Republic of Zambia
Ministry of Health

NUTRITION GUIDELINES FOR CARE AND SUPPORT OF PEOPLE WITH HIV

2017

THE NATIONAL FOOD AND NUTRITION COMMISSION OF ZAMBIA

Nutrition Guidelines for Care and Support of People with HIV

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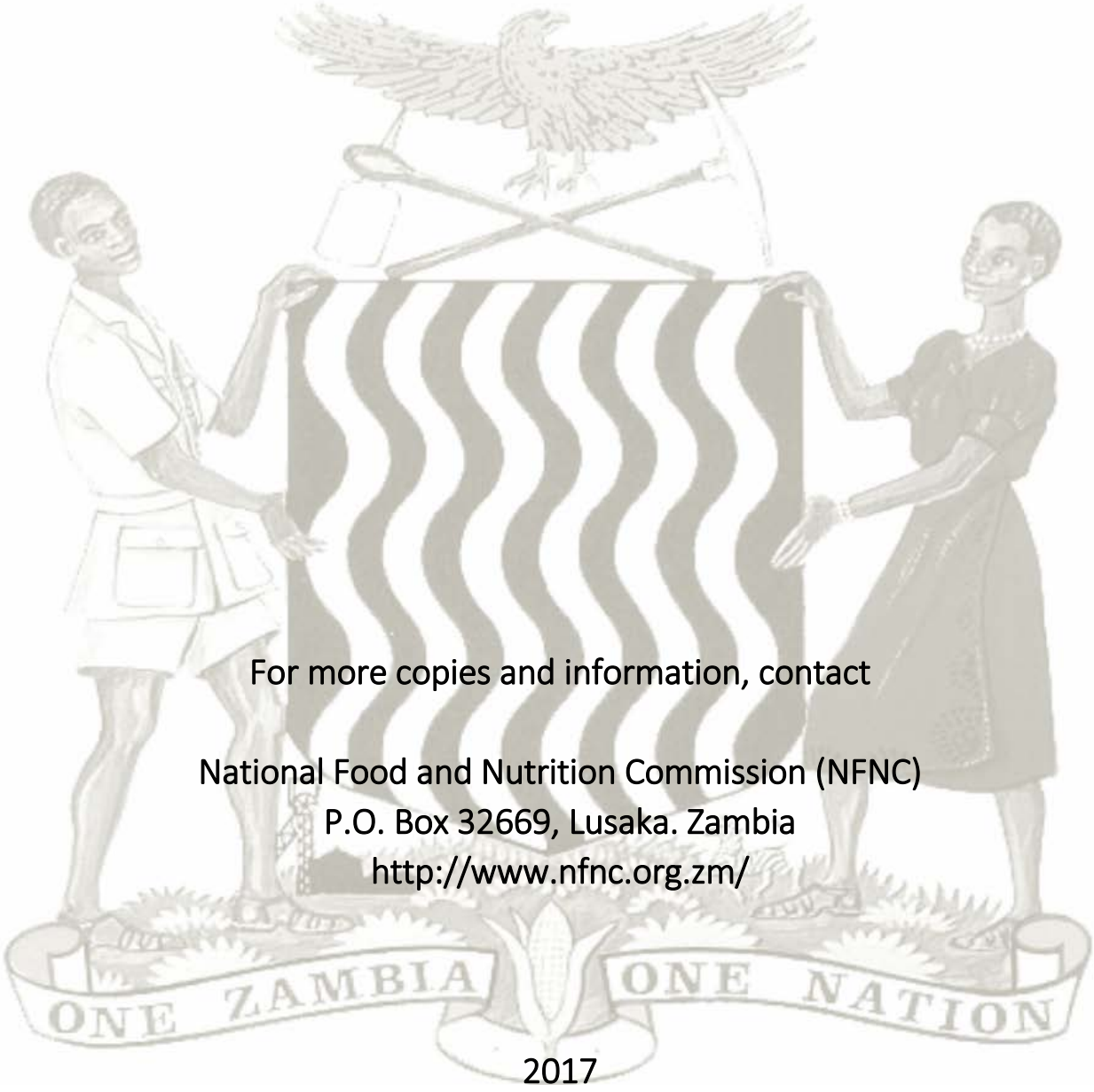
Recommended citation:
Zambia Ministry of Health, National Food and Nutrition Commission and Food and Nutrition Technical Assistance III Project (FANTA). 2017. *Nutrition Guidelines for Care and Support of People with HIV*. Lusaka: Ministry of Health.

Cover photo: Iain McClellan

NUTRITION GUIDELINES FOR CARE AND SUPPORT



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2017

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Foreword

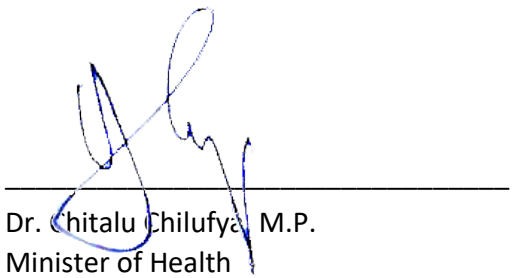
Zambia has made significant progress in reducing morbidity and mortality due to HIV and AIDS through the provision of free comprehensive HIV prevention services and antiretroviral drugs in all public health facilities. This has led to a reduction of new HIV infections from 77,500 in 2010 to approximately 46,000 in 2016. However, the devastating impact of HIV infection continues to be experienced by individuals, families, communities and the nation at large.

Evidence has shown that there is a relationship between HIV and nutrition. In the presence of HIV infection, nutrient requirements increase, and, HIV infection impairs nutrient intake and uptake. Poor nutrition therefore increases the risk of opportunistic infections and causes acceleration in progression of HIV to AIDS. In addition, maintaining good nutrition helps in reinforcing the effectiveness of antiretroviral drugs by improving their tolerance and safety. Thus, malnutrition and HIV/AIDS are interdependent and create a vicious cycle.

The Government of the Republic of Zambia recognizes that nutrition is an important component in the provision of quality care and support to people living with HIV and AIDS. This is in accordance with the National Health Strategic Plan 2017-2021, embedded in the 7th National Development Plan 2017-2021, that identifies the importance of a healthy nation in attaining middle income status by 2030.

These guidelines were therefore developed to define the necessary actions service providers need to take for them to include nutrition components at all sites providing HIV services and treatment including; maternal and child health (MCH) care services, services for orphans and vulnerable children (OVC), and home-based care (HBC) services. They seek to assist all categories of people infected with and/or affected by HIV.

In order to successfully implement quality nutritional care and support services to PLHIV, there is need for an inferred partnership between those affected and the different levels of care providers, as well as a coordinated effort by all stakeholders. I therefore call for the wide dissemination and use of these guidelines as a complement to other documents providing guidance on HIV prevention, treatment and support so as to improve the quality of life of people living with HIV and AIDS.



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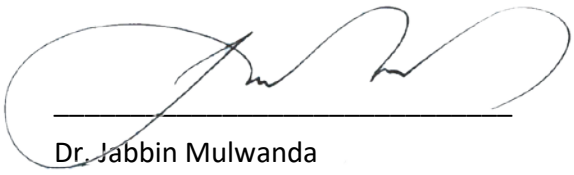
Acknowledgements

The Ministry of Health, through the National Food and Nutrition Commission (NFNC), appreciates the contributions made by various partners in the development of these guidelines. The National HIV/AIDS/STI/TB Council provided the policy and technical context. The United States Agency for International Development (USAID)/Zambia contributed financial and technical support. We also thank other stakeholders and development partners who participated in the review and finalisation of this document.

We are grateful for technical input from the Food and Nutrition Technical Assistance III Project (FANTA) and technical review of the guidelines by the Thrive Project, PCI, Infant and Young Child Nutrition Project, Catholic Relief Services (CRS) Scaling Up Community Care and Enhancing Social Safety Nets Return to Life (SUCCESS/RTL) Project, the Natural Resources Development College, the Nutrition Association of Zambia, UNICEF, the World Health Organisation (WHO) and the World Food Programme (WFP).

Our sincere gratitude goes to our colleagues from the Network of Zambian People Living with HIV/AIDS (NZP+) for their valuable input in ensuring that the guidelines were tailored to the practical needs of people living with HIV in Zambia.

Finally, we would like to acknowledge the tireless work of NFNC in compiling material and coordinating the process that led to the production of this document.



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Dr. Jabbin Mulwanda
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Abbreviations and Acronyms

µg	Microgramme(s)
AIDS	Acquired immune deficiency syndrome
ART	Antiretroviral treatment
ARV	Antiretroviral drug
BMI	Body mass index
CDC	U.S. Centers for Disease Control and Prevention
dL	Decilitre(s)
FAO	Food and Agriculture Organization of the United Nations
FBF	Fortified-blended food
HEPS	High-energy protein supplement
g	Gramme(s)
GMP	Growth monitoring and promotion
Hb	Haemoglobin
HDL	High-density lipoprotein
HIV	Human immunodeficiency virus
IMAM	Integrated Management of Acute Malnutrition
IU	International unit
kcal	Kilocalorie(s)
LDL	Low-density lipoprotein
MAM	Moderate acute malnutrition
mg	Milligramme(s)
MOH	Ministry of Health
MTP	Medium-Term Programme
MUAC	Mid-upper arm circumference
NAC	National AIDS Council
NACS	Nutrition assessment, counselling and support along the continuum of care
NFNC	National Food and Nutrition Commission
NGO	Non-governmental organisation
OVC	Orphan(s) and vulnerable child(ren)
PMTCT	Prevention of mother-to-child transmission of HIV
RDA	Recommended dietary allowance
RUTF	Ready-to-use therapeutic food
SAM	Severe acute malnutrition
TB	Tuberculosis
UNAIDS	Joint United Nations Programme on HIV/AIDS
WAZ	Weight for age z-score
WHO	World Health Organisation
WHZ	Weight for height z-score
WFP	World Food Programme
ZDHS	Zambia Demographic and Health Survey

Definitions

Advocacy	Speaking or writing in support of someone or something
AIDS	A group of illnesses caused by HIV that weaken the immune system
Antioxidant	A substance (e.g., vitamin E, vitamin C, zinc, selenium) that prevents and repairs damage caused by free radicals (by-products of the body's use of oxygen)
Antiretroviral	A drug used for HIV prophylaxis or treatment but not cure
Balanced diet	A diet containing foods which provide all nutrients in the correct proportion for adequate nourishment
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)
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	Giving a child semi-solid or solid foods in addition to breast milk from the sixth month of life until the child is fully weaned
Enzyme	A biological catalyst which enhances or inhibits a chemical reaction
Exclusive breastfeeding	Providing an infant only with breast milk and no other liquids or solids, not even water, for the first 6 months of life
HIV	Human immunodeficiency virus
Indigenous food	Food native to a country or community
Legumes	Plants (e.g., beans and peas) that are high in protein and contain many of the essential amino acids (also known as pods or pulses)
Malabsorption	Failure of the digestive tract to absorb nutrients into the body
Malnutrition	A condition caused by inadequate or excess intake of nutrients
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
Mixed feeding	Feeding an infant breast milk and other foods or liquids for the first 6 months of life

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
NACS	Client-centred nutrition assessment, counselling and support along the continuum of care, with health facility-community referrals and effective coordination for optimal quality and impact
Nutrient	A substance that can be metabolised to provide energy and build tissue. The nutrients in food include carbohydrates, proteins (amino acids), fats (lipids), vitamins and minerals.
Nutrition	The process of assimilating food and using it for growth and replacement of tissues
Nutritional status	A measurement of the extent to which a person's physiological needs for nutrients are met
Opportunistic infection	An infection which takes advantage of weakness in the immune system; people living with HIV are vulnerable to such 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 and beverages marketed or otherwise represented to be suitable, with or without modification, for use as a partial or total replacement of breast milk
Snack	A small quantity of food which is readily available, can be eaten without much preparation and is usually taken between meals
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. Introduction

Zambia has a generalised HIV epidemic fuelled by early sexual debut, multiple and concurrent partnerships, mobility and labour migration and gender and social norms (NAC 2015). In 2015, 1.2 million Zambians were living with HIV (UNAIDS 2016). Adult HIV prevalence declined from 19.0 percent in 2003 (Central Statistical Office [CSO] et al. 2014) to 12.9 percent in 2015 (UNAIDS 2016). The 2013–14 Zambia Demographic and Health Survey (ZDHS) reported that more females (15.1 percent) than males (11.3 percent) were HIV positive, and urban areas had higher HIV prevalence (18.2 percent) than rural areas (9.1 percent). HIV and AIDS have increased Zambia's disease burden and pressure on the health system. Of the estimated 1.2 million people with HIV in 2016, over 800,000 were on antiretroviral treatment (ART), allowing them to live longer and healthier lives. At the end of 2016, over 1,800 health facilities provided HIV testing and counseling and 800 sites provided ART (National AIDS Strategic Framework 2017–2010).

Malnutrition is one of the main complications of HIV infection and a significant factor in disease progression. HIV causes nutrient malabsorption and alters metabolism, resulting in weight loss, reduced immune function and increased susceptibility to secondary infections. While HIV increases energy needs, people with HIV may have less access to food because of inability to work and stigma. Research in 2007 by the Centres for Infectious Disease Research in Zambia (CIDRZ), the World Food Programme (WFP) and the U.S. Centers for Disease Control and Prevention (CDC) found that malnutrition among people with HIV was much higher than in the general population. Of adults starting antiretroviral drugs (ARVs), 33.5 percent were moderately malnourished, with a body mass index (BMI) between 16.0 and 18.5, and 13.5 percent were severely malnourished, with a BMI less than 16 (figure 1). The same studies found that 44 percent of HIV-positive children were underweight, with < –2 weight-for-age z-score (figure 2), compared with 15 percent in the general population (CSO et al. 2009). These figures are likely to have decreased with increasing access to ART.

Figure 1. BMI: Adults on ART in Lusaka

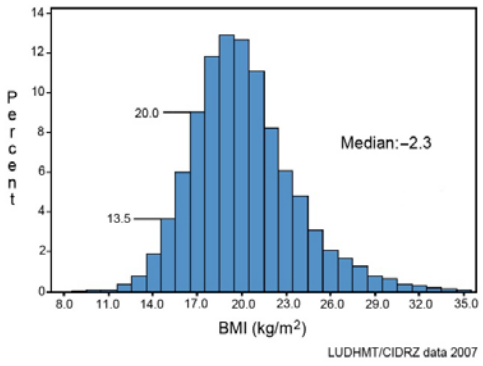
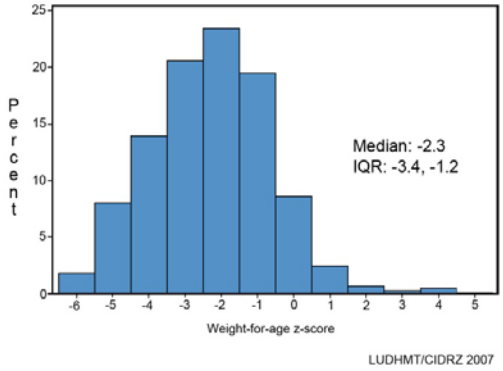


Figure 2. WAZ: 2,965 children on ART in Lusaka



Malnutrition contributes to morbidity and mortality, especially in children under 5 years. The 2013–14 ZDHS reported that 40.2 percent of children 0–59 months were stunted (low height for age), a decrease from 45 percent in the 2007 ZDHS, and 17 percent were severely stunted; 6 percent were wasted (low weight for height), compared with 5 percent in 2007; and 15 percent were underweight (low weight for age). In 2010, the University Teaching Hospital reported that the average mortality rate among severely malnourished children admitted to the malnutrition

ward was 40 percent (associated mainly with cryptosporidium- and salmonella-related diarrhoea), with a rate of 55 percent among HIV-positive children (Mwambazi and Irena 2010).

While ART has reduced HIV-related mortality, noncommunicable diseases (NCDs) are increasing in people living longer on ART, related to the infection itself, the medications used to treat it or the process of aging. These NCDs include cancers, heart disease, lung disease and diabetes. Management of these chronic conditions will further strain Zambia's health system.

