Government of Malawi
Ministry of Health

NATIONAL GUIDELINES ON NUTRITION CARE, SUPPORT, AND TREATMENT (NCST) FOR ADOLESCENTS AND ADULTS

2nd Edition

November 2017

Recommended Citation

Ministry of Health (MOH). 2017. *National Guidelines on Nutrition Care, Support, and Treatment (NCST) for Adolescent and Adults*. Second edition. Lilongwe, Malawi: MOH.

Contact Information

Nutrition Unit of the Ministry of Health
P.O. Box 30377
Lilongwe 3
Malawi

Telephone: +265 (01) 789 400
Fax : +265 (01) 789 431

These guidelines are made possible by the generous support of the American people through the support of the Office of Health, Infectious Diseases, and Nutrition, Bureau for Global Health, U.S. Agency for International Development (USAID), the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), and USAID/Malawi, under terms of Cooperative Agreement No. AID-OAA-A-12-00005, through the Food and Nutrition Technical Assistance III Project (FANTA), managed by FHI 360.

Foreword

Malnutrition remains a major public health problem in Malawi and is compounded by the high prevalence of infections, such as HIV and tuberculosis (TB). The Government of Malawi (GOM) recognises the important role that food and nutrition interventions play in the care and treatment of these diseases and is therefore committed to delivering effective food and nutrition interventions.

In March 2006, the GOM developed the *Interim Guidelines for the Management of Acute Malnutrition in Adolescents and Adults.* These guidelines focused on nutrition assessment and provision of therapeutic and supplementary food support to moderately and severely undernourished people living with HIV (PLHIV). The guidelines were updated in 2014 to incorporate emerging issues, lessons learned, and best practices from Malawi and globally. The 2017 update of the guidelines aligns with the 2016 guidelines for community-based management of acute malnutrition (CMAM) and the 3rd Edition (2016) of the *Malawi Guidelines for Clinical Management of HIV in Children and Adults*.

The purpose of these updated guidelines on nutrition care, support, and treatment (NCST) is to provide the required minimum standards for delivering a comprehensive set of nutrition interventions aimed at preventing and managing undernutrition and overnutrition in adolescents and adults at various service delivery points in health facilities and communities. These guidelines also provide direction to service providers on how to link and refer clients between health facility and community health, nutrition, economic strengthening, livelihoods, and food security interventions. The guidelines are expected to help service providers improve the quality of nutrition service delivery and health outcomes of PLHIV, TB patients, and other patients presenting at health facilities with various forms of illness.

These guidelines have been developed through a consultative process with local and external technical experts. They are aligned with the *National Multi-Sector Nutrition Policy 2017–2021*, the *National Multi-Sector Nutrition Strategic Plan 2017–2021* and the *National HIV Strategic Plan 2015-2020*. The guidelines will be updated as need arises in order to incorporate emerging evidence and issues.

The Government is appealing to all service providers at the facility and community levels involved in delivering NCST services to adolescents and adults in the country to adhere to these guidelines. The Government is further appealing to managers, such as hospital directors, district health officers, and development partners, to support operationalisation of these guidelines.

The Government is very grateful to the European Union (EU), the World Food Programme (WFP), and the U.S. Agency for International Development (USAID)-supported Food and Nutrition Technical Assistance III Project (FANTA)/FHI 360 for their technical and financial support in the review of the guidelines.

Dr. Charles Mwansambo
CHIEF OF HEALTH SERVICES

Acknowledgements

The *National Guidelines on Nutrition Care, Support, and Treatment (NCST) for Adolescents and Adults* was developed with financial support from the European Union (EU), the U.S. Agency for International Development (USAID) through the Food and Nutrition Technical Assistance III Project (FANTA)/ FHI 360, and the World Food Programme (WFP)/Malawi, and their support is deeply appreciated. The Government of Malawi (GOM) would further like to express its sincere gratitude to all those who contributed in different capacities to the development and production of these guidelines.

Dr George Chithope-Mwale, Director for Clinical Services (Ministry of Health [MOH]) and Mr. Felix Phiri Director for Nutrition, Department of Nutrition, HIV and AIDS (DNHA) are recognised in a special way for their policy guidance. The Government is also highly indebted to Janet Guta (Deputy Director for Nutrition, MOH), Alice Nkoroi (FANTA) and Violet Orchardson (USAID) for their leadership and technical guidance during the whole process of drafting and producing the final version of these national guidelines.

The guidelines were made technically sound due to the contributions from the following team of experts:

Mr Frank Msiska	MOH, Nutrition Unit
Tapiwa Ngulube	MOH, Nutrition Unit
Sylvester Kathumba	MOH, Nutrition Unit
Micheal Eliya	MOH, HIV Unit
Eustace Mhango	MOH, HIV Unit
Andrew Dimba	MOH, TB Unit
Rhoda Kam'mwamba	MOH, Blantyre District Health Office
Hilda Kuweruza	MOH, Dowa District Health Office
Letcher Munyenyembe	MOH, Rumphi District Health Office
George Mtengowadula	MOH, Ntcheu District Health Office
Maggie Chiwaula	MOH, Zomba District Health Office
Uruji Mezuwa Banda	MOH, Nkhotakhota District Health Office
Janet Chikondi	MOH, Lilongwe District Health Office
Ellious Chasukwa	National AIDS Commission
Mzondwase Mgomezulu	MoAFS, Department of Agriculture Extension Services
Martha Mwale	MoAFS, Department of Agriculture Extension Services
Edda Lungu	MoAFS, Department of Agriculture Extension Services
Dr John Phuka	University of Malawi, College of Medicine
Chrissy Thakwalakwa	University of Malawi, College of Medicine
Ms Enala Thombozi	Kamuzu College of Nursing
Stacia Nordin	FAO/Malawi
Jecinter Oketch	UNICEF/Malawi
Emma Chimzulira	WFP/Malawi
Dr Susan Kambale	WHO/Malawi
Tomaida Msiska	European Union
Jennifer Marcy	FANTA/FHI 360
Serigne Diene	FANTA/FHI 360
Phindile Lupafya	FANTA/FHI 360
Chawanangwa Jere	FANTA/FHI 360
Linely Hauya	ASSIST/URC
Tiwonge Moyo	ASSIST/URC
Zachary Andersson	LIFT II/FHI 360
Clinton Sears	LIFT II/FHI 360
Henry Swira	LIFT II/FHI 360

Theresa Banda	Valid International
Zinaumaleka Nkhono	Baylor College of Medicine Children's Foundation Malawi
Catherine Mkangama	USAID/SSDI
Jemma Rowlands	Clinton Health Access Initiative
Patrick McCarthy	Peace Corps, Malawi

Contents

List of Tables

List of Figures

Abbreviations and Acronyms

>	greater than
≥	greater than or equal to
<	less than
AIDS	Acquired Immunodeficiency Syndrome
ANC	antenatal care
ART	antiretroviral therapy
ARV	antiretroviral drug
BMI	body mass index
BUN	blood urea nitrogen
cm	centimetre(s)
CMV	combined mineral and vitamin mix
CNA	Critical Nutrition Actions
CSB	corn-soya blend
dL	decilitre(s)
DSM	dry skimmed milk
DWM	dry whole milk
ES/L/FS	economic strengthening/livelihood/food security
FANTA	Food and Nutrition Technical Assistance III Project
FAO	Food and Agriculture Organization of the United Nations
g	gram(s)
Hb	haemoglobin
HIV	human immunodeficiency virus
HTS	HIV testing services
IU	international unit(s)
kcal	kilocalorie(s)
kg	kilogram(s)
L	litre(s)
µg	microgram(s)
mcL	microlitre(s)
mg	milligram(s)
ml	millilitre(s)
mm	millimetre(s)
MOH	Ministry of Health
MUAC	mid-upper arm circumference
NCST	nutrition care, support, and treatment
OPC	Office of the President's Cabinet
OPD	outpatient department
PDSA	Plan-Do-Study-Act
PLHIV	person or people living with HIV
PMTCT	prevention of mother-to-child transmission of HIV
QA	quality assurance
QI	quality improvement
RDA	recommended daily allowance
RUTF	ready-to-use therapeutic food
TB	tuberculosis
WASH	water, sanitation, and hygiene
WFP	World Food Programme
WHO	World Health Organisation

1. Introduction

1.1 Purpose of the Guidelines

These guidelines are intended to:

- Establish a consistent set of nutrition interventions and recommendations aimed at managing and preventing undernutrition and overnutrition in adolescents and adults, with a focus on people with HIV/AIDS and tuberculosis (TB) patients.
- Provide simple and clear guidance to service providers and managers on how to implement the nutrition interventions and recommendations at the various health care delivery contact points.
- Provide a framework for policymakers and development partners to use when planning nutrition interventions for adolescent and adults.

1.2 Use of the Guidelines

These guidelines should be used by managers and service providers responsible for providing nutrition care, support, and treatment (NCST) services at facilities (i.e., clinics, health posts, health centres, and hospitals) and in communities. The guidelines should be used to manage adolescents and adults at health service delivery points, such as outpatient departments (OPDs), antiretroviral therapy (ART) clinics, antenatal/prevention of mother-to-child transmission of HIV (PMTCT) clinics, HIV testing services (HTS) clinics, TB clinics and wards, medical wards, and community-based care, including peer support group forums. 'Adolescent' in these guidelines refers to a girl or boy who is 15–18 years of age, whereas 'adult' refers to a woman or man 19 years of age and older.

1.3 What Is New in This Updated Version of the Guidelines?

The 2006 interim guidelines provided guidance on nutrition assessment using anthropometric methods and provision of therapeutic and supplementary food to moderately and severely undernourished people living with HIV (PLHIV). The updated version of guidelines describes NCST as a client-centred approach for integrating a set of priority nutrition interventions into various health care service delivery contact points.

The national NCST guidelines provide guidance on implementing the following set of nutrition interventions within the health care system:

- **Nutrition assessment and classification**, including the use of anthropometric, biochemical, clinical, and dietary assessment methods
- Nutrition counselling and education
- Nutrition care plans and support based on clients' nutritional status, including normal nutritional status, moderate undernutrition, severe undernutrition, overweight, and obese
- Monitoring and reporting
- **Managing the quality of nutrition service delivery** at the facility level, including quality assurance (QA) and continuous quality improvement (QI)

The updated NCST guidelines should be used together with a set of complementary technical tools. The set of NCST technical tools includes the **training materials, job aids**, **counselling flip chart**, **monitoring and reporting tools**, and the **NCST operational plan 2018-2022**.

1.4 What Is New in These Guidelines

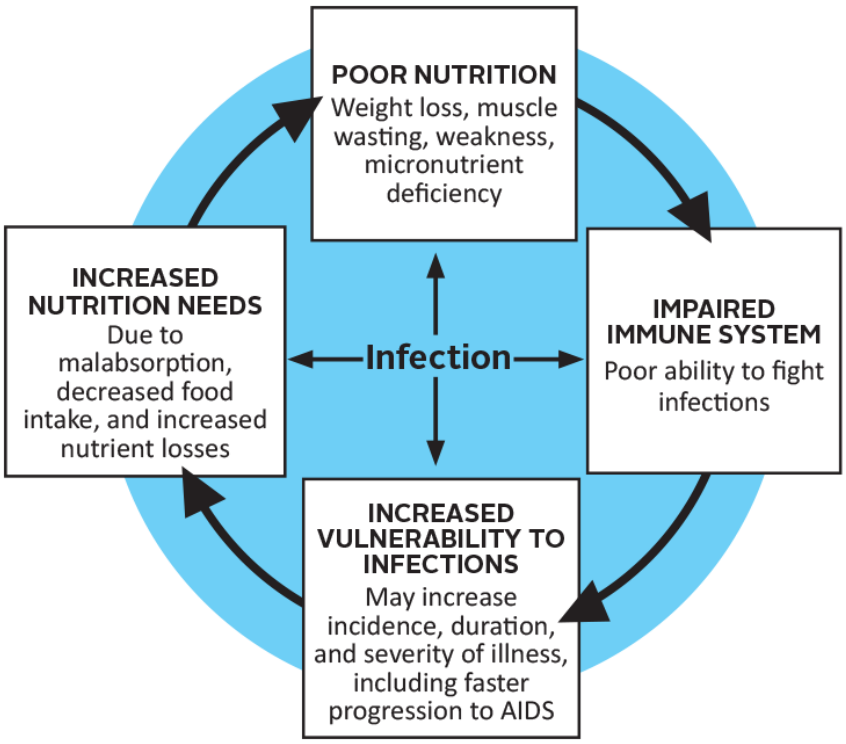
The table below provides a summary of changes that have been made to this 2017 update of the national NCST guidelines.

1.	Introduction	Page #
Old	Adolescent in the NCST guidelines referred to a boy or girl 12 - 18 years	
New	Adolescent in the NCST guidelines now refer to a boy or girl 15 - 18 years Note: the age cut-off of 15-18 years for adolescent has been updated in all relevant sections of these guidelines	1
Old	No Malawi Six Food Groups Chart	
New	Included the Malawi Six Food Groups Chart	5
2.	**Nutrition Assessment and Classification**	
Old	All MUAC measurements were provided in mm	
New	All MUAC measurements are now provided in mm and cm	
New	Updated the job aid on how to measure MUAC	10
New	Updated Figure 2. Classifying Nutritional Status of Adolescent 15-18 Years and Adults ≥ 19 Years	14
3.	**Nutrition Counselling and Education**	
New	Updated section 3.1. Nutrition Counseling Technique (ALIDRAA) to align with the NCST Counselling and Education Flip Chart (July 2017)	15
New	Added "always address the clients core needs" under section 3.2: Counselling on the Critical Nutrition Actions.	17
New	Added the follow sections to align with the NCST Counselling and Education Flip Chart (July 2017) • Section 3.3: Counselling on Diet • Section 3.4: Counselling People with Non-communicable Diseases (NCDs) • Section 3.5: Counselling People who are Ill	18
4.	**Nutrition Care Plans and Support**	
New	Aligned medical care and support to the 2016 Guidelines for Clinical Management of Children and Adults.	23, 24, 27, 29 & 33
New	Removed the use of CSB++ in the nutrition care and support for clients with moderate undernutrition	25
New	Preparation of F-75 and F-100 using the new tin packaged therapeutic milk	30 & 31
5.	**Monitoring and Reporting**	
New	Updated Figure 3. NCST Data Flow	42
6.	**Managing the Quality of NCST Services**	
	No change has been made to this chapter	
	Annexes	
New	Annex 13: Specifications of Supplementary Foods Used in Malawi	80
New	Annex 14: Therapeutic Food Specifications	82
New	Added Annex 15: How to Conduct RUTF Appetite Test	84
New	Annex 17: Adolescent and Adult Nutrition Register • Updated the age cut off from 12-18 year to 15-18 years	86
New	Annex 18: Undernourished Client Management Form for Adolescent and Adults • Removed the 12-15 years age category • Specified that MUAC should only be used if the client is a pregnant woman, lactating woman up to 6 months post-partum, or non-pregnant/non-lactating up-to 6 months client who is too ill to have their height taken	87
New	Annex 20: NCST Monthly Report • Updated the age cut off from 12-18 years to 15-18 years • Add a column for new admissions and total admissions under treatment for severe and moderate undernutrition	89

1.5 The Link between Food, Nutrition, and Infection

The link between nutrition and infection is well established. Poor nutrition impairs the immune response and makes it more difficult for the body to fight infections. On the other hand, infection can alter the way the body absorbs and uses nutrients, increase energy and nutrient needs, and increase nutrient losses, all of which can lead to undernutrition. Consumption of an appropriate diet is essential for prevention, management, and recovery from infections. **Figure 1** illustrates the relationship between poor nutrition and infection.

Figure 1. Cycle of Poor Nutrition and Infection



Adapted from: Regional Centre for Quality of Health Care and FANTA. 2003. *Handbook: Developing and Applying National Guidelines on Nutrition and HIV/AIDS.* Kampala and Washington, DC: RCQHC and FANTA/FHI 360.

1.6 The Importance of Eating a Diverse Diet

The body needs different nutrients for its normal functions, such as metabolising food and maintaining vital organs. Some circumstances, such as growth during childhood and adolescence, pregnancy and lactation, and recovery from illness, increase daily nutrient requirements. **Micronutrients**, commonly referred to as vitamins and minerals, are needed in small amounts. **Macronutrients**, which include carbohydrates, proteins, and fats, are needed in larger amounts.

Annex 2 describes the functions of various nutrients in the body, and **Annex 3** shows the nutrient requirements for different groups of people.

Diverse diets containing foods from six food groups are vital to providing the body with the variety of nutrients it requires. In Malawi, the six commonly categorised food groups are: vegetables, fruits, legumes and nuts, animal foods, staples, and fats.

The Six Food Groups of Malawi

1. **Vegetables** include green leafy and yellow vegetables, such as *bononGwe*, *chisoso*, *khwanya*, *mnkhwani*, *kholowa*, *rape*, *mpiru*, *kamganje*, carrots, eggplants, pumpkin, tomatoes, and mushrooms. Vegetables provide the body with vitamins, minerals, water, and dietary fibre.

2. **Fruits** include citrus fruits, such as oranges, lemons, baobab, and tangerines, bananas, pineapples, pawpaws, mangoes, *masawu*, *bwemba*, *malambe*, *masuku*, peaches; apples; guavas, and watermelons. Fruits provide the body with vitamins, minerals, water, energy, and dietary fibre.

3. **Legumes and nuts** include groundnuts, soya beans, common beans, peas, cowpeas, ground beans (*nzama*), bambara nuts, and pigeon peas. Legumes and nuts provide protein, fibre, and energy, and soybeans and nuts also contain healthy fats.

4. **Animal foods** include all foods of animal origin, including meat, eggs, milk products, fish (e.g., *matemba*, *utaka*, *usipa*, *kapenta*, *makakana*, *chambo*), and insects (e.g., *bwanoni*, *ngumbi*, *mafulufute*, *mphalabungu*). They provide the body with important protein, vitamins, and minerals.

5. **Staples** include cereal grains, such as sorghum, millet, maize; starchy fruits, such as green bananas and plantains; and starchy roots (cassava, sweet potato, and Irish potato). Staples provide carbohydrates and, depending on the food and on how it is processed, protein, fibre, and vitamins, and minerals.

6. **Fats** can be both healthy and unhealthy. Healthy fats are found in vegetable oils, nuts and seeds, avocado, and fatty fish (*batala*), such as lake trout and tuna. Unhealthy fats, such as butter and fat from animal products other than fish, should be eaten sparingly.

Water is considered an essential nutrient because it is necessary for body functions. Adults should drink at least 2 litres or about 8 cups of water a day. The water should be safe, clean, and treated if necessary. Tea, *thobwa*, soup, milk, juice, and fruit also contain water and can help meet the body's needs.

The Malawi Six Food Groups Chart

2. Nutrition Assessment and Classification

Nutrition assessment and classification requires specialised training and should be conducted by trained personnel. **All clients** should have their nutritional status assessed and classified at every visit to the health facility.

This chapter provides guidance on how to assess and classify nutritional status using four types of nutrition assessment methods: **anthropometric**, **biochemical**, **clinical**, and **dietary**.

2.1 Why Is Nutrition Assessment Important?

Nutrition assessment is important because it helps:

- Identify nutrient deficiencies that might affect health
- Track growth and weight
- Detect dietary habits that increase the risk of disease
- Inform nutrition education and counselling
- Provide information that can be used to recommend a nutrition care plan

2.2 Anthropometric Assessment

Anthropometric assessment involves taking various physical measurements of the body. These measurements can be compared to global standards to determine a person's nutritional status. Three common anthropometric assessments used in NCST are **weight**, **height**, and **mid-upper arm circumference (MUAC)**.

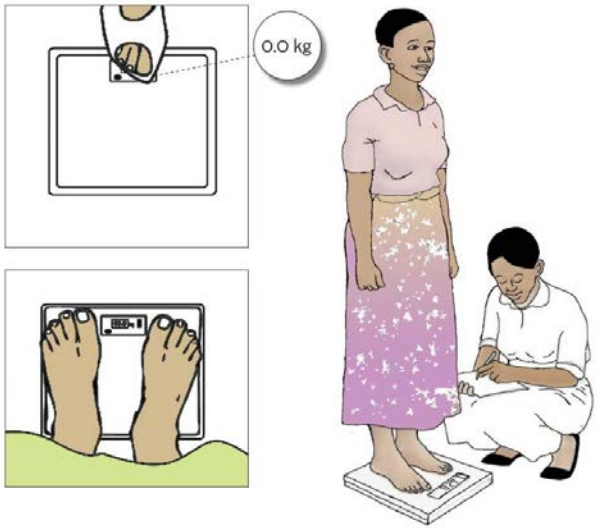
Weight and height measurements are used to calculate **body mass index (BMI)**, which is used to determine the nutritional status of adults. **BMI-for-age** is used to determine the nutritional status of children and adolescents 15–18 years old. (Note that the nutritional status of pregnant women and women who have given birth within the last 6 months cannot be assessed using BMI. Instead, their nutritional status should be based on weight and MUAC.)

BMI

Steps 1–3 below describe how to weigh, measure height, and calculate BMI for adults 19 years and older. Steps 1–4 describe how to weigh, measure height, calculate BMI, and look up BMI-for-age for adolescents 15–18 years old.

Step 1. Measure Weight

Accurate weight measurement is important because errors can lead to incorrect classification of nutritional status and, ultimately, the wrong care and treatment for the client. Scales should be standardised for accuracy before each clinic session by weighing an object of known weight.



To weigh a client:

1. Ensure that you have a functioning weighing scale that measures weight in kilograms (kg) to the nearest 100 grams (g).

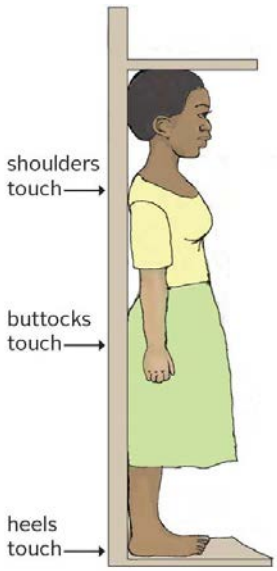
2. Place the scale on a flat surface. Turn on the scale. In case you are using a solar scale, turn on the scale by covering the solar panel for a second using your foot or hand. When the number 0.0 appears, the scale is ready.
3. Ask the client to remove shoes, hats, and scarves and to empty pockets.
4. Ask the client to stand unassisted on the centre of the scale.
5. Read and record the weight to the nearest 100 g (0.1 kg), for example, 62.3 kg.

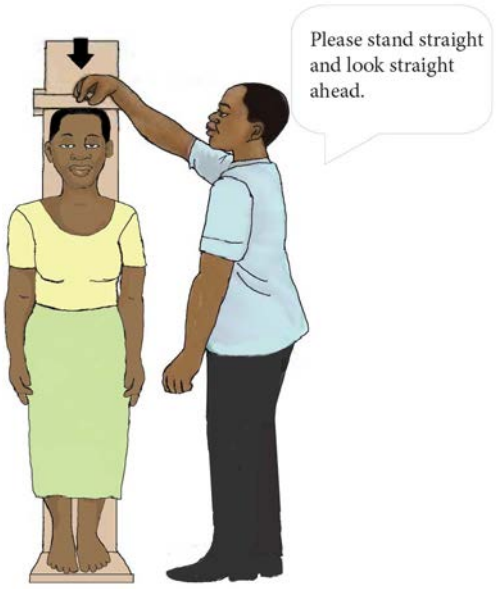
Step 2. Measure Height

Measuring the height of an adolescent or adult requires a height board or a measuring tape securely taped to the wall and accurately marked in centimetres (cm).

