what is the distance (in kilometres) from your household to the nearest market/shop? _____ **kilometres.**

18. In general, how do prices of basic food commodities this August compared to August last year and normally?

	Above	About the same	Below
August last year			
August normally			

19. Which of the following items did your household spend money on **last month? Tick and rank the three items on which you spent the most:** ***1=first item on which you spent the most, 2=second item on which you spent the most, 3=third item on which you spent the most*****.**

(Month)		
Item	**Tick**	**Rank**
Food		
Education		
Medical services		
Veterinary drugs		
Firewood/charcoal		
Kerosene		
Transport		
Soaps, detergents		
Water		
Other (specify, e.g., tobacco, alcohol)		

G. DIETARY DIVERSITY

20. How many meals did ***children (under five)*** in your household **eat yesterday and per day (on average) in the last month**? How many meals do they **normally eat per day**?

Yesterday			Last week/month			Normally			Remarks
1	2	3 or more	1	2	3 or more	1	2	3 or more	

21. How many meals did ***adults*** in your household **eat yesterday; and per day (on average) in the last month**? How many meals do they **normally eat per day**?

Yesterday			Last week/month			Normally			Remarks
1	2	3 or more	1	2	3 or more	1	2	3 or more	

22. Since **last week/month:**

(a) Has the composition of meals in your household changed?

Yes	
No	

<u>If the answer is "Yes" to QUESTION 22(a)</u> above, how has it changed (e.g., eating more of less preferred foods)? .....

(b) Has the size of meals in your household changed?

Yes	
No	

<u>If the answer is "Yes" to QUESTION 22(b)</u>, how has it changed compared to normal? **Tick only one.**

Less than normal	More than normal

23. Did you or anyone else in your household eat the following foods ***<u>yesterday</u>, during the day and or at night***?

(Read the list of foods. Write <u>1 (one)</u> in the box on the right if anyone in the household ate the food in the food group. <u>Write 0 (zero)</u> in the box on the right if no one in the household ate the food in the food group.)

Indicate the source of the food using a source code. See source code numbers at the bottom of the table. Note: One food group can have more than one source.

No.	Food group	Type of food	0 if no 1 if yes	Source code (1–8)
1	Cereals	Any ugali, bread, chapatti, rice, noodles, biscuits, or any other foods made from millet, sorghum, maize, rice, wheat, etc.?	|___|	|___|
2	Roots and tubers and plantains	Any round/sweet potatoes, yams, cassava, *matoke* or other food made from roots, tubers or plantains?	|___|	|___|
3	Vegetables	Any vegetables?	|___|	|___|
4	Fruits	Any fruits?	|___|	|___|
5	Meat, poultry, offal	Any beef, pork, lamb, goat, rabbit, wild game, chicken, duck, or other birds, liver, kidney, heart, intestines or other organ meats?	|___|	|___|
6	Eggs	Any eggs?	|___|	|___|
7	Fish and fishery products	Any forms of aquatic life including finfish or shellfish (fresh, dried or fried), fish meal, etc.?	|___|	|___|
8	Pulses, legumes, nuts	Any foods made from beans, peas, lentils, or nuts?	|___|	|___|
9	Milk and milk products	Any cheese, yogurt, milk or other milk products?	|___|	|___|
10	Oil/fats	Any foods made with oil, coconut, fat or butter?	|___|	|___|
11	Sugar/honey	Any sugar or honey?	|___|	|___|
12	Other (specify)…	Any other foods, such as condiments, coffee or tea?	|___|	|___|

Source codes	1 = Own production	5 = Purchased
	2 = Worked for food	6 = Food assistance
	3 = Borrowed	7 = Exchanged (bartered)
	4 = Gift	8 = Hunting/fishing/gathering

H. WATER, SANITATION AND HEALTH

24. Which type of toilet facility is used by your household members? **Tick only one.**

None	Household latrine	Communal latrine

25. What is the main **current** source of water for your household? What is the **normal** source? **Tick only one for each source.**

Timeline	Protected source (e.g., tap water, kisima)	Unprotected source (e.g., pond)
Current		
Normally		

26. How long does it **currently and normally** take to access water from the source for your household? **Record time in hours and/or minutes.**

Timeline	Hours	Minutes
Current		
Normally		

27. Estimate how many litres of water your household uses per day (for all household needs such as cooking, laundry/washing, etc.) _____ **litres.**

Name of head of household interviewed (if interested)

Name	Contacts	
	Telephone	Email

Jamhuri ya Muungano wa Tanzania

Mfumo wa Uchambuzi wa Uhakika wa Chakula na Lishe (MUCHALI), Tanzania

Food Security Assessment for the ___ Market Year from Season ___

Village Level Wealth Ranking _____

Completed by …….	Checked by …….
Date ……	Date ……

Region _____ District _____ Division _____ Ward _____ Village _____

Instructions: With village leaders/key informants, establish characteristics and estimate the number or percentage of households (HH) falling into each category. Below are examples of characteristics of households in each category. However, village leaders/key informants should develop the criteria themselves.