1.1. Government Response to the HIV Epidemic

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

- 1975: National Food and Nutrition Act
- 1984: First confirmed case of HIV and AIDS in Zambia (retrospective diagnosis)
- 1986: Establishment of the National AIDS Prevention and Control Programme
- 1987: Development of an emergency short- term plan to ensure safe blood and blood product supplies
- 1988–1992: First Medium-Term Programme (MTP) with eight operational priorities: tuberculosis and leprosy; information, education and communication; counselling; laboratory support; epidemiology and research; sexually transmitted diseases and clinical care (including nutritional care); programme management and home-based care (HBC)
- 1994–1998: Second MTP, with a multi-sectoral approach and a mechanism for coordination and collaboration
- 1999–2003: Creation of the semi-autonomous, multi-sectoral National HIV/AIDS/STI/TB Council
- 2001–2003: Launch and implementation of the first National AIDS Strategic Framework
- 2000–2002: Establishment of the PMTCT Secretariat
- 2000–2006: Ndola Demonstration Project to integrate infant feeding counselling into HIV services
- 2002: National HIV/AIDS/STI/TB Policy
- 2003–2004: Scale-up of ART
- 2006: National HIV/AIDS Council Strategic Framework 2006–2010
- 2006: National Food and Nutrition Policy
- 2007: Commencement of National Nutrition Surveillance
- 2011: National Food and Nutrition Strategic Plan for Zambia 2011–2015
- 2014: National HIV/AIDS Council Strategic Framework 2014–2016
- 2016: Maternal, Adolescent, Infant and Young Child Nutrition (MAIYCN) Guidelines
- 2017: National HIV/AIDS Council Strategic Framework 2017–2021

Government HIV and AIDS mitigation interventions are channelled through a national strategic framework that directs interventions for prevention, treatment and care and encompasses all government ministries, the private sector, religious groups and civil society. The National HIV/AIDS Council Strategic Framework 2017–2021 prioritizes increasing knowledge of HIV status, treatment and viral load suppression, as well as reducing stigma and discrimination, and

promotes nutrition support as an integral part of HIV and TB treatment. District AIDS Task Forces have mobilized nongovernmental organizations (NGOs) and community-based organizations to respond to the needs of vulnerable populations by providing health and other related services.

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

The *Nutrition Guidelines for the Care and Support of People Living with HIV* provide the information needed to optimise such care services. The guidelines were first published in 2004 and updated in 2010 and 2011. The current edition includes updated global and national guidance as well as references to more recent publications.

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

- Chapter 1 introduces the HIV epidemic in Zambia.
- Chapter 2 gives an overview of the relationship between nutrition and HIV.
- Chapter 3 covers nutrition care and support for non-pregnant/lactating adults with HIV.
- Chapter 4 describes recommended nutrition interventions for HIV-positive pregnant and lactating women
- Chapter 5 describes recommended nutrition interventions for infants and young children of HIV-positive mothers.
- Chapter 6 explains how to manage the interaction between food and HIV medications.
- Chapter 7 covers hygiene and sanitation for people with weakened immune systems.
- Chapter 8 describes the impact of HIV on food security and suggests approaches to help people with HIV and their households in this area.
- Chapter 9 discusses community outreach and mobilisation as essential components of the care and support of people with HIV and the management of malnutrition.
- Chapter 10 discusses monitoring and evaluating nutrition interventions in HIV services.

These guidelines are intended for health care managers, health care providers and nutritionists who implement nutrition and HIV interventions. They can also be used by policy makers and training institutions to standardise management of malnutrition by the health workforce. With some adaptation, the guidelines can be used by non-health staff, including social welfare workers, interest groups, churches, politicians, NGOs, extension workers and teachers. Local adaptation should be done only with the collaboration and consent of the MOH and NFNC. Suggestions for adaptation are listed below.

- Managing 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 in the target area.
- Details on specific topics can be found in other guidelines from the MOH, NFNC or NAC.
- Diets can be modified according to food available in different settings, but macro- and micronutrient requirements must be observed.
- Job aids are useful to explain counselling points.

Chapter 2. HIV and Nutrition

Acquired immune deficiency syndrome (AIDS) is caused by a retrovirus known as the human immunodeficiency virus (HIV). The virus attacks the immune system and impairs the body's ability to fight infection. Some people who contract HIV do not show symptoms or become ill for years. During this 'asymptomatic phase' of the infection, 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 are a clear indication of a weakened immune system. Once these opportunistic infections are evident, the person is said to have AIDS, which is the end-stage of HIV infection. Progression of HIV to AIDS depends on general health and nutritional status before and during the time of HIV infection. Good health, including good nutrition, can help delay this progression and improve quality of life. This is why nutrition care and support are an important part of comprehensive care and treatment of HIV.

2.1. Basic Nutrition

Nutrition is the sum of all the processes involved in the body's taking in, assimilating and using nutrients. Food contains the nutrients that the body needs for the following:

- Development, growth, maintenance, replacement and repair of cells and tissues
- Resistance to and fighting of infection
- Production of energy, warmth, movement and work

When the body does not get enough quality food, it becomes weak and cannot function properly. The nutrients the body needs to function are water, carbohydrates, proteins, fats, vitamins and minerals. Carbohydrates, proteins and fats are needed in large amounts and are referred to as *macronutrients*. Vitamins and minerals are needed in smaller amounts and are referred to as *micronutrients*. The body needs both macronutrients and micronutrients in the right amounts and combinations for the body to function properly (annex 1).

Good nutrition requires eating a variety of safe and nutritious foods in the right quantities to meet the body's needs.

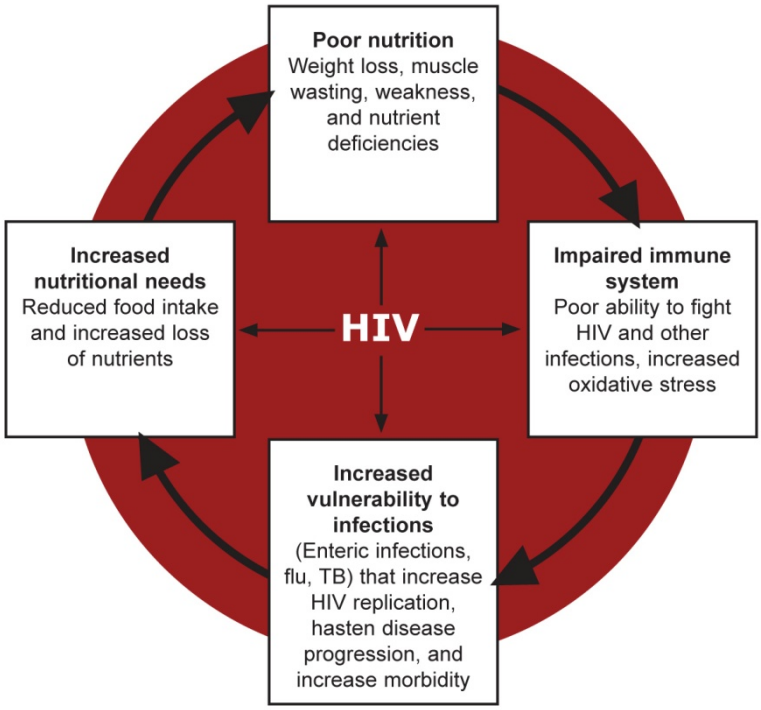
Diet is the amount and kind of food and drink consumed day to day. A *balanced diet* includes a variety of foods that help meet the body's functional needs. No single food except breast milk provides infants under 6 months with all the nutrients they need to function properly. Everyone else, including young children, adolescents, pregnant and lactating women, the elderly and people with HIV, needs to eat a variety of foods for good health.

2.2. The Link between Nutrition and HIV

Malnutrition—a condition caused by inadequate or excess intake of nutrients—is a common problem in Zambia and a prominent feature of HIV and AIDS. The relation between malnutrition and HIV is a vicious cycle. Malnutrition weakens the immune system, which worsens the effects of HIV, which then increases the likelihood of malnutrition. People with HIV have an increased risk of malnutrition because of reduced food intake, nutrient absorption and nutrient utilisation.

Because poor nutrition increases susceptibility to opportunistic infections, it may speed the progression from HIV to AIDS. Figure 3 shows the relationship between poor nutrition and HIV.

Figure 3. Cycle of poor nutrition and infection in a person with HIV



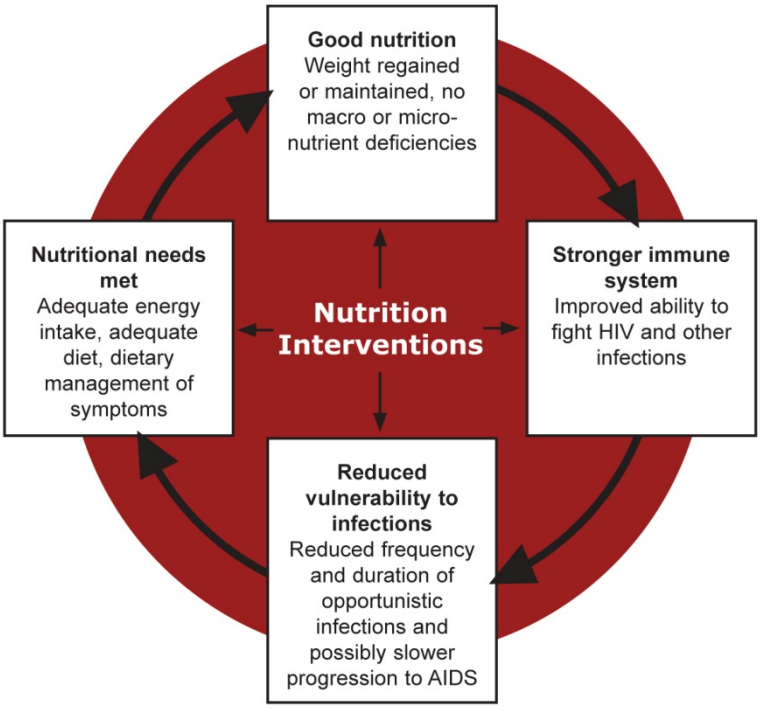
Source: Food and Agriculture Organization of the United Nations (FAO). 2002. *Living Well with HIV/AIDS: A Manual on Nutritional Care and Support for People Living with HIV/AIDS*. Rome.

Unlike other infections, HIV attacks and destroys the cells of the immune system. Ultimately, other organs become more vulnerable to other infections. These infections affect nutritional status by reducing nutrient intake and absorption while increasing the utilisation and excretion of other nutrients, leading to protein-energy malnutrition and certain micronutrient deficiencies as the body tries to fight the attack on its immune system. This cycle usually contributes to weight loss and wasting seen in adult AIDS patients. Decreased food intake is the most important cause of malnutrition and wasting. Other causes are malabsorption of nutrients and alterations in metabolism. HIV affects nutritional status early in the infection, even before other symptoms appear. It is important to identify and treat malnutrition promptly because it negatively affects immune function and is associated with HIV disease progression. Good nutrition plays an important role in the comprehensive care and management of HIV and AIDS because it:

- Helps prevent malnutrition and wasting
- Enhances the body's ability to fight opportunistic infections
- Helps achieve and maintain optimal body weight
- Improves the effectiveness of medications
- Helps prolong good health
- Improves the quality of life

Figure 4 shows the relationship between good nutrition and HIV.

Figure 4. 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.

The following clinical signs and symptoms can indicate malnutrition:

- Weight loss
- Loss of muscle tissue and subcutaneous fat
- Vitamin and mineral deficiencies
- Reduced immune competence
- Increased susceptibility to infection
- Diarrhoea and poor absorption
- Poor response to medication
- Hair changes, hair loss and other signs of nutritional deficiencies

Poor nutrition can be caused by:

1. **Reduced food intake** because of:
    - Difficulty eating or swallowing because of painful mouth or throat sores
    - Nausea and vomiting
    - Poor appetite from fatigue, depression and/or changed taste of food
    - Inability to buy or grow food
    - Weakness
    - Lack of awareness of the importance of nutrition
    - Side effects of medications

Excessive nutrient loss from diarrhoea

2.3. Nutritional Requirements of Adults with HIV

Most people with HIV lose weight at some point and weight loss is associated with mortality in people with HIV. Adequate nutrition is important to prevent weight loss or maintain weight, fight infection and build and maintain muscle mass. People with HIV have increased energy needs because of the HIV infection itself, opportunistic infections and changes in metabolism. They therefore need to eat a diet that provides all the essential nutrients (carbohydrates, protein, fat, minerals and vitamins).

2.3.1. Energy Requirements

WHO recommends that people with HIV consume more energy to meet the increased nutritional needs resulting from infections and metabolic changes caused by HIV. Energy requirements vary based on the stage of the infection. An HIV-positive adult with no symptoms (asymptomatic) requires **10 percent** more energy over the level recommended for a healthy non-HIV-positive adult of the same age, sex and physical activity. An HIV-positive adult with symptoms (symptomatic) requires **20–30 percent** more energy over the level recommended for a -HIV-negative adult of the same age, sex and physical activity (WHO 2003). Box 1 summarises the energy needs of people with HIV.

Box 1. Energy requirements of people with HIV

Healthy adults without HIV: Between 1,990 and 2,580 kilocalories (kcal) a day

HIV-positive adults in the early/asymptomatic stage: 10 percent more energy, or about 200–300 additional kcal a day, the food equivalent of one additional snack (for example, a mug of porridge with sugar, milk and oil or a slice of bread with a handful of groundnuts)

HIV-positive adults in the advanced/symptomatic stage: 20–30 percent additional energy (420–630 kcal) a day, depending on the severity of symptoms, the food equivalent of two or three additional snacks

HIV-positive children: 10 percent more energy to maintain growth if asymptomatic, 20–30 percent more energy to maintain growth if symptomatic and 50–100 percent more energy if losing weight

2.3.2. Protein Requirements

Recommended protein intake for healthy non-HIV-positive people is 12–15 percent of total energy intake. Combining sources of protein (meat, dairy and legumes) helps ensure adequate intake of essential amino acids, which maintain body cell functions. 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).

According to WHO (2003)**,** there is insufficient evidence to recommend that people with HIV consume more protein as a proportion of total energy intake than people without HIV. However, the amount of protein which 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 their bodies can use protein to build or maintain their lean muscle and strengthen their immune systems.

2.3.3. Fat Requirements

Dietary fat is a good source of essential fatty acids and concentrated energy. People with HIV 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 does not recommend that people with HIV eat a higher percentage of fat in their total diet than 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 individual advice regarding fat intake.

2.3.4. Micronutrient Requirements

Many vitamins and minerals are important for people with HIV because of their role in the functioning of the immune system. HIV-positive people commonly have deficiencies of vitamins and minerals because of excessive losses of these micronutrients in urine. Correcting vitamin and mineral deficiencies may help slow disease progression from HIV to AIDS. WHO does not recommend that people with HIV consume more micronutrients than the RDA, which is shown in table 1. The *WHO recommendation is not to exceed two times the RDA*. Annex 2 lists recommendations for micronutrient supplementation in Zambia.

2.4. Foods to Meet the Energy and Nutrient Needs of People with HIV

People with HIV should do the following to meet their increased energy and nutrient needs:

- Eat more food and a wider variety of food than they normally do.
- Eat more frequently throughout the day in small meals to maximise energy intake, especially if appetite is a problem.
- Eat more nutrient-dense foods.
- Eat foods fortified with essential nutrients such as iron and B vitamins.

The Zambia **food pyramid** can help make healthy food choices to get all the nutrients the body needs. The pyramid divides foods into six food groups. A mixed (balanced) diet includes at least one food from each group in the right amounts and combinations daily to meet the body's needs. The pyramid narrows from the bottom to the top. People should eat more foods from the botton group than from the next group and the least amount from the top group.

Fats, oils and sweets provide extra energy and should be eaten only in small amounts. They include chocolate, margarine, butter, oil, sugar, ice-cream and honey.

Milk and milk products are protein foods that make muscles and bones strong. Fermented foods like yoghurt and mabisi contain helpful bacteria that improve digestion.

Vegetables contain vitamins and minerals that help resist and fight infection. Examples are tomatoes, avocados, eggplants, *impwa*, carrots, onions, peppers, *mankolombwe*, okra, *sindambi*, cat whiskers, *ibondwe*, pumpkin, green leafy vegetables such as spinach and cassava, pumpkin leaves (*chibwabwa*) and *lumanda*.

Meat, nuts and legumes contain protein to make muscles and bones strong. Examples from animal sources are fish, chicken, duck, *kapenta*, eggs and caterpillars. Examples from plant sources are beans, soya, bambara nuts, groundnuts, lentils, cow peas and beans.

Fruits contain vitamins and minerals to help resist and fight infection. Examples are oranges, mangos, pawpaw, pineapples, bananas, watermelon, guavas, *tusongole*, *masuku* and *masau*.

Cereals, roots and tubers provide most of the energy ('fuel') the body needs to function well. Examples are bread, nshima, rice and pasta, sweet potatoes and cassava and beverages such as *munkoyo*, *thobwa*, *chibwantu* and *maheu*

Water is an important component of the body and its functions. The body loses water through sweat, urine, breath, faeces, fever and diarrhoea. People with HIV need to drink plenty of water and other fluids (e.g., teas, soups, milk and juices), especially when they have been sweating from physical exertion or hot weather or have diarrhoea, vomiting or fever. The water should be boiled or treated to avoid infections. People with HIV should drink tea and coffee in moderation because they cause dehydration and contain substances called tannins that bind essential nutrients such as iron, making them unavailable to the body.

Locally available and indigenous foods can provide a healthy diet for people with HIV. These foods are often easy to prepare and provide essential nutrients. They are generally wholesome, affordable, accessible, unrefined and unprocessed and therefore more nutrient dense. Annex 3 lists local and indigenous foods in Zambia and their roles in nutrition

No single food provides all the nutrients the body needs in the right amounts and combinations. A nutritious diet includes a variety of foods in adequate amounts and combinations to meet the body's daily needs.