To measure the height of a client:

1. Use a height board or fasten a non-stretchable tape measure securely to a wall.
2. Place the height board vertically against a flat surface.
3. Ask client to remove shoes and headwear.
4. Ask client to stand straight and look straight ahead.
5. Bring the moveable head piece to rest firmly on the top of the client's head.
6. Record the measurement to the nearest 0.1 cm.





Step 3. Calculate BMI

Weight and height information is used to calculate BMI. BMI is a simple index used to evaluate the nutritional status of adults.

DO NOT use BMI to assess the nutritional status of pregnant women, women who gave birth within the last 6 months, or adults with bilateral pitting oedema.

To calculate BMI:

1. Measure the client's weight (in kg) and height (in cm).
2. Convert height measurements from cm to m (100 cm = 1 m).

3. Divide the client's weight in kg by the client's height in square meters (m^2) as shown in the formula below.

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}$$

You can also use BMI reference tables or a BMI wheel to find BMI using weight in kg and the height in cm. See **Annex 4** for BMI reference tables and **Annex 6** on how to find BMI and BMI-for-age using a BMI wheel.

Determine the adult client's nutritional status using the BMI cut-offs in **Table 1**.

Table 1. BMI Cut-Offs for Adults ≥ 19 Years of Age

BMI	Nutritional status
< 16.0	Severe underweight
16.0 to 18.4	Moderate underweight
18.5 to 24.9	Normal nutritional status
25.0 to 29.9	Overweight
≥ 30.0	Obese

Source: World Health Organisation (WHO). 1995.

Step 4. Look Up BMI-for-Age for Adolescents 15–18 Years of Age

Adolescents are still growing and developing. Therefore, their age and sex have to be taken into consideration when determining their nutritional status. Thus, BMI-for-age is used to determine the nutritional status of adolescents 15–18 years of age.

To find BMI-for-age:

1. Weigh (Step 1) and measure height (Step 2) of the adolescent
2. Determine the adolescent's BMI using the formula in Step 3 (above) or you can use the BMI reference tables in **Annex 5, pages 63–66** to determine the adolescent's BMI.
3. After you have identified the adolescent's BMI, use the BMI-for-age reference tables in **Annex 5, page 67** to determine nutritional status. Note that boys and girls have separate BMI-for-age reference tables.
4. If available, you can also use a BMI wheel to find BMI, BMI-for-age, and determine nutritional status. See **Annex 6** on how to find BMI and BMI-for-age using a BMI wheel.

MUAC Measurement

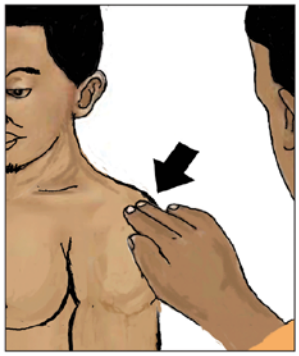
MUAC is the circumference of the mid-point of the upper arm. Use MUAC to assess the nutritional status of pregnant and post-partum women (within 6 months of delivery) and clients whose weight and height cannot be measured (e.g., if they are too ill to stand or have bilateral pitting oedema). MUAC can also be used to screen for undernutrition at the community level.

To ensure the most accurate readings, record MUAC measurements in millimetres (mm) instead of centimetres (cm).

To measure MUAC:

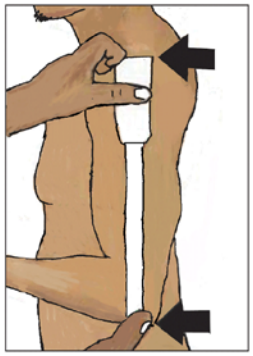
1. Find midpoint of upper arm

Step 1a



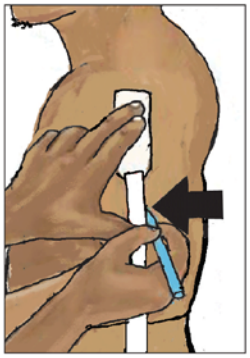
Always use left arm. Bend arm to a 90 degree angle. Find arm endpoints at the tip of the shoulder and tip of the elbow.

Step 1b



Use thumbs to place tape at endpoints.

Step 1c



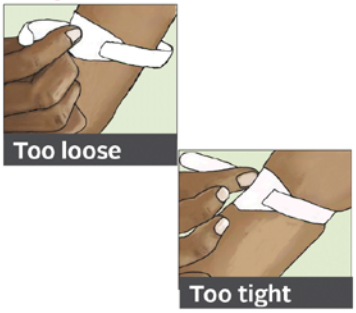
Make a mark on the arm's midpoint

2. Measure circumference

Step 2a

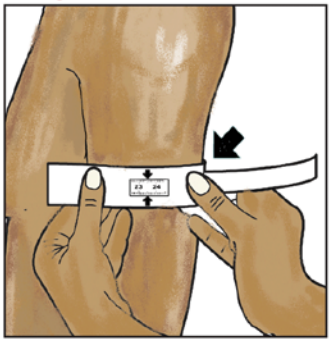
Straighten the arm. Wrap the tape around the mid-point and thread it through the window.

Step 2b



Adjust the tension of the tape so that it is not too tight or too loose.

Step 2c



Record the measurement in mm where the arrows point inward.

3. Classify

Group	Severe underweight	Moderate underweight	Normal nutritional status
Adolescents 15–18 years	< 185 mm (< 18.5 cm)	185 to 219 mm (18.5 to 21.9 cm)	≥ 220 mm (≥ 22.0 cm)
Adults*	< 190 mm (< 19.0 cm)	190 to 219 mm (19.0 to 21.9 cm)	≥ 220 mm (≥ 22.0 cm)

* includes pregnant and lactating women

Using Weight Gain to Measure the Nutritional Status of Pregnant and Lactating Women

Inadequate weight gain during pregnancy is associated with low birth weight, pre-term delivery, and intra-uterine growth retardation. Women who gain too much weight during pregnancy are also at increased risk for complications and adverse outcomes. While MUAC takes time to respond to changes in nutritional status, tracking weight gain between visits allows a health worker to easily identify pregnant women who are at risk of underweight and who have a higher risk of delivering a pre-term or low birth weight baby. At the first antenatal care (ANC) visit, weight gain targets should be set for each woman, based on her nutritional status.

Table 2 shows the recommended range of weight gain during pregnancy, based on the nutritional status of a woman at her first ANC visit.

Table 2. Recommended Weight Gain during Second and Third Trimester of Pregnancy

Nutritional status at first ANC (MUAC)	Recommended total weight gain during pregnancy
< 220 mm (<22.0 cm) - **Underweight**	13–18 kg
220 mm to 299 mm (22.0 to 29.9 cm) - **Normal**	11–16 kg
≥ 300 mm (≥30.0 cm) - **Overweight**	7–11 kg

Adapted from Institute of Medicine. 2009.

Pregnant and lactating women should be weighed at every visit. It is especially important that pregnant women gain adequate weight during pregnancy. Women who gain less than 1 kg per month since their last visit should be referred for additional assessment and intervention.

2.3 Biochemical Assessment

Biochemical assessment involves checking the levels of nutrients in a person's blood, urine, stool, and other body fluids. Laboratory test results provide trained health care providers with useful information about medical problems that can affect appetite or nutritional status. **Annex 7** lists laboratory tests that can identify nutrition problems.

At minimum, the following test results should be used at the facility level to identify nutritional problems:

1. Blood for haemoglobin (Hb) and red blood cell count, which provides important information on micronutrient deficiencies, such as iron, folate, and vitamin B12.
2. A metabolic test of the fasting blood glucose levels to provide important information on nutrition-related non-communicable diseases, such as diabetes. This test is most relevant for overweight and obese clients.

2.4 Clinical Assessment

Clinical assessment involves checking for visible signs of nutrition deficiencies. There are two steps in clinical nutrition assessment.

Step 1. Check for Medical Conditions That Can Affect Nutritional Status

1. Ask about symptoms of fever, diarrhoea, or vomiting, any of which can increase nutrient needs and losses.
2. Read the client's temperature; a temperature above 38.5° C could imply infection.
3. Ask about medical conditions, such as HIV and TB, that impair digestion and nutrient absorption and increase the risk of developing undernutrition.

4. Check medical records for information about recent illness; hospitalisations; operations; diagnostic tests; and therapies and medications, such as antiretroviral drugs (ARVs), that can affect nutritional status.
5. Check blood pressure of clients whose anthropometric measurements indicate that they are overweight or obese. Blood pressure can help with identifying risk for non-communicable diseases.

Step 2. Look for Visible Signs of Nutritional Deficiencies, e.g., Bilateral Pitting Oedema

Nutritional deficiencies can affect the hair, mouth, skin, nails, eyes, tongue, muscles, and thyroid glands. Physical examination of the body can help assess the presence and relative severity of clinical signs of nutritional deficiencies. **Annex 8** lists some physical signs of severe acute undernutrition.

Bilateral pitting oedema is oedema in both feet in which pressure on the skin leaves a depression in the tissues. Any client with bilateral pitting oedema should be classified as having severe acute undernutrition regardless of anthropometric measurements. Bilateral pitting oedema, or nutritional oedema, is more common in young children than in adolescents or adults. Oedema in adults may be a sign of other medical problems. Adults with oedema should be referred for a thorough medical exam to rule out causes of oedema not related to nutrition.

To assess for bilateral pitting oedema:

1. Press with your thumbs on both feet for 3 seconds and then remove your thumbs.
2. If the skin stays depressed on both feet, the person has Grade + (mild) bilateral pitting oedema.
3. Do the same test on the lower legs, hands, and lower arms. If the skin stays depressed in these areas, look for swelling in the face, especially around the eyes. If there is no swelling in the face, then the person has Grade ++ (moderate) bilateral pitting oedema. If swelling appears in the face, then the person has Grade +++ (severe) bilateral pitting oedema.

Table 3 shows the grades of bilateral pitting oedema.

Table 3. Grades of Bilateral Pitting Oedema

Grade	Definition
Absent or 0	No bilateral pitting oedema
Grade +	Mild (in both feet or ankles)
Grade ++	Moderate (in both feet plus lower legs, hands, and/or lower arms)
Grade +++	Severe (generalised, including both feet, legs, arms, and face)

2.5 Dietary Assessment

Dietary assessment involves assessing food and fluid intake. A dietary assessment should be conducted for a client whose anthropometric measurements indicate that he or she is severely or moderately underweight, overweight, or obese; a client who has had unintentional weight loss or weight gain; or a client who experiences such symptoms as loss of appetite or nausea that could be managed through changes to diet. Dietary assessment should be conducted during the first visit. Thereafter, the service provider should support the client to address food intake problems during follow-up visits.

A 24-hour food intake should be used to assess dietary intake and diversity. See **Annex 9** for a sample 24-hour dietary assessment form. To conduct a 24-hour recall dietary assessment follow the steps below.

1) Ask the client to mention everything he/she ate or drank in the last 24 hours (from when she/he woke up yesterday to when he/she woke up in the morning). Allow the client to remember all the foods eaten without interrupting. Use the following questions to probe for information on foods eaten in the last 24 hours.
   - What was the first thing you ate or drank when you got up in the morning?
   - Do you remember anything else you ate or drank?
   - Did you eat the food plain or put something else on it?
   - While you were working, did you take a break to eat or drink something?
   - What foods do you especially like or dislike?
   - Were you sick? If you were sick during the 24 hours, how did that affect your eating?

2) Next, ask the client to estimate the amount of food or drink that he or she consumed. Use household measures such as spoons, cups, mugs, glasses, bowls, and fistfuls to assist the client in estimating the amount of food or drink consumed.

3) Check with the client if the eating pattern in the last 24 hours was usual or unusual. For example, did the client attend a wedding or party.

4) Record all of the client's responses in the table provided in **Annex 9, 24-Hour Recall Dietary Assessment Form**.

5) Analyse the food intake and identify any food intake problems that the client may have.

Use information gathered from the client about the quantity and types of foods the client has eaten to make suggestions about ways to alter the diet to address nutrition challenges.

2.6 Classifying Nutritional Status

Once nutrition assessment is completed, results are used to categorise a client's nutritional status based on national and international nutrition standards. Classifying a client's nutritional status is important because it helps to:

1. Determine an appropriate nutrition care plan for a client
2. Select appropriate nutrition counselling messages
3. Determine eligibility for treatment of undernutrition
4. Monitor a client's recovery

Information on classifying nutritional status of adolescents and adults is provided in **Figure 2**.

Figure 2. Classifying Nutritional Status for Adolescents 15–18 Years and Adults ≥ 19 Years

3. Nutrition Counselling and Education

Nutrition counselling should be provided by a service provider who is trained on how to provide nutrition counselling. All service providers providing nutrition counselling are required to have good listening, learning, and interpersonal communication skills. Service providers should use the NCST Counselling and Education Flip Chart (2017) to guide counselling and education sessions.

This chapter reviews recommended **nutrition counselling technique** and presents the **Critical Nutrition Actions** (CNA) and the core needs of clients.

3.1 Nutrition Counselling Technique

Nutrition counselling is an interactive process: The counsellor offers a client the time, attention, information, and respect that is necessary to help him or her use the information provided to make a choice or solve a nutrition problem. The counsellor should always explain the reasons for the advice provided and the benefits of recommended actions to the client or caregiver.

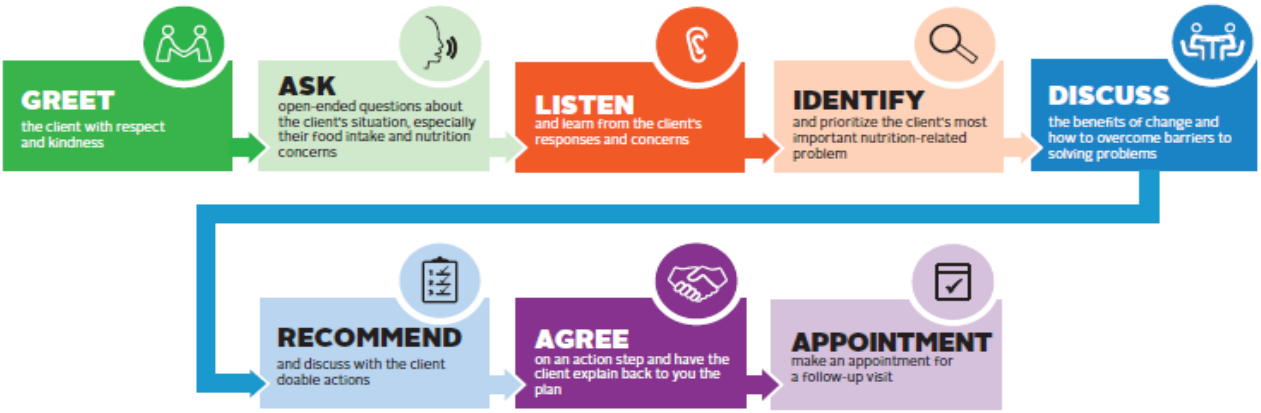
During the assessment phase, health care providers determine the clinical, dietary, and medical causes of undernutrition or overnutrition. Counselling provides the opportunity to investigate other factors that may be contributing to a client's nutrition problems, such as food insecurity, poor hygiene, unsafe water, and depression or anxiety, and to help a client overcome those problems.

The most important part of counselling is listening.

Use the following **ALIDRAA** checklist as a guide when conducting a nutrition counselling session.

1. Greet the client with respect and kindness. Ask him or her to sit down and then exchange introductions to establish a comfortable atmosphere.
2. **Ask** the client about his or her situation and current practices using open-ended questions and familiar language.
3. **Listen** to what the client and/or caregiver says. Notice body language, use probing questions, and reflect back what the client says to make sure you understand it correctly.
4. **Identify** the client's key problems and help select the most important ones to address.
5. **Discuss** options, considering what is realistic and using visual materials to engage the client and/or caregiver in discussion.
6. **Recommend and negotiate a small, doable action**, explaining the rationale and benefits.
7. Ask the client to repeat what he or she understood from the discussion and what action he or she **Agrees** to try at home.
8. Make a follow-up **Appointment** and ask the client to repeat the date.

Steps in Effective Counselling Using the ALIDRAA Technique



3.2 Counselling on the Critical Nutrition Actions (CNAs)

The CNA is a set of eight actions that, if followed, promote nutritional well-being. Depending on the challenges identified through counselling, the counsellor should select the appropriate CNA that might improve the nutrition situation of each client and discuss with the client practical steps that he or she can take to adopt the selected CNA. The list below contains the eight CNAs, along with supporting information and messages.

1. Get weighed regularly and have weight recorded.

- If you feel unwell, think that you are losing or gaining weight, have health-related problems, or have been diagnosed with undernutrition or overnutrition in the past, get weighed every month.
- If you feel healthy and well, or have a normal nutritional status, get weighed at least every 3 months.
- Keep a record of your weight in your health passport.

2. Eat a variety of foods and increase your intake of nutritious foods.

- Eat locally available foods that are in season.
- Eat foods from each of the six food groups every day; enrich grains or porridge with vegetables, beans, milk, or other locally available foods that you like.
- If you want to gain weight, try eating more frequently. For example, eat at least five times a day (three meals and two snacks).
- Buy and consume commercially fortified foods, such as cooking oil, salt, sugar, maize and wheat flour, and *likuni phala*.

3. Drink plenty of boiled or treated water.

- Drink about eight glasses of water a day.
- Boil or treat drinking water.
- Store boiled or treated water in a covered container.
- Serve the water with a clean ladle so that nothing dirty (hands or cups) touches it to avoid recontamination.

4. Avoid habits that can lead to poor nutrition and poor health.

- Practise safe sex; use condoms.
- Avoid alcohol, especially if you are taking medicines.
- Avoid smoking cigarettes and taking drugs without prescription.
- Avoid drinking sweetened, coloured drinks sold in shops and eating sugary and fatty foods.
- Seek help at the nearest health facility or with community support groups to manage depression and stress.
- Get at least 7 hours of sleep every night.

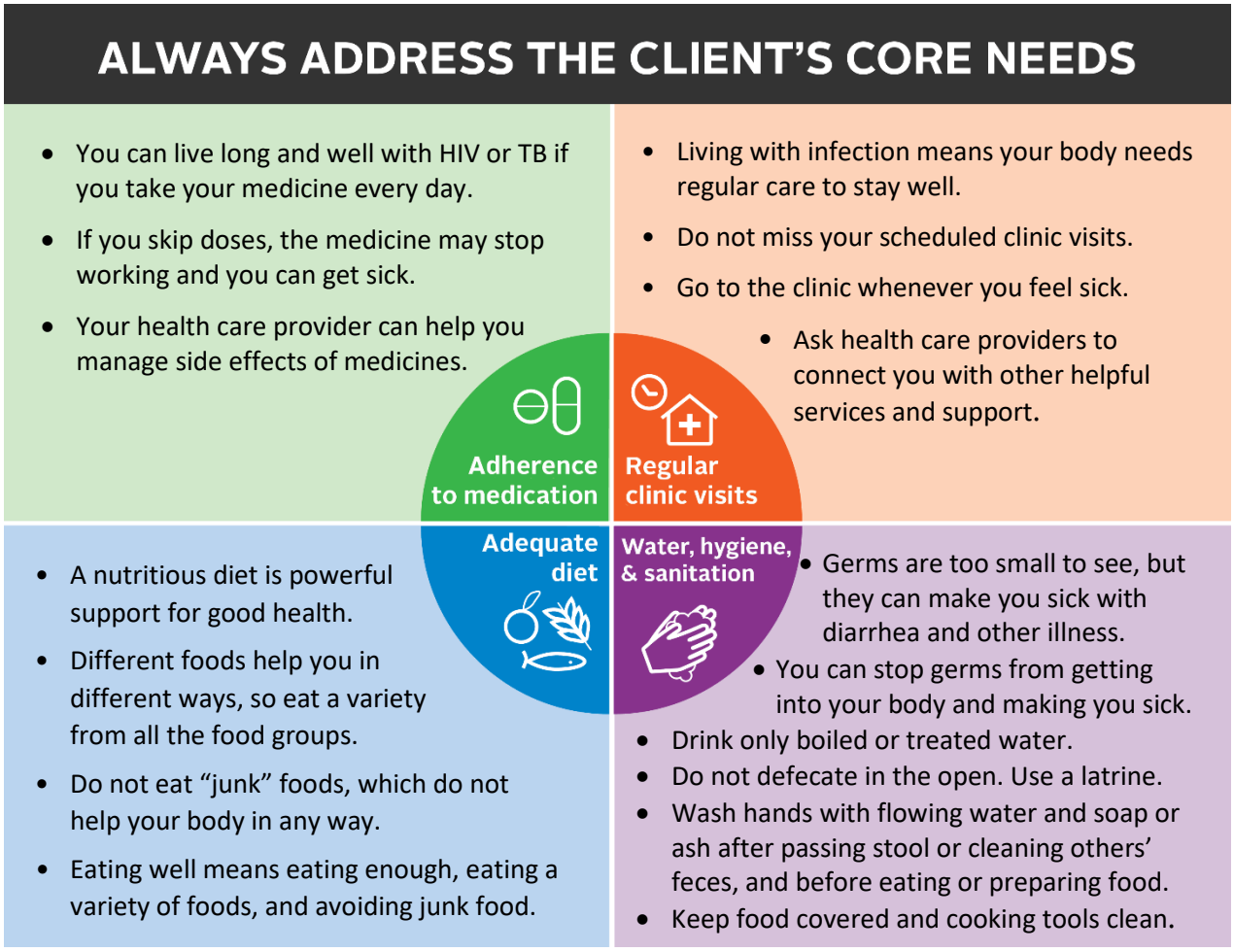
5. Maintain good personal hygiene.

- Wash your hands under poured or running water with soap after using the toilet and before handling and preparing food.
- Avoid buying ready-to-eat foods that may not be hygienically prepared

6. **Get exercise whenever physically possible.**
   - Exercise regularly, at least 30 minutes each day, by doing household chores, walking, jogging, or doing another vigorous activity that you enjoy.

7. **Seek early treatment of infections and advice on managing symptoms.**
   - Seek immediate clinical help for management of illnesses.
   - Always seek advice from a health care provider on any traditional remedies or nutrition supplements you are taking.
   - Try managing symptoms with changes to dietary practices. See **Annex 11** for information on dietary management of common symptoms of illness.

8. **Take medicines as prescribed and seek advice on how to manage drug side effects and drug-food interactions.**
   - Take all medicines as advised by the health care provider.
   - Work with a health care provider or counsellor to make and maintain a drug-food schedule.
   - Ask about side effects that are likely to result from drugs you are taking.
   - Ask how you can manage drug side effects at home.



3.3 Counselling on Diet

A nutritious diet is powerful support for good health. Different foods meet different needs of our bodies. Eating a varied diet promotes good health. Every day, adolescents and adults need to eat a combination of body-building protein for strength (from animals, legumes, and nuts); carbohydrates for energy (from staples and fats); and vitamins and minerals (from vegetables and fruits) to protect the immune systems.

Counselling on diet should focus the following recommendations:

- Eat locally available foods in season.
- Eat a variety of foods from each of the six food groups.
- Create colourful meals from the six food groups to ensure you consume a variety of nutrients.
- Ask friends and family to share recipes to add new foods into your diet.

3.4 Counselling People with Non-Communicable Diseases (NCDs)

Overweight and obesity are on the rise and contribute to non-communicable diseases (NCDs), including cardiovascular disease, stroke, hypertension, cancer, and metabolic diseases such as diabetes. Nutrition counseling should be provided for people who are overweight, obese, and with NCDs.

Nutrition Counselling for people with NCDs should focus on the following recommendations:

- Eat less sugar and avoid sugary drinks.
- Avoid processed foods.
- Eat plenty of fruits and vegetables to get needed vitamins and minerals.
- Get regular exercise.
- Eat more fibre from fruits, vegetables, whole grains, pulses, and nuts.
- Eat fewer fatty and fried foods.