Better-off households

	Characteristic (Examples only. Create a list for the village surveyed.)	**Range (from...to...)**	**# or % of households in the better-off category**
1	Land cultivated by HH (acres)		
2	Livestock holding (cattle)		
3	Livestock holding (shoats)		
4	Livestock holding (chicken)		
5	Major income-generating activities		

Middle households

	Characteristic (examples only. Create a list for the village surveyed)	**Range (from...to...)**	**# or % of households in the middle category**
1	Land cultivated by HH (acres)		
2	Livestock holding (cattle)		
3	Livestock holding (shoats)		
4	Livestock holding (chicken)		
5	Major income-generating activities		

Resource-poor households

	Characteristic (examples only. Create a list for the village surveyed)	**Range (from…to…)**	**# or % of households in the resource-poor category**
1	Land cultivated by HH (acres)		
2	Livestock holding (cattle)		
3	Livestock holding (shoats)		
4	Livestock holding (chicken)		
5	Major income-generating activities		

Annex 11. Evaluation Questionnaire: National Guidelines for Nutrition Care and Support of People with HIV

Please complete this questionnaire 12 months after your organisation introduces these guidelines. Send the completed questionnaire to TFNC by fax to (+255) 22 2116713 or by email to info@lishe.org.

1. Name of your organisation _____

2. Kind of organisation
   - 2.1. Government health facility
   - 2.2. Private health facility
   - 2.3. Training institution
   - 2.4. NGO
   - 2.5. International organisation
   - 2.6. Community-based organisation
   - 2.7. Other (please specify) _____

3. What group does your organisation provide services to the most?
   - 3.1. People with HIV
   - 3.2. Most vulnerable children (MVC)
   - 3.4. People with chronic infectious diseases

4. How many years have you been a service provider? _____

5. How many years has your organisation been providing services? _____

6. Do you provide nutrition care? Yes No

7. Which of these services does your organisation provide?
   - 7.1. Nutrition education
   - 7.2. Nutrition counselling
   - 7.3. Food support
   - 7.4. Social or economic support
   - 7.5. Psychosocial support

8. What is your profession?

   8.1. Nurse
   8.2. Doctor
   8.3. Nutritionist/dietician
   8.4. Social worker
   8.5. Teacher
   8.6. Pharmacist
   8.7. Health educator
   8.8. Programme manager
   8.9. Other (please specify) _____

9. Please tick the chapter(s) of the guidelines you have personally read.

Chapter 1		Chapter 5		Chapter 9	
Chapter 2		Chapter 6		Chapter 10	
Chapter 3		Chapter 7		None	
Chapter 4		Chapter 8			

If you ticked 'None', please exit the questionnaire here. Thank you for your participation.

10. Please tick the chapter(s) of the guidelines that apply to your service area in your organisation (i.e., your workplace).

Chapter 1		Chapter 5		Chapter 8	
Chapter 2		Chapter 6		Chapter 9	
Chapter 3		Chapter 7		Chapter 10	
Chapter 4					

11. How well do you agree with the following statements?

   11.1. The guidelines are easy to read.

      11.1.1. Strongly agree
      11.1.2. Agree
      11.1.3. Disagree
      11.1.4. Strongly disagree

11.2. The guidelines contain most of the information I need.

11.2.1. Strongly agree

11.2.2. Agree

11.2.3. Disagree

11.2.4. Strongly disagree

11.3. It is easy to find specific information in the guidelines.

11.3.1. Strongly agree

11.3.2. Agree

11.3.3. Disagree

11.3.4. Strongly disagree

12. During the 12 months you have had the guidelines, how have you used them?

12.1. Used some information to provide nutrition education

12.2. Provided training on nutrition care

12.3. Referred to some chapters for specific information

12.4. Used some information to develop client materials

12.5. Other (please explain) _____

13. How many people in your health facility or organisation have been oriented in the guidelines? _____

14. To the best of your knowledge, how many health facilities have implemented nutrition services in accordance with the guidelines? _____

15. To the best of your knowledge, how many community programmes have implemented nutrition services in accordance with the guidelines? _____

16. At what service level(s) are the guidelines available in your workplace?

16.1. Management (health facility in-charge, program director)

16.2. Practitioner (health care provider, community worker)

16.3. Beneficiary

16.4. Other (please specify) _____

17. What examples, if any, of behaviour change among people with HIV and caregivers of HIV-affected children do you know of as a result of nutrition interventions recommended in the guidelines?

    _____

    _____

18. What examples, if any, of behaviour change among health facility or community programme staff do you know of as a result of the guidelines?

    _____

    _____

19. If your organisation has implemented nutrition interventions recommended in the guidelines, what percentage of people with HIV in care and treatment do you estimate have improved nutritional status as a results of those interventions?

    _____

    _____

20. What are the most useful elements of the guidelines for your work?

    _____

    _____

21. What information would you like to see included in the guidelines that is not in the current version? Please elaborate.

    _____

    _____

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