2.5. Enduring Adequate Nutrient and Energy Intake

People with HIV can consume enough energy and nutrients for their stage of illness by following the recommendations below.

- Eat frequent meals and do not miss meals.
- Eat a variety of foods at every meal to get the necessary nutrients. A meal should contain a staple food such as *nshima* (a thick porridge made from maize meal), potatoes, rice, cassava or sweet potatoes; meat, fish, beans or *kapenta* (dried fish); vegetables such as *ibondwe* (amaranthus), sweet potato leaves or cassava leaves; and fruits in season such as mangoes, guavas, pawpaw, *masuku* (a wild fruit), apples and oranges.
- Eat high-energy foods such as avocado, groundnuts, sugar cane, jam, honey and margarine and add fats or oils to foods, but only in moderation.
- Eat snacks of fruit, cooked or roasted groundnuts or porridge at least twice a day to increase energy and nutrient intake.
- Eat fermented foods such as *maheu*, *chibwantu*, *munkoyo*, sour milk or yoghurt to improve taste and prevent the growth of diarrhoea-causing germs.
- Eat germinated foods to activate proteins and essential fatty acids.
- Eat fortified foods such as vitamin A-fortified household sugar and iodised salt to improve micronutrient intake.

Chapter 3. Nutrition Care and Support for Adults with HIV

People with HIV need nutrition assessment, counselling and support (NACS) to improve their nutrition at all stages of HIV infection. Good nutrition strengthens the immune system and can delay the progression of HIV to AIDS, making it possible to remain productive.

The goals of NACS for adult people with HIV are to.

1. Ensure adequate nutrient intake by improving eating habits and building stores of essential nutrients needed for the immune system to function.
2. Prevent nutritional deficiencies.
3. Prevent loss of weight and muscle mass.
4. Improve response and adherence to ART.
5. Prevent food-borne 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 well-being, self-esteem and a positive attitude to improve the quality of life.

To achieve the goals of nutrition care and support, the following **minimum package** of nutrition assessment, counselling and support (NACS) should be included in any programme serving people with HIV:

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

NACS is an approach that provides food and nutrition interventions as part of a clinical package of HIV care and treatment, with strong links to community-based services whenever possible. NACS aims to:

1. Improve nutritional status and minimise loss of muscle mass.
2. Promote and improve adherence to and retention in ART or TB treatment.
3. Improve ART or TB treatment efficacy and help manage side effects.
4. Slow disease progression.
5. Improve birth outcomes of HIV-positive pregnant women and promote HIV-free survival of infants and children.
6. Provide continuity of care for people with HIV in PMTCT and ART programmes.

3.1. 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 helps determine what nutrition interventions clients need, such as diet changes, food supplements, medical treatment and referral for further assessment.

- Nutrition assessment measures changes in nutritional status to monitor progress.

Nutrition assessment of adults with HIV should include:

1. **Anthropometric assessment.** Weight and height should be measured regularly to find BMI in non-pregnant/lactating adults and mid-upper arm circumference (MUAC) should be measured regularly for adults who are pregnant or lactating or cannot stand up to be measured. Percentage of weight gain or loss is another measure of nutritional status in adults. Adults with HIV who lose 10 percent of their body weight over 1 month should seek medical and nutritional care.

2. **Biochemical assessment.** Laboratory examinations for blood (haemoglobin [Hb], haematocrit), protein (serum albumin) and micronutrient (vitamin B_{12}, iron, zinc and folate) and lipid (cholesterol and triglycerides) measurements help identify nutrient deficiencies. People on Zidovudine (AZT) should have their Hb checked every 3–6 months.

3. **Clinical assessment of signs and symptoms of illness.** People with HIV should be checked for symptoms that affect food intake (diarrhoea, nausea, vomiting, anorexia, mouth and throat sores, oral thrush), signs of clinical malnutrition (wasting and weight loss, skin changes, bilateral pitting oedema, apathy, hair changes) and signs of anaemia (pale conjunctiva, gums, nails and skin; breathlessness; rapid pulse).

4. **Dietary assessment.** Information about the types and amounts of foods eaten, appetite, food habits and eating behaviours helps identify factors that affect food intake such as food availability, side effects of medications, traditional food taboos and economic factors.

5. **Medical history.** Information about other illnesses (e.g., diabetes), psychological factors (e.g., depression and stress) and traditional therapies helps identify needed nutrition and dietary interventions, as well as harmful medication-food interactions.

6. **Assessment of the living environment and functional status.** A clean environment is vital for people with HIV with compromised immune systems. At every contact, health care providers should assess the cleanliness of a client's environment, the availability and use of safe and clean water, food hygiene and support from families, friends and support groups.

7. **Assessment of lifestyle practices.** Smoking, alcohol and drug abuse may affect food and nutrient intake and decrease the effectiveness of some medications.

Annex 4 summarises the types of nutrition assessment for people with HIV.

3.2. Nutrition Education and Counselling

Nutrition education and counselling are integral parts of the care and support of people with HIV. Nutrition education and counselling should emphasise:

- **The need for regular weighing.** People with HIV enrolled in care and treatment should be weighed during every clinical visit. People not enrolled in such programmes can be weighed regularly in community-based programmes and support groups.

- **The need for an adequate diet.** Annex 5 describes the steps to follow when counselling people with HIV on maintaining a healthy weight.
- **The need to increase energy intake** and maintain recommended protein and micronutrient intake
- **The importance of treating illness promptly.** People with HIV are vulnerable to infections that can affect food intake and nutritional status. Any illness should be taken seriously and treated quickly.
- **Ways to manage common HIV-related symptoms.** Symptoms that can affect food intake and accelerate disease progression include thrush, mouth and throat sores, fever, fatigue/lethargy, diarrhoea, nausea/vomiting, taste alterations and loss of appetite (anorexia). Annex 6 lists ways to manage these common symptoms through diet.
- **The importance of personal and food hygiene and water safety.** Infections that cause diarrhoea commonly cause HIV disease progression and morbidity. Health care providers should counsel people with HIV on how to wash their hands, make drinking and cooking water safe, dispose of garbage and faeces safely and prepare and store food safely.
- **The effects of smoking, alcohol intake and drug abuse** on food intake, absorption and utilisation.

3.2.1. Prevention for Positive Living

Health care providers should also promote the following actions as part of nutrition education and counselling:

- **Physical activity.** Physical activity can improve body composition and quality of life. Walking, aerobics, jogging and light physical exercise in the home, including housework, helps stimulate appetite and increase energy. Weight-bearing exercises help enhance and maintain muscle mass. Massage therapy for bed-bound clients can help relieve aching muscles and prevent muscle loss.
- **Safer sexual and reproductive health practices.** People with HIV should be counselled and educated on all positive HIV prevention methods, including abstinence and faithfulness and the use of condoms, to avoid re-infection and transmission of HIV to their partners. Re-infection increases the viral load and hence damage to the immune system, leading to faster progression to AIDS.
- **Involvement in prevention, treatment and care.** People with HIV should know how to protect their own health through active involvement in planning and monitoring their own care. This ensures that interventions address their needs and can decrease stigma and discrimination.
- **Adherence to prophylaxis and treatment regimens.** Good adherence to ARV prophylaxis and treatment facilitates maximum viral suppression and reduces the risk of HIV transmission from mother to child. Adherence counselling, use of pill boxes and medication companions can be provided in clinical, community or home settings.

- **Prevention of mother-to-child transmission of HIV (PMTCT).** Health care providers should discuss strategies to reduce the likelihood of HIV transmission to partners and infants with HIV-positive women and couples who want children. HIV-positive women who become pregnant should be referred to PMTCT services as early as possible.
- **Disclosure strategies.** Health care providers should discuss strategies for disclosing their HIV status to sex partners with all HIV-positive adults and offer confidential HIV testing to their partners and children. Health care providers and counsellors can offer to mediate disclosure for people who do not feel comfortable disclosing on their own.
- **Diagnosis and treatment of sexually transmitted infections (STIs).** Active STIs can increase the chance of HIV transmission. Health care providers should advise people with HIV on diagnosis, treatment and syndromic management of genital herpes and other STIs as part of routine care and treatment.

Prevention messages and strategies can be included in counselling, support groups and peer-led interventions. 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.

3.2.2. Psychosocial Support

Psychological support is an important component of nutritional care and support because depression, stress and stigma can affect appetite and reduce nutrition intake and have a serious impact on self-esteem. People with HIV need emotional, spiritual and social support in a supportive and non-stigmatising environment. Health care providers can refer clients to support groups and networks in the area; encourage a positive attitude toward their illness and help them overcome feelings of guilt, fear and denial.

3.3. Nutrition Support

Many food assistance programmes, such as those of WFP, aim to increase the food security of HIV-affected populations, targeting families with household food rations that often consist mainly of staple foods. In the health sector, food is sometimes prescribed to supplement the diets of individual people with HIV with clinical malnutrition identified through routine anthropometry or assessment of health status or vulnerability.

Nutrition support for people with HIV may include therapeutic foods to treat severe acute malnutrition (SAM) and/or supplementary foods to treat moderate acute malnutrition (MAM), based on strict eligibility criteria including nutritional status, micronutrient supplementation and enteral or parenteral feeding of clients who cannot take food orally. Health facilities that do not have specialised food products should counsel clients on how to improve their nutritional status through diet and refer them to economic strengthening, livelihoods and food security support in the community to improve their food security.

3.3.1. Specialised Food Products

Trained staff prescribe specialised food products for a limited time, based on clear anthropometric entry and exit criteria (annex 7). Take-home rations of specialised food products are designed to supplement individual diets to improve nutrition and health outcomes. Specialised food products prescribed to clinically malnourished people with HIV should 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.

Specialised food products include therapeutic milks and ready-to-use therapeutic food (RUTF) to treat severely malnourished people with HIV and fortified blended foods (FBF) such as high-energy protein supplement (HEPS) to treat moderately malnourished people with HIV. FBF is nutrient dense and fortified with vitamin and mineral premix. The prescribed amount should provide at least 50 percent of the daily energy requirements of a malnourished client and contain enough protein to provide 12–15 percent of total energy needs. Like RUTF, FBF should meet high safety standards.

1. *Therapeutic milks*: F-100 and F-75 and modified formats for inpatient care
2. *RUTF used in Zambia*: Plumpy'Nut® (imported), packaged in 92-gramme sachets providing 500 kcal each (or 543 kcal/100 g) for inpatient and outpatient care
3. *FBF used in Zambia*: HEPS, which contains maize, soy and micronutrient premix with sugar added, packaged in 100-gramme packets providing 380 kcal each

The amount and combination of specialised food products to prescribe 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. Specialised food products should be prescribed by staff trained in the national guidelines for this approach.

The following adult clients may qualify for specialised food products in Zambia:

- Malnourished adult and adolescent pre-ART and ART clients (non-pregnant/lactating)
- Malnourished HIV-positive pregnant women and malnourished HIV-positive women with infants under 6 months

Although people with HIV may need other food support, specialised food products are prescribed only for *nutritional therapy and rehabilitation*. Health care 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 family food support.

3.3.2. 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. The evidence for individual micronutrient supplementation for people with HIV is not conclusive. WHO recommends vitamin A supplements every 4–6 months for children 6–59 months at high risk of vitamin A deficiency, including children born to HIV-positive mothers. However, vitamin A supplementation is not generally recommended for HIV-positive pregnant women. Studies have shown that HIV-

positive mothers have an increased risk of transmitting HIV to their infants if they are given vitamin A supplements.[1] Some studies have shown that zinc and iron supplementation can produce adverse outcomes in HIV-positive people.

People who do not get enough micronutrients from their diet or live in areas where anaemia is common should take daily multiple micronutrient supplements following government- protocols and the directions of health care providers. Multiple micronutrient supplements work better than individual micronutrients taken separately (see annex 2). Intestinal upsets and kidney stones have been reported from 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 who are consuming fortified specialised food products to treat acute malnutrition should consult their health care providers before taking additional micronutrient supplements to avoid over-supplementation of some nutrients.

Chapters 4 and 5 outline the protocols for micronutrient supplementation for pregnant women and children 6–59 months.

3.3.3. Enteral and Parenteral Nutrition Support

Rapid and unintentional weight loss, malabsorption, recurring infections and nutritional deficiencies are common problems for people with HIV. When they cannot take food orally, other options should be considered to help prevent malnutrition associated with these problems. Enteral and parenteral nutrition are usually undertaken only in a hospital setting. Parenteral nutrition, in particular, requires close monitoring and evaluation by trained staff.

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 based on 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 client 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.

[1] Raiten, DF, K Mulligan, P Papathakis and C Wanke. 2011. 'Executive Summary: Nutritional Care of HIV-Infected Adolescents and Adults, including Pregnant and Lactating Women: What Do We Know, What Can We Do, and Where Do We Go from Here?' *American Journal of Clinical Nutrition* 94: 1667S-1676S.

Thorough nutrition assessment should be done before beginning enteral or parenteral feeding. Fluid, energy, protein and micronutrient requirements should be assessed because the HIV-positive client 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 for enteral or parenteral nutrition support should be followed.

Annex 8 is a simple algorithm for management of malnutrition in adults.

3.4. Client Follow-up and Referral

A **continuum of care** is an integrated system of care that tracks a client over time through a comprehensive set of health services spanning all levels of care, from the hospital to the home. Medical and social services should be pooled in the community and linkages made among home, community and clinical care.

Nutrition care is important for people in both the early and late stages of HIV disease to restore immunity and strength and maximise the effectiveness of ART. Caring for people with HIV at home is not an easy task. It requires meeting the needs of the sick person and balancing those needs with the needs of other family members. Caregivers need support to make sure people with HIV consume an adequate diet, take medications as directed and follow care regimens.

At all levels of care, health care providers should:

- Spend time with people with HIV.
- Focus nutrition interventions on both family members (primary caregivers) and clients.
- Provide comprehensive client-family education on all aspects of good nutrition.
- Involve clients and caregivers in planning meals.
- Adopt a supportive and encouraging attitude toward clients that reinforces positive living principles.

Client follow-up and referral involve providing required services to clients after the first service delivery contact, including ensuring that they can follow recommended treatment and advice.

3.4.1. Follow-Up

Client follow-up starts from the time the client and health service provider agree on a return date and ends when the client is lost to follow-up, moves or dies. The frequency of follow-up depends on the client's health and needs. The purposes of client follow-up are to:

- Review health and nutrition records.
- Assess current nutritional status and weight gain or loss.

- Assess progress managing symptoms and medication side effects.
- Review the client's experience implementing nutrition recommendations.
- Recommend modified practices if needed.
- Support adherence to medication regimens.
- Renew prescriptions for specialised food products.

3.4.2. Health Facility-Community Links

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. Linking health facilities with community outreach can:

- Increase community understanding of the importance of nutrition and the availability of NACS services.
- Allow early detection and follow-up of malnutrition to improve clinical outcomes and relieve inpatient services.
- Link prevention and treatment of malnutrition.

A strong continuum of care between clinical services and people with HIV households ensures comprehensive care and support for malnourished people with HIV and allows faster recovery from malnutrition. 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. Community health volunteers should refer people with HIV to health care facilities for medical assessment or treatment.

Referral is sending or directing a client elsewhere to seek care or services that are not offered at the current contact point. Health care providers should refer people with HIV to the following services:

- Supplementary food support, if available
- Community care, spiritual care or legal support
- Economic strengthening support

Strong referral links require an inventory of community support services available near ART clinics. Referrals may also involve the following challenges:

- Client's refusal to seek follow-up care
- Transport problems
- Poor coordination with other services
- Fear of stigma that leads people to seek ART away from their places of residence

3.5. Nutrition Care and Support for People with HIV at Increased Risk of Malnutrition

This section summarises nutrition considerations for elderly people with HIV and for people with HIV and TB co-infection.

3.5.1. 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 the care and treatment of people with HIV, overweight or obese elderly clients may need to be advised 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 may be present in people with HIV because of the following nutritional considerations:

- Quantity and timing 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. People with diabetes and uncontrolled diabetes may be at high risk of dehydration from polyuria (production of abnormally large volumes of dilute urine). These clients should be monitored and provided with fluids and treatment modified to limit symptoms of hypoglycaemia.

3.5.2. Nutrition Care and Support for People with HIV and TB Co-infection

HIV increases the risks of getting TB, of latent TB becoming active, of reactivation of TB and of undernutrition (WHO 2013). It also worsens TB-related outcomes, including cachexia and death. In return, TB speeds HIV disease progression. Like HIV, TB reduces appetite and increases energy expenditure, causing wasting. Protein loss in TB patients can cause nutrient malabsorption. Malnutrition reduces expression of mycobactericidal substances, which may compromise cell-mediated immunity and lead to active TB. Increased energy expenditure and tissue breakdown in TB are thought to increase micronutrient requirements. For these reasons, WHO (2016) recommends HIV testing and referral for care and treatment of all TB patients. The effects of malnutrition are compounded in people co-infected with HIV and TB, who have a higher risk of morbidity and mortality than people with either disease alone. Mitigating the effects of disease and malnutrition require medical treatment for TB or TB/HIV and adequate nutritional intake (Parananda and Wanke 2017). Improved nutrition can have a significant impact on the incidence of active TB and mortality due to TB.