3.5 Counselling People Who Are Ill

Infections and diseases can reduce appetite, decrease nutrient absorption, and make the body use nutrients faster than usual, for example, to repair the immune system. Nutrition counseling complements clinical care for clients with chronic infectious diseases.

Counselling for people who are ill should focus the following recommendations:

- Eat a variety of foods from the six food groups in small amount, and more often.
- Increase energy intake to meet the extra energy needs caused by illness.
- Stimulate appetite by eating your favourite nutritious foods
- Take medication as prescribed by the clinician.
- Some medication should be taken with food, some without food, and some either with or without food to maximize their effectiveness and minimize negative side effects

3.6 Counselling Pregnant and Lactating Women

This section covers counselling on healthy eating and infant and young child feeding for women with infectious diseases.

3.6.1 Women's Nutrition during Pregnancy and Lactation

Trained service providers should counsel women on how to adopt healthy eating practices to gain the recommended amount of weight during pregnancy (see **Table 2** in Section 2.2). To attain the recommended weight gain, additional daily energy intake may be required. **Table 4** shows the amount of additional energy (kcal) needed each day for pregnant and lactating women with normal/healthy weights.

Table 4. Daily Additional Energy Needs during Pregnancy and Lactation

1st trimester	2nd trimester	3rd trimester	First 6 months of lactation
85 kcal/day	285 kcal/day	475 kcal/day	505 kcal/day

Source: Food and Agriculture Organization of the United Nations (FAO). 2004.

The combined additional energy requirements for HIV and pregnancy make pregnant and lactating PLHIV vulnerable to undernutrition. Their nutritional status and weight gain/loss should be monitored every month, or as frequently as possible.

In addition to the standard CNAs (see Section 3.2), service providers should counsel pregnant and lactating women on the following topics:

- Eat two extra meals in between main meals each day for additional energy and nutrients for yourself and your growing baby.
- If you feel nauseated, you should eat small, frequent meals, five or six times a day.
- Every day, eat nutritious meals that include locally available foods from all six food groups.
- Avoid alcohol and smoking.
- Take iron/folic acid tablets as directed by the health care provider to prevent anaemia.
- Use iodised salt to ensure adequate intake of iodine.
- Visit the health facility at least four times during the period on your pregnancy for monitoring, vaccinations, and malaria prophylaxis (sulfadoxine pyrimethamine) and to receive de-worming tablets (400 mg of Albendazole).
- Sleep under a long-lasting insecticide-treated mosquito net every night, all year round to prevent malaria.
- Get tested together with your partner to know your HIV status and access support services, if appropriate.

3.6.2 Infant Feeding Recommendations for HIV-Positive Women

All HIV-positive pregnant women should be provided with care and support to reduce the risk of transmitting HIV to their babies during pregnancy, labour, and breastfeeding.

Regardless of HIV status, all mothers should exclusively breastfeed their infants for the first 6 months of life, and continued breastfeeding up until the child is 24 months old. Compared to mixed feeding, exclusive breastfeeding reduces the risk of passing HIV from mother to child. Exclusive breastfeeding also reduces child mortality and protects infants from illnesses, including diarrhoea and pneumonia.

The following information should be provided to all HIV-positive pregnant women and lactating mothers:

- Take ARVs and make sure your baby takes ARVs according to the national treatment guidelines.
- Initiate breastfeeding within 30 minutes of birth.
- Seek prompt help for breastfeeding problems.
- Breastfeed exclusively up to 6 months. Do not give your baby water, teas, or herbs without a doctor's prescription until he or she is 6 months old.
- Practice expressing breast milk by hand so that you can leave it for your baby when you are separated.
- Introduce complementary foods at 6 months and continue breastfeeding until your baby is about 24 months old.
- Stop breastfeeding gradually (not rapidly) over a period of 2 weeks to 1 month.

3.7 Counselling on Water, Sanitation, and Hygiene

Water, sanitation, and hygiene (WASH); food- and water-borne diseases; and undernutrition interact in a vicious cycle. People who are ill may eat less and are less able to absorb nutrients from food. Undernourished people are more susceptible to infections when they are exposed to faecal material or other pathogens in the environment.

Many life-threatening opportunistic infections in PLHIV are caused by exposure to unsafe drinking water and food, inadequate sanitation, and poor hygiene. Diarrhoea affects most PLHIV and causes morbidity and mortality. Diarrhoea can interfere with and compromise the absorption of ARVs. Clients experiencing weight loss or who complain of diarrhoea or stomach problems should be assessed for potential WASH problems and counselled accordingly.

No water or food is 100% safe at all times for all people, but the risk of water- and food-borne illness can be reduced by following a few simple rules.

1. Use treated water for drinking and store it safely.

- Treat water to make it safe to drink using one of these options:
  - Hypochlorite (chlorine) solution
  - Boiling
  - Commercial filter
- Store treated water in a covered container with a narrow neck and a tap if possible.
- Do not touch the water in the container with your hands. Pour it into a clean pitcher to serve it or hang a ladle on the wall to dip into the water to serve it.

2. Wash hands properly.

- Hand washing with soap prevents infection spreading from person to person.
- Rinsing hands is not enough—use soap or ash every time you wash your hands.
- Wash your hands under poured or flowing water to remove dirt and germs. Do not wash your hands in a basin of water that many people use to wash their hands in. The water becomes dirty, and washing your hands in this water does not prevent infection.
- Wash your hands before you handle, prepare, or eat food; before you feed someone or give them medicines; and often while you are preparing food.
- Wash your hands after you go to the toilet, clean someone who has defecated, blow your nose, cough, sneeze, or handle an animal or animal waste.
- Wash your hands both before and after you take care of someone who is sick.

3. Always use a latrine.

- Keep latrines as far away from houses or cooking areas as possible.
- Upgrade pit latrines with cleanable platforms, covers over the pits, housing that provides privacy, and nearby hand washing stations.
- Clear the path to the latrine by removing stones and branches and filling in holes.
- Keep the latrine platform, seat, walls, and other surfaces clean and free of faeces. Put all anal cleaning materials in the latrine. Put a scoop of lime or ash in the latrine after defecating to reduce odour and keep flies away.
- Build supports (e.g., poles, ropes, stools) for children or weak household members so that they can use the latrine comfortably.
- If you do not have a latrine, put a bedside commode or bedpan next to the bed of children or weak household members and empty it regularly.
- Always wash your hands after defecating.
- If you do not have a latrine, bury faeces away from your house.

4. Keep food preparation areas clean.

- Wash all surfaces and equipment used to prepare or serve food with soap and water (and bleach, if possible).
- Protect food from insects and animals by covering it with netting or cloth or keeping it in containers.

5. Separate raw and cooked food.

- Keep raw eggs, meat, poultry, fish, and seafood away from other foods because they can contain bacteria that cause illness.
- Use separate knives and cutting boards for raw animal foods.
- Store food in covered containers to avoid contact between raw and cooked foods.

6. Cook food thoroughly.

- Cook meat, poultry, eggs, fish, and seafood until they are well done. For meat and poultry, cook until the juice is clear, not pink.
- Bring soups and stews to a boil, at least until you see the first big bubbles.
- Reheat cooked food thoroughly by bringing it to a boil or heating it until it is too hot to touch. Stir the food while reheating it.

7. Keep foods at safe temperatures.

- Do not leave cooked food out at room temperature for more than 2 hours.
- Reheat already prepared food before serving it. Bring it to a boil or heat it until too hot to touch.
- Do not store food in a refrigerator for more than 2 days.
- Do not thaw frozen food at room temperature.

8. Eat safe foods.

- Buy only fresh and healthy foods.
- Do not use food beyond its expiry date.
- Use pasteurised milk or boil fresh milk before use.
- Wash raw vegetables and fruits with treated water or peel the skin before eating.

3.8 Nutrition Education

Compared to nutrition counselling, nutrition education more often involves one-way communication of basic nutrition messages from a health care provider to a group of clients. The health provider should elicit questions and information from the clients, but one-on-one nutrition counselling is more useful for providing tailored and appropriate messages for a client's individual needs.

Nutrition education should be provided to a group of clients by trained service providers. Nutrition education can be conducted in health facility waiting rooms; during community outreach visits; or through peer support groups, home-based care, or the media.

Any of the topics mentioned in Sections 3.2, 3.3, 3.4, 3.5 and 3.6 can be covered during a nutrition education session.

The following points should be considered when planning for and delivering nutrition education:

1. Plan education sessions in advance, with clear and relevant objectives identified for each session.
2. Review the discussion topics before each session and ensure that you are fully conversant in the topic area.
3. Communicate clearly and use various teaching techniques during the session, e.g., visual aids, such as photographs; flip charts; real examples; demonstrations, dramas, or songs; and audio, if available.
4. Allow adequate time for the clients to ask questions.
5. Listen carefully and engage clients to find solutions to questions and issues raised.
6. Avoid presenting on too many topics during one session and keep the session short enough to maintain the attention of the participants.
7. Present practical solutions, or have participants suggest practical solutions, to common challenges in the local context.

4. Nutrition Care Plans and Support

Trained service providers should identify and negotiate appropriate nutrition care plans and support with clients based on the results of nutrition assessment. A nutrition care plan should specify nutrition goals and the actions or treatment to meet those goals.

This chapter provides guidance on nutrition support and selecting care plans for clients with normal nutritional status, moderate undernutrition, complicated and uncomplicated severe undernutrition, and overweight/obesity. The chapter also describes how to link clients to economic strengthening/ livelihood/food security (ES/L/FS) support and how to manage referrals between communities and health care facilities.

4.1 Nutrition Care Plan for Clients with Normal Nutritional Status

Table 5. Criteria for Classifying Clients with Normal Nutritional Status

Adolescents 15–18 years (non-pregnant and non-post-partum):

- **BMI-for-age**: ≥ −2 to +1 OR
- **MUAC:** ≥ 220 mm (22.0 cm)

Adults ≥ 19 years (non-pregnant/non-post-partum):

- **BMI:** 18.5 to 24.9 OR
- **MUAC:** ≥ 220 mm (22.0 cm)

Pregnant women and lactating women up to 6 months post-partum:

- **MUAC:** 220 to 299 mm (22.0 to 29.9 cm)

Step 1. Provide Medical Care and Support for Clients with Normal Nutritional Status

1. Review the client's medical records and condition and provide or refer for treatment according to the national guidelines for clinical management of HIV in children and adults or for infection prevention and control of TB.
2. Treat any medical conditions that were identified during the assessment
3. If the client's HIV status is unknown, provide or refer for HIV Testing Services (HTS).
4. If the client tests positive for HIV but is not on ART, start treatment or refer for treatment according to the national guidelines for clinical management of HIV in children and adults.
5. If the client tests positive for TB but is not receiving TB treatment, ensure that treatment is initiated immediately according to the national TB guidelines.
6. Find out whether the client is experiencing symptoms that affect nutrition and counsel on how to manage the symptoms. See **Annex 11** for information on dietary management of common symptoms of illness.
7. If the client is a pregnant or lactating woman up to 6 months post-partum:
   - If the woman is HIV-positive, ensure provision of ARVs for both the mother and infant according to the national guidelines for clinical management of HIV in children and adults.
   - Give iron/folic acid every day (lactating woman up to 6 months post-partum) and counsel the woman to take the supplements as directed and on how to manage possible side effects.
   - If the client is pregnant, provide malaria prophylaxis (sulfadoxine pyrimethamine) and deworming tablets (e.g., Albendazole) according to national malaria guidelines.

Step 2. Provide Nutrition Care and Support for Clients with Normal Nutritional Status

1. Praise the client for good nutrition practices and explain the need to maintain those practices to avoid becoming undernourished or overnourished.
2. Review the client's nutrition records and address issues of concern.
3. Provide tailored counselling, explaining the need for adherence to medication; regular clinic visits; adequate diet; and water, sanitation, and hygiene (WASH) actions. **These topics are covered in the NCST counselling flipchart**.

Step 3. Refer and Follow up a Client Who Has Normal Nutritional Status

1. Make an appointment to review the client's progress in 3 months or during the next ART or TB review/drug collection appointment date. Tell the client to come back to the health facility earlier if he or she experiences any health-related problems.
2. If the client is a pregnant woman or a lactating woman up to 6 months post-partum, make an appointment to review the client's progress during the next antenatal or post-natal visit.
3. Ask the client if his or her economic situation has changed in a way that could affect access to food. If so, refer the client for ES/L/FS assessment and support.

4.2 Nutrition Care Plan for Clients with Moderate Undernutrition

Table 6. Criteria for Classifying Clients with Moderate Undernutrition

Adolescents 15–18 years (non-pregnant and non-post-partum):

- **BMI for-age:** ≥ −3 to < −2 OR
- **MUAC:** 185 mm to 219 mm (18.5 to 21.9 cm) OR
- **Unintentional weight loss of 5%–10%**

Adults ≥19 years (non-pregnant and non-post-partum):

- **BMI:** 16.0 to 18.4 OR
- **MUAC:** 190 mm to 219 mm (19.0 to 21.9 cm) OR
- **Unintentional weight loss of 5%–10%**

Pregnant women and lactating women up to 6 months post-partum:

- **MUAC:** 190 mm to 219 mm (19.0 to 21.9 cm) OR
- **Weight gain:** Less than 1 kg per month since the last visit

Step 1. Provide Medical Care and Support for Clients with Moderate Undernutrition

1. Review the client's medical records and condition and provide or refer for treatment according to the national guidelines for clinical management of HIV in children and adults or for infection prevention and control of TB.
2. Treat any medical problems that were identified during the assessment.
3. If the client's HIV status is unknown, provide or refer for HTS.
4. If the client is HIV-positive but is not on ART, start treatment or refer for treatment according to the national guidelines for clinical management of HIV in children and adults.
5. If client is HIV-positive, on ART, and losing weight, provide further clinical and dietary assessment to find the cause of weight loss.
6. If the client tests positive for TB but is not receiving TB treatment, ensure that treatment is initiated immediately according to the national TB guidelines.

7. If the client has TB, is receiving TB treatment, but is losing weight, refer for further medical assessment.
8. Find out whether the client is experiencing symptoms that affect nutrition and counsel on how to manage the symptoms. See **Annex 11** for information on dietary management of common symptoms of illness.
9. If the client is anaemic, provide or refer for treatment according to the national guidelines.
10. If the client is a pregnant or lactating woman up to 6 months post-partum:
    - If the woman is HIV-positive, ensure provision of ARVs for both the mother and infant according to the national guidelines for clinical management of HIV in children and adults.
    - Give iron/folic acid every day (lactating woman up to 6 months post-partum) and counsel the woman to take the supplements as directed and on how to manage possible side effects.
    - If the woman is pregnant, provide malaria prophylaxis (sulfadoxine pyrimethamine) and deworming tablets (e.g., Albendazole) according to national malaria guidelines.

Step 2. Provide Nutrition Care and Support for Clients with Moderate Undernutrition

1. Review the client's nutrition records and address issues of concern.
2. Provide tailored counselling, explaining the need for adherence to medication, regular clinic visits, adequate diet, and WASH actions. **These topics are covered in the NCST counselling flipchart**
3. Provide counselling and support on how the client can consume 20% more energy, using locally available nutritious foods. If the client is an adolescent, more additional energy may be required to gain and maintain weight.
4. Provide the client with supplementary food, such as fortified corn-soya blend (CSB+) (*likuni phala)* or Vitameal. T**able 7** shows the supplementary food ration sizes to be provided to an adolescent or adult client.

Table 7. Supplementary Food Ration Sizes for Adolescents and Adults

Group	Daily Ration			Monthly Ration		
	CSB+ (*likuni phala*) and oil		Vitameal	CSB+ (*likuni phala*) and oil		Vitameal
Adolescents and adults (including pregnant and lactating women up to 6 months post-partum)	300 g	33.33 ml	300 g	9.0 kg	1 L	4.5 kg

See **Annex 13** for the nutrition content of Vitameal.

5. Counsel the client to eat the supplementary food as an additional snack, not to replace normal meals, and not to share it with other household members. Explain that the product is medicine to help improve his or her nutritional status.
6. Show the client how to prepare the supplementary food at home. Explain to the client how much of the *likuni phala* or Vitameal he or she should eat each day.

Step 3. Refer and Plan to Follow up the Client Who Has Moderate Undernutrition

1. Make an appointment to review the client's progress after 1 month. Tell the client to return earlier if he or she experiences any health-related problems before the next appointment.
2. At follow-up visits, refer the client for further medical examination or nutrition assessment if he or she is losing weight.
3. Ask the client if his or her economic or livelihood situation has changed in a way that impairs access to food. If so, refer the client for ES/L/FS assessment and support.

4. Transition the client to the nutrition care plan for normal nutritional status when:
   - Opportunistic infections have been cured.
   - The client has steady weight gain and reached the BMI, BMI-for-age, or MUAC cutoffs in **Table 8** for two consecutive visits.

Table 8. Cut-Offs for Transitioning from Moderate Undernutrition to Normal Nutritional Status

Group	BMI	BMI-for-age	MUAC	Weight gain
15–18 years		≥ −2	≥ 220 mm (22.0 cm)	At least 10% of body weight
≥ 19 years	≥ 18.5		≥ 225 mm* (22.5 cm)	
Pregnant women and lactating women up to 6 months post-partum			≥ 225 mm* (22.5 cm)	At least 2 kg per month

* Note that this cut-off is 5 mm higher than the MUAC cut-off for classifying clients as having normal nutritional status.

- If a client was admitted for treatment of moderate undernutrition due to unintentional weight loss, the client should be transitioned to the nutrition care plan for normal nutritional status if he or she:
  - Gains at least 10% of the body weight.
  - Has a steady weight gain and meets the BMI, BMI-for-age, or MUAC cut-off in Table 8 for two consecutive visits.

4.3 Nutrition Care Plan for Clients with Severe Undernutrition without Medical Complications

Table 9. Criteria for Classifying Clients with Severe Undernutrition without Medical Complications

Adolescents 15–18 years (non-pregnant and non-post-partum):

- **BMI-for-age:** < −3 OR
- **MUAC:** < 185 mm (18.5 cm) OR
- Unintentional weight loss of more than 10% OR
- Presence of bilateral pitting oedema + or ++ AND
- Passed appetite test

Adults ≥ 19 years (non-pregnant/non-post-partum):

- **BMI:** < 16.0 OR
- **MUAC:** < 190 mm (19.0 cm) OR
- Unintentional weight loss of more than 10%
- Presence of bilateral pitting oedema + or ++ AND
- Passed appetite test

Pregnant women and lactating women up to 6 months post-partum:

- MUAC: < 190 mm (19.0 cm) OR
- Any weight loss

Step 1. Provide Medical Care and Support for Clients with Severe Undernutrition without Medical Complications

1. Review the client's medical records and condition and provide or refer for treatment according to the national guidelines for clinical management of HIV in children and adults or for infection prevention and control of TB.
2. Treat any medical conditions that were identified during the assessment.
3. If the client's HIV status is unknown, provide or refer for HTS.
4. If the client is HIV-positive but is not on ART, start treatment or refer for treatment according to the national guidelines for clinical management of HIV in children and adults.
5. If the client tests positive for TB but is not receiving TB treatment, ensure that treatment is initiated immediately according to the national TB guidelines.
6. If the client has HIV or TB, is receiving ART or TB treatment but is losing weight, conduct further clinical and dietary assessment to find the cause of weight loss.
7. Find out whether the client is experiencing symptoms that affect nutrition and counsel on how to manage the symptoms. See **Annex 11** for information on dietary management of common symptoms of illness.
8. Assess the client for anaemia:
   - If the client has severe anaemia (Hb < 7.0 g/dL), refer the client for further assessment and treatment in inpatient care.

- If the client has mild or moderate anaemia (male: Hb 7.0–13.7 g/dL, female: Hb 7.0–12.0 g/dL), DO NOT give iron/folic acid; ready-to-use therapeutic food (RUTF) contains iron/folic acid. As the client's nutritional status improves, it is expected that Hb levels will improve. See the nutrition composition of therapeutic foods—F-75, F-100 and RUTF—in **Annex 14**.

Step 2. Provide Nutrition Care and Support for Clients with Severe Undernutrition without Medical Complications

1. Conduct an appetite test by offering the client one sachet of RUTF. The client should eat at least half of the sachet in about 30 minutes. If the client has no appetite, try giving smaller amounts of RUTF every 10–15 minutes. If the client still does not eat the RUTF, refer the client to inpatient care. **See Annex 15** on how to conduct RUTF appetite test.
2. If the client has a good appetite (passes the appetite test), is willing to manage severe undernutrition at home, and has someone at home to support him or her, provide three sachets of RUTF and 300 grams of *likuni phala* or Vitameal per day.
3. Explain to the client the following key messages:
   - RUTF and *likuni phala* are food-based medicines to treat your current poor nutritional status. They should not be shared.
   - If you are having trouble eating, eat small frequent meals of RUTF and *likuni phala*. Finish all the RUTF and *likuni phala* allocated for each day.
   - In addition to RUTF and *likuni phala*, eat meals with your family and snacks between meals.
   - When suffering from diarrhoea, do not stop eating. Continue to eat the RUTF, *likuni phala*, and other nutritious foods, and drink plenty of fluids.
4. RUTF and *likuni phala* provide needed micronutrients; therefore, do not give an additional micronutrient supplement.
5. Provide tailored counselling, explaining the need for adherence to medication, regular clinic visits, adequate diet, and WASH actions. **These topics are covered in the NCST counselling flipchart**.

   NOTE: Severely undernourished pregnant and lactating women up to 6 month post-partum SHOULD NOT be treated with RUTF. Provide the client with only *likuni phala* or other supplementary food that meets recommended standards. RUTF contains high doses of vitamin A, above the recommended 10,000 IU per day. High doses of vitamin A can cause tetrogenetic effects in early pregnancy.

Encourage pregnant and lactating women to meet their additional energy requirements by eating other home-prepared nutritious foods.

Step 3. Refer and Plan to Follow up with a Client with Severe Undernutrition without Medical Complications

1. Make an appointment to review the client's progress after 2 weeks in the first month of treatment. When the client's condition improves, review progress once a month. Tell the client to return to the health facility earlier if he or she experiences any health-related problems before the next appointment.
2. Refer the client for further medical assessment if the client develops bilateral pitting oedema OR is not gaining weight OR has lost weight for two consecutive visits.
3. Ask the client if his or her economic or livelihood situation has changed in a way that negatively affects access to food. If so, refer the client for the ES/L/FS assessment and support.
4. Transition the client to the nutrition care plan for moderate undernutrition when:
   - Opportunistic infections have been managed
   - The client has a steady weight gain and reached the BMI, BMI-for-age, or MUAC cut-offs listed in **Table 10** for two consecutive visits.