Chapter 4. Nutrition Care for HIV-Positive Pregnant and Lactating Women

Good maternal nutrition is vital for the survival and well-being of both mothers and their developing infants. Pregnant and lactating women with HIV have an increased risk of malnutrition and mortality because of the extra demands not only of pregnancy and lactation but also of HIV and related infections. Poor nutritional status can also increase an HIV-positive pregnant woman's risk of transmitting HIV to her infant.

4.1. Nutritional Requirements of Pregnant and Lactating Women with and without HIV

During pregnancy and lactation, energy, protein, vitamin and mineral needs increase to meet the demands of gestational weight gain, foetal development and milk production. For HIV-positive pregnant and lactating women, HIV causes excess nutrient loss and malabsorption at the same time as it increases nutritional needs.

4.1.1. Energy

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 more than the basic energy needs of non-pregnant, non-lactating women of the same age and physical activity level if asymptomatic and 20–30 percent more if symptomatic. Table 2 lists the energy requirements of both HIV-negative and HIV-positive women during pregnancy and lactation.

Table 2. Increased energy requirements during pregnancy and lactation

	Average energy intake (kcal)	Increased energy requirements for pregnancy and lactation (kcal)	Increased energy requirements for HIV (kcal)	Total energy intake (kcal)
Pregnant				
HIV negative	2,140	280	0	2,340–2,425
HIV positive, asymptomatic	2,140	280	10% (210)	2,630
HIV positive, symptomatic	2,140	280	20–30% (428–642)	2,848–3,062
Lactating				
HIV-negative	2,140	500	0	2,640
HIV-positive, asymptomatic	2,140	500	10% (210)	2,850
HIV-positive, symptomatic	2,140	500	20–30% (428–642)	3,068–3,282

Source: Food and Nutrition Technical Assistance (FANTA) Project. 2004. *HIV/AIDS: A Guide for Nutritional Care and Support*. Washington, DC: Academy for Educational Development.

Table 3 shows the approximate energy needs of a moderately active, *asymptomatic* 25-year-old HIV-positive pregnant woman who weighs 55 kg.

Table 3. Energy requirements of an asymptomatic 25-year-old HIV-positive pregnant woman weighing 55 kg

Energy requirement	Kcal
Normal	2,140
Extra 10% because of HIV	210
Extra because of pregnancy in the 2nd and 3rd trimester	280
Total recommended daily energy intake	**2,630**

Table 4 shows the approximate energy needs of a moderately active, *symptomatic* 25-year-old HIV-positive pregnant woman who weighs 55 kg.

Table 4. Energy requirements of a symptomatic 25-year-oldHIV-positive pregnant woman

Energy requirement	Kcal
Normal	2,140
Extra 20–30% because of HIV	640
Extra because of pregnancy in 2nd and 3rd trimester	280
Total recommended daily energy intake	**3,060**

4.1.2. Protein

Table 5 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.

Table 5. Increased protein requirements during pregnancy and lactation

Status	Period	Increased protein requirements
Pregnant	1st trimester	+12.0 g/day[1]
	2nd trimester	+6.1 g/day[1]
	3rd trimester	+10.7 g/day[1]
Lactating		+16.0 g/day for the first 6 months of lactation[1]
		+12.0 g/day for the second 6 months of lactation and 11.0 g/day thereafter[1]

[1] WHO. 1985. *Energy and Protein Requirements: Report of a Joint FAO/WHO/United Nations University (UNU) Expert Consultation.* WHO Technical Report Series No. 724. Geneva.

4.1.3. Micronutrients

Pregnant women are particularly vulnerable to iron deficiency. Anaemia during pregnancy is a risk factor for infant and maternal morbidity and mortality. Because of the high prevalence of

anaemia in Zambia, it is generally recommended that all women take iron and folic acid supplementation during pregnancy and lactation. In some HIV-positive women, however, iron supplementation may contribute to disease progression.

A daily multimicronutrient supplement in single RDA formulations may be beneficial for HIV-positive pregnant and lactating women during the antenatal period and for at least 6 weeks postpartum, especially for women who are breastfeeding. More research is needed on the benefits and possible harm of multiple micronutrient supplements in HIV-positive pregnant and lactating women.

Vitamin A supplementation at moderate doses may elevate serum cholesterol and triglycerides in people with HIV who already have elevated serum triglycerides. Current evidence does not support vitamin A supplementation of pregnant women to reduce maternal or perinatal mortality. However, antenatal vitamin A supplementation has been shown to reduce maternal anaemia in pregnant women with HIV. More research is needed on the optimal dose of vitamin A and duration of supplementation to prevent maternal anaemia, as well on the contribution of vitamin A supplementation to reducing maternal infection (McCauley et al. 2015).

4.2. Nutrition Care for HIV-Positive Pregnant and Lactating Women

For HIV-positive women, nutrition care before or during pregnancy is important to minimise the impact of HIV on nutritional status. MUAC should be measured regularly for pregnant or lactating adolescents and adults. Nutrition care should start as early as possible in pregnancy to maximise the well-being of mothers and infants. Health care providers should encourage all pregnant women, including HIV-positive pregnant women, to:

- Attend antenatal care (ANC) for weight monitoring and nutrition assessment as soon as they are aware of their pregnancy.
- Eat a diverse diet rich in nutrients and avoid foods with little nutritional value.
- Get more rest than usual, particularly in the third trimester.
- Share information on traditional foods and therapies or practices that could be beneficial or harmful during pregnancy and lactation.
- Use only clean, boiled water to drink and prepare food.
- Take iron and folic acid.
- Use iodised salt in foods to prevent iodine deficiency.
- Sleep under insecticide-treated mosquito nets.
- Seek intermittent presumptive treatment and prompt treatment for malaria.
- Prevent and treat parasitic infestations such as malaria and worms to enhance adequate gestational weight gain.
- Seek help for breastfeeding problems.
- Enrol in a PMTCT programme as early as possible in pregnancy for ARVs and counselling on nutrition and infant feeding in the context of HIV.
- Manage HIV-related symptoms and medication-food interactions that can have a negative impact on nutritional status.
- Practice food safety and hygiene to avoid food-borne illnesses.

Chapter 5. Nutrition Care for Infants and Young Children of HIV-Positive Mothers

About two-thirds of infants born to HIV-positive mothers are not infected with HIV, even without any intervention. Approximately 5–20 percent of infants born to HIV-positive mothers are infected through breastfeeding. The risk continues as long as the mother breastfeeds (De Cock et al. 2000; Nduati et al. 2000). Exclusive breastfeeding (breastfeeding only) for the first 6 months of life 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). All pregnant women should be encouraged to be tested for HIV so that they know their status and can receive the appropriate infant feeding counselling.

5.1. Nutrition Care for Infants for the First 6 Months of Life

In Zambia HIV-positive pregnant women are counselled and supported to breastfeed and receive ARVs.

In 2016, WHO made the following recommendation on HIV and infant feeding: Mothers living with HIV should exclusively breastfeed their infants for the first 6 months of life, introduce appropriate complementary foods thereafter, breastfeed for at least 12 months and up to 24 months or beyond (similar to the general population) while being fully supported for ART adherence. All pregnant and breastfeeding with ART should be provided lifelong ART regardless of CD4 count or clinical stage (option B+).

Mothers known to be living with HIV should only give commercial infant formula milk as a replacement feed to their HIV-negative infants or infants who are of unknown HIV status when specific conditions are met:

1. Safe water and sanitation are assured at the household level and in the community.
2. The mother or other caregiver can reliably provide sufficient infant formula milk to support the normal growth and development of the infant.
3. The mother or caregiver can prepare it cleanly and frequently enough so that it is safe and carries a low risk of diarrhoea and malnutrition.
4. The mother or caregiver can, in the first 6 months, exclusively give infant formula milk.
5. The family supports this practice.
6. The mother or caregiver can access health care that offers comprehensive child health services.

Policies that support exclusive breastfeeding in Zambia—the Baby-Friendly Hospital Initiative (BFHI), Maternity Protection and the International Code of Marketing of Breast-Milk Substitutes—should be promoted, implemented and enforced.

5.1.1. Exclusive Breastfeeding

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

- Support them to position and attach their infants properly.
- Counsel them on the importance of continuing exclusive breastfeeding without giving any other foods or liquids, even water, for 6 months.
- Counsel them to seek immediate medical attention for sore or cracked nipples or mouth lesions or thrush in their infants; good breastfeeding techniques help reduce the risk of cracked nipples associated with HIV transmission during breastfeeding.
- Help them solve common breastfeeding difficulties such as 'insufficient milk'.
- Help them make breastfeeding safer.
- 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.
- At each contact, encourage them to continue to breastfeed exclusively.
- Encourage them to 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 for severe pneumonia.

5.1.2. Exclusive Replacement Feeding

HIV-positive mothers should feed commercial infant formula milk as a replacement feed only when the following conditions can be met (WHO 2010):

- Safe water and sanitation are ensured in the household and in the community.
- The mothers or caregivers can reliably provide sufficient formula milk to support normal growth and development of the infants.
- 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.
- The mothers or caregivers can feed infant formula milk exclusively in the first 6 months.
- Families are supportive of this practice.
- The mothers or caregivers can access health care that offers comprehensive child health services.

If HIV-positive mothers choose to replacement feed exclusively, health service provider should do the following:

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

5.2. Nutrition Care for HIV-Positive Children Older than 6 Months

Regardless of their HIV status, all children need complementary foods from the age of 6 months. HIV affects the nutritional status of children just as it does that of adults. Stunted growth and failure to thrive are common in children with HIV. Children with HIV also have more frequent common childhood infections such as diarrhoea, ear infections, pneumonia, fever, chronic gastroenteritis and TB. All these infections can affect nutrient intake, leading to malnutrition and higher risk of death. In addition, poor appetite, inability to suckle, swallowing difficulties and nausea increase the risk of malnutrition for HIV-positive children. Children need to consume adequate amounts of macronutrients and micronutrients to meet the increased metabolic demands for illness, growth and development.

Nutrition care should be part of comprehensive care and support of HIV-positive children, including the following interventions:

- Regularly assess all children of mothers with HIV for feeding problems and signs of malnutrition. Measure weight and height regularly to calculate weight-for-height z-score (WHZ) for children under 5 years and weight-for-age z-score (WAZ) for children 5–10 years. Severe growth failure in HIV-positive children is associated with reduced survival. Early monitoring is critical because symptomatic HIV disease can impair growth. As soon as growth faltering is observed, start appropriate nutrition interventions as part of comprehensive assessment of child health and nutrition. Weigh children with HIV or children enrolled in the Integrated Management of Acute Malnutrition (IMAM) programme according to the national schedule.
- Support all HIV-positive children to consume adequate energy and nutrients.

Energy needs vary in HIV-positive children depending on the type and duration of HIV-related infections. Asymptomatic HIV-positive children need 10 percent more energy than HIV-negative children of the same age, sex and activity level to help maintain growth. HIV-positive children who are losing weight need 50–100 percent more energy than HIV-negative children of the same age, sex and activity level.

Protein intake should be similar to that of HIV-negative children of the same age and sex (WHO 2003), although some increase is warranted when the children are symptomatic. The increase in energy intake may call for increases in protein intake in terms of absolute amounts. The increase should be based on individual needs, severity of symptoms and ability to meet the needs.

Specialised food products are not appropriate for infants under 6 months because such food can interfere with exclusive breastfeeding, the recommended method of feeding for this age group unless otherwise indicated and is usually not nutritionally adequate for infants on exclusive replacement feeding.

The following child clients may qualify for specialised food products in Zambia:

1. Orphans and vulnerable children (OVC) 6–23 months
2. Malnourished OVC 24 months to 17 years

Micronutrient intake is recommended at the same level as that for HIV-negative children. Children should receive biannual vitamin A supplementation (see annex 2).

Health care providers should:

1. Review the appetite, diet and food intake of HIV-positive children at every under-5 clinic visit to ensure appropriate feeding and adequate nutrient intake, to identify early growth faltering and other nutritional problems and to initiate timely interventions.
2. Treat conditions that affect appetite and food intake appropriately.
3. Advise mothers and caregivers to improve the children's diet, taking into consideration age, resources and family circumstances.
    - Feed foods rich in energy and other nutrients.
    - Enrich porridge with milk, sugar, pounded groundnuts, bean powder or soya beans and oil.
    - Add a small amount of margarine or oil to the food of symptomatic children (with diarrhoea, nausea or fat malabsorption) to increase energy intake.
    - Feed infants mashed fruits and vegetables such as ripe bananas, avocadoes and pumpkin, as often as possible to increase energy and nutrient intake.
    - Feed children small frequent meals with nutritious snacks such as banana, avocado, mashed pumpkin or boiled sweet potato between main meals.
    - Feed children actively and responsively, responding to their cues for hunger and encouraging them to eat.
    - Serve and feed children on their own separate plates to ensure adequate intake.
    - Give HIV-positive children a daily multivitamin supplement, if available, to prevent micronutrient deficiencies.
4. Counsel mothers and caregivers on good hygiene and food and water safety.
5. De-worm children every 4–6 months.
6. Counsel mothers and caregivers to seek medical care as soon as possible if the children have any secondary infections (such as skin infections, which occur during or immediately after treatment for another infection or disease) and maintain their food and fluid intake to reduce the nutritional effect of these infections.
7. Make sure HIV-positive children receive all other child health and survival interventions, such as immunisations, on the same schedule as HIV-negative children.
8. Refer symptomatic HIV-positive children for medical treatment.

Annex 9 is an algorithm for managing malnutrition in children 6 months to 14 years.

Children with HIV should be followed up using the national children's clinic card and approved immunisation schedule as part of GMP. Severely malnourished HIV-positive children without complications should be managed at the community level. Severely malnourished HIV-positive children with complications should be referred to a hospital for management of complications and nutrition rehabilitation. Malnourished children with HIV should be treated according to the national IMAM guidelines and followed up within the GMP framework.

Chapter 6. Nutrition and Antiretroviral Treatment

People may take various medications to treat HIV, opportunistic infections and other common ailments such as colds, malaria and intestinal parasites. Some people with HIV also take herbal remedies and micronutrient supplements. There is no cure for HIV, but ARVs can mitigate the effects of HIV by lowering the viral load, thus reducing morbidity and mortality. 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-positive clients.

6.1. Medication-Food Interactions

Interactions between medications and food can affect the effectiveness of medications, nutritional status and adherence to medication regimens. Medication-food interactions fall into the following categories:

- Medication may alter nutrient absorption, metabolism, distribution and excretion, thus affecting nutritional status.
- Food may affect the absorption, metabolism, distribution and excretion of medications.
- Some medications may lower food intake or absorption.
- Many medications have diet restrictions (e.g., avoiding milk and milk products when taking tetracycline).
- Medication side effects include loss of appetite/anorexia, changes in taste, diarrhoea, fatigue, depression, loss of sleep and pain, which are likely to lower food intake.

Health care providers should give people with HIV updated information on medication-food interactions to mitigate the side effects of medications. Annex 10 summarises the interactions between food and ARVs commonly given in Zambia and annex 11 describes how to counsel people with HIV on nutrition and ARVs. This information can also be obtained from health facilities that provide ART services; peer groups; nutrition counsellors; and the websites of WHO, UNAIDS, NAC and the Food and Nutrition Technical Assistance Project III (FANTA).[2]

6.1.1. Sequencing Medications and Food to Increase Medication Effectiveness

Different foods can enhance or inhibit the absorption, metabolism, distribution and excretion of medications. All people with HIV should be educated, advised and counselled on sequencing medication and food intake to increase the effectiveness of their medicines.

[2] WHO, http://www.who.int/nutrition/publications/infantfeeding/en/index.html; UNAIDS, http://www.unaids.org; NAC, http://www.nac.org.zm; FANTA-2, http://www.fantaproject.org.

Because food can reduce the absorption of Isoniazid, which is used to treat TB, Isoniazid should be taken 1 or 2 hours after a meal. Fatty foods can reduce the absorption of most ARVs, including Zidovudine (AZT) and Efavirenz (EFV). However, a high-fat meal increases the bioavailability of the ARV Tenofovoir (TDF). Certain ARVs affect the body's use of nutrients. Increased intake of fatty foods can increase the risk of heart problems. Increased intake of sugary foods raises blood sugar levels, increasing the risk of diabetes.

Health care providers should help people with HIV and their caregivers make timetables to take medications in relation to meals and adhere to these plans to reduce the negative effects of medication-food interactions.

6.1.2. Modifying the Diet to Enhance Nutrient Absorption and Metabolism

Health care providers should counsel and advise people with HIV on ART on diet modifications that may be needed to enhance nutrient absorption and metabolism. Some medications interact with certain nutrients in foods, affecting their absorption, metabolism, distribution and excretion and thus reducing their effectiveness. Because the TB medication Isoniazid inhibits the metabolism of vitamin B_6, supplementation of vitamin B_6 is recommended to avoid its depletion and symptoms associated with its deficiency. Some ARVs produce metabolic disorders that elevate levels of triglycerides and cholesterol, fat maldistribution and insulin resistance (which may lead to diabetes). People with HIV taking these medications may have to modify their diets, avoid alcohol and smoking and take medications to lower the lipid levels.