Table 10. Cut-Offs for Transitioning from Severe Undernutrition without Medical Complications to Moderate Undernutrition

Group	BMI	BMI-for-age	MUAC	Weight gain
15–18 years		≥ –3	≥ 185 mm (18.5 cm)	10% or more of body weight
≥ 19 years	≥ 16.0		≥ 190 mm (19.0 cm)	
Pregnant women and lactating women up to 6 months post-partum			≥ 190 mm (19.0 cm)	At least 2.0 kg per month

   - If a client was admitted for treatment of severe undernutrition due to unintentional weight loss, the client should be transitioned to the nutrition care plan for moderate undernutrition if he or she:
     - Gains 10% or more of his/her body weight
     - Has a steady weight gain and meets the BMI, BMI-for-age, or MUAC cut-off on **Table 10** for two consecutive visits

4.4 Nutrition Care Plan for Clients with Severe Undernutrition with Medical Complications

Most adolescents and adults with severe undernutrition will present with other health problems. Some medical conditions can be treated at home, but some clients may have medical complications that require inpatient treatment. The following complications indicate that a patient requires inpatient management of severe undernutrition:

- Severe bilateral pitting oedema (Grade +++)
- Failed appetite test
- Infection that requires intravenous antibiotics
- Inability to care for oneself and absence of caretakers at home
- Severe infection that require hospitalisation according to the national guidelines for clinical management of HIV in children and adults, or the national guidelines for tuberculosis control

Table 11. Criteria for Classifying Clients with Severe Undernutrition with Medical Complications

- Bilateral pitting oedema +++
- Any of the following anthropometric measurement criteria for severe undernutrition:

Adolescents 15–18 years (non-pregnant and non-post-partum):

- BMI-for-age: < −3 OR
- MUAC: < 185 mm (18.5 cm) OR
- Unintentional weight loss of more than 10%

Adults ≥ 19 years (non-pregnant/non-post-partum):

- BMI: < 16.0 OR
- MUAC: < 190 mm (19.0 cm) OR
- Unintentional weight loss of more than 10%

Pregnant women and lactating women up to 6 months post-partum:

- MUAC: < 190 mm (19.0 cm) OR
- Any weight loss

WITH any of the following medical conditions

- Failed appetite test
- Severe infections or medical conditions that require hospitalisation according to the national guidelines for clinical management of HIV in children and adults or for TB control

Step 1. Provide Medical Care and Support for Clients with Severe Undernutrition with Medical Complications

1. Treat clients with severe undernutrition with medical complications (no appetite, oedema +++, and severe infections or medical conditions that require hospitalisation) in inpatient care.
2. Review the client's medical records and condition and treat severe infections and other medical conditions, such as severe anaemia, chronic diarrhoea, and severe dehydration, according to the national guidelines for clinical management of HIV in children and adults or for infection prevention and control of TB.

3. If the client's HIV status is unknown, provide or refer for HTS.
4. If the client is HIV-positive but is not on ART, start treatment or refer for treatment according to the national guidelines for clinical management of HIV in children and adults.
5. If the client tests positive for TB but is not receiving TB treatment, ensure that treatment is initiated immediately according to the national TB guidelines.
6. If client is HIV-positive, is receiving ART, but is losing weight, conduct further clinical and dietary assessment to find the cause of weight loss.
7. If the client has TB, is receiving TB treatment, but is losing weight, conduct further clinical and dietary assessment to find the cause of weight loss.
8. If the client is an HIV-positive pregnant or lactating woman, ensure provision of ARVs for both the mother and infant according to the national guidelines for clinical management of HIV in children and adults.

Step 2. Provide Nutrition Care and Support for Clients with Severe Undernutrition with Medical Complications

1. After the client is admitted to inpatient care, give him or her F-75 therapeutic milk as an initial feed for the first 1–2 days based on weight (130 ml/kg/day). If the client has severe (+++) oedema, his or her weight will not be a true weight; the weight may be as much as 30% higher due to excess fluid. To compensate for the excess weight, give the client only 100 ml/kg/day of F-75.

   The table below shows daily amounts of F-75 feeds for adolescents and adults who are severely underweight or have bilateral pitting oedema + or ++, and admitted to inpatient care.

Weight of patient (kg)	8 feeds per day, amount of each feed (ml)
15.0–19.9	260
20.0-24.9	290
25.0–29.9	300
30.0–39.9	320
40.0–60.0	350

   The table below shows daily amounts of F-75 feeds for adolescents and adults with severe bilateral pitting oedema (+++).

Weight of patient (kg)	8 feeds per day, amount of each feed (ml)
15.0–19.9	210
20.0-24.9	230
25.0–29.9	240
30.0–39.9	255
40.0–60.0	280

   Preparation of F-75 Therapeutic Milk

- When using the old commercial sachet packaged F-75, mix 1 sachet of F-75 (102.5 g) with 500 ml of cooled boiled water.
- When using the new commercial tin packaged F-75, ensure that the water temperature is not below 70° C **(i.e. cooled for not less than 3 – 5 minutes after boiling).** Mix 1 scoop (white) of F-75 with 25 ml of water.
- If commercial pre-packaged F-75 is not available, use one of the recipes available in **Annex 16** to prepare F-75.

2. It will take about 2–3 days for a client to transition from F-75 to a more energy-dense therapeutic food, such as RUTF or F-100. Transition a client when the following criteria are met:

- The client has good appetite (easily finishes the F-75 feeds).
- Bilateral pitting oedema is subsiding, e.g., severe oedema (+++) has reduced to moderate (++).
- No serious medical problems or any complications that require intravenous treatment exist.

3. When the condition is improving and the client is ready to transition, gradually introduce RUTF. Test the acceptability of RUTF by offering it to the client every meal time. Ask the client to first eat RUTF before providing F-75 feeds. If the client does not finish 75% of the RUTF (2 sachets of RUTF) for the day, top up with F-75 milk feeds. The amount of F-75 to top up with will be determined by the number of RUTF sachets consumed. If the amount of RUTF is less than one sachet of RUTF, the top-up amount of F-75 is equal to the daily ration size. If it is between 1 and 2 sachets, then top up with 50% of the daily ration size of F-75.
4. When the client is able to consume 75% to 100% (2–3 sachets) of RUTF, stop giving the F-75 milk feeds. Encourage the client to drink water freely.
5. Monitor intake of RUTF for the next 1–2 days, ensuring that the client can consume the recommended daily ration of 3 sachets of RUTF. During this period, encourage the client to consume CSB+/*likuni phala* when he or she has completed the daily RUTF ration.
6. If the client develops complications during the transition period, return him or her to the initial phase using F-75 feeds and provide appropriate medical care. If the client tolerates RUTF for this period of time, discharge to continue treatment in outpatient care.
7. In a situation where the client is having difficulty eating RUTF due to mouth sores or severe oral thrush, use F-100 instead of RUTF during the transition period.

   The table below shows daily amounts of F-100 feeds to give adolescents and adults during the transition period.

Weight of patient (kg)	6 feeds per day, amount of each feed (ml)	5 feeds per day, amount of each feed (ml)
15.0–19.9	300	400
20.0-24.9	320	450
25.0–29.9	350	450
30.0–39.9	370	500
40.0–60.0	400	500

Preparation of F-100 Therapeutic Milk

- When using old commercial sachet packaged F-100, mix 1 packet of F-100 (114 g) with 500 ml of cooled boiled water.
- When using the new commercial tin packaged F-100, ensure that the water temperature is not below 70° C **(i.e., cooled for not less than 3 – 5 minutes after boiling).** Mix 1 scoop (blue) of F-100 with 25 ml of water.
- If commercial pre-packaged F-100 is not available, use one of the recipes available in **Annex 16** to prepare the F-100.

NOTE: Severely undernourished pregnant and lactating women SHOULD NOT be treated with RUTF or F-100 during transition or rehabilitation. Provide the client only with *likuni phala* or other supplementary food that meets recommended standards. RUTF and F-100 contain high doses of vitamin A, above the recommended 10,000 IU per day. High doses of vitamin A can cause tetrogenetic effects during early in pregnancy.

Encourage pregnant and lactating women to meet their additional energy requirements by eating other home-prepared nutritious foods.

8. When the client successfully transitions to F-100 feeds (i.e., easily finishes daily amount of F-100 feeds, medical condition has stabilised), increase the amount of F-100 milk gradually with 10–20 ml during each feed. Ensure that the F-100 feeds do not exceed the amounts provided on the table below during the rehabilitation period.

Weight of patient (kg)	6 feeds per day, amount of each feed (ml)	5 feeds per day, amount of each feed (ml)
15.0–19.9	550	650
20.0-24.9	650	780
25.0–29.9	750	900
30.0–39.9	850	1,000
40.0–60.0	1,000	1,200

If the client is in the rehabilitation phase and taking F-100, add 1 crushed tablet of ferrous sulphate (200 mg) to each 2–2.4 L of F-100. For lesser volumes: 1,000 to 1,200 ml of F-100, dilute 1 tablet of ferrous sulphate (200 mg) in 4 ml water and add 2 ml of the solution. For 500–600 ml of F-100, add 1 ml of the solution.

9. When the client's oral thrush or mouth sores improve, conduct an RUTF appetite test. If the client passes the test, monitor the RUTF intake for 1 day and discontinue the F-100 feeds. **See Annex 15** on how to conduct RUTF appetite test. When the client is eating RUTF, stop giving iron/folic acid because RUTF contains adequate amounts of iron/folic acid.
10. Give the client 3 sachets of RUTF and 300 g of CSB+ (*likuni phala)* Explain to the client the following key messages:

- RUTF and CSB+ (*likuni phala)* are food-based medicines to treat your current poor nutritional status. They should not be shared.
- If you are having trouble eating, eat small, frequent meals of RUTF and CSB+ (*likuni phala).* Finish the entire allocation of RUTF and CSB+ (*likuni phala)* allocated for each day.
- In addition to RUTF and CSB+ (*likuni phala),* eat meals with your family and snacks between meals.
- When suffering from diarrhoea, do not stop eating. Continue to eat the RUTF, CSB+ (*likuni phala),* and other nutritious foods, and drink plenty of fluids.

Step 3. Refer and Plan to Follow up a Client with Severe Undernutrition with Medical Complications

1. Refer the client for management of severe undernutrition without complications in outpatient care when:

- The client has good appetite (is able to consume the full day's ration of RUTF and CSB+ (*likuni phala).*
- Medical conditions have resolved or chronic conditions have stabilised.
- If the client had bilateral pitting oedema, it is subsiding.

2. Provide the client with 42 sachets (3 per day for 14 days) of RUTF and 4.5 kg of CSB+(*likuni phala)* (300 g per day for 14 days). Refer the client for monitoring and weighing after 2 weeks at a health facility close to where he or she lives.
3. Encourage the client to eat nutritious home-cooked meals after finishing the daily ration of RUTF and CSB+ (*likuni phala)* to meet additional nutritional needs.

4. Follow up to ensure that the client is reviewed at the referral health facility after 2 weeks.

4.5 Nutrition Care Plan for Overweight and Obesity

Table 12. Criteria for Classifying Clients with Overweight and Obesity

Adolescents 15–18 years (non-pregnant and non-post-partum):

BMI-for-age:

- Overweight: ≥ +1 to < +2
- Obese: ≥ +2

Adults ≥ 19 years (non-pregnant and non-post-partum):

BMI:

- Overweight: 25.0 to 29.9
- Obese: ≥ 30.0

Pregnant women and lactating women up to 6 months post-partum:

MUAC:

- Overweight/obese: ≥ 300 mm (30.0 cm)

Step 1. Provide Medical Care and Support for Clients Who Are Overweight or Obese

1. Review the client's medical records and condition and provide or refer for treatment according to the national guidelines for clinical management of HIV in children and adults or for infection prevention and control of TB.
2. Treat any medical conditions that were identified during the assessment.
3. Check the client for risk factors of non-communicable diseases:
    - Check the client's blood pressure. If blood pressure is above normal, manage according to the national guidelines for non-communicable diseases.
    - Check the client's fasting blood glucose levels to assess for diabetes or pre-diabetes. If fasting blood glucose is above normal, manage according to the national guidelines for non-communicable diseases.
    - If the facility is equipped for lab work, check cholesterol levels.
4. If the client's HIV status is unknown, provide or refer for HTS.
5. Find out whether the client is experiencing symptoms that affect nutrition and counsel on how to manage the symptoms. See **Annex 11** for information on dietary management of common symptoms of illness.
6. If the client is tests positive for HIV but is not on ART, start treatment or refer for treatment according to the national guidelines for clinical management of HIV in children and adults.
7. If the client tests positive for TB but is not receiving TB treatment, ensure that treatment is initiated immediately according to the national TB guidelines.
8. If the client is a pregnant or lactating woman up to 6 months post-partum:
    - If the woman is HIV-positive, ensure provision of ARVs for both the mother and infant according to the national guidelines for clinical management of HIV in children and adults.
    - Give iron/folic acid every day (lactating woman up to 6 months post-partum) and counsel the woman to take the supplements as directed and on how to manage possible side effects.
    - If the client is pregnant, provide malaria prophylaxis (sulfadoxine pyrimethamine) and deworming tablets (e.g., Albendazole) according to national malaria guidelines

Step 2. Provide Nutrition Care and Support for Clients Who Are Overweight or Obese

1. Review the client's nutrition records and provide tailored counselling, explaining the need for adherence to medication, regular clinic visits, adequate diet, and WASH actions. **These topics are covered in the NCST counselling flipchart**.
2. Be sure to counsel the client on making changes to diet and physical activity to attain a healthy weight range within BMI of 18.5 to 25.0. This can be achieved by:
    - Reducing the intake of highly processed food, fatty food, junk foods, sweet drinks, and sugary foods
    - Increasing the consumption of fresh fruits and vegetables
    - Doing at least 30 minutes of physical exercise every day, such as walking, jogging, and doing household chores
    - Reducing portion sizes
3. If the client is pregnant, do not encourage weight loss, but set appropriate weight gain targets for pregnancy and encourage healthy eating habits. Go over the relevant messages for pregnant women and lactating women up to 6 months post-partum on page 17.

Step 3. Refer and Plan to Follow up Clients Who Are Overweight or Obese

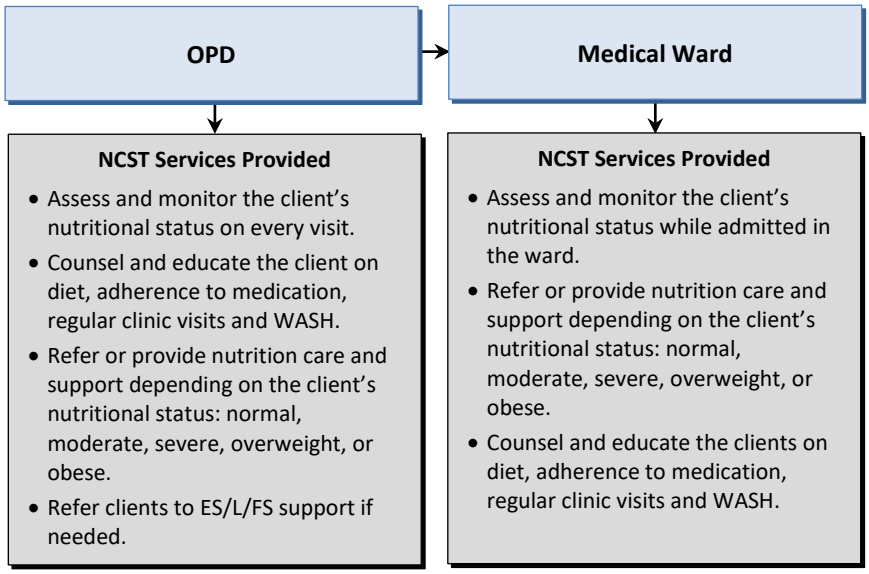
1. Make an appointment to review the client's progress in 1 month or during the next ART or TB review/drug collection appointment date. Tell the client to return to the health facility earlier if he or she experiences any health-related problems.
2. If the client is a pregnant or lactating woman up to 6 months post-partum, make an appointment to review the client's progress during the next antenatal or post-natal visit.
3. Ask the client if his or her economic situation has changed in a way that could affect access to food. If so, refer the client for ES/L/FS assessment and support.

4.6 Integrating Nutrition at Various Health Care Delivery Points

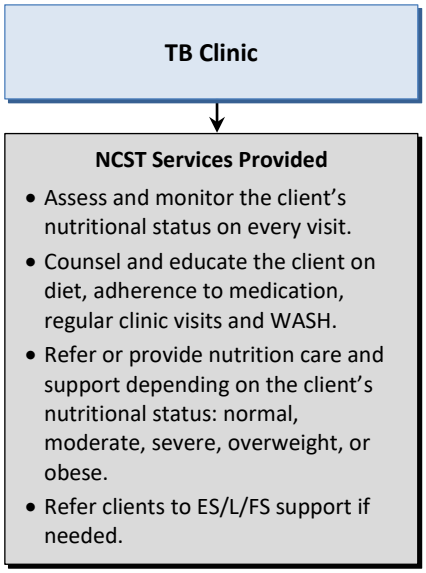
This section provides guidance on nutrition interventions that can be provided at various health care delivery contact points. The interventions include nutrition assessment and classification, nutrition counselling and education, and nutrition care plans and support

At a minimum, nutrition assessment and classification, and nutrition counselling and education should be provided at the OPD, medical wards, ANC/PMTCT, HTC, ART, TB, and youth-friendly health services such as Adolescent Clubs/"Teens Clubs". If a health facility has a formalised nutrition clinic or contact point, service providers should refer undernourished clients to receive nutrition support.

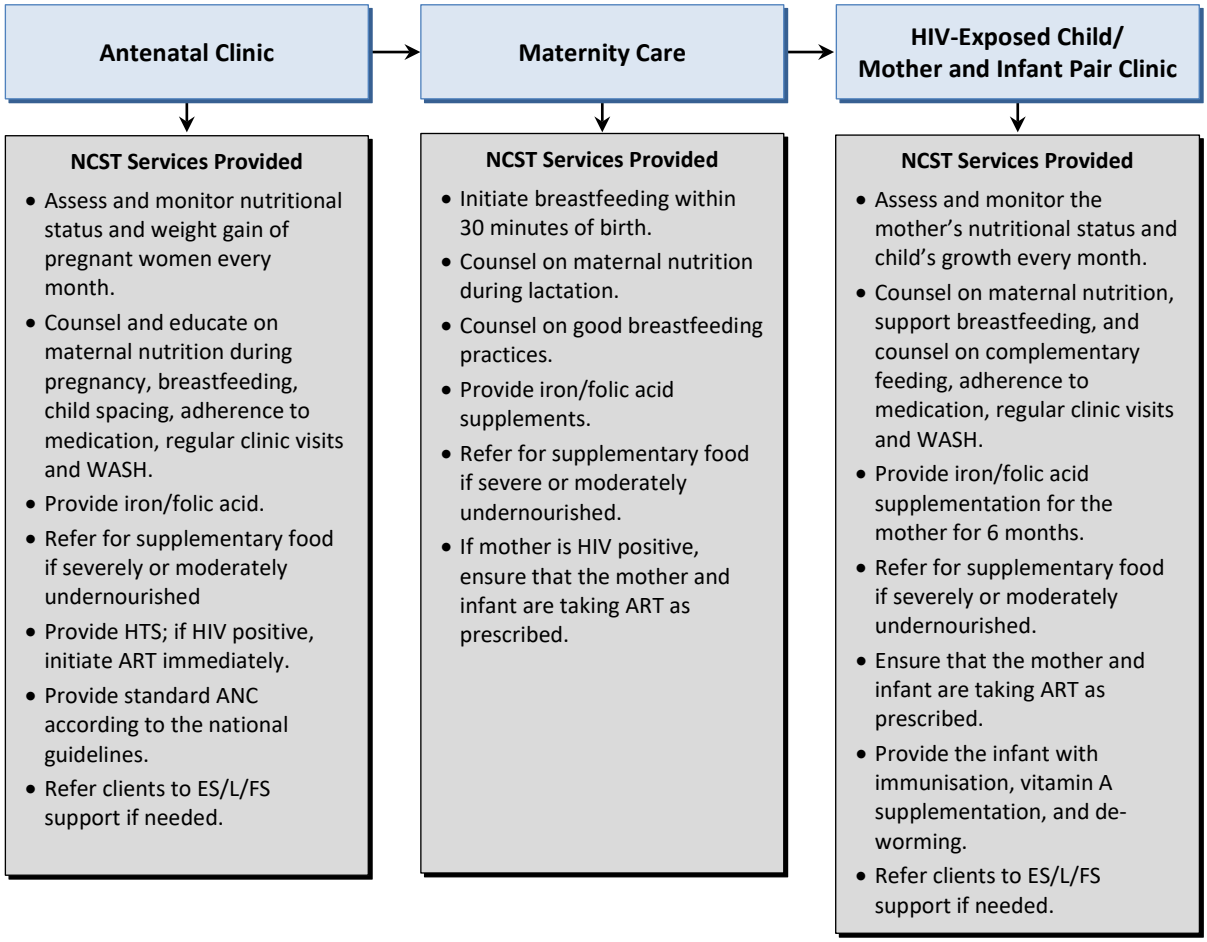
NCST at OPD and Medical Wards



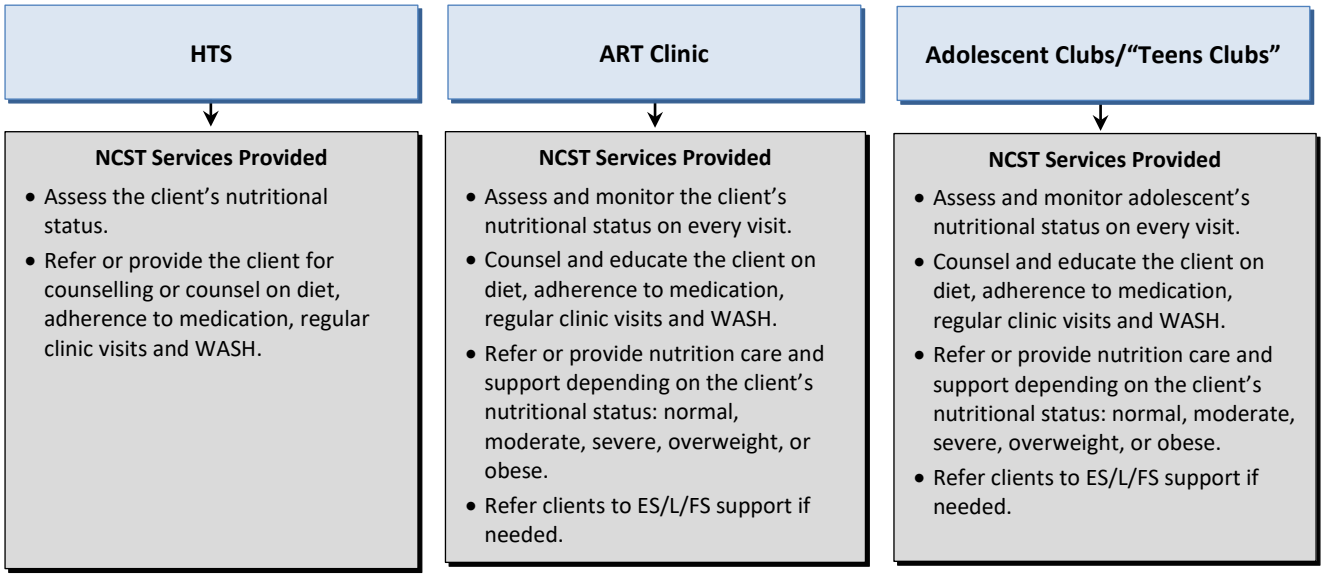
NCST during TB Care



NCST during Pregnancy and Post-Partum (up to 6 months)



NCST during HIV Care



4.7 Referral from Facility to Community ES/L/FS Support

Food insecurity is one of the major causes of undernutrition in Malawi. Food security depends on adequate food availability, accessibility, and utilisation (FAO 2008). It is important to link clients receiving NCST services at the health facility with community-based ES/L/FS services because:

1. Sustained improvement in household food access can prevent relapse after management of severe and moderate undernutrition.
2. Increasing food security contributes to increased retention in HIV care (Weiser et al. 2014).
3. Illness and undernutrition reduce labour productivity and disrupt household livelihood patterns, which can reduce food access and income.
4. Food insecurity and poverty may lead to coping strategies, such as migration for work or high-risk sexual behaviours, thereby increasing vulnerability to HIV and other diseases.