6.1.3. Modifying the Diet to Improve Medication Effectiveness

Health care providers should counsel people with HIV on foods to eat or avoid to improve the effectiveness of medications. For example, people taking Idinavir should avoid grapefruit juice because it lowers the medication's effectiveness. Drinking alcohol may cause liver and pancreas problems for people on ART. People with HIV who are taking Zidovudine, Lamivudine and the anti-TB medications Rifampicin and Isoniazid should avoid alcohol. See annex 10 for ARVs prescribed in Zambia and their potential side effects and interactions with food.

6.1.4. Managing ARV Side Effects through Diet

Health care providers should advise people with HIV of side effects of ARVs that might result in poor nutrient intake and absorption, weight loss and malnutrition and counsel them on how to mitigate those effects. Such side effects include nausea, vomiting, loss or change in taste, loss of appetite, bloating and heartburn, constipation and diarrhoea. Annex 10 lists dietary actions to manage side effects of common ARVs in Zambia.

Various complications have been recognised in people who are on ART for a long period. These include disorders of lipoprotein, glucose and bone metabolism.

ART is associated with **dyslipidaemia**, a disorder of lipoprotein metabolism that raises levels of total cholesterol or 'bad' low-density lipoprotein (LDL) cholesterol and triglyceride concentrations in the blood and decreases levels of 'good' high-density lipoprotein (HDL)

cholesterol. Dyslipidaemia is a consideration in many situations including diabetes, a common cause of lipidaemia. Protease inhibitors have the greatest effect on lipids, followed by non-nucleoside and nucleoside reverse transcriptase inhibitors (NNRTIs and NRTIs). Dyslipidaemia is associated with increased risk of atherogenesis and artherosclerosis, raising concern that people living longer on ART may have increased risk of coronary or cerebral vascular morbidity and mortality. About half of patients with dyslipidaemia have abdominal obesity. Clients should be counselled to increase exercise, fruit and vegetable intake, intake of omega-3 fatty acids from fish and plant sources and the proportion of mono- and polyunsaturated fats in the diet, as well as to reduce intake of refined carbohydrates and sugar and decrease intake of saturated fats and trans-fatty acids to less than 7 percent of total calories. Measuring LDL, HDL and total cholesterol and triglyceride levels every year is recommended for adults on ART. Optimal LDL cholesterol levels for adults with diabetes are less than 100 milligrammes (mg)/dL (2.60 mmol/L) and optimal HDL cholesterol levels are equal to or greater than 40 mg/dL (1.02 mmol/L).

Disorders of glucose metabolism, or **dysglycaemia**, are usually diagnosed through periodic fasting glucose determinations or a 2-hour oral glucose tolerance test. Glycosylated Hb levels are usually normal, even in the setting of insulin resistance. Mild cases respond to reduced intake of refined carbohydrates, sugars and poor-quality fats and exercise. Moderate cases respond to insulin-sensitising agents such as the glitazones and severe cases respond to insulin therapy. Replacing protease inhibitors with non-protease inhibitors may also be successful.

Osteopaenia and osteoporosis have both been described in patients on ART. The cause has not been established, although the HIV-1 protease inhibitors may affect osteoclast or osteoblast differentiation. Diagnosis is done by standard DEXA scanning. Routine DEXA scanning is not indicated for all people with HIV but should be considered for people with HIV who have other risk factors for osteoporosis such as family history, hypogonadism, smoking and corticosteroid use. Preliminary studies have shown that alendronate is effective in treating osteoporosis in these patients. Dietary management should include reducing intake of meat, fish, grains, legumes, nuts, sweet carbonated drinks and caffeine; reducing smoking; and increasing intake of calcium-rich foods (green vegetables, fruit and dairy products).

Lipodystrophy is a disturbance in the way the body produces, uses and distributes fat. People with HIV, especially people on ART, may have changes in body shape from changes in fat distribution. Lipoatrophy, or subcutaneous fat loss, is most commonly seen in the face, extremities and buttocks. Lipohypertrophy, or increased deposit of fat, is most often seen in the abdominal region ('paunch'), dorso-cervical region ('buffalo hump') and breasts. People with HIV often have a combination of the two types. There is no definitive treatment for fat maldistribution. For lipohypertrophy, replacement of the protease inhibitor with a reverse transcriptase inhibitor may be useful.

6.1.5. Modifying the Diet to Increase Consumption of Nutritious Foods

Inadequate food may make it difficult to manage medication-food interactions and result in discontinuing ART. Health care providers should counsel people with HIV to eat locally available and affordable foods as dictated by specific medication-food interactions. They should also refer people with HIV to food support where available. Families and caregivers

who are informed about medication-food interactions can help people with HIV manage them and support intra-house food distribution that favours people with HIV. Health care providers should do the following to help people with HIV manage medication-food interactions and support ART:

- On every contact, stress the importance of following instructions on the use of medications, including completing the full course. Taking intermittent doses of ARVs and sub-optimal levels of ARVs can lead to ARV-resistant strains of HIV.
- Counsel the client to avoid alcohol and recreational drugs, which may interfere with ART.
- Counsel the client to avoid self-prescribed medications.
- Caution the client about herbs that may be sold under the pretext of curing HIV or opportunistic infections.
- Record medication side effects and actions taken to manage those side effects and refer all abnormal reactions to a health facility.
- Inform the client that there are no established methods to treat lipodystrophy or redistribution of fat in the body as a side effect of ARVs.
- Encourage exercise to reduce fat accumulation and improve blood triglyceride levels.
- Seek regular updates on side effects of medications and medication-food or medication-nutrient interactions and best management practices.

6.2. Herbal Treatment and Diet Supplements

Many Zambians use herbal and traditional medicines to treat ailments. Annex 12 describes the benefits of common herbs and spices and ways to use them. Herbs and spices can enhance the taste and smell of food and improve appetite, but they may also interfere with the effects of medications, have negative effects on the body and/or restrict food intake. Many of these foods have not been subjected to formal clinical research and their toxicity and effect on the course of HIV infection are unknown.

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

- Do not reduce the effectiveness of ARVs
- Are used as supplements and not as replacement for standard therapy
- Have the potential to 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 if they are taking herbs and traditional therapies and advise them about any harmful effects these may have (for example, fasting can cause weight loss). Health care providers 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. Supplements containing micronutrients and selected amino acids alone or with herbs are also available. Some health-promoting bacterial cultures (probiotics) and materials

that promote growth of bacteria associated with good gut flora (prebiotics) or their combination (symbiotic) may play a significant role in nutrition care of people with HIV. However, 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.

Chapter 7. Food and Water Safety and Hygiene

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

A healthy person's immune system is well equipped to fight harmful germs, but low immunity puts people with HIV at higher risk of infection. They also experience more severe symptoms of food- and water-borne illness, which are more likely to cause serious conditions such as meningitis and can 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 illness can cause weight loss and further lower the body's resistance to other infections.

7.1. Food- and Water-Borne Illness

Humans carry bacteria and viruses in their mouths and intestines and on their skin, hands and fingernails, but germs, including parasites, are mainly 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. Raw and under-cooked chicken, meat, fish and eggs; milk; contaminated raw vegetables; raw and smoked fish; and unsafe water are ideal conditions for germs to multiply.

Poor water, sanitation and hygiene (WASH) practices are thought to contribute to child stunting by inducing a gut disorder called environmental enteropathy, which results from chronic childhood exposure to faecal microbes. Constant faecal-oral contamination results in inflammation and flattening of the villi (finger-like projections that protrude from the lining of the intestine to collect nutrients from food) which limits the body's ability to absorb nutrition while increasing exposure to toxic microbes. These structural changes in the gut divert energy from growth toward fighting infection. This condition may also reduce the effectiveness of orally administered vaccines and micronutrient supplements, increasing the risk of serious infection in undernourished children.

Natural toxins, metals and environmental pollutants, chemicals used for treating animals, improperly used pesticides, chemicals used for cleaning and some food additives are other causes of food and water contamination. 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 risk from 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 in areas where most vehicles use leaded fuel may have increased levels of lead 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 consumer products. Cookware and utensils glazed with materials containing heavy metals such as lead or cadmium can cause chemical poisoning. Chemicals used for cleaning can also be toxic. It is important to read and understand the instructions on the labels of these products.

7.2. Food Safety

No food is completely safe at all times for all people, but people 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 way to prevent disease.
    - Wash hands with running water and soap or ashes.
    - Rub hands together to make a lather and scrub all surfaces for 15–20 seconds.
    - Rinse hands well under clean running water. Do not use a washbasin where other people have washing their hands.
    - Dry hands by shaking them in the air, not by wiping them on a cloth that has been touched by other people.
    - Wash hands before handling food and during food preparation and after going to the toilet, sneezing or blowing your nose, changing or cleaning an infant or touching animals. Wash hands before and after tending to someone who is sick.

2. Keep food preparation areas and utensils clean.
    - Wash all surfaces and equipment used for food preparation or serving.
    - Protect kitchen areas and food from insects, pests and other animals.
    - Store kitchen utensils out of reach of pests and other animals.

    IMPORTANT: Sharing eating utensils with people with HIV cannot spread HIV.

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 cutting meat and other foods.
    - Store foods in covered containers to avoid contact between raw and cooked foods.

4. Eat clean, safe food.
    - Wash fruits and vegetables well in clean, safe water.
    - Throw away bruised, mouldy or rotten fruit or vegetables.
    - Do not buy cracked eggs.
    - Do not eat raw eggs, meat or fish.
    - When cooking meat or poultry, make sure juices are clear, not pink.
    - Bring soups and stews to a boil.
    - Keep food well covered to keep flies and other insects away from it.

- Reheat cooked food thoroughly, boiling it 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 street food (*nshima*, stew, fried vegetables, smoked sausages, *buka buka* fish, offal, *ifisashi*) because vendors may not use hygienic practices.

5. Store food safely.
    - Do not leave cooked food out at room temperature for more than 2 hours.
    - Do not store food too long, even in a refrigerator (no longer than 5 weeks for raw eggs, 1 week for cooked eggs, 1 week for dairy products, 5 days for meat, 2 days for fish and poultry and 2 days for cooked food).
    - 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.
    - Store food where insects and rodents that carry germs that can contaminate food can't reach it.
    - Do not eat food that has been frozen, thawed and then refrozen.
    - Serve freshly prepared food to people with HIV and 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.

7.3. Water Safety

Contamination of water during collection, transport and home storage is a serious health risk for everyone in the family, but especially for people with HIV, who are most vulnerable to infection. Several studies have shown an increased risk of diarrhoea because of inadequate water storage. Storage vessels with wide openings such as pots or buckets are easily contaminated with faeces when people use cups, dippers or hands to take out water. Water can also be contaminated by flies, cockroaches and rodents. People with HIV 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, let 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).
    - Clean water containers regularly with soap and clean water.
    - Do not scoop the water out with a cup or bowl—use a ladle.
    - Do not drink boiled water that has been stored for more than 24 hours, as it can easily become contaminated again.

Chapter 8. Food Security in Households with People with HIV

The 1996 World Food Summit defined food security as 'all people at all times having access to sufficient, safe and nutritious food to maintain a healthy and active life' (FAO 1996). Household food security depends on income and assets, including land and other productive resources. HIV reduces families' ability to produce and purchase food because of the disease's impact on productive labour, income and food stores. Households with people with HIV tend to reduce portion size or skip meals and to divert earnings and savings to meet health care and funeral costs. Economic pressures may lead to poverty and increase vulnerability to risky behaviour, such as providing sex for food and money, child labour, crime and drug abuse. HIV affects all four components of food security: availability, access, utilisation and stability (U.S. Government 2010). These components are defined below.

- **Availability:** Enough nutritious food at all times
- **Access:** Sufficient resources to purchase appropriate foods to maintain an adequate diet
- **Utilisation:** Knowledge and basic sanitary conditions to choose, prepare and distribute food in a way that results in good nutrition for all family members
- **Stability:** Ability to access and utilise food over time without adverse weather, political instability or economic factors (unemployment, rising food prices)

The following nutrition actions can help people with HIV and families affected by HIV improve their food security:

- Assess the nutritional and economic vulnerability of HIV-affected households to identify needed support.
- Refer economically vulnerable people with HIV and their households to programmes that provide food support, cash transfers, training for income generation, micro-credit or improved access to financing.
- Refer vulnerable people with HIV who depend on agriculture for their livelihood to programmes that provide inputs for sustainable food production and lobby for the prioritisation of people with HIV in such programmes. These include the farmer input support programme of the Ministry of Agriculture and Cooperatives and others that provide linkages to markets and marketing agents and access to labour-saving technologies such as safe and efficient cooking facilities, 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 assistance to people with HIV and other vulnerable populations according to strict eligibility criteria.
- Help people with HIV and HIV-affected households plan for the 'hungry season' when supplies of some foods are low or non-existent.
- Promote consumption of nutritious root vegetables, local vegetables and fruits, nuts, insects and oilseeds.
- Include nutrition education for people with HIV in community-based gardening and poultry and small livestock-rearing initiatives.

Chapter 9. Community Participation in Nutrition Care and Support for People with HIV

People with HIV with opportunistic infections and recurrent illness may lose income, experience stress and depression, have high medical expenses and face social isolation because of stigma. Family members, community and religious leaders, community volunteers, government officials, NGOs and other community groups can provide essential support to help people with HIV maintain their dignity and quality of life.

People with HIV may be reluctant to seek care from health facilities because of distance, cost or stigma associated with HIV. They may not realise the importance of nutrition in maintaining health and maximising the effectiveness of ART. They also may not know about available services.

Community outreach and mobilisation are essential components of both care and support of people with HIV and management of malnutrition. Community outreach fosters coordination, collaboration and communication between ART and PMTCT services and community-based services for referral and follow-up. Community mobilisation involves the community in case-finding, awareness raising and follow-up and encourages community involvement in nutrition and HIV interventions. Providing outpatient care without community outreach rarely results in high service coverage or uptake. In fact, community case referrals may represent the bulk of admissions in health facility nutrition care and support programmes.

The aims of community outreach in the context of nutrition and HIV are listed below.

- Increase understanding of the importance of nutrition for people with HIV.
- Empower community members to make others aware of NACS services.
- Strengthen case-finding and referral for care.
- Increase client coverage and follow-up.
- Allow early detection and follow-up of malnourished people with HIV and children to improve clinical outcomes and relieve the strain on inpatient services.
- Provide an alternative source of nutrition information and counselling where people with HIV hesitate to visit health facilities because of HIV-related stigma.
- Link prevention and treatment of malnutrition.

Channels of community outreach for management of malnutrition in people with HIV include the following:

1. **Community health providers** can be trained, supervised and provided with appropriate supplies and equipment to improve key nutrition behaviors, extend the accessibility of key services and strengthen linkages between communities and health services. They can identify, support and monitor malnourished people with HIV and provide emotional, material and counselling support to caregivers. They can measure MUAC, identify bilateral pitting oedema and assess dietary habits and the nutrient content of household foods. They can provide nutrition education, demonstrate safe preparation of nutritious meals and refer malnourished people with HIV to health facilities for further nutrition

assessment and counselling and to food assistance and livelihood support. Because many people with HIV do not seek nutrition care in health facilities or return for follow-up visits, community health workers are an important resource for following up NACS clients and reducing rates of defaulters.

2. **Health posts and health centres** can participate in nutrition and HIV training, provide material support (e.g., soap, disinfectants, gloves and medications for common ailments) to caregivers or people with HIV and display posters or disseminate brochures in local languages about the signs and risks of malnutrition.

3. **District authorities and community leaders** can mobilise communities to take advantage of available nutrition support and disseminate information on good nutrition and hygiene practices through community outreach, radio and community meetings.

4. **HIV networks and support groups** can provide psychosocial support and encourage their members to be weighed regularly, enrol in PMTCT programmes and practice recommended nutrition actions for people with HIV. They can also refer malnourished members to services.

5. **Local media** can broadcast or print messages about where to access NACS services and eligibility criteria for specialised food products.

Chapter 10. NACS Data Collection and Management

Collecting and reporting nutrition information is an important component of HIV care and support. This information is needed to monitor the outcomes and impacts of food and nutrition interventions, inform and improve food and nutrition programming and increase awareness of the importance of diet and nutritional status among people with HIV and health care providers.

10.1. Purpose of Nutrition and HIV Data Management

Health care providers should collect and report data on the nutritional status of people with HIV regularly to:

- Inform and improve programme design, implementation, supervision and management.
- Share information with other programmes and stakeholders to improve programming and support advocacy for nutrition services.
- Report progress and results to national governments and donors.
- Inform and educate clients about progress in improving their nutritional and functional status.
- Inform health care providers of client status and progress to guide care, treatment and counselling.
- Determine eligibility of clients for services such as prescription of specialised food products.
- Evaluate the impact of policy implementation and service delivery.
- Inform resource allocation.