4.7.1 Suggested Strategy for Establishing a Facility-to-Community Referral System

Establishing a good referral system between health facilities and community-based ES/L/FS services would make health care providers' work life easier by reducing the workload of district and facility-level staff and improving short- and long-term outcomes for patients. An organised referral system should include a complete directory of available support services that lists criteria necessary for accessing services, where and when services are offered, and which organisations offer the services. The referral directory should contain contact information for service providers, program and project details, and eligibility criteria that will allow for targeted referrals to address each client's unique needs.

The District Assembly-based Nutrition Coordinating Committees, working in close collaboration with the District Health Office Nutritionists, should champion referrals between health facilities and community-based ES/L/FS services. Referral systems can be either paper-based or electronic (using mobile phones or electronic tablets). To establish a facility-to-community referral system, follow the suggested steps below.

Step 1. Make a Paper-Based or Electronic Service Directory

A paper-based directory would have, for example, a separate sheet of paper for each community-based ES/L/FS service and program. Each sheet would list information about the community service (e.g., name of catchment area, support services offered, name of service provider, project details, and eligibility criteria). A separate paper would show the names of clients referred to each community service.

Step 2. Conduct Community Mapping

Knowing all the resources in a community will help you make the best referrals.

1. Identify and map all the ES/L/FS services and programs in each catchment area.
2. Create a service-referral directory and make notes in your referral directory about how people in the catchment area can access services and programs. Also note existing collaborations, relationships, and current referral mechanisms.
3. Enter relevant information from the mapping exercise into your service directory.

Step 3. Hold Stakeholder Meetings to Validate the Service Directory

Hold a meeting with government and non-governmental stakeholders in each catchment area to share and validate the community mapping results. With stakeholders, develop and agree on priorities for improving linkages between NCST at the health facility services and ES/L/FS services in the community. Distribute the service directory to the stakeholders for review and finalisation.

Step 4. Establish and Manage the Referral System and Network

The District Health Office Nutritionist should work closely with the District Assembly and stakeholders to:

1. Lead the implementation, maintenance, and monitoring of the referral system.
2. Share relevant and appropriate referral data and information with partners.
3. Help ensure follow-up of referred clients.
4. Coordinate referral committee meetings for representatives from all service providers in the network.
5. Work with stakeholders to update the service directory annually, address gaps and inefficiencies in the system, track referral outcomes, and ensure the quality of the system.

5. Monitoring and Reporting

This section describes NCST monitoring and reporting tools and indicators used to monitor individual clients and analyse service output at a particular health facility or district. The section also describes NCST data flow.

5.1 Why Is Monitoring and Reporting of NCST Services Important?

Monitoring and reporting helps:

- Assess the effectiveness and outcome of nutrition care, support, and treatment interventions.
- Inform and improve the design of service delivery.
- Provide timely results to district and national authorities and partners.
- Identify successful approaches.
- Advocate for support, resource allocation, and expansion of activities.

5.2 Monitoring Individual Clients

5.2.1 Monitoring Clients Receiving Health Services

All adolescent and adult clients visiting a health facility to receive health care should be monitored as usual, using the existing standard Ministry of Health (MOH) electronic system or manual registers.

Nutrition interventions, including assessment, classification, and counselling, should be provided at health care delivery contact points, such as OPD, pre-ART/ART, ANC/PMTCT, and TB clinics. See Section 4.6 on integrating nutrition at various health service delivery contact points.

The MOH electronic system or manual registers can provide service providers with information on the following monthly report indicator:

- Number of clients who received HIV, TB, or ANC/PMTCT health services during a particular month

5.2.2 Monitoring Nutrition Interventions Provided at Health Service Delivery Contact Points

It is crucial that clients' nutrition data are recorded and reported. Each contact point where nutrition interventions are provided should keep a copy of the Adolescent and Adult Nutrition Register (**Annex 17**).

Service providers providing nutrition interventions at OPD, pre-ART/ART, ANC/PMTCT, TB clinics, and teens clubs should record data on the nutrition service register provided to a client during each visit. This data should be recorded in the Adolescent and Adult Nutrition Register (**Annex 17**). The register contains the following data elements: weight, height, MUAC, BMI or BMI-for-age (whichever is appropriate), nutrition counselling, HIV status, and classification of nutritional status.

In addition to providing individual data for improved clinical care of each patient, analysis of the information collected in the Adolescent and Adult Nutrition Register can provide service providers with information on the following monthly report indicators:

- Number of clients who receive nutrition assessment
- Classification of nutritional status of those assessed as severe undernutrition, moderate undernutrition, normal, overweight, and obese
- Number of clients who receive nutrition counselling

Clients classified as having severe and moderate undernutrition should be referred to the facility-designated point where undernourished clients are managed.

5.2.3 Monitoring Nutrition Interventions Provided to Severely and Moderately Undernourished Clients

Clients with severe or moderate undernutrition need close monitoring to determine the progress of treatment, to appropriately respond in case of a sudden deterioration, and to follow up with clients who miss appointments.

If a client is classified as having severe or moderate undernutrition, he or she should be referred from the point of entry to the facility-designated point where therapeutic and supplementary food support is provided. To avoid double counting patients, it is important that each facility has one point where severely and moderately undernourished cases are monitored.

Each severely or moderately undernourished client should be issued with a client management form (see **Annex 18** for a copy of the Undernourished Client Management Form). The client management forms are kept at the facility-designated point where clients with severe and moderate undernutrition are treated. The form is used to monitor clients' nutritional status during the entire treatment period.

The Undernourished Client Management Form is used to monitor nutritional status, the amount of therapeutic and supplementary food provided to the client during each visit, and patient outcomes: recovered, defaulted, died, non-recovered, or transferred. See **Table 13** for definitions of terms used in monitoring severe and moderate undernutrition.

Table 13. Definition of Terms Used in Monitoring Severe and Moderate Undernutrition

Term	Definition
Admission to treatment of severe or moderate undernutrition	Clients who meet the criteria for severe (inpatient/outpatient) or moderate undernutrition and begin treatment in a particular month. Admissions also include clients who are transferred from another health facility where they were receiving treatment, and clients who are transitioned from severe to moderate after recovery.
Exits	Clients who leave treatment for severe or moderate undernutrition. Clients exiting treatment are classified as recovered, defaulted/lost to follow-up, died, non-recovered, or 'transferred out' to another facility.
Recovered or **transitioned to a new care plan**	Clients who exit treatment for severe or moderate undernutrition after reaching the target BMI, BMI-for-age, or MUAC, as appropriate (Step 3 of Sections 4.2 and 4.3). If a patient recovers from severe undernutrition and moves to the care plan for moderate undernutrition, he or she is considered an admission in the care plan for moderate undernutrition.
Defaulter or **lost to follow-up**	Clients who have not returned for NCST services and are not known to have been transferred to another facility or died. A client is defined as a defaulter if she or he does not return for services for two consecutive visits/appointments.
Died	There is a reliable report of the NCST client's death, regardless of the cause.
Non-recovered or **treatment failure**	A client exits treatment for undernutrition after failing to reach the targeted BMI, BMI-for-age, or MUAC, or weight gain, as appropriate, for a period of up to 4 months. Before a client is considered to have failed

Term	Definition
	treatment, all social, economic, and medical factors should have been considered and addressed.
Transferred 'out' or **'in'**	**Transfer out** refers to clients have left the facility for another facility where they will continue to receive therapeutic and/or supplementary food. Transfer out should be considered as exits. **Transferred in** clients come to the facility from another facility where they received therapeutic or supplementary food. 'Transfer in' should be considered **'**admission' in the facility where treatment is continued.

5.3 Monitoring Therapeutic and Supplementary Food Commodities

The service provider responsible for issuing therapeutic and supplementary food to clients should always record the amount issued to a client on the columns provided in the client management form.

To manage therapeutic and supplementary food, the health facility storekeeper should issue a stock card for each food commodity available for NCST. See **Annex 19** for a copy of the stock card. The stock card is used to register the 'in' and 'out' flow of food commodities in the store room. The stock card should be always up to date, and the balance between 'in' and 'out' should equal the physical count of food commodities in the store room.

5.3.1 Delivery of Therapeutic and Supplementary Food Commodities

Commodities must be checked on delivery. The person delivering the commodities should always present a waybill. Verify the content on the waybill by physically counting the food commodities on delivery. Indicate (in writing) any problem or inconsistencies between the physical count and the content indicated on the waybill. Ensure that you have a certified copy of the waybill for your record.

5.3.2 Storage of Food and Non-Food Commodities

The storeroom should be:

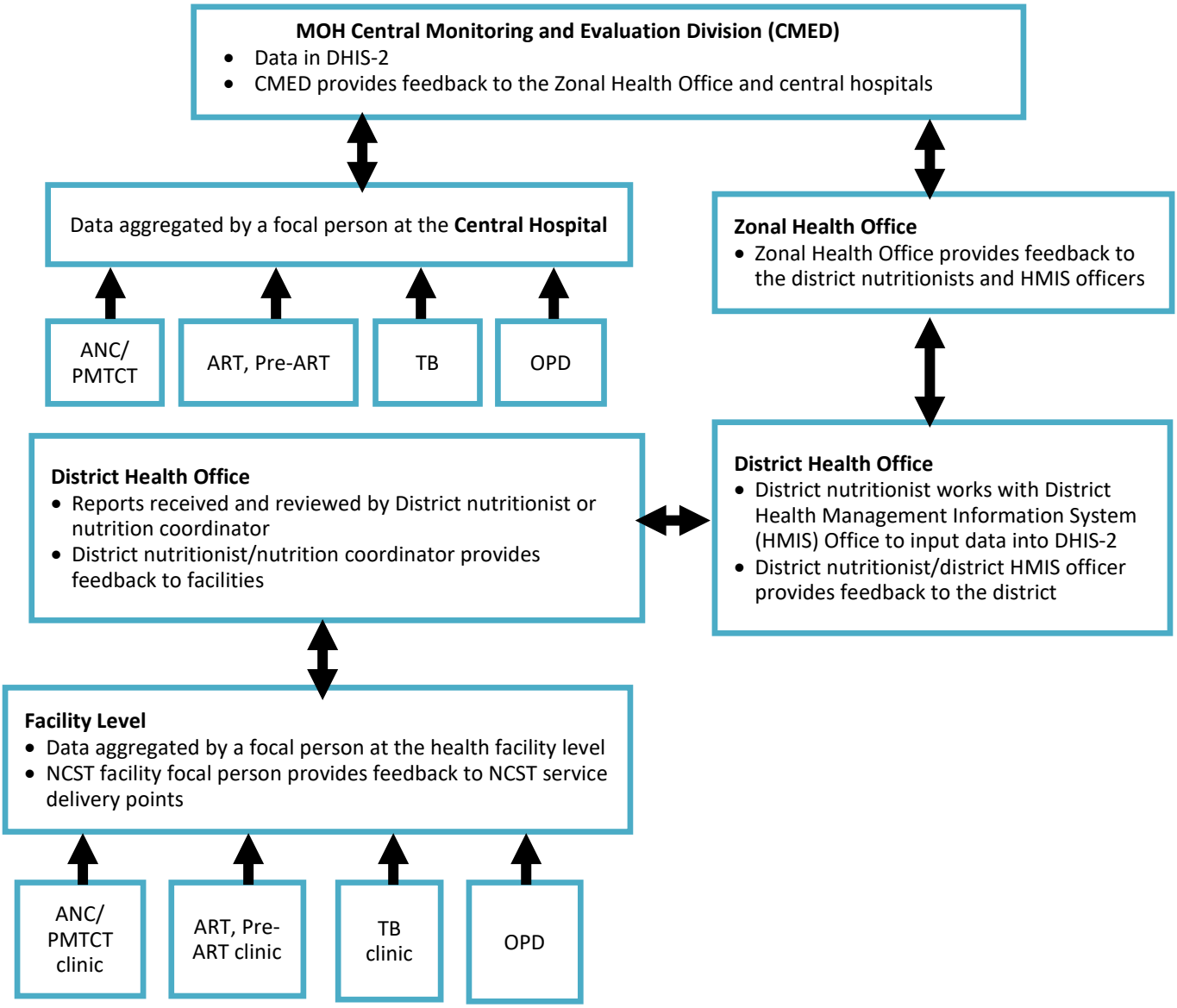
1. Large enough (1–2 m) to store 2 months' stock of food commodities
2. Easily accessible by a vehicle
3. Well ventilated and sheltered from the rain
4. Regularly cleaned and/or disinfected
5. Protected from rodents
6. Secured—under lock and key

5.4 Monitoring NCST Services

5.4.1 NCST Monthly Report

Each health facility providing NCST services should appoint a focal person to be responsible for consolidating NCST data. The focal person interacts with service providers working at the respective contact points where nutrition services are provided. The NCST monthly report (**Annex 20)** is used to consolidate data at the end of every month. The completed monthly report should be submitted to the district nutritionist by the end of the first week of the following month. **Figure 3** depicts the NCST data flow.

Figure 3. NCST Data Flow



The NCST monthly reports contains the following set of indicators:

1. # of clients who received health services during the month (HIV, TB, ANC/PMTCT)
2. # of clients who received nutrition assessment and were classified by nutritional status (severe, moderate, normal, overweight, and obese)
3. # of clients who received nutrition counselling
4. # of clients admitted for treatment of severe or moderate undernutrition
5. Proportion of clients who exit from the treatment of severe or moderate undernutrition categorised by recovered/transitioned, defaulted, died, non-recovered, and transferred
6. # of therapeutic and supplementary food supplies used and requested

5.4.2 Definition of NCST Monthly Report Indicators

NCST indicators should be analysed at the end of every month by health facility QI teams; district, zonal, and national health officials; and partners. The indicators listed below measure the quantity and efficiency of activities provided.

Nutrition Assessment

Indicator Definition: The number and proportion of adolescent and adult clients in care and treatment who were nutritionally assessed during the reporting period.

Nutrition assessment means anthropometric measurement, which includes calculation of BMI for non-pregnant adults, BMI-for-age for adolescents, and MUAC and weight gain for pregnant women.

Method of Measurement and Data Collection: The primary source of data for this indicator is the **Adolescent and Adult Nutrition Register**, which documents whether clients have received nutrition assessment. Each time a client is nutritionally assessed using anthropometric measurement, the measurement is recorded on the nutrition register.

To measure the *proportion* of clients who receive nutrition assessment, divide the number of clients (including adults, adolescents, and pregnant and lactating women) who were nutritionally assessed using anthropometric measurement at any point during the reporting period by the number of clients who attended ART, ANC/PMTCT, and TB care and treatment services during the same reporting period. Because the indicator unit is PLHIV and TB patients, count every client who received care and treatment services at least once during the reporting period once in the denominator (and once in the numerator if he or she received nutrition assessment at any point during the reporting period).

Frequency of Reporting: Collected routinely and reported at the end of each month. This indicator should be reported by the health facility NCST focal person. The focal person aggregates NCST indicators into the monthly report, which is submitted to the district nutritionist or nutrition focal person.

Nutrition Counselling

Definition: The number and proportion of clients in care and treatment who were nutritionally assessed with anthropometric measurement and also received nutrition counselling at any point during the reporting period.

'Nutrition counselling' is defined as individual, active, one-on-one counselling in which a service provider and client discuss the client's individual dietary practices, preferences, constraints, and options; ask and answer questions; and identify feasible actions to improve dietary practices.

Method of Measurement and Data Collection: The primary source of data for this indicator is the **Adolescent and Adult Nutrition Register**, which documents whether clients receive nutrition assessment and nutrition counselling. Each time a client is nutritionally assessed using anthropometric measurement, record the measurement on the nutrition register. Similarly, each time nutrition counselling is provided, record it on the nutrition register.

To tabulate the *number* of clients who receive nutrition counselling at any point during the reporting period, service providers should review adolescent and adult nutrition client registers.

When the *proportion* of individuals receiving nutrition counselling is measured, the numerator is the number of clients, including adults, adolescents, and pregnant and lactating women, who received nutrition counselling. The denominator is the number of clients who received nutrition assessment during the same reporting period.

Frequency of Reporting: Collected routinely and reported at the end of each month. This indicator should be reported by the health facility NCST focal person. The focal person aggregates NCST indicators into the monthly report, which is submitted to the district nutritionist or nutrition focal person.

Provision of Therapeutic Food Support

Indicator Definition: The number and proportion of severely undernourished adolescent and adult clients who received therapeutic food at any point during the reporting period.

'Therapeutic foods' are defined as foods designed for the management of severe undernutrition, include RUTF, also known as *Chiponde*, an energy-dense, fortified peanut-based paste locally produced in Malawi. RUTF is nutritionally equivalent to F-100 therapeutic milk.

Method of Measurement and Data Collection: The source of data for this indicator is the undernourished client management record, which documents whether a client received therapeutic food or not.

To tabulate the *number* of severely undernourished clients receiving therapeutic food at any point during the reporting period, review individual client management records.

When the *proportion* of individuals receiving therapeutic food is measured, the numerator is the number of severely undernourished who received therapeutic food at any point during the reporting period and the denominator is the number of clients who were nutritionally assessed and found to be severely undernourished. Count severely undernourished clients once in the denominator and once in the numerator (if they received the therapeutic food at least once during the reporting period).

Frequency of Reporting: Collected routinely and reported at the end of each month. This indicator should be reported by the health facility NCST focal person. The focal person aggregates NCST indicators into the monthly report, which is submitted to the district nutritionist or nutrition focal person.

Provision of Supplementary Food Support

Indicator Definition: The number and proportion of moderately undernourished adolescent and adult clients who received supplementary food at any point during the reporting period.

'Supplementary foods', used to manage mild and moderate undernutrition, are primarily fortified-blended foods (e.g., CSB, commonly known as *likuni phala* or CSB ++).

Method of Measurement and Data Collection: The source of data for this indicator is the undernourished client management form, which documents whether a client is moderately undernourished and receives supplementary food.

To tabulate the *number* of moderately undernourished clients receiving supplementary food at any point during the reporting period, review individual client management records.

When the *proportion* of individuals receiving supplementary food is measured, the numerator is the number of moderately undernourished who received supplementary food at any point during the reporting period. The denominator is the number of clients who were nutritionally assessed and found to be moderately undernourished. Count moderately undernourished clients in the denominator and once in the numerator (if they received the supplementary food at least once during the reporting period).

Frequency of Reporting: Collected routinely and reported at the end of each month. This indicator should be reported by the health facility NCST focal person. The focal person aggregates NCST indicators into the monthly report, which is submitted to the district nutritionist or nutrition focal person.

6. Managing the Quality of NCST Service Delivery

This chapter describes QA and recommends a QI model that can be used to continuously improve the quality of NCST service delivery. QA and QI are distinct but intersecting approaches, both of which are critical for improving service delivery.

6.1 Quality Assurance

QA refers to the measures put in place to ensure that NCST services comply with recommended standards. QA activities can also include conducting assessments/evaluations, supervising and training service providers, and providing necessary equipment and materials for service delivery. For QA to be effective, it is important that its activities are linked with QI.

6.1.1 Training NCST Service Providers

It is essential that service providers involved in NCST receive training on the updated national guidelines and standards. NCST training covers six training modules shown in the table below. Service providers working in OPD, ART, ANC/PMTCT, and TB clinics should be prioritised during the NCST trainings. Training should be performance-based and focus on building the required knowledge and skills for service providers who are involved in providing nutrition care and support. See **Annex 21** for the minimum required NCST competencies and standards.

The following categories of service providers should receive training in the topics of NCST listed in the table below.

Module	Topic	Target Service Provider
1	Introduction to Nutrition	Clinicians, nurses, nutritionists, medical clerks, health surveillance assistants (HSAs), home craft workers, ward attendants, and expert clients
2	Nutrition Assessment, Classification	Clinicians, nurses, nutritionists, medical clerks, HSAs, home craft workers, ward attendants, and expert clients
3	Nutrition Counselling and Education	Clinicians, nurses, nutritionists, pharmacists/pharmacy technicians, medical clerks, HSAs, home craft workers and expert clients
4	Nutrition Care Plans and Support	Clinicians, nurses, nutritionists, pharmacists/pharmacy technicians, medical clerks, HSAs, and home craft workers
5	NCST Monitoring and Reporting	Clinicians, nurses, nutritionists, pharmacists/pharmacy technicians, medical clerks, data officers, and HSAs
6	Managing the Quality of NCST Services	Clinicians, nurses, nutritionists, pharmacists/pharmacy technicians, medical clerks, HSAs, home craft workers, ward attendants, and expert clients

Annex 22 shows the division of roles and responsibilities of trained service providers when implementing NCST activities at the facility level.

District, zonal, and national managers also need to be adept in NCST competencies **(**see **Annex 21)**. In addition, technical managers should have the ability to mentor and coach service providers to acquire these competencies.

6.1.2 Monitoring and Supervision

Trained national, zonal, and district-level managers should monitor and supervise NCST services quarterly. Supervision should assess adherence to national standards for quality of client care and quality and completeness of data. In addition, QA supervision should ensure that health facilities are meeting the minimum NCST competencies and performance standards (see **Annex 21**).

6.1.3 Equipment and Supplies

Health facilities providing NCST services should ensure that they have the necessary equipment, supplies, and materials for service delivery. This includes therapeutic and supplementary food supplies, weighing scales, height measuring devices, MUAC tapes, technical reference materials, and job aids. **Annex 23** provides the full list of NCST equipment, supplies, and materials.

6.2 Quality Improvement

QI is the combined and unceasing efforts of everyone involved in family health, including health care providers, patients, and their families, to make changes that will lead to better patient outcomes, better system performance, and better professional development (Batalden and Davidoff 2007). QI enables service providers to systematically improve the quality of health care delivery by identifying weaknesses in current practices, analysing the reasons for the weaknesses, and developing solutions to improve the current practices.

QI can play an important role in improving a variety of processes that affect **safety**, **effectiveness**, **patient centeredness**, **timeliness**, **efficiency**, or **equity** within a health care delivery system.

6.2.1 Principles of QI

There are four main principles of QI:

1. **Client focus.** Clients are the focus of QI activities. Services should meet the needs and the expectations of clients and their communities.
2. **Focus on systems and processes.** Service providers should analyse the systems and processes through which they are delivering services to improve them. By understanding how systems and processes work, service providers are better able to analyse gaps and understand causes of poor performance.
3. **Test changes and emphasise the use of data.** Service providers develop and test changes to improve the way services are provided and to determine whether they yield the desired changes.
4. **Teamwork.** QI is achieved through a team approach to problem solving. A QI team should consist of representatives from every step in a process or system of health care delivery.

6.2.2 Applying QI in NCST

QI can help ensure that health facilities implement the standard components of NCST including: nutrition assessment and classification; nutrition counselling and education; nutrition care plans and support; and monitoring and reporting. QI can also be used to strengthen implementation at health facilities where NCST services are already established. Below are examples of how QI can be applied in NCST service delivery:

1. Identifying ways to integrate nutrition into routine HIV and TB care treatment to improve client outcomes and avoid overburdening service providers
2. Identifying ways to retain clients in care and treatment for undernutrition to ensure recovery
3. Improving the linkage between health facilities and ES/L/FS support and clients' access to ES/L/FS support

4. Improving service providers' ability to collect, record, analyse, and use data on nutrition assessment, counselling, and support provided in improving patient outcomes

QI should be a continuous process whereby teams of service providers routinely examine the system processes and use existing data to continuously analyse the quality of care. Facility-based service providers can use the health facility gap analysis checklist in **Annex 24** every 3–6 months to identify NCST implementation gaps and prioritise areas for improvement.

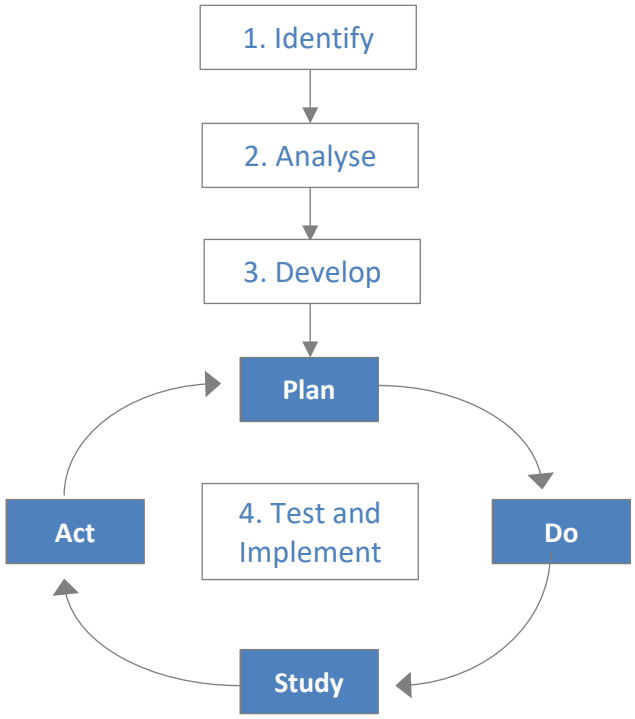
6.2.3 The QI Model

The QI model described in this chapter is referred to as the 'model for improvement'; it is based on answering three questions:

1. What are we trying to accomplish?
2. How will we know that a change is an improvement?
3. What changes can we make and what changes will result in improvement?

Figure 4 presents the model for improvement; the model guides service providers to test changes using the Plan-Do-Study-Act (PDSA) cycle.

Figure 4. The Model for Improvement



Source: Langley et al. 2009.

Step 1. Identify: What Are We Trying to Accomplish?

Service providers, working in a team, clearly identify and articulate the problem that they want to solve. Identifying the problem requires defining the problem; how frequently it occurs; and the effect that the problem has on clients, communities, and service delivery.

Once a problem has been identified, a clearly defined 'aim' statement should be developed. The improvement aim should have the following characteristics:

1. A defined **boundary** that specifies the scope of the improvement aim
2. Specific **numerical goals for outcomes** that are ambitious but achievable
3. A **time frame** (how much improvement and by when?)
4. **Guidance** on how the aim will be achieved

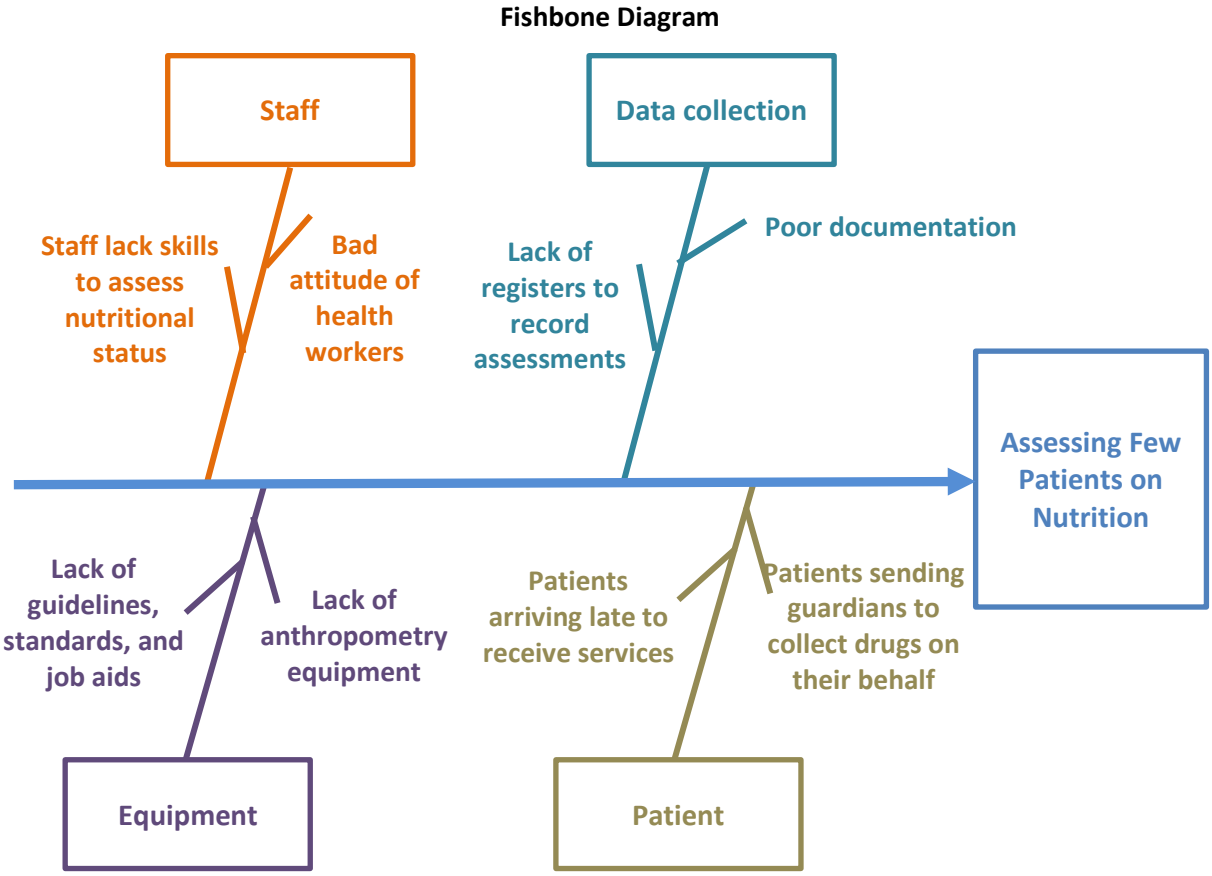
Example of an Improvement Aim for NCST

At Nyungwe Health Center, we will assess and classify the nutritional status of all adolescents and adult clients attending ART, TB, and ANC/PMTCT clinics from March 2013 to July 2013, using MUAC, BMI, and BMI-for-age.

Step 2. Analyse the Information: What Do We Need to Understand to Make an Improvement?

Once an improvement aim has been developed, the team of service providers works together to identify the root cause of the problem and its effects. This involves analysing the systems and processes that are used in providing services to clients. Analysis of available data and information can provide important information on the problem that needs to be addressed. A cause-and-effect analysis using a fishbone diagram can help in identifying and documenting all the potential causes of problems that need to be addressed (see **Figure 5**).

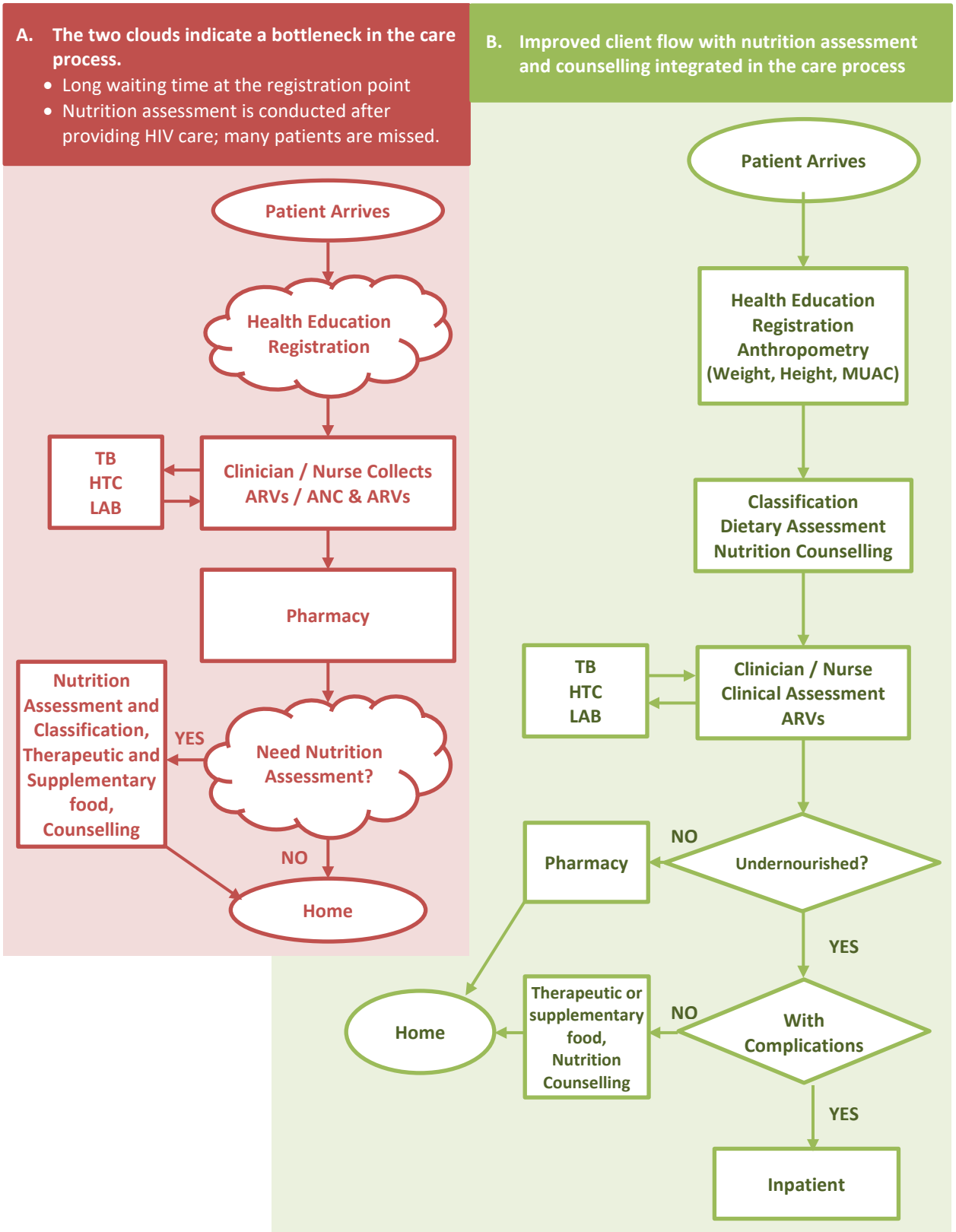
Figure 5. Analysis of Causes and Effect in Assessing Nutritional Status of Clients at a Health Centre



Process mapping can be a useful way to help teams understand how the process and system work. One example of process mapping tools is a client flow diagram that provides a visual picture of the

process being studied and problems that may occur. **Figure 6** provides an example of how a health facility team used a flow diagram to analyse the care process to reduce client waiting time and at the same time integrate NCST interventions within the care process. In Figure 6, the cloud seen in part A represents areas where bottlenecks were identified. Part B of the figure provides an improved flow diagram with the identified bottlenecks in the care process eliminated.

Figure 6. Example of a Client Flow Diagram



Step 3. Develop Changes: What Changes Can We Make and What Changes Will Result in Improvement?

With a clear aim and the root cause(s) of the problem identified, the team of service providers needs to identify potential ideas to test on a small scale to improve the system. 'Change ideas' are actionable steps for change targeted at improving specific processes and outcomes. Change ideas can come from referencing evidence-based practices from other settings or from creative brainstorming sessions. The table below provides examples of change ideas developed by a team to reduce the number of clients who default NCST services.

Improvement Aim	Change Ideas	Period of Testing Change
Nyungwe Health Facility: We will reduce defaulters to 0% by March 2014 using follow-up and tracking of appointment dates.	1. Document the patient's physical address and phone numbers of patients for easy tracking.	January 1–31, 2014
	2. Document the next appointment date in the patient health passport as reminder to the patient.	January 1–31, 2014
	3. Document the patient's next appointment dates in the health facility register for easy tracking of the client.	January 1–31, 2014
	4. Use HSAs and expert clients to follow up on patients who miss appointments.	February 3–28, 2014
	5. Use mobile phones to track patients who miss appointments.	February 3–28, 2014

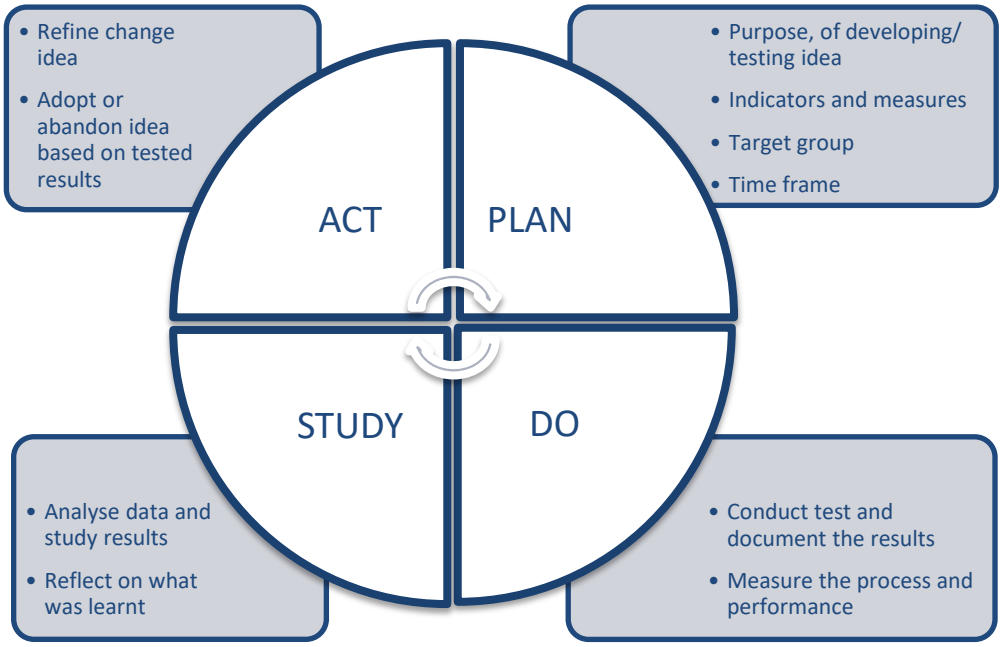
Step 4. Test and Implement Change Ideas

The model for improvement relies on a continuous process of developing and conducting small tests of change using the PDSA cycle shown in **Figure 7**. This approach allows teams to introduce a change to see if it helps lead to improvement before implementing the change at a large scale.

A PDSA cycle can build knowledge for further testing, demonstrate the benefits of new ideas, and be used to engage staff. Small tests of change may help in uncovering the undesirable effects of changes, allowing QI teams to modify or abandon a change idea that has unintended consequences.

To determine whether changes made are actually leading to tangible improvement, information/data on the impact of changes needs to be collected, analysed, and reported on. This includes both **process** and **outcome** measurements. Information/data collected should be on a small sample of sites or beneficiaries, and results should be plotted on time series charts.

Figure 7. The PDSA Cycle



The table below provides an example of change ideas that were tested using the PDSA cycle. A change idea was either adopted, abandoned, or refined based on its effectiveness.

Improvement Aim	Change Ideas	Period of Testing Change	Change effective or not?	Comment
Nyungwe Health Facility: We will reduce defaulters to 0% by March 2014 using follow-up and tracking of appointment dates.	Document the patient's physical address and phone numbers of patients for easy tracking.	January 1–31, 2014	Effective (Change adopted)	- This made it easy to trace clients who miss an appointment
	Document the next appointment date in the patient health passport as reminder to the patient.	January 1–31, 2014	Not Effective (Change abandoned)	- Not every client is able to read - Clients often forgot to refer to the health passport
	Document the patient's next appointment dates in the health facility register for easy tracking of the client.	January 1–31, 2014	Effective (Change adopted)	- Helped to track patients' appointments, easy to identify those who miss an appointment
	Use HSAs and expert clients to follow up on patients who miss appointments.	February 3–28, 2014	Effective (Change adopted)	- Expert clients live in the community and know the clients - Both the expert clients and HSAs counselled the patients on the importance of returning for care
	Use mobile phones to track patients who miss appointments.	February 3–28, 2014	Effective (Refine the idea)	- Reminded clients of their next appointment - Change was effective but not sustainable due to the cost of making phone calls - Alternative is to write letters to clients reminding them of next appointment

References

1. Batalden, Paul B. and Davidoff, Frank. 2007. 'What is "Quality Improvement" and How Can It Transform Healthcare?' *Quality and Safety in Health Care.* 16.1: 2–3.
2. Burgess, A. and Glasauer, P. 2004. *Family Nutrition Guide*. Rome: FAO.
3. Ballard, T.; Coates, J.; Swindale, A.; and Deitchler, M. 2011. *Household Hunger Scale: Indicator Definition and Measurement Guide.* Washington, DC: FANTA/FHI 360.
4. FANTA. 2004. *HIV/AIDS: A Guide for Nutritional Care and Support*. Washington, DC: FANTA/FHI 360.
5. FAO. 2008. 'An Introduction to the Basic Concepts of Food Security'. Available at: http://www.fao.org/docrep/013/al936e/al936e00.pdf.
6. ———. 2004. *Human Energy Requirements: Report of a Joint FAO/WHO/UNU Expert Consultation.* FAO Food and Nutrition Technical Reports Series 1. Rome: FAO.
7. Institute of Medicine. 2009. *Weight Gain during Pregnancy: Reexamining the Guidelines. Report Brief.* Washington, DC: Institute of Medicine.
8. Langley G.L. et al. 2009. *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance.* Second Edition. San Francisco: Jossey-Bass Publishers.
9. ———. 2011. *Malawi Nutrition Assessment Counselling and Support (NACS) for People Living with HIV (PLHIV). Rapid Review Summary Report*. Unpublished.
10. Ministry of Health (MOH). 2012. *National Tuberculosis Control Programme Manual*. Seventh edition. Lilongwe: MOH.
11. ———. 2012. *Guidelines for Community-Based Management of Acute Malnutrition*. Lilongwe: MOH.
12. ———. *Malawi Integrated Guidelines for Providing HIV Services in: antenatal clinic, maternity, under five clinic, family planning clinic and ART clinic.* Lilongwe: MOH.
13. ———. 2006. *Interim Guidelines for the Management of Acute Malnutrition in Adolescents and Adults*. Lilongwe: MOH.
14. Republic of Malawi. 2014. *National Nutrition Policy 2014–2019*. Lilongwe: Department of Nutrition, HIV and AIDS, Office of the President and Cabinet.
15. ———. 2014. *National Nutrition Strategic Plan 2014–2019*. Lilongwe: Department of Nutrition, HIV and AIDS, Office of the President and Cabinet.
16. ———. 2013. *National HIV and AIDS Policy: Sustaining the Response*. Second Edition. Lilongwe: Department of Nutrition, HIV and AIDS, Office of the President and Cabinet.
17. Swindale, A. and Bilinsky, P. 2006. *Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide (v.2).* Washington, DC: FANTA/FHI 360.
18. Tumilowicz, A. 2010. *Guide to Screening for Food and Nutrition Services among Adolescents and Adults Living with HIV*. Washington, DC: FANTA/FHI 360.
19. United States Department of Agriculture. 2011. *Dietary Reference Intakes (DRIs): Recommended intakes for individuals.* Washington, DC: U.S. Government
20. Weiser, S.D. et al. 2014. 'Longitudinal assessment of associations between food insecurity, antiretroviral adherence and HIV treatment outcomes in rural Uganda'. *AIDS.* 2;28(1):115–20.

21. World Health Organisation (WHO). 2009. *Nutritional Care and Support for People Living with HIV/AIDS: A Training Course. Participant's Manual.* Geneva: WHO.

22. ———. 2007. 'Growth Reference Data for 5–19 Years'. Available at: http://www.who.int/growthref/en/.

23. ———. 1999. *Management of Severe Malnutrition: A Manual for Physicians and Other Senior Health Workers.* Available at: http://whqlibdoc.who.int/hq/1999/a57361.pdf.

24. ———. 1995. *Physical Status: The Use and Interpretation of Anthropometry: Report of a WHO Expert Committee.* WHO Technical Report Series 854. Geneva: WHO.

25. WHO and FAO. 2002. *Living Well with HIV/AIDS. A Manual on Nutrition Care and Support for People Living with HIV/AIDS.* Available at: ftp://ftp.fao.org/docrep/fao/005/y4168E/y4168E00.pdf.

Annex 1. Definition of Terms

Acquired Immunodeficiency Syndrome (AIDS) is an advanced stage of HIV, clinically defined by the presence of HIV infection and a low level of CD4+ T cells or an AIDS-defining illness.

Anaemia is a condition in which the haemoglobin (Hb) concentration in the blood is below a defined level (< 12 g/dL in non-pregnant women of reproductive age and < 11 g/dL in pregnant women and children 0–59 months of age). This results in reduced oxygen-carrying capacity of red blood cells. Pregnant women, infants, and young children are particularly vulnerable to anaemia. Anaemia increases the risk of maternal and perinatal mortality, preterm birth, low birth weight, and impaired cognitive development in children, and reduces adult work productivity.

Anthropometry is the measurement of the human body. It is used to assess the nutritional status of individuals to screen for medical conditions and as entry criteria for nutrition support. Common nutrition-related anthropometric measures are height, weight, and mid-upper arm circumference (MUAC).

Appetite test is a test to determine whether people with severe acute undernutrition should be treated as inpatients or outpatients. The test is done at admission and during all follow-up sessions to determine whether clients can eat a specific amount of ready-to-use therapeutic food (RUTF). Clients who 'fail' the appetite test must be treated for severe acute undernutrition in inpatient care, and clients who 'pass' the appetite test can be treated for severe acute undernutrition as outpatients if no other severe medical complications are identified.

Bilateral pitting oedema—also known as nutritional oedema, kwashiorkor, or oedematous malnutrition—is a sign of severe acute undernutrition regardless of anthropometric measurements. It is caused by an abnormal infiltration and excess accumulation of serous fluid in connective tissue or in serous cavities. Bilateral pitting oedema is verified when thumb pressure applied on the tops of both feet for 3 seconds leaves a pit (indentation) in the foot after the thumb is lifted.

Body mass index (BMI) is a calculation of adult nutritional status calculated by dividing weight in kilograms by height in metres squared (BMI = kg/m^2). BMI is not accurate in pregnant women and women up to 6 months post-partum, whose weight is not a function of nutritional status.

Calorie is the amount of energy needed to increase the temperature of 1 g of water by $1^{\circ}C$. This unit of energy is so small that calories are frequently expressed in 1,000-calorie units known as kilocalories (kcal). Kilocalories are a measure of the amount of metabolic energy contained in food.

Clients are individuals who receive commodities or services.

The **Critical Nutrition Actions (CNA)** is a set of eight interventions to promote good nutrition and health in people with infectious diseases, such as HIV and TB.

Exclusive breastfeeding is feeding an infant only breast milk and *no other* liquids or solids except vitamins, mineral supplements, or medicines in drop or syrup form. Exclusive breastfeeding is recommended until an infant reaches 6 months of age.

Food is anything that provides the body with nutrients.

Food access refers to the affordability and allocation of food.

Food availability is having sufficient quantities of food from household production, other domestic output, commercial imports, or food assistance.

Food groups are categories of food based on the type of nourishment they supply. The six food groups in Malawi are: 1) vegetables and 2) fruits (protective foods that provide vitamins and minerals), 3) legumes and nuts and 4) animal-source foods (body-building foods that provide protein), 5) fats, and 6) staple foods (energy-giving foods that provide carbohydrates).

Food security is defined by the U.S. Agency for International Development (USAID) as all people at all times having both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life. Food security has four components: food availability, food access, food utilisation, and stability of the first three components.

Food stability refers to the ability to acquire and utilise food over time. Food stability can be threatened by, among other things, climate changes, crop failure, and natural disaster.

Food utilisation refers to the metabolism of food. Food safety, disease/illness, and food choice can all affect the body's food utilisation.