10.2. Challenges in Nutrition and HIV Data Management

All data management is challenging, but these challenges are compounded in NACS. The health and nutritional status of many people with HIV inevitably declines over the long run, especially if they are not on ART. Many ART clients are lost to follow-up, which may affect the interpretation of results. Changes in nutritional status or other outcomes cannot be attributed to nutrition assessment, education, counselling and food supplementation alone because many other factors, including economic difficulties, play a role. Nevertheless, regular data on the nutritional status of people with HIV are critical to guide and improve interventions.

Below are some common obstacles faced in collecting and analysing nutrition data on people with HIV and suggested ways to address them.

- **Clients may feel that the questions health care providers ask are intrusive or exploitative.** Collecting data from people with HIV can raise the fear of stigma and discrimination. Health care providers should let clients know that the information will be kept confidential and under lock and key, especially if clients' names are recorded. Unless the information is for health care purposes, it should not be shared with other people without the permission of the client.

- **Collecting data takes a lot of time and increases staff workload.** It is important that health care providers understand why they are asked to collect nutrition data on people with HIV and that they receive clear guidelines and support from supervisors and regular feedback on the data they collect and submit to higher levels.

- **It may not be clear who is responsible for collecting and reporting nutrition data.** If there is no nutritionist in the health facility that provides HIV services, the health manager should clearly delegate staff responsible for nutrition data collection on clients with HIViand establish a structure and system for this purpose.

- **Health care facilities may lack standard data collection tools.** Weak data collection systems generate incomplete and inaccurate data that may be useless for decision making or for the central level. To the extent possible, there should be agreement at national level on a standard format and tool for collecting and reporting NACS data. Districts should be supported in distributing the tool to all relevant facilities. Health facility managers should ensure that responsible staff are trained to use the forms, recording data on every client visit in the same way every time (including noting when a service was not provided) and compiling and submitting data according to schedule.

10.3. Nutrition and HIV indicators

Table 6 list examples of indicators for monthly retrospective nutrition data collection in ART and PMTCT sites in Zambia.

Table 6. Sample indicators for nutrition data collection

Indicator	Children 0–17 years		Adults 18 years and older	
	Female	Male	Female	Male
1. Number and/or percentage of clients who received nutrition assessment during the reporting period				
2. Number and/or or percentage of clients who received nutrition counselling during the reporting period				
2. Number (or percentage) of clients who received nutrition assessment and were found malnourished during the reporting period (disaggregated by age, sex, pregnancy status and severe or moderate malnutrition)				
3. Number of clinically malnourished clients who received specialised food products during the reporting period				

The following indicators can capture information on training and service provision:

- Number of health care providers trained in NACS using the MOH/NFNC course
- Number of sites providing NACS services for people with HIV
- Number of sites with functioning anthropometric equipment

- Number of sites with updated *Nutrition Guidelines for Care and Support of People Living with HIV*
- Number of sites with nutrition and HIV counselling materials and job aids

The MOH uses the SmartCare electronic health record system, developed with CDC and other implementing partners, to capture data from ART sites. This clinical information management system used at facility and district levels records but does not usually analyse most of the data referred to in table 6 above. The National Health Management Information System contains data on a limited number of nutrition-related indicators.

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Annex 1. Macronutrients and Micronutrients Needed for Good Nutrition

Nutrient	Source	Function	Signs and symptoms of deficiency
Macronutrients (nutrients the body needs in large amounts)			
Protein	Beef, game meat, fish, poultry, beans, dried peas, groundnuts, edible insects, (e.g., *ifinkubala*, *inswa*), milk and milk products, eggs, soya beans, dried mushrooms	• Building, repairing and maintaining body tissues • Resistance to infection	• Protein energy malnutrition • Marasmus (wasting) • Kwashiorkor • Anaemia • Failure to thrive
Carbohydrate	Maize meal, millet meal, sorghum meal, cassava meal, rice, potatoes, sweet potatoes, cassava, bread, yams	• Energy production • Prevention of constipation, coronary heart disease and diabetes and treatment of diarrhoea (fibre in carbohydrates)	• Protein energy malnutrition • Marasmus (wasting) • Kwashiorkor • Fatigue • General body pain
Fat	Edible insects (e.g., *tunkubyu*, *inswa*, *matingatila*), cooking oil, margarine, cream, groundnuts, avocados	• Stores excess energy for body to retrieve when it needs it • Insulates organs against shock • Maintains body temperature • Promotes healthy cell function	• Marasmus (wasting) • Skin problems • Anaemia • Hypothermia (sub-normal body temperature)
Micronutrients (nutrients the body needs in smaller amounts)			
Calcium	Milk, yoghurt, cheese, green leafy vegetables, broccoli, dried fish with bones that are eaten, legumes	• Builds strong bones and teeth • Helps heart function (including normal blood pressure) • Helps prevent blood clots	• Delayed blood clotting • Weak and breakable bones • Problem teeth • Low resistance to infection • Rickets (weak bones, common in children) • Stunting

Nutrient	Source	Function	Signs and symptoms of deficiency
Folic acid	Liver, green leafy vegetables (*kalebwe*/ *kalembula*, *chibwabwa*, *katapa*, *ibondwe*), fish, pork, kidneys, legumes, groundnuts, oil seeds	• Healthy teeth, gums and bones • Resistance to infection • Iron absorption	• Bleeding gums • Poor hearing • Frequent infections • Anaemia • Muscle and joint pain • Depression
Iodine	Seafood, iodised salt	• Brain and nervous system development and functioning • Growth and development • Reproduction	• Goitre (swelling on the neck) • Cretinism (imbecility) • Impaired brain function • Dwarfism (gross stunting) • Abortion
Iron (vitamin C is important for iron absorption)	Meat, liver, fish, poultry, shellfish, eggs, legumes, nuts including groundnuts	• Oxygen exchange in blood • Energy production	• Anaemia • Headache • Irritability • Fatigue • Pallor • Dizziness • Decreased alertness
Magnesium	Legumes, nuts, seeds, whole grains, avocados, green leafy vegetables, okra, broccoli, cucumber skin, seafood	• Muscle and nerve function • Release of energy from fats, proteins and carbohydrates • Strong bones and teeth	• Spasms (muscle twitching) • Cramps • Tremors • Constipation
Selenium	Brown rice and other whole grains, nuts, onions, garlic, egg yolk, milk, meat, seafood	• Prevents breakdown of fat and other body cells • Prevents or slows oxidative damage	• Weakness • Pancreatitis (blockage of pancreatic ducts) • Impaired growth • Impaired hearing • Faster HIV progression and reduced survival • Impaired immune system

Nutrient	Source	Function	Signs and symptoms of deficiency
Vitamin A (fat soluble, so poorly absorbed by people who eat low-fat diets)	Carrots, eggs, liver, mangos, pawpaw, pumpkins, green leafy vegetables, yellow sweet potatoes, red palm oil, full-cream milk (when fortified), cheese, butter, amaranthus (*ibondwe*), cassava leaves (*katapa*), cowpea leaves, sweet potato leaves (*kalembula*), turnips, wild fruits, fortified sugar, fortified maize meal	• Vision • Gene transcription • Reproduction • Growth of epithelial and other cells • Resistance to infection • Skin health • Maintenance of skin, mucous membranes, bones, teeth and hair	• Dry eyes • Night blindness • Dry skin • Dry hair • Blindness • Skin infections • Growth retardation in children
Vitamin B_1 (thiamine)	Whole-grain cereals, beef, pork, kidneys, liver, poultry, fish, milk, eggs, oil, seeds and legumes, bambara groundnuts, soya beans, cashew nuts, cowpeas	• Energy production • Appetite promotion • Support for central nervous system	• Beriberi (nervous system ailment marked by severe lethargy and fatigue and cardiovascular and gastrointestinal problems) • Appetite loss • Nausea • Numb hands and feet
Vitamin B_2 (riboflavin)	Milk, eggs, liver, meat, fish, yoghurt, green leaves, whole-grain cereals, legumes, *ibondwe*, okra leaves	• Energy production • Vision • Skin health	• Cracked mouth corners • Cracked lips • Rough skin

Nutrient	Source	Function	Signs and symptoms of deficiency
Vitamin B_3 (niacin)	Milk, eggs, meat, poultry, fish, peanuts, whole-grain cereals, unpolished rice, cassava, potatoes, sweet potatoes, yams, beans, soya beans, cowpeas, groundnuts, bambara groundnuts, cashew nuts, pumpkin seeds, carrots, cauliflower, cowpea leaves, eggplant, mushrooms, okra, peppers, caterpillars, sweet potato leaves, avocados, guavas, mangos, pawpaw	• Energy production • Healthy skin	• Pellagra (lesion on skin exposed to sun, dermatitis, irritability, diarrhoea, confusion, mucous membrane inflammation, depression) • Fatigue • Forgetfulness • Nausea or vomiting • Appetite loss • Mouth sores • Headache • Anaemia • Trouble sleeping or relaxing
Vitamin B_6	Legumes (white beans), potatoes, meat, fish, poultry, shellfish, watermelon, oil seeds, maize, avocado, broccoli, green leafy vegetables, peppers, bananas, groundnuts, soya beans, liver	• Breakdown of protein and fats • Production of antibodies, red blood cells, protein and neurotransmitters	• Anaemia • Fatigue • Irritability • Depression • Dizziness • Muscle twitching • Nerve problems
Vitamin B_{12}	Meat, fish, poultry, cheese, eggs, milk, liver, grubs	• Formation of red and white blood cells • Maintenance of nerves and digestive tissue	• Anaemia • Fatigue • Confusion • Numbness • Nerve problems • Memory problems • Ringing in the ears
Vitamin C	Guavas, oranges, lemons, cabbage, green leaves, tomatoes, peppers, potatoes, yams, cooked plantains, wild fruits	• Use of calcium and other nutrients to build bones and blood vessels • Non-haeme iron absorption • Immune function • Prevention or delay in oxidative damage • Protein metabolism	• Scurvy (bleeding of the gums) • Gingivitis (bleeding, sore and inflamed gums) • Stomatitis (sores on corners of the mouth) • Anaemia

Nutrient	Source	Function	Signs and symptoms of deficiency
Vitamin E	Green leafy vegetables, (*kalebwe/ kalembula*, *chibwabwa*, *katapa*, *ibondwe*), vegetable oils and wheat germ, whole-grain products, butter, liver, egg yolk, groundnuts, milk fat, nuts, seeds	• Increases resistance to infections • Helps reproduction • Slows aging • Treats scar tissue • Prevents or slows oxidative damage	• Fatigue • Dry hair • Leg cramps • Muscle weakness • Nerve problems • Hearing problems • Infertility • Impotence
Zinc	Meat; liver; egg yolk; oysters and other seafood; whole-grain breads, cereals, and other fortified or enriched grain products; legumes	• Protection of digestive and immune systems • Enzyme formation • Wound healing • Vitamin A metabolism • Development of male organs • Prevention or delay of oxidative damage	• Decreased wound healing • Hypogonadism • Mild anemia • Decreased taste acuity • Hair loss • Diarrhoea • Growth failure • Skin changes

Annex 2. Micronutrient Supplementation Recommendations for Zambia

The following vitamin and mineral supplements are recommended to prevent micronutrient deficiencies:

Vitamin A for children

Group	Dosage	Dosage	Notes
Non-breastfed infant 0–5 months	50,000 IU	½ blue capsule	Do NOT give the red capsule to this age group.
Infants 6–11 months, including breastfed HIV-positive infants	100,000 IU	All drops in one blue capsule	Give ½ of the dose in one red capsule.
Child 12–59 months, including breastfed HIV-positive children	200,000 IU	All drops in two blue capsules	Give all drops in one red capsule.
Infants of HIV-positive mothers who are not breastfed	50,000 IU	½ blue capsule	Do NOT give the red capsule.

Iron and folate for pregnant and lactating women

Group	Non-anaemic (prevention of anaemia)	Anaemic (treatment)
Pregnant women*	1 tablet of 200 mg iron daily 1 tablet of 5 ug folic acid daily throughout pregnancy 60 mg of elemental iron and 400 µg of folic acid daily for 6 months after the first trimester	1 tablet of iron 3 times a day 1 tablet of folic acid daily for 3 months 60 mg of elemental iron and 400 µg of folic acid twice a day for 6 months after the first trimester
Postpartum women*	200,000 IU no later than 6 weeks after delivery plus 200 mg of ferrous sulphate and 5 mg of folic acid	

***** Iron may contribute to disease progression of HIV to AIDS.

Zinc for children with diarrhoea to reduce the duration and severity of diarrhoea and provide protective effects 2–4 months following the episode

Annex 3. Nutritional Benefits of Zambian Foods

Food	Role in the body
Grains, cereals and tubers	
• *Mugaiwa/umgayiwa* (straight-run mealie meal from maize or green maize) • *Musozya* (maize samp or hulled dried maize) • *Maila, amasaka* (sorghum) • *Nzembwe, amale* (millet) • *Umupunga* (rice) • *Tute* (cassava tubers) • *Ifyumbu, chimbwali* (sweet potatoes)	• Provide energy. • Provide minerals and vitamins, particularly B vitamins (riboflavin, thiamine, niacin, B6 and B12, folate) if the skin and kernel of the grains /cereals are eaten whole. • Some refined cereals are fortified with vitamins and minerals.
Indigenous vegetables and legumes	
• *Kalembula* (sweet potato leaves) • *Katapa* (cassava leaves) • *Ibondwe* (amaranthus) • *Nshaba, nyemu, imbalala* (groundnuts) • *Cilemba, nchunga* (beans) • *Ifipushi* (pumpkin) • Mushrooms • Okra • Baobab twigs	• Provide proteins, vitamins (especially vitamin A) and minerals; the dark green leafy vegetables and yellow, orange and red vegetables and fruits are rich in vitamins. • Provide phytochemicals that may strengthen the immune system. • Provide fibre.
Wild fruits	
• *Mabuyu* • *Imfungo* • *Masuku* • *Masawu* • *Inji* • *Mmabungo* • *Impundu*	• Provide vitamin C and some minerals. • Provide phytochemicals that may strengthen the immune system.
Edible insects	
• *Dried finkubala* (caterpillars) • *Inswa* (termites) • *Inshonkonono* • *Makanta* (grasshoppers)	• Provide protein and some vitamins and minerals.
Small animals	
• *Imbeba* (bush mice) • *Imfuko* (moles) • *Sikaale* (squirrels) • *Impanya, kalulu* (rabbits)	• Provide protein, some vitamins and minerals including iron and zinc.

Food	Role in the body
Local beverages	
• *Mabuyu*, orange, pawpaw or lemon juice • *Mantamba, maheu, chibwantu munkoyo* (non-alcoholic drinks made from grains)	• Provide vitamin C. • Provide B vitamins.

Annex 4. Types of Nutrition Assessment

1. Anthropometric assessment
    - Weight-for-height z-score (WHZ) to measure stunting in children
    - Weight-for-age z-score (WAZ) to measure wasting in children
    - Body mass index (BMI) to measure nutritional status in non-pregnant/lactating adults
    - BMI-for-age to measure nutritional status in children 5–18 years
    - Mid-upper arm circumference (MUAC) to measure nutritional status for anyone older than 6 months. MUAC should always be used to measure nutritional status in pregnant and lactating women, whose weight is not an indication of nutritional status, and bedridden people who cannot stand up to be measured and weighed.

2. Biochemical assessment
    - Lipid profile for ART clients
    - Cholesterol
    - Triglycerides
    - Haemoglobin (Hb)

3. Clinical assessment
    - Protein-energy malnutrition (kwashiorkor) in children
    - Wasting (extreme thinness, including marasmus in children)
    - Anaemia
    - Skin changes
    - Hair changes

4. Dietary assessment
    - Food intake
    - Food security, access and utilisation
    - Food preparation and handling
    - Medications and food
    - Factors that affect food intake

Annex 5. Counselling People with HIV to Maintain Desirable Weight

1. Weigh the client.
   - Compare current weight to previous weight.
   - Refer to points 2–9 for clients who are underweight, experiencing unintended weight loss or want to increase their weight.
   - Refer to point 13 for clients who are overweight and experiencing unintended and undesired weight gain.

2. Urgently refer any client who is severely malnourished for inpatient nutrition rehabilitation, where available. For severely malnourished children under 5 years, follow the national IMAM guidelines.

3. Inform the client of the **Critical Nutrition Practices** listed below.

   1. **Get weighed** on every clinical visit to a health facility and have weight recorded.

   2. **Eat a variety of nutritious foods and increase intake energy intake** according to HIV disease stage. An asymptomatic adult should consume 10 percent more energy (one snack) a day over the recommended daily allowance (RDA) for HIV-negative healthy people of the same age, sex, physical activity level and health status. A symptomatic adult should consume 20–30 percent more energy (two to three snacks) a day over the RDA for HIV-negative healthy people. A symptomatic child with weight loss should be fed 50–100 percent more energy than the RDA for HIV-negative children of the same age and sex.