Formula 75 (F-75) is the milk-based food recommended by the World Health Organisation (WHO) for stabilisation of people with severe acute undernutrition with medical complications in inpatient care. F-75 contains 75 kcal/100 ml.

Formula 100 (F-100) is the milk-based food recommended by WHO for the nutritional rehabilitation of people with severe acute undernutrition after stabilisation before RUTF was available. F-100 provides 100 kcal/100 ml. Its main use currently is for people with severe acute undernutrition and severe mouth lesions who cannot swallow RUTF in inpatient care. F-100-Diluted is used for the stabilisation and rehabilitation of infants with severe acute undernutrition in inpatient care.

Human immunodeficiency virus (HIV) is a virus that attacks the immune system. It is spread through sexual contact; contaminated needles; blood transfusion; or from mother to child during pregnancy, birth, or breastfeeding. Left untreated, HIV compromises immune system function, leaving the infected person susceptible to a variety of opportunistic infections and progression of HIV to AIDS.

Macronutrients are substances that are required by the body in large amounts for the proper growth, maintenance, and repair of body processes and tissues. They include carbohydrates, proteins, water, and fats.

Malnutrition occurs when food intake does not match dietary needs. Malnutrition includes both undernutrition and overnutrition.

Micronutrients are substances that are required by the body in small amounts (vitamins and minerals). Absence of these substances in the diet leads to deficiency diseases.

Micronutrient deficiencies are a result of inadequate micronutrient intake and/or absorption. The most common forms of micronutrient deficiencies are related to iron, vitamin A, and iodine.

Nutrients are components of food that can be metabolised to provide energy; regulate biological processes; and maintain, repair, or build body tissues. They include macronutrients and micronutrients.

Nutrition is the body's process of taking in and digesting food; using it for growth, reproduction, immunity, breathing, work, and health; and storing nutrients and energy in appropriate parts of the body.

Nutrition screening is a rapid and simple way to identify people who may be undernourished or at risk of undernutrition and to help determine whether a client needs more detailed nutrition assessment.

Nutritional status is the outcome determined by the balance between the intake of nutrients by an organism and the expenditure of nutrients in the processes of growth, reproduction, and health maintenance.

Opportunistic infections are illnesses that usually do not cause disease in people with normal immune systems. People living with advanced HIV infection may develop opportunistic infections of the lungs, brain, eyes, and other organs. Opportunistic infections commonly found in people with HIV are *Pneumocystis carinii* pneumonia; Kaposi's sarcoma; cryptosporidiosis; histoplasmosis; and other parasitic, viral, and fungal infections, as well as some types of cancers.

Overnutrition is a result of excessive intake of energy, leading to overweight or obesity.

Ready-to-use therapeutic food (RUTF) is an energy-dense, mineral- and vitamin-enriched food specifically designed to treat severe acute undernutrition. RUTF has a similar nutrient composition as F-100. RUTF is a soft crushable food that can be consumed easily by people from the age of 6 months without adding water. Unlike F-100, RUTF is not water-based, meaning that bacteria cannot grow in it and it can be used safely at home without refrigeration or where hygiene conditions are not optimal. It does not require preparation before consumption.

Recommended Daily Intake (RDI) is the minimum amount of macronutrients and micronutrients required by an individual to prevent the development of micronutrient deficiencies or undernutrition.

Staple foods are foods that form the main part of the diet, usually cereals, such as maize, rice, wheat, and millet, or root crops, such as cassava, Irish potatoes, and sweet potatoes

Tuberculosis (TB) is a bacterial infection caused by *Mycobacterium tuberculosis*. TB bacteria are spread by airborne droplets expelled from the lungs when a person with active TB coughs, sneezes, or speaks. Exposure to these droplets can lead to infection in the air sacs of the lungs. TB is seen with increasing frequency among people with HIV. Most cases of TB occur in the lungs (pulmonary TB), but the disease may also occur in the larynx, lymph nodes, brain, kidneys, or bones (extrapulmonary TB).

Undernutrition is a lack of nutrients caused by inadequate dietary intake. It encompasses a range of conditions, including acute undernutrition, chronic undernutrition, and micronutrient deficiency.

Wasting is defined by low MUAC or low weight-for-height z-score.

Annex 2. Nutrients and Their Importance

Nutrients	Main use in the body
Macronutrients	
Carbohydrates - *starches and sugars*	Provide energy needed for life, breathing, movement, warmth, and growth and repair of tissues; when eaten in excess, carbohydrates are changed to body fat
Carbohydrates - *dietary fibre*	Make faeces soft and bulky and absorb harmful chemicals to keep the gut healthy, slow digestion and absorption of nutrients in meals, and help prevent obesity
Fats	Provide a concentrated source of energy and the fatty acids needed for growth and health and aid the absorption of vitamins, including A, D, E, and K
Protein	Build cells, body fluids, antibodies, and other parts of the immune system
Water	Removes toxins; makes fluids, such as tears, sweat, and urine; and facilitates chemical processes in the body
Micronutrients	
Iron	Makes haemoglobin, the protein in red blood cells that carries oxygen to the tissues, to allow the muscles and brain to work properly
Iodine	Makes thyroid hormones that help control the way the body works. Is essential for the development of the brain and nervous system in the foetus
Zinc	Is necessary for growth and normal development, reproduction, and proper immune system function
Vitamin A	Prevents infection; keeps the immune system working properly; and keeps the skin, eyes, and lining of the gut and lungs healthy
B-group vitamins	Help the body use macronutrients for energy and other purposes and help the nervous system work properly
Folate	Makes healthy red blood cells and prevents abnormalities in the foetus
Vitamin C	Aids in the absorption of iron, destroys harmful molecules in the body, and helps wound healing

Source: Burgess and Glasauer. 2004.

Annex 3. Nutritional Requirements for PLHIV

Nutrient needs depend on age; physical changes, such as pregnancy and breastfeeding; and level of activity. For people living with HIV (PLHIV), energy requirements are influenced by severity of disease state. The nutrient requirements of various groups of people are shown in **Table A3-1**.

Table A3-1. Energy Requirements (kcal/day)

Age group	Healthy	HIV-infected	
		Asymptomatic	Symptomatic
Adolescent		10% more energy	20% more energy
15–18 years old	2,800	3,080	3, 360
Adults			
Non-pregnant/lactating	2,000–2,580	10% more energy (200–257 more kcal)	20% more energy (400-514 more kcal)
Pregnant/lactating women up-to 6 months post-partum	2,460–2,570*		

* The requirements for adults also apply to pregnant and lactating women, in addition to the usual extra requirements for pregnancy and lactation.

Source: Adapted from: WHO. 2009.

Protein

Protein should constitute 12%–15% of dietary intake (50–80 g/day or 1 g/kg of ideal body weight).

According to WHO, there is no evidence that PLHIV have different protein requirements than healthy HIV-negative people.

Table A3-2. Protein Requirements

Group	Grams per day
15–18 years old	Girls: 46
	Boys: 52
19–> 70 years old	Females: 46
	Males: 56
Pregnant women	71
Lactating women up to 6 months post-partum	105

Source: United States Department of Agriculture. 2011.

Fat

Fat/oil intake should not be more than 35% of total energy needs. People with HIV and/or TB should consume the same percentage of energy from fat as healthy people. However, people on medications such as antiretroviral therapy (ART) or with persistent diarrhoea may need special advice regarding fat intake.

Vitamins and Minerals

Eating a varied diet from the six food groups is the best way to ensure adequate intake of vitamins and minerals.

Where dietary intake of vitamins and minerals may not be sufficient to correct nutritional deficiencies or the recommended intakes cannot be achieved, high-risk groups, such as pregnant and lactating women, may need multiple micronutrient supplements.

Pregnant and post-partum women

- 60 mg of elemental iron and 400 µg of folic acid daily for 6 months after the first trimester of pregnancy and 6 months post-partum to prevent anaemia and twice daily to treat severe anaemia

PLHIV

- For HIV-negative non-pregnant/lactating adults, no more than 1 recommended dietary allowance (RDA) of micronutrients

Annex 4. BMI Reference Tables for Adults > 19 Years Old

Height (cm)	Adults 134–169 cm tall, table 1 of 2																											
169	9.8	10.2	10.5	10.9	11.2	11.6	11.9	12.3	12.6	13.0	13.3	13.7	14.0	14.4	14.7	15.1	15.4	15.8	16.1	16.5	16.8	17.2	17.5	17.9	18.2	18.6	18.9	19.3	19.6
168	9.9	10.3	10.6	11.0	11.3	11.7	12.0	12.4	12.8	13.1	13.5	13.8	14.2	14.5	14.9	15.2	15.6	15.9	16.3	16.7	17.0	17.4	17.7	18.1	18.4	18.8	19.1	19.5	19.8
167	10.0	10.4	10.8	11.1	11.5	11.8	12.2	12.5	12.9	13.3	13.6	14.0	14.3	14.7	15.1	15.4	15.8	16.1	16.5	16.9	17.2	17.6	17.9	18.3	18.6	19.0	19.4	19.7	20.1
166	10.2	10.5	10.9	11.2	11.6	12.0	12.3	12.7	13.1	13.4	13.8	14.2	14.5	14.9	15.2	15.6	16.0	16.3	16.7	17.1	17.4	17.8	18.1	18.5	18.9	19.2	19.6	20.0	20.3
165	10.3	10.7	11.0	11.4	11.8	12.1	12.5	12.9	13.2	13.6	14.0	14.3	14.7	15.1	15.4	15.8	16.2	16.5	16.9	17.3	17.6	18.0	18.4	18.7	19.1	19.5	19.8	20.2	20.6
164	10.4	10.8	11.2	11.5	11.9	12.3	12.6	13.0	13.4	13.8	14.1	14.5	14.9	15.2	15.6	16.0	16.4	16.7	17.1	17.5	17.8	18.2	18.6	19.0	19.3	19.7	20.1	20.4	20.8
163	10.5	10.9	11.3	11.7	12.0	12.4	12.8	13.2	13.5	13.9	14.3	14.7	15.1	15.4	15.8	16.2	16.6	16.9	17.3	17.7	18.1	18.4	18.8	19.2	19.6	19.9	20.3	20.7	21.1
162	10.7	11.1	11.4	11.8	12.2	12.6	13.0	13.3	13.7	14.1	14.5	14.9	15.2	15.6	16.0	16.4	16.8	17.1	17.5	17.9	18.3	18.7	19.1	19.4	19.8	20.2	20.6	21.0	21.3
161	10.8	11.2	11.6	12.0	12.3	12.7	13.1	13.5	13.9	14.3	14.7	15.0	15.4	15.8	16.2	16.6	17.0	17.4	17.7	18.1	18.5	18.9	19.3	19.7	20.1	20.4	20.8	21.2	21.6
160	10.9	11.3	11.7	12.1	12.5	12.9	13.3	13.7	14.1	14.5	14.8	15.2	15.6	16.0	16.4	16.8	17.2	17.6	18.0	18.4	18.8	19.1	19.5	19.9	20.3	20.7	21.1	21.5	21.9
159	11.1	11.5	11.9	12.3	12.7	13.1	13.4	13.8	14.2	14.6	15.0	15.4	15.8	16.2	16.6	17.0	17.4	17.8	18.2	18.6	19.0	19.4	19.8	20.2	20.6	21.0	21.4	21.8	22.2
158	11.2	11.6	12.0	12.4	12.8	13.2	13.6	14.0	14.4	14.8	15.2	15.6	16.0	16.4	16.8	17.2	17.6	18.0	18.4	18.8	19.2	19.6	20.0	20.4	20.8	21.2	21.6	22.0	22.4
157	11.4	11.8	12.2	12.6	13.0	13.4	13.8	14.2	14.6	15.0	15.4	15.8	16.2	16.6	17.0	17.4	17.9	18.3	18.7	19.1	19.5	19.9	20.3	20.7	21.1	21.5	21.9	22.3	22.7
156	11.5	11.9	12.3	12.7	13.1	13.6	14.0	14.4	14.8	15.2	15.6	16.0	16.4	16.8	17.3	17.7	18.1	18.5	18.9	19.3	19.7	20.1	20.5	21.0	21.4	21.8	22.2	22.6	23.0
155	11.7	12.1	12.5	12.9	13.3	13.7	14.2	14.6	15.0	15.4	15.8	16.2	16.6	17.1	17.5	17.9	18.3	18.7	19.1	19.6	20.0	20.4	20.8	21.2	21.6	22.1	22.5	22.9	23.3
154	11.8	12.2	12.6	13.1	13.5	13.9	14.3	14.8	15.2	15.6	16.0	16.4	16.9	17.3	17.7	18.1	18.6	19.0	19.4	19.8	20.2	20.7	21.1	21.5	21.9	22.3	22.8	23.2	23.6
153	12.0	12.4	12.8	13.2	13.7	14.1	14.5	15.0	15.4	15.8	16.2	16.7	17.1	17.5	17.9	18.4	18.8	19.2	19.7	20.1	20.5	20.9	21.4	21.8	22.2	22.6	23.1	23.5	23.9
152	12.1	12.6	13.0	13.4	13.9	14.3	14.7	15.1	15.6	16.0	16.4	16.9	17.3	17.7	18.2	18.6	19.0	19.5	19.9	20.3	20.8	21.2	21.6	22.1	22.5	22.9	23.4	23.8	24.2
151	12.3	12.7	13.2	13.6	14.0	14.5	14.9	15.4	15.8	16.2	16.7	17.1	17.5	18.0	18.4	18.9	19.3	19.7	20.2	20.6	21.1	21.5	21.9	22.4	22.8	23.2	23.7	24.1	24.6
150	12.4	12.9	13.3	13.8	14.2	14.7	15.1	15.6	16.0	16.4	16.9	17.3	17.8	18.2	18.7	19.1	19.6	20.0	20.4	20.9	21.3	21.8	22.2	22.7	23.1	23.6	24.0	24.4	24.9
149	12.6	13.1	13.5	14.0	14.4	14.9	15.3	15.8	16.2	16.7	17.1	17.6	18.0	18.5	18.9	19.4	19.8	20.3	20.7	21.2	21.6	22.1	22.5	23.0	23.4	23.9	24.3	24.8	25.2
148	12.8	13.2	13.7	14.2	14.6	15.1	15.5	16.0	16.4	16.9	17.3	17.8	18.3	18.7	19.2	19.6	20.1	20.5	21.0	21.5	21.9	22.4	22.8	23.3	23.7	24.2	24.7	25.1	25.6
147	13.0	13.4	13.9	14.3	14.8	15.3	15.7	16.2	16.7	17.1	17.6	18.0	18.5	19.0	19.4	19.9	20.4	20.8	21.3	21.8	22.2	22.7	23.1	23.6	24.1	24.5	25.0	25.5	25.9
146	13.1	13.6	14.1	14.5	15.0	15.5	16.0	16.4	16.9	17.4	17.8	18.3	18.8	19.2	19.7	20.2	20.6	21.1	21.6	22.0	22.5	23.0	23.5	23.9	24.4	24.9	25.3	25.8	26.3
145	13.3	13.8	14.3	14.7	15.2	15.7	16.2	16.6	17.1	17.6	18.1	18.5	19.0	19.5	20.0	20.5	20.9	21.4	21.9	22.4	22.8	23.3	23.8	24.3	24.7	25.2	25.7	26.2	26.6
144	13.5	14.0	14.5	14.9	15.4	15.9	16.4	16.9	17.4	17.8	18.3	18.8	19.3	19.8	20.3	20.7	21.2	21.7	22.2	22.7	23.1	23.6	24.1	24.6	25.1	25.6	26.0	26.5	27.0
143	13.7	14.2	14.7	15.2	15.6	16.1	16.6	17.1	17.6	18.1	18.6	19.1	19.6	20.0	20.5	21.0	21.5	22.0	22.5	23.0	23.5	24.0	24.5	24.9	25.4	25.9	26.4	26.9	27.4
142	13.9	14.4	14.9	15.4	15.9	16.4	16.9	17.4	17.9	18.3	18.8	19.3	19.8	20.3	20.8	21.3	21.8	22.3	22.8	23.3	23.8	24.3	24.8	25.3	25.8	26.3	26.8	27.3	27.8
141	14.1	14.6	15.1	15.6	16.1	16.6	17.1	17.6	18.1	18.6	19.1	19.6	20.1	20.6	21.1	21.6	22.1	22.6	23.1	23.6	24.1	24.6	25.1	25.7	26.2	26.7	27.2	27.7	28.2
140	14.3	14.8	15.3	15.8	16.3	16.8	17.3	17.9	18.4	18.9	19.4	19.9	20.4	20.9	21.4	21.9	22.4	23.0	23.5	24.0	24.5	25.0	25.5	26.0	26.5	27.0	27.6	28.1	28.6
139	14.5	15.0	15.5	16.0	16.6	17.1	17.6	18.1	18.6	19.2	19.7	20.2	20.7	21.2	21.7	22.3	22.8	23.3	23.8	24.3	24.8	25.4	25.9	26.4	26.9	27.4	27.9	28.5	29.0
138	14.7	15.2	15.8	16.3	16.8	17.3	17.9	18.4	18.9	19.4	20.0	20.5	21.0	21.5	22.1	22.6	23.1	23.6	24.2	24.7	25.2	25.7	26.3	26.8	27.3	27.8	28.4	28.9	29.4
137	14.9	15.5	16.0	16.5	17.0	17.6	18.1	18.6	19.2	19.7	20.2	20.8	21.3	21.8	22.4	22.9	23.4	24.0	24.5	25.0	25.6	26.1	26.6	27.2	27.7	28.2	28.8	29.3	29.8
136	15.1	15.7	16.2	16.8	17.3	17.8	18.4	18.9	19.5	20.0	20.5	21.1	21.6	22.2	22.7	23.2	23.8	24.3	24.9	25.4	26.0	26.5	27.0	27.6	28.1	28.7	29.2	29.7	30.3
135	15.4	15.9	16.5	17.0	17.6	18.1	18.7	19.2	19.8	20.3	20.9	21.4	21.9	22.5	23.0	23.6	24.1	24.7	25.2	25.8	26.3	26.9	27.4	28.0	28.5	29.1	29.6	30.2	30.7
134	15.6	16.2	16.7	17.3	17.8	18.4	18.9	19.5	20.0	20.6	21.2	21.7	22.3	22.8	23.4	23.9	24.5	25.1	25.6	26.2	26.7	27.3	27.8	28.4	29.0	29.5	30.1	30.6	31.2
Weight (kg)	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56