   3. **Maintain good hygiene and sanitation**. Use boiled or treated water to prepare food, wash hands correctly at the critical times, cover prepared food and get dewormed every 6 months with an appropriate broad-spectrum anti-helminthic such as Albendazole or Mebendazole if you are living in areas where hookworm is common.

   4. **Practice positive living**, including using condoms to avoid re-infection with HIV, avoiding alcohol and cigarettes and other tobacco products, avoiding junk foods and managing depression and stress.

   5. **Get regular physical exercise** (housework, walking, gardening) to strengthen or build muscles and increase appetite and health.

   6. **Drink plenty of clean, safe water.** Use only filtered and boiled or chlorinated water and use clean boiled or treated water to take medicines and prepare juices.

   7. **Get infections treated promptly and manage HIV-related symptoms through diet.**

   8. **Manage medication-food interactions and medication side effects through diet** and inform health care providers if you are taking traditional remedies (herbs, medicines) or other nutrition supplements.

4. Counsel a client with opportunistic infections (OIs) or other illnesses which affect nutrient absorption or utilisation on how to manage symptoms through diet and refer her/him to a physician.

5. If the client does not have OIs, assess energy intake. People with HIV should eat at least three meals a day in quantities 'reasonably adequate' for age, sex, activity and physiological state, including a variety of foods from all food groups (energy foods, body-building foods, protective foods, clean water) and one or two high-energy snacks such as enriched porridge or mashed bananas, baked bananas, sweet potatoes or nuts.

6. If inadequate energy intake is a result of medication-related side effects such as nausea and loss of appetite, discuss dietary management and modify the medication-food timetable to enable increased intake. If side effects continue, refer the client to a physician, who may prescribe appetite stimulants, anti-emetics to prevent vomiting or anti-diarrhoea medications.

7. If medication-related side effects are not an issue and food is available in the household, counsel the client to eat more energy foods more often or enrich staple foods with fats, oils, sugar or honey. Help the client identify appealing and affordable foods.

8. If the client lacks access to sufficient food, help identify options, including budgeting food expenditures and accessing food or livelihood support.

9. If dietary intake is adequate and the client has no OIs or medication side effects that affect nutrient absorption but is still losing weight, refer the client to a physician for assessment of metabolic changes or other problems.

10. Counsel the client to get moderate physical exercise (e.g., housework, walking) 3–4 times a week to build muscles. If the client has difficulty exercising, refer to a physiotherapist if available.

11. Allow time to discuss the client's questions and concerns.

12. If improved diet fails to increase weight, refer the client to a physician for further assessment.

13. If the client is overweight (BMI = 25.0–29.9) or obese (BMI ≥ 30.0) or gaining weight unintentionally, ask about daily food intake. If fat and energy intake is higher than recommended, help the client identify ways to eat less high-fat and high-energy foods (especially alcohol and foods containing sugar and oil) and to increase physical activity to reach a healthy BMI (18.5–24.9). If weight gain is a result of metabolic changes rather than dietary intake, refer the client to a physician for further assessment and treatment.

Annex 6. Dietary Management of HIV-Related Symptoms

Illness	Dietary management	Prevention and treatment
Anorexia (appetite loss)	• Stimulate appetite by eating favourite foods. • Eat small amounts of energy-dense food more often. • Avoid strong-smelling foods.	• If appetite loss is a result of illness, seek medical treatment.
Diarrhoea	• Drink a lot of fluids (soups, diluted fruit juices, boiled water and light herbal teas) to avoid dehydration. • Avoid strong citrus fruits (orange, lemon) because they irritate the stomach • Eat foods rich in fibre (millet, banana, peas and lentils) to help retain fluids. • Eat fermented foods such as porridge and yoghurt. • Eat easily digestible foods such as rice, bread, millet, maize porridge, potatoes, sweet potatoes and crackers. • Eat small amounts of food frequently • Continue to eat after illness to recover weight and nutrient loss. • Eat soft fruits and vegetables such as bananas, squash, cooked and mashed green bananas, mashed sweet potato and mashed carrots. • Drink non-fat milk if there is no problem with lactose. • Boil or steam foods if diarrhoea is associated with fat malabsorption. • Avoid or reduce intake of milk; coffee and tea; alcohol; fatty foods; fried foods; extra oil, lard or butter and gas-forming foods such as cabbage, onions and carbonated soft drinks.	**Prevention** • Drink clean boiled water. • Wash hands with water and soap before handling, preparing, serving or storing food, after using the latrine or after cleaning a child after defecation. **Treatment** • Drink more fluids to prevent dehydration, including oral rehydration solutions. • Go to a health facility if symptoms such as severe dehydration (low or no urine), fainting, dizziness, shortness of breath, bloody stools, high fever, vomiting, severe abdominal pain or diarrhoea persist for more than 3 days.

Illness	Dietary management	Prevention and treatment
Fever	• Eat energy- and nutrient-rich soups made of maize, potatoes or carrots. • Drink plenty of fluids. • Drink lemon, guava and gum tree tea. • Eat small, frequent meals as tolerated.	• Drink fluids, especially clean boiled water, to prevent dehydration. • Bathe in cool water. • Rest more. • Take two Panadol with a meal morning, afternoon and evening. • Go to a health facility if loss of consciousness, severe body pain, yellow eyes, severe diarrhoea, convulsions and seizures or fever that lasts several days and is not relieved with aspirin.
Nausea and vomiting	• Eat small frequent meals. • Eat soups, unsweetened porridge and fruits such as bananas. • Eat lightly salted and dry foods such as crackers to calm the stomach. • Drink herbal teas and lemon juice in hot water • Avoid spicy and fatty foods. • Avoid coffee, tea and alcohol. • Drink liquids, including clean boiled water.	• Avoid an empty stomach, which makes nausea worse. • Avoid lying down immediately after eating—wait at least 20 minutes. • Avoid vomiting. • Rest between meals.
Thrush	• Eat soft, mashed foods, such as carrots, scrambled eggs, mashed potatoes, bananas, soups and porridge. • Eat foods cold or at room temperature • Avoid spicy, salty or sticky foods that may irritate mouth sores. • Avoid sugary foods that cause yeast to grow. • Avoid strong citrus fruits and juices that may irritate mouth sores. • Avoid alcohol and drink plenty of fluids.	• Seek medical treatment. • Use a spoon or cup to eat small amounts of foods. • Tilt your head back when eating to help swallowing. • Rinse your mouth with boiled warm, salty water after eating to reduce irritation and keep infected areas clean so yeast cannot grow.
Constipation	• Eat more high-fibre foods, such as maize, whole wheat bread, green vegetables and washed fruits with the peel. • Drink plenty of liquids. • Avoid processed and refined foods.	• Avoid cleansing practices such as enemas and medications. • Drink plenty of fluids, including boiled water.

Illness	Dietary management	Prevention and treatment
Anaemia	• Eat more iron-rich foods (eggs; fish; meat; liver; green leafy vegetables such as collard greens or spinach; legumes such as beans, lentils or groundnuts; nuts; oil seeds; and fortified cereals • Take iron supplements	• Take a daily iron tablet with a source of vitamin C, such as tomatoes or orange juice, to help absorption. • Drink fluids to avoid constipation. • Treat malaria and hookworm.
Muscle wasting	• Eat more and eat more often. • Improve the quality and quantity of foods by eating a variety of foods. • Increase protein in the diet. • Increase intake of starchy foods in cereals and other staples. • Eat small frequent meals.	• Exercise and do physical activity to enhance protein utilisation.
Bloating or heartburn	• Eat small, frequent meals. • Avoid gas-forming foods, such as cabbage and soda. • Drink plenty of fluids.	• Eat long enough before sleeping that food can digest.
Tuberculosis	• Eat foods high in protein, energy, iron and vitamins.	• Seek medical attention immediately. • If taking Isoniazid, take a vitamin B_6 supplement to avoid deficiency.
Loss of taste or abnormal taste	• Eat small, frequent meals. • Do regular weight-bearing exercise to build muscles. • Use flavour enhancers such as salt, spices, herbs and lemon. • Chew food well and move it around in the mouth to stimulate receptors.	
Dyslipidaemia	• Eat more fruits and vegetables, fish and plant sources of omega-3 fatty acids. • Eat fewer mono- and polyunsaturated fats, refined carbohydrates, sugar and saturated fats.	• Get regular physical activity. • Stop smoking. • Decrease or stop alcohol consumption. • Maintain a healthy body weight (BMI 20–25).

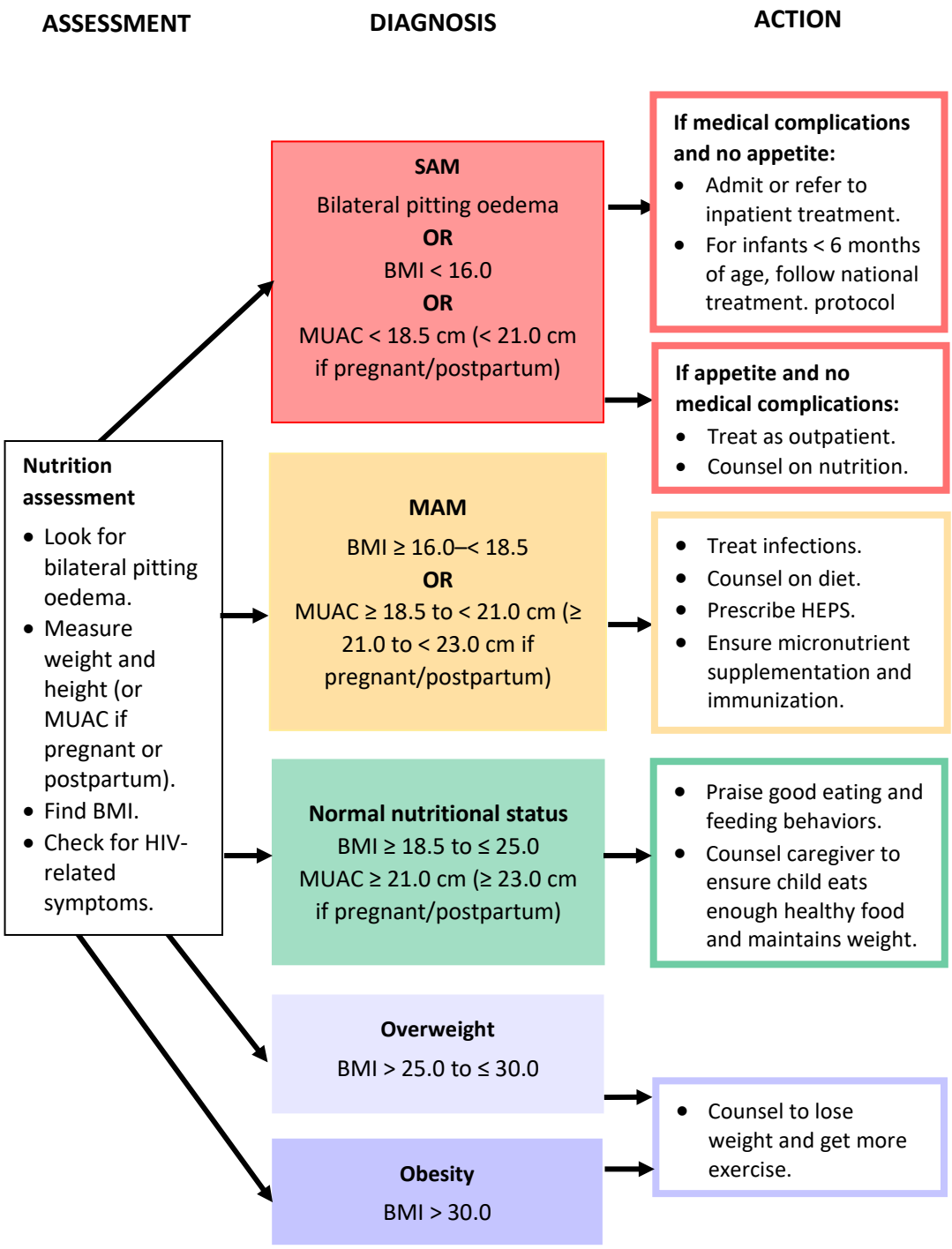
Annex 7. Entry, Transition and Exit Criteria for Specialised Food Products

<table>
<tr><th>Target group</th><th>Entry criteria</th><th>Prescription (RUTF in 92 g packets providing 500 kcal, HEPS in 100 g bags)</th><th>Transition/exit criteria</th></tr>
<tr><td rowspan="3">Children 6–23 months</td><td><u>Severe acute malnutrition (SAM)</u>
Bilateral pitting oedema of any grade
OR WHZ < –3
OR MUAC < 11.5 cm</td><td><u>Outpatient treatment</u>: 200 kcal/kg/day of RUTF to last until the next visit. See dosage table below.
<table><tr><th colspan="3">RUTF dosage: Number of 92 g sachets</th></tr><tr><th rowspan="2">Weight (kg)</th><th colspan="2">200 kcal/kg/day</th></tr><tr><th>Per day</th><th>Per week</th></tr><tr><td>3.0–3.5</td><td>1</td><td>7</td></tr><tr><td>3.5–3.9</td><td>1½</td><td>11</td></tr><tr><td>4.0–4.9</td><td>2</td><td>14</td></tr><tr><td>5.0–6.9</td><td>2½</td><td>18</td></tr><tr><td>7.0–8.4</td><td>3</td><td>21</td></tr><tr><td>8.5–9.4</td><td>3½</td><td>25</td></tr><tr><td>9.5–10.4</td><td>4</td><td>28</td></tr><tr><td>10.5–11.9</td><td>4½</td><td>32</td></tr><tr><td>12 +</td><td>5</td><td>35</td></tr></table></td><td><u>Transition to MAM if</u>:
No bilateral pitting oedema for more than 2 weeks
OR WHZ ≥ –3
OR MUAC ≥ 11.5 cm</td></tr>
<tr><td><u>Moderate acute malnutrition (MAM)</u>
WHZ ≥ –3 and < –2
OR MUAC ≥ 11.5 and < 12.5 cm</td><td rowspan="2">One 100-g bag of HEPS/day to last until the next visit</td><td>Transition to normal nutritional status if:
WHZ ≥ –2
OR MUAC ≥ 12.5 cm</td></tr>
<tr><td>All HIV-exposed children regardless of nutritional status</td><td>Exit non-malnourished HIV-exposed children at 24 months.</td></tr>
</table>

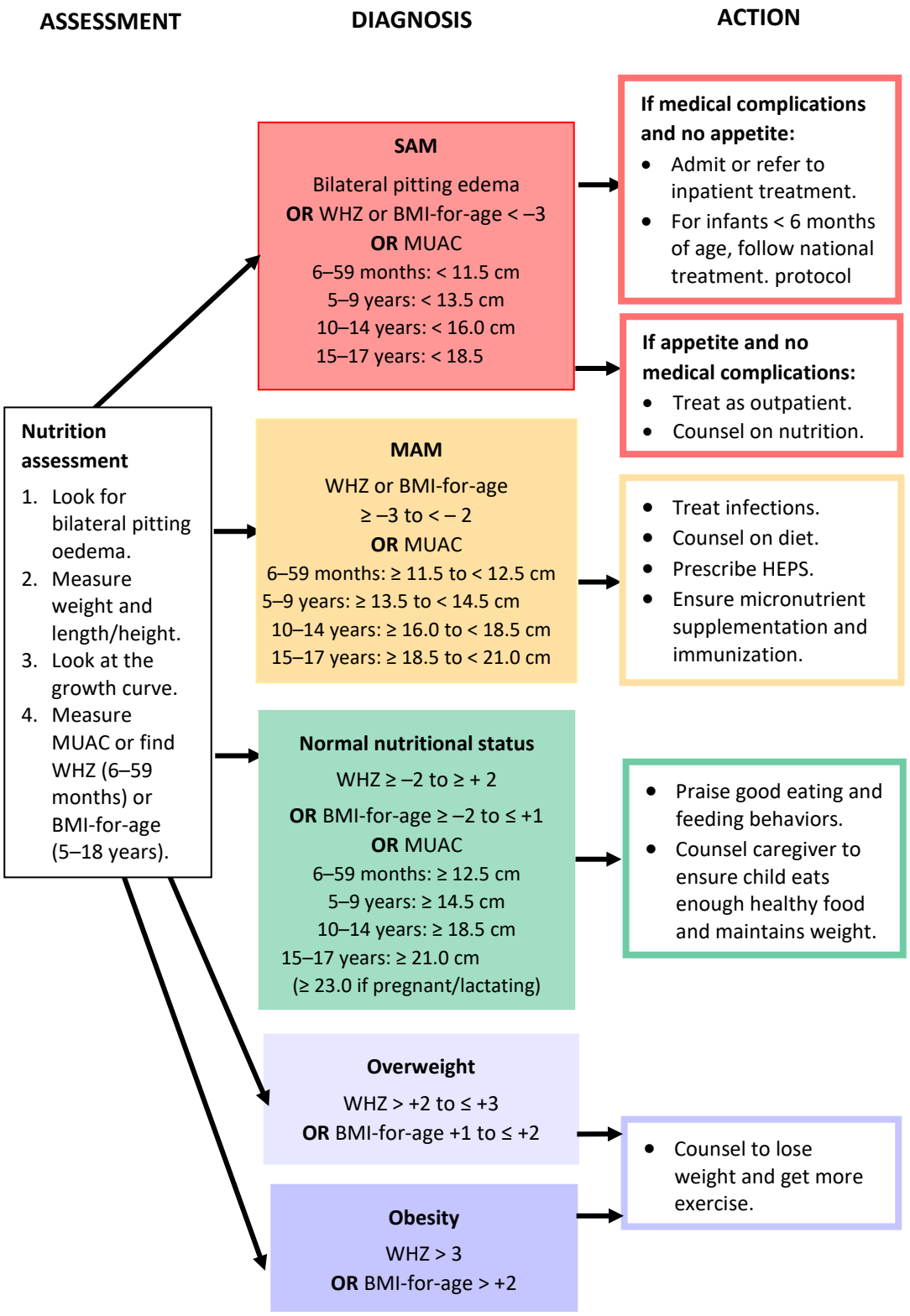
<table>
<tr><th>Target group</th><th>Entry criteria</th><th>Prescription (RUTF in 92 g packets providing 500 kcal, HEPS in 100 g bags)</th><th>Transition/exit criteria</th></tr>
<tr><td rowspan="2">Children and adolescents 2–17 years</td><td><u>SAM</u>
Bilateral pitting oedema of any grade
OR WHZ < –3
OR BMI-for-age (5–18 years) < –3
OR MUAC
24–59 months: < 11.5 cm
5–9 years: < 13.5 cm
10–14 years: < 16.0 cm
15–18 years: < 18.5 cm</td><td>Outpatient treatment
<u>24–59 months</u>: 200 kcal/kg/day to last until next visit
<u>5–10 years</u>: 100 kcal/kg/day to last until next visit
<u>11–14 years</u>: 75 kcal/kg/day to last until next visit
<u>15–17 years</u>: 2 packets to last until next visit
<table>
<tr><th colspan="7">RUTF dosage</th></tr>
<tr><th rowspan="3">Weight (kg)</th><th colspan="2">24–59 months</th><th colspan="2">5–10 years</th><th colspan="2">11–17 years</th></tr>
<tr><th colspan="2">200 kcal/kg/day</th><th colspan="2">100 kcal/kg/day</th><th colspan="2">75 kcal/kg/day</th></tr>
<tr><th>Per day</th><th>Per week</th><th>Per day</th><th>Per week</th><th>Per day</th><th>Per week</th></tr>
<tr><td>3.0–3.5</td><td>1</td><td>7</td><td>½</td><td>3½</td><td>½</td><td>3</td></tr>
<tr><td>3.5–3.9</td><td>1½</td><td>11</td><td>¾</td><td>6</td><td>½</td><td>4¼</td></tr>
<tr><td>4.0–4.9</td><td>2</td><td>14</td><td>1</td><td>7</td><td>¾</td><td>5¼</td></tr>
<tr><td>5.0–6.9</td><td>2½</td><td>18</td><td>2¼</td><td>9</td><td>1</td><td>6¾</td></tr>
<tr><td>7.0–8.4</td><td>3</td><td>21</td><td>1½</td><td>11</td><td>1¼</td><td>8</td></tr>
<tr><td>8.5–9.4</td><td>3½</td><td>25</td><td>1¾</td><td>13</td><td>1½</td><td>9½</td></tr>
<tr><td>9.5–10.4</td><td>4</td><td>28</td><td>2</td><td>14</td><td>1½</td><td>10½</td></tr>
<tr><td>10.5–11.9</td><td>4½</td><td>32</td><td>2¼</td><td>16</td><td>1¾</td><td>12</td></tr>
<tr><td>12–19.9</td><td>5</td><td>35</td><td>2½</td><td>18</td><td>2</td><td>14</td></tr>
<tr><td>20.0 +</td><td>8</td><td>56</td><td>4</td><td>28</td><td>3½</td><td>21</td></tr>
</table></td><td><u>Transition to MAM if</u>:
WHZ ≥ –3
OR BMI-for-age ≥ –3
OR MUAC
24–59 months: ≥ 11.5 cm
5–9 years: ≥ 13.5 cm
10–14 years: ≥ 16.0 cm
15–18 years: ≥ 18.5 cm
AND no oedema for more than 2 consecutive weeks
AND on RUTF for at least 8 weeks</td></tr>
<tr><td><u>MAM</u>
WHZ OR BMI-for-age ≥ –3 and < –2
OR MUAC
24–59 months: ≥ 11.5 and < 12.5 cm
5–9 years: ≥ 13.5 and < 14.5 cm</td><td>2–9 years: 100 g of HEPS/day to last until next visit
10–14 years: 200 g of HEPS/day to last until next visit
15–17 years: 300 g (3 bags) of HEPS/day to last until next visit</td><td>Transition to normal nutritional status if:
WHZ OR BMI-for-age ≥ –2
OR MUAC
24–59 months: ≥ 12.5 cm
5–9 years: ≥ 14.5 cm</td></tr>
</table>

Target group	Entry criteria	Prescription (RUTF in 92 g packets providing 500 kcal, HEPS in 100 g bags)	Transition/exit criteria
	10–14 years: ≥ 16.0 and < 18.5 cm 15–17 years: ≥ 18.5 and < 21.0 cm		10–14 years: ≥ 18.5 cm 15–17 years: ≥ 21.0 cm
Adults (non-pregnant/ postpartum)	**SAM** Bilateral pitting oedema **OR** MUAC < 18.5 cm **OR** BMI < 16.0	***Outpatient treatment*** 276 g (3 packets) of RUTF/day **PLUS** 400 g (4 bags) of HEPS/day to last until next visit	Transition to moderate malnutrition if: Sustained weight gain **AND** no oedema for the past two visits **AND** MUAC ≥ 18.5 cm **OR** BMI ≥ 16.0
	Moderate malnutrition MUAC ≥ 18.5 and < 21.0 cm **OR** BMI ≥ 16.0 and < 18.5	400 g (4 bags) of HEPS/day to last until next visit	Transition to normal nutritional status if: MUAC ≥ 21.0 cm for the past two visits **OR** BMI ≥ 18.5 for the past two visits
Pregnant women and women ≤ 6 months postpartum	**SAM** Bilateral pitting oedema **OR** MUAC < 21.0 cm	***Outpatient treatment:*** 92 g (1 packet) of RUTF/day **PLUS** 400 g (4 bags) of HEPS/day to last until next visit	Transition to moderate malnutrition if: MUAC ≥ 21.0 cm
	Moderate malnutrition MUAC 21.0–< 23.0 cm **OR** if pregnant: Weight loss for the past two visits	400 g (4 bags) of HEPS/day to last until next visit	Transition to normal nutritional status if: MUAC ≥ 23.0 cm **AND** (if pregnant): Weight gain for the past two visits

Annex 8. Algorithm for Management of Malnutrition in Adults



Annex 9. Algorithm for Management of Malnutrition in Children



Annex 10. Food Recommendations for and Possible Side Effects of Common HIV Medications Used in Zambia

Medication	Nutrition guidance	Avoid	Possible side effects
Antiretroviral drugs (ARVs)			
Nucleoside and nucleotide reverse transcriptor inhibitors (NRTIs)			
Abacavir (ABC)	Take with or without food, but taking with food reduces side effects. Alcohol increases levels of side effects.	Alcohol	Nausea, vomiting, fever, allergic reaction, anorexia, abdominal pain, diarrhoea, anaemia, rash, hypotension, pancreatitis, dyspnea, weakness and insomnia, cough, headache
Emtricitabine (FTC)	Take before bedtime, with or without food.	Fatty food	Dizziness, drowsiness, insomnia, abnormal dreams, impaired concentration, headache, diarrhoea, nausea, d rash, skin discolouration
Lamivudine (3TC)	Take with or without food.	Alcohol	Nausea, vomiting, headache, dizziness, diarrhoea, anaemia, abdominal pain, nasal symptoms, cough, fatigue, pancreatitis
Stavudine (d4T)	Take with or without food.	Alcohol	Nausea, vomiting, diarrhoea, peripheral neuropathy, chills and fever, appetite loss, rash, stomatitis, anaemia, headaches, pancreatitis, lipoatrophy, hyperlipidemia, increased liver enzymes
Zidovudine (AZT)	Take with or without food.	Alcohol, fatty food	Anaemia, anorexia, nausea, vomiting, bone marrow suppression, headache, fatigue, constipation, fever, dizziness, dyspnea, insomnia, muscle pain, rash, lipodystrophy, cardiovascular disease
Non-nucleoside reverse transcriptor inhibitors (NNRTIs)			
Efavirenz (EFV)	Take with or without food just before bedtime.	Alcohol, high-fat meals	Elevated blood cholesterol levels, elevated triglycerides, rash, dizziness, anorexia, nausea, vomiting, diarrhoea, dyspepsia, abdominal pain, flatulence

Medication	Nutrition guidance	Avoid	Possible side effects
Etravirine (ETV)	Always take after a meal.	Taking on an empty stomach	Severe skin rash, allergic reactions, immune reconstitution inflammatory syndrome (IRIS), gain or loss of body fat, tingling, numbness or pain in hands or feet (peripheral neuropathy)
Nevirapine (NVP)	Take with or without food.	St. John's wort	Nausea, vomiting, rash, fever, headache, skin reactions, fatigue, stomatitis, abdominal pain, drowsiness, paraesthesia, high hepatoxicity
Protease inhibitors (PIs)			
Atazanavir/Ritonavir (ATV/r)	Take with food.	Alcohol, St. John's wort	Diarrhoea, gas, nausea, fat maldistribution, vomiting, stomach pain, kidney stones, hyperglycaemia, lactic acidosis (rare), hyperlipidaemia
Darunavir/Ritonavir (RTV)	Take th food.		Liver problems, skin reactions or rash, dark-colored urine, jaundice, pale-colored feces, nausea, vomiting, appetite loss, fatigue, pain or tender-ness on right side under ribs
Lopinavir/Ritonavir (LPV-r)	Take with or without food.	St. John's wort	Nausea, vomiting, weakness, diarrhoea, headache, dizziness, abdominal pain, fever, diabetes, anorexia, hepatitis, jaundice
Ritonavir (RTV)	Take with food.	St. John's wort	Nausea, vomiting, diarrhea, taste changes, hepatitis, jaundice, weakness, appetite loss, abdominal pain, fever, diabetes, pancreatitis, headache, dizziness, possible increased risk of lipodystrophy, increase triglyceride levels, increased uric acid, increased liver enzymes
Integrase strand transfer inhibitor (INSTI)			
Dolutegravir (DTG)	Take with or without food.		Allergic reaction, liver problems, gain or loss of body fa, immune reconstitution inflammatory syndrome (IRIS), trouble

Medication	Nutrition guidance	Avoid	Possible side effects
			sleeping, fatigue, headache
Antibacterial medications for TB			
Rifampicin	Take on an empty stomach, 1 hour before or 2 hours after a meal. Supplement with 10 mg vitamin B_6 daily.	Alcohol	Gastrointestinal irritation, anaemia, jaundice, pancreatitis, altered taste, anorexia
Rifabutin	Take with or without food (with food if stomach is upset).	High-fat food	Urine discoloration, neutropenia, leukopenia, thrombocytopaenia, rash, diarrhoea, headache

Source: Republic of Zambia Ministry of Health Directorate of Clinical Care and Diagnostic Services. 2016. *Zambia Consolidated Guidelines for Treatment and Prevention of HIV Infection*. Lusaka, Zambia: MOH. http://www.hivpolicywatch.org/duremaps/data/guidelines/ZambiaARTguidelines2013.pdf; WHO. 2016. *Consolidated Guidelines on the Use of Antiretroviral Drugs for Treating and Preventing HIV Infection: Recommendations for a Public Health Approach*. 2nd edition. Geneva: WHO. http://apps.who.int/iris/bitstream/10665/208825/1/9789241549684_eng.pdf?ua=1

Annex 11. Counselling on Nutrition and Antiretroviral Drugs

1. Explain that good nutrition for people on antiretroviral drugs (ARVs) can:
    - Strengthen ability to fight disease.
    - Reduce opportunistic infections
    - Slow progression of HIV to AIDS.
    - Make ARVs more effective
    - Help manage side effects of ARVs.

2. Explain how HIV affects nutrition.
    - HIV increases the body's energy needs.
    - HIV leads to opportunistic infections, which increase nutritional needs and reduce appetite.
    - Medication side effects can reduce food intake or nutrient absorption.
    - Increased nutrient needs plus poor food intake and absorption can lead to malnutrition.

3. Explain that some ARVs have side effects that reduce appetite or nutrient absorption or cause overweight, but most symptoms disappear with time.

4. Explain that some foods and ARVs affect each other.
    - Some ARVs affect the availability, absorption and use of nutrients.
    - Some foods taken with ARVs can reduce medication effectiveness and worsen side effects.

5. Explain the dietary recommendations for each ARV or other medication the client is taking.

6. Stress the importance of using clean and safe water to take medicines.
    - People with HIV are vulnerable to water-borne infections.
    - Some ARVs call for drinking plenty of water to avoid side effects.

7. Help the client make a medication-food plan/timetable to maximise the effectiveness of the medications, ensure good nutrition and minimise side effects. For each time of day, list or draw foods the client can eat and list the medications to take and the appropriate timing of meals for the medications.

4. Explain that people with HIV should drink plenty of boiled or treated water every day when they are taking ARVs.

5. Explain that alcohol reduces the effectiveness of many ARVs and may cause dangerous side effects.

6. Stress the importance of completing the full course of ART as prescribed by health care providers to ensure the medications work and to avoid developing resistance that will require taking even stronger ARVs.

Annex 12. Common Herbs and Spices

Herbs and spices can improve digestion, stimulate appetite and preserve foods. The following table lists common herbs and spices, beneficial effects reported by clients living with HIV and their recommended uses.

Herb or spice	Benefits reported by people with HIV	How to use
Aloe	Helps relieve constipation	Use as extract; boil and drink the concentrated water. Use in limited amounts and stop immediately if it causes cramps or diarrhoea.
Basil	Helps relieve nausea and aid digestion; has an antiseptic function for mouth sores	Add to food to treat nausea and digestive problems. Use as gargle for mouth sores.
Calendula	Flower heads have antiseptic, anti-inflammatory and healing effects; helps with infections of the upper digestive tract	Use as a compress to treat infected wounds. Prepare as tea to help digestion.
Cardamom	Helps relieve digestive problems, pain, diarrhoea, nausea, vomiting and loss of appetite	Add to food during cooking or prepare as tea.
Cayenne	Stimulates appetite, helps fight infection and heals ulcers and intestinal inflammation	Add a pinch to cooked or raw foods. For an energising drink, add to fruit juice or water.
Camomile	Helps digestion and relieves nausea	Prepare tea from the leaves and flowers and drink several cups throughout the day.
Clove	Stimulates appetite; helps weak digestion; and relieves diarrhoea, nausea and vomiting	Use in soups, stews, warmed fruit juice and tea.
Coriander	Helps increase appetite and reduce flatulence and controls bacteria and fungi	Add to meals.
Eucalyptus	Has an antibacterial effect, particularly for lungs and during bronchitis; eucalyptus oil from leaves increases blood flow and reduces the symptoms of inflammation	Prepare tea from the leaves or extract.

Herb or spice	Benefits reported by people with HIV	How to use
Fennel	Helps increase appetite, combat flatulence and expel gas	Add as spice to foods or prepare tea from the seeds. Use a limited amount.
Garlic	Has antibacterial, antiviral and antifungal effects, particularly in the gut, intestines, lungs and vagina; helps digestion and relieves weakness; is also good for thrush, throat infections, herpes and diarrhoea	Prepare tea or energy drink or use in food.
Ginger	Improves digestion, energises, relieves diarrhoea and stimulates appetite; used for treating common colds, flu and nausea	Use as a spice in meals or boil in water to prepare tea.
Lemon grass	Has a calming effect as well as soothing digestion and alleviating stress	Use as tea.
Mint	Has an anti-inflammatory effect and helps digestion	Use as tea or gargle for mouth sores; chew leaves to aid digestion.
Neem	Brings down fever	Cut a fresh twig, remove the leaves, boil the bark in water; drink as tea. The bark can also be chewed.
Parsley	Reduces intestinal colic, stimulates stomach secretions and activity and produces a feeling of hunger; seed is used to remove excess water from the body	Add raw or cooked to food.
Peppermint	May help nausea, reduces colic (abdominal pain and cramps), helps control diarrhoea and stop vomiting and relieves tension and sleeplessness	Prepare as tea by boiling the leaves for about 10 minutes. Add to food.
Thyme	Has antiseptic and antifungal effects, relaxes nervous coughing and increases mucosal secretions (particularly effective in the gut); stimulates digestion and growth of good intestinal flora	Use as gargle or mouthwash, as a vaginal douche or as tea.
Turmeric/yellow root	Aids digestion and has antiseptic and antioxidant effects	Use powdered in rice, cereals, etc.

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