Adults 134–169 cm tall, table 2 of 2

Height (cm)	Weight (kg)																												
169	20.0	20.3	20.7	21.0	21.4	21.7	22.1	22.4	22.8	23.1	23.5	23.8	24.2	24.5	24.9	25.2	25.6	25.9	26.3	26.6	27.0	27.3	27.7	28.0	28.4	28.7	29.1	29.4	29.8	30.1
168	20.2	20.5	20.9	21.3	21.6	22.0	22.3	22.7	23.0	23.4	23.7	24.1	24.4	24.8	25.2	25.5	25.9	26.2	26.6	26.9	27.3	27.6	28.0	28.3	28.7	29.1	29.4	29.8	30.1	30.5
167	20.4	20.8	21.2	21.5	21.9	22.2	22.6	22.9	23.3	23.7	24.0	24.4	24.7	25.1	25.5	25.8	26.2	26.5	26.9	27.3	27.6	28.0	28.3	28.7	29.0	29.4	29.8	30.1	30.5	30.8
166	20.7	21.0	21.4	21.8	22.1	22.5	22.9	23.2	23.6	24.0	24.3	24.7	25.0	25.4	25.8	26.1	26.5	26.9	27.2	27.6	27.9	28.3	28.7	29.0	29.4	29.8	30.1	30.5	30.8	31.2
165	20.9	21.3	21.7	22.0	22.4	22.8	23.1	23.5	23.9	24.2	24.6	25.0	25.3	25.7	26.1	26.4	26.8	27.2	27.5	27.9	28.3	28.7	29.0	29.4	29.8	30.1	30.5	30.9	31.2	31.6
164	21.2	21.6	21.9	22.3	22.7	23.1	23.4	23.8	24.2	24.5	24.9	25.3	25.7	26.0	26.4	26.8	27.1	27.5	27.9	28.3	28.6	29.0	29.4	29.7	30.1	30.5	30.9	31.2	31.6	32.0
163	21.5	21.8	22.2	22.6	23.0	23.3	23.7	24.1	24.5	24.8	25.2	25.6	26.0	26.3	26.7	27.1	27.5	27.9	28.2	28.6	29.0	29.4	29.7	30.1	30.5	30.9	31.2	31.6	32.0	32.4
162	21.7	22.1	22.5	22.9	23.2	23.6	24.0	24.4	24.8	25.1	25.5	25.9	26.3	26.7	27.1	27.4	27.8	28.2	28.6	29.0	29.3	29.7	30.1	30.5	30.9	31.2	31.6	32.0	32.4	32.8
161	22.0	22.4	22.8	23.1	23.5	23.9	24.3	24.7	25.1	25.5	25.8	26.2	26.6	27.0	27.4	27.8	28.2	28.5	28.9	29.3	29.7	30.1	30.5	30.9	31.2	31.6	32.0	32.4	32.8	33.2
160	22.3	22.7	23.0	23.4	23.8	24.2	24.6	25.0	25.4	25.8	26.2	26.6	27.0	27.3	27.7	28.1	28.5	28.9	29.3	29.7	30.1	30.5	30.9	31.3	31.6	32.0	32.4	32.8	33.2	33.6
159	22.5	22.9	23.3	23.7	24.1	24.5	24.9	25.3	25.7	26.1	26.5	26.9	27.3	27.7	28.1	28.5	28.9	29.3	29.7	30.1	30.5	30.9	31.2	31.6	32.0	32.4	32.8	33.2	33.6	34.0
158	22.8	23.2	23.6	24.0	24.4	24.8	25.2	25.6	26.0	26.4	26.8	27.2	27.6	28.0	28.4	28.8	29.2	29.6	30.0	30.4	30.8	31.2	31.6	32.0	32.4	32.8	33.2	33.6	34.0	34.4
157	23.1	23.5	23.9	24.3	24.7	25.2	25.6	26.0	26.4	26.8	27.2	27.6	28.0	28.4	28.8	29.2	29.6	30.0	30.4	30.8	31.2	31.6	32.0	32.5	32.9	33.3	33.7	34.1	34.5	34.9
156	23.4	23.8	24.2	24.7	25.1	25.5	25.9	26.3	26.7	27.1	27.5	27.9	28.4	28.8	29.2	29.6	30.0	30.4	30.8	31.2	31.6	32.1	32.5	32.9	33.3	33.7	34.1	34.5	34.9	35.3
155	23.7	24.1	24.6	25.0	25.4	25.8	26.2	26.6	27.1	27.5	27.9	28.3	28.7	29.1	29.6	30.0	30.4	30.8	31.2	31.6	32.0	32.5	32.9	33.3	33.7	34.1	34.5	35.0	35.4	35.8
154	24.0	24.5	24.9	25.3	25.7	26.1	26.6	27.0	27.4	27.8	28.3	28.7	29.1	29.5	29.9	30.4	30.8	31.2	31.6	32.0	32.5	32.9	33.3	33.7	34.2	34.6	35.0	35.4	35.8	36.3
153	24.3	24.8	25.2	25.6	26.1	26.5	26.9	27.3	27.8	28.2	28.6	29.0	29.5	29.9	30.3	30.8	31.2	31.6	32.0	32.5	32.9	33.3	33.7	34.2	34.6	35.0	35.5	35.9	36.3	36.7
152	24.7	25.1	25.5	26.0	26.4	26.8	27.3	27.7	28.1	28.6	29.0	29.4	29.9	30.3	30.7	31.2	31.6	32.0	32.5	32.9	33.3	33.8	34.2	34.6	35.1	35.5	35.9	36.4	36.8	37.2
151	25.0	25.4	25.9	26.3	26.8	27.2	27.6	28.1	28.5	28.9	29.4	29.8	30.3	30.7	31.1	31.6	32.0	32.5	32.9	33.3	33.8	34.2	34.6	35.1	35.5	36.0	36.4	36.8	37.3	37.7
150	25.3	25.8	26.2	26.7	27.1	27.6	28.0	28.4	28.9	29.3	29.8	30.2	30.7	31.1	31.6	32.0	32.4	32.9	33.3	33.8	34.2	34.7	35.1	35.6	36.0	36.4	36.9	37.3	37.8	38.2
149	25.7	26.1	26.6	27.0	27.5	27.9	28.4	28.8	29.3	29.7	30.2	30.6	31.1	31.5	32.0	32.4	32.9	33.3	33.8	34.2	34.7	35.1	35.6	36.0	36.5	36.9	37.4	37.8	38.3	38.7
148	26.0	26.5	26.9	27.4	27.8	28.3	28.8	29.2	29.7	30.1	30.6	31.0	31.5	32.0	32.4	32.9	33.3	33.8	34.2	34.7	35.2	35.6	36.1	36.5	37.0	37.4	37.9	38.3	38.8	39.3
147	26.4	26.8	27.3	27.8	28.2	28.7	29.2	29.6	30.1	30.5	31.0	31.5	31.9	32.4	32.9	33.3	33.8	34.2	34.7	35.2	35.6	36.1	36.6	37.0	37.5	37.9	38.4	38.9	39.3	39.8
146	26.7	27.2	27.7	28.1	28.6	29.1	29.6	30.0	30.5	31.0	31.4	31.9	32.4	32.8	33.3	33.8	34.2	34.7	35.2	35.7	36.1	36.6	37.1	37.5	38.0	38.5	38.9	39.4	39.9	40.3
145	27.1	27.6	28.1	28.5	29.0	29.5	30.0	30.4	30.9	31.4	31.9	32.3	32.8	33.3	33.8	34.2	34.7	35.2	35.7	36.1	36.6	37.1	37.6	38.0	38.5	39.0	39.5	40.0	40.4	40.9
144	27.5	28.0	28.5	28.9	29.4	29.9	30.4	30.9	31.3	31.8	32.3	32.8	33.3	33.8	34.2	34.7	35.2	35.7	36.2	36.7	37.1	37.6	38.1	38.6	39.1	39.5	40.0	40.5	41.0	41.5
143	27.9	28.4	28.9	29.3	29.8	30.3	30.8	31.3	31.8	32.3	32.8	33.3	33.7	34.2	34.7	35.2	35.7	36.2	36.7	37.2	37.7	38.1	38.6	39.1	39.6	40.1	40.6	41.1	41.6	42.1
142	28.3	28.8	29.3	29.8	30.3	30.7	31.2	31.7	32.2	32.7	33.2	33.7	34.2	34.7	35.2	35.7	36.2	36.7	37.2	37.7	38.2	38.7	39.2	39.7	40.2	40.7	41.2	41.7	42.2	42.7
141	28.7	29.2	29.7	30.2	30.7	31.2	31.7	32.2	32.7	33.2	33.7	34.2	34.7	35.2	35.7	36.2	36.7	37.2	37.7	38.2	38.7	39.2	39.7	40.2	40.7	41.2	41.7	42.3	42.8	43.3
140	29.1	29.6	30.1	30.6	31.1	31.6	32.1	32.7	33.2	33.7	34.2	34.7	35.2	35.7	36.2	36.7	37.2	37.8	38.3	38.8	39.3	39.8	40.3	40.8	41.3	41.8	42.3	42.9	43.4	43.9
139	29.5	30.0	30.5	31.1	31.6	32.1	32.6	33.1	33.6	34.2	34.7	35.2	35.7	36.2	36.7	37.3	37.8	38.3	38.8	39.3	39.9	40.4	40.9	41.4	41.9	42.4	43.0	43.5	44.0	44.5
138	29.9	30.5	31.0	31.5	32.0	32.6	33.1	33.6	34.1	34.7	35.2	35.7	36.2	36.8	37.3	37.8	38.3	38.9	39.4	39.9	40.4	41.0	41.5	42.0	42.5	43.1	43.6	44.1	44.6	45.2
137	30.4	30.9	31.4	32.0	32.5	33.0	33.6	34.1	34.6	35.2	35.7	36.2	36.8	37.3	37.8	38.4	38.9	39.4	40.0	40.5	41.0	41.6	42.1	42.6	43.2	43.7	44.2	44.8	45.3	45.8
136	30.8	31.4	31.9	32.4	33.0	33.5	34.1	34.6	35.1	35.7	36.2	36.8	37.3	37.8	38.4	38.9	39.5	40.0	40.5	41.1	41.6	42.2	42.7	43.3	43.8	44.3	44.9	45.4	46.0	46.5
135	31.3	31.8	32.4	32.9	33.5	34.0	34.6	35.1	35.7	36.2	36.8	37.3	37.9	38.4	39.0	39.5	40.1	40.6	41.2	41.7	42.2	42.8	43.3	43.9	44.4	45.0	45.5	46.1	46.6	47.2
134	31.7	32.3	32.9	33.4	34.0	34.5	35.1	35.6	36.2	36.8	37.3	37.9	38.4	39.0	39.5	40.1	40.7	41.2	41.8	42.3	42.9	43.4	44.0	44.6	45.1	45.7	46.2	46.8	47.3	47.9
Weight (kg)	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**

KEY	Severe undernutrition (BMI < 16.0)	Moderate undernutrition (BMI ≥ 16.0 to 18.4)	Normal (BMI ≥ 18.5 to 24.9)	Overweight (BMI ≥ 25.0 to 29.9)	Obese (BMI ≥ 30.0)

Adults 170–200 cm tall, table 1 of 2

Height (cm)	Weight (kg)																											
200	11.5	11.8	12.0	12.3	12.5	12.8	13.0	13.3	13.5	13.8	14.0	14.3	14.5	14.8	15.0	15.3	15.5	15.8	16.0	16.3	16.5	16.8	17.0	17.3	17.5	17.8	18.0	18.3	18.5
199	11.6	11.9	12.1	12.4	12.6	12.9	13.1	13.4	13.6	13.9	14.1	14.4	14.6	14.9	15.2	15.4	15.7	15.9	16.2	16.4	16.7	16.9	17.2	17.4	17.7	17.9	18.2	18.4	18.7
198	11.7	12.0	12.2	12.5	12.8	13.0	13.3	13.5	13.8	14.0	14.3	14.5	14.8	15.0	15.3	15.6	15.8	16.1	16.3	16.6	16.8	17.1	17.3	17.6	17.9	18.1	18.4	18.6	18.9
197	11.9	12.1	12.4	12.6	12.9	13.1	13.4	13.7	13.9	14.2	14.4	14.7	14.9	15.2	15.5	15.7	16.0	16.2	16.5	16.7	17.0	17.3	17.5	17.8	18.0	18.3	18.6	18.8	19.1
196	12.0	12.2	12.5	12.8	13.0	13.3	13.5	13.8	14.1	14.3	14.6	14.8	15.1	15.4	15.6	15.9	16.1	16.4	16.7	16.9	17.2	17.4	17.7	18.0	18.2	18.5	18.7	19.0	19.3
195	12.1	12.4	12.6	12.9	13.1	13.4	13.7	13.9	14.2	14.5	14.7	15.0	15.3	15.5	15.8	16.0	16.3	16.6	16.8	17.1	17.4	17.6	17.9	18.1	18.4	18.7	18.9	19.2	19.5
194	12.2	12.5	12.8	13.0	13.3	13.6	13.8	14.1	14.3	14.6	14.9	15.1	15.4	15.7	15.9	16.2	16.5	16.7	17.0	17.3	17.5	17.8	18.1	18.3	18.6	18.9	19.1	19.4	19.7
193	12.3	12.6	12.9	13.2	13.4	13.7	14.0	14.2	14.5	14.8	15.0	15.3	15.6	15.8	16.1	16.4	16.6	16.9	17.2	17.5	17.7	18.0	18.3	18.5	18.8	19.1	19.3	19.6	19.9
192	12.5	12.7	13.0	13.3	13.6	13.8	14.1	14.4	14.6	14.9	15.2	15.5	15.7	16.0	16.3	16.5	16.8	17.1	17.4	17.6	17.9	18.2	18.4	18.7	19.0	19.3	19.5	19.8	20.1
191	12.6	12.9	13.2	13.4	13.7	14.0	14.3	14.5	14.8	15.1	15.4	15.6	15.9	16.2	16.4	16.7	17.0	17.3	17.5	17.8	18.1	18.4	18.6	18.9	19.2	19.5	19.7	20.0	20.3
190	12.7	13.0	13.3	13.6	13.9	14.1	14.4	14.7	15.0	15.2	15.5	15.8	16.1	16.3	16.6	16.9	17.2	17.5	17.7	18.0	18.3	18.6	18.8	19.1	19.4	19.7	19.9	20.2	20.5
189	12.9	13.2	13.4	13.7	14.0	14.3	14.6	14.8	15.1	15.4	15.7	16.0	16.2	16.5	16.8	17.1	17.4	17.6	17.9	18.2	18.5	18.8	19.0	19.3	19.6	19.9	20.2	20.4	20.7
188	13.0	13.3	13.6	13.9	14.1	14.4	14.7	15.0	15.3	15.6	15.8	16.1	16.4	16.7	17.0	17.3	17.5	17.8	18.1	18.4	18.7	19.0	19.2	19.5	19.8	20.1	20.4	20.7	20.9
187	13.2	13.4	13.7	14.0	14.3	14.6	14.9	15.2	15.4	15.7	16.0	16.3	16.6	16.9	17.2	17.4	17.7	18.0	18.3	18.6	18.9	19.2	19.4	19.7	20.0	20.3	20.6	20.9	21.2
186	13.3	13.6	13.9	14.2	14.5	14.7	15.0	15.3	15.6	15.9	16.2	16.5	16.8	17.1	17.3	17.6	17.9	18.2	18.5	18.8	19.1	19.4	19.7	19.9	20.2	20.5	20.8	21.1	21.4
185	13.4	13.7	14.0	14.3	14.6	14.9	15.2	15.5	15.8	16.1	16.4	16.7	16.9	17.2	17.5	17.8	18.1	18.4	18.7	19.0	19.3	19.6	19.9	20.2	20.5	20.7	21.0	21.3	21.6
184	13.6	13.9	14.2	14.5	14.8	15.1	15.4	15.7	15.9	16.2	16.5	16.8	17.1	17.4	17.7	18.0	18.3	18.6	18.9	19.2	19.5	19.8	20.1	20.4	20.7	21.0	21.3	21.6	21.9
183	13.7	14.0	14.3	14.6	14.9	15.2	15.5	15.8	16.1	16.4	16.7	17.0	17.3	17.6	17.9	18.2	18.5	18.8	19.1	19.4	19.7	20.0	20.3	20.6	20.9	21.2	21.5	21.8	22.1
182	13.9	14.2	14.5	14.8	15.1	15.4	15.7	16.0	16.3	16.6	16.9	17.2	17.5	17.8	18.1	18.4	18.7	19.0	19.3	19.6	19.9	20.2	20.5	20.8	21.1	21.4	21.7	22.0	22.3
181	14.0	14.3	14.7	15.0	15.3	15.6	15.9	16.2	16.5	16.8	17.1	17.4	17.7	18.0	18.3	18.6	18.9	19.2	19.5	19.8	20.1	20.5	20.8	21.1	21.4	21.7	22.0	22.3	22.6
180	14.2	14.5	14.8	15.1	15.4	15.7	16.0	16.4	16.7	17.0	17.3	17.6	17.9	18.2	18.5	18.8	19.1	19.4	19.8	20.1	20.4	20.7	21.0	21.3	21.6	21.9	22.2	22.5	22.8
179	14.4	14.7	15.0	15.3	15.6	15.9	16.2	16.5	16.9	17.2	17.5	17.8	18.1	18.4	18.7	19.0	19.4	19.7	20.0	20.3	20.6	20.9	21.2	21.5	21.8	22.2	22.5	22.8	23.1
178	14.5	14.8	15.1	15.5	15.8	16.1	16.4	16.7	17.0	17.4	17.7	18.0	18.3	18.6	18.9	19.3	19.6	19.9	20.2	20.5	20.8	21.1	21.5	21.8	22.1	22.4	22.7	23.0	23.4
177	14.7	15.0	15.3	15.6	16.0	16.3	16.6	16.9	17.2	17.6	17.9	18.2	18.5	18.8	19.2	19.5	19.8	20.1	20.4	20.7	21.1	21.4	21.7	22.0	22.3	22.7	23.0	23.3	23.6
176	14.9	15.2	15.5	15.8	16.1	16.5	16.8	17.1	17.4	17.8	18.1	18.4	18.7	19.0	19.4	19.7	20.0	20.3	20.7	21.0	21.3	21.6	22.0	22.3	22.6	22.9	23.2	23.6	23.9
175	15.0	15.3	15.7	16.0	16.3	16.7	17.0	17.3	17.6	18.0	18.3	18.6	18.9	19.3	19.6	19.9	20.2	20.6	20.9	21.2	21.6	21.9	22.2	22.5	22.9	23.2	23.5	23.8	24.2
174	15.2	15.5	15.9	16.2	16.5	16.8	17.2	17.5	17.8	18.2	18.5	18.8	19.2	19.5	19.8	20.1	20.5	20.8	21.1	21.5	21.8	22.1	22.5	22.8	23.1	23.5	23.8	24.1	24.4
173	15.4	15.7	16.0	16.4	16.7	17.0	17.4	17.7	18.0	18.4	18.7	19.0	19.4	19.7	20.0	20.4	20.7	21.0	21.4	21.7	22.1	22.4	22.7	23.1	23.4	23.7	24.1	24.4	24.7
172	15.5	15.9	16.2	16.6	16.9	17.2	17.6	17.9	18.3	18.6	18.9	19.3	19.6	19.9	20.3	20.6	21.0	21.3	21.6	22.0	22.3	22.6	23.0	23.3	23.7	24.0	24.3	24.7	25.0
171	15.7	16.1	16.4	16.8	17.1	17.4	17.8	18.1	18.5	18.8	19.2	19.5	19.8	20.2	20.5	20.9	21.2	21.5	21.9	22.2	22.6	22.9	23.3	23.6	23.9	24.3	24.6	25.0	25.3
170	15.9	16.3	16.6	17.0	17.3	17.6	18.0	18.3	18.7	19.0	19.4	19.7	20.1	20.4	20.8	21.1	21.5	21.8	22.1	22.5	22.8	23.2	23.5	23.9	24.2	24.6	24.9	25.3	25.6

Adults 170–200 cm tall, table 2 of 2

Height (cm)	Weight (kg)																													
200	18.8	19.0	19.3	19.5	19.8	20.0	20.3	20.5	20.8	21.0	21.3	21.5	21.8	22.0	22.3	22.5	22.8	23.0	23.3	23.5	23.8	24.0	24.3	24.5	24.8	25.0	25.3	25.5	25.8	26.0
199	18.9	19.2	19.4	19.7	19.9	20.2	20.5	20.7	21.0	21.2	21.5	21.7	22.0	22.2	22.5	22.7	23.0	23.2	23.5	23.7	24.0	24.2	24.5	24.7	25.0	25.3	25.5	25.8	26.0	26.3
198	19.1	19.4	19.6	19.9	20.2	20.4	20.7	20.9	21.2	21.4	21.7	21.9	22.2	22.4	22.7	23.0	23.2	23.5	23.7	24.0	24.2	24.5	24.7	25.0	25.3	25.5	25.8	26.0	26.3	26.5
197	19.3	19.6	19.8	20.1	20.4	20.6	20.9	21.1	21.4	21.6	21.9	22.2	22.4	22.7	22.9	23.2	23.4	23.7	24.0	24.2	24.5	24.7	25.0	25.3	25.5	25.8	26.0	26.3	26.5	26.8
196	19.5	19.8	20.0	20.3	20.6	20.8	21.1	21.3	21.6	21.9	22.1	22.4	22.6	22.9	23.2	23.4	23.7	23.9	24.2	24.5	24.7	25.0	25.2	25.5	25.8	26.0	26.3	26.6	26.8	27.1
195	19.7	20.0	20.2	20.5	20.8	21.0	21.3	21.6	21.8	22.1	22.4	22.6	22.9	23.1	23.4	23.7	23.9	24.2	24.5	24.7	25.0	25.2	25.5	25.8	26.0	26.3	26.6	26.8	27.1	27.4
194	19.9	20.2	20.5	20.7	21.0	21.3	21.5	21.8	22.1	22.3	22.6	22.9	23.1	23.4	23.6	23.9	24.2	24.4	24.7	25.0	25.2	25.5	25.8	26.0	26.3	26.6	26.8	27.1	27.4	27.6
193	20.1	20.4	20.7	20.9	21.2	21.5	21.7	22.0	22.3	22.6	22.8	23.1	23.4	23.6	23.9	24.2	24.4	24.7	25.0	25.2	25.5	25.8	26.0	26.3	26.6	26.8	27.1	27.4	27.7	27.9
192	20.3	20.6	20.9	21.2	21.4	21.7	22.0	22.2	22.5	22.8	23.1	23.3	23.6	23.9	24.1	24.4	24.7	25.0	25.2	25.5	25.8	26.0	26.3	26.6	26.9	27.1	27.4	27.7	27.9	28.2
191	20.6	20.8	21.1	21.4	21.7	21.9	22.2	22.5	22.8	23.0	23.3	23.6	23.8	24.1	24.4	24.7	24.9	25.2	25.5	25.8	26.0	26.3	26.6	26.9	27.1	27.4	27.7	28.0	28.2	28.5
190	20.8	21.1	21.3	21.6	21.9	22.2	22.4	22.7	23.0	23.3	23.5	23.8	24.1	24.4	24.7	24.9	25.2	25.5	25.8	26.0	26.3	26.6	26.9	27.1	27.4	27.7	28.0	28.3	28.5	28.8
189	21.0	21.3	21.6	21.8	22.1	22.4	22.7	23.0	23.2	23.5	23.8	24.1	24.4	24.6	24.9	25.2	25.5	25.8	26.0	26.3	26.6	26.9	27.2	27.4	27.7	28.0	28.3	28.6	28.8	29.1
188	21.2	21.5	21.8	22.1	22.4	22.6	22.9	23.2	23.5	23.8	24.0	24.3	24.6	24.9	25.2	25.5	25.7	26.0	26.3	26.6	26.9	27.2	27.4	27.7	28.0	28.3	28.6	28.9	29.1	29.4
187	21.4	21.7	22.0	22.3	22.6	22.9	23.2	23.4	23.7	24.0	24.3	24.6	24.9	25.2	25.5	25.7	26.0	26.3	26.6	26.9	27.2	27.5	27.7	28.0	28.3	28.6	28.9	29.2	29.5	29.7
186	21.7	22.0	22.3	22.5	22.8	23.1	23.4	23.7	24.0	24.3	24.6	24.9	25.1	25.4	25.7	26.0	26.3	26.6	26.9	27.2	27.5	27.7	28.0	28.3	28.6	28.9	29.2	29.5	29.8	30.1
185	21.9	22.2	22.5	22.8	23.1	23.4	23.7	24.0	24.3	24.5	24.8	25.1	25.4	25.7	26.0	26.3	26.6	26.9	27.2	27.5	27.8	28.0	28.3	28.6	28.9	29.2	29.5	29.8	30.1	30.4
184	22.2	22.4	22.7	23.0	23.3	23.6	23.9	24.2	24.5	24.8	25.1	25.4	25.7	26.0	26.3	26.6	26.9	27.2	27.5	27.8	28.1	28.4	28.7	28.9	29.2	29.5	29.8	30.1	30.4	30.7
183	22.4	22.7	23.0	23.3	23.6	23.9	24.2	24.5	24.8	25.1	25.4	25.7	26.0	26.3	26.6	26.9	27.2	27.5	27.8	28.1	28.4	28.7	29.0	29.3	29.6	29.9	30.2	30.5	30.8	31.1
182	22.6	22.9	23.2	23.5	23.8	24.2	24.5	24.8	25.1	25.4	25.7	26.0	26.3	26.6	26.9	27.2	27.5	27.8	28.1	28.4	28.7	29.0	29.3	29.6	29.9	30.2	30.5	30.8	31.1	31.4
181	22.9	23.2	23.5	23.8	24.1	24.4	24.7	25.0	25.3	25.6	25.9	26.3	26.6	26.9	27.2	27.5	27.8	28.1	28.4	28.7	29.0	29.3	29.6	29.9	30.2	30.5	30.8	31.1	31.4	31.7
180	23.1	23.5	23.8	24.1	24.4	24.7	25.0	25.3	25.6	25.9	26.2	26.5	26.9	27.2	27.5	27.8	28.1	28.4	28.7	29.0	29.3	29.6	29.9	30.2	30.6	30.9	31.2	31.5	31.8	32.1
179	23.4	23.7	24.0	24.3	24.7	25.0	25.3	25.6	25.9	26.2	26.5	26.8	27.2	27.5	27.8	28.1	28.4	28.7	29.0	29.3	29.6	30.0	30.3	30.6	30.9	31.2	31.5	31.8	32.1	32.5
178	23.7	24.0	24.3	24.6	24.9	25.2	25.6	25.9	26.2	26.5	26.8	27.1	27.5	27.8	28.1	28.4	28.7	29.0	29.4	29.7	30.0	30.3	30.6	30.9	31.2	31.6	31.9	32.2	32.5	32.8
177	23.9	24.3	24.6	24.9	25.2	25.5	25.9	26.2	26.5	26.8	27.1	27.5	27.8	28.1	28.4	28.7	29.0	29.4	29.7	30.0	30.3	30.6	31.0	31.3	31.6	31.9	32.2	32.6	32.9	33.2
176	24.2	24.5	24.9	25.2	25.5	25.8	26.1	26.5	26.8	27.1	27.4	27.8	28.1	28.4	28.7	29.1	29.4	29.7	30.0	30.3	30.7	31.0	31.3	31.6	32.0	32.3	32.6	32.9	33.3	33.6
175	24.5	24.8	25.1	25.5	25.8	26.1	26.4	26.8	27.1	27.4	27.8	28.1	28.4	28.7	29.1	29.4	29.7	30.0	30.4	30.7	31.0	31.3	31.7	32.0	32.3	32.7	33.0	33.3	33.6	34.0
174	24.8	25.1	25.4	25.8	26.1	26.4	26.8	27.1	27.4	27.7	28.1	28.4	28.7	29.1	29.4	29.7	30.1	30.4	30.7	31.0	31.4	31.7	32.0	32.4	32.7	33.0	33.4	33.7	34.0	34.4
173	25.1	25.4	25.7	26.1	26.4	26.7	27.1	27.4	27.7	28.1	28.4	28.7	29.1	29.4	29.7	30.1	30.4	30.7	31.1	31.4	31.7	32.1	32.4	32.7	33.1	33.4	33.7	34.1	34.4	34.7
172	25.4	25.7	26.0	26.4	26.7	27.0	27.4	27.7	28.1	28.4	28.7	29.1	29.4	29.7	30.1	30.4	30.8	31.1	31.4	31.8	32.1	32.4	32.8	33.1	33.5	33.8	34.1	34.5	34.8	35.2
171	25.6	26.0	26.3	26.7	27.0	27.4	27.7	28.0	28.4	28.7	29.1	29.4	29.8	30.1	30.4	30.8	31.1	31.5	31.8	32.1	32.5	32.8	33.2	33.5	33.9	34.2	34.5	34.9	35.2	35.6
170	26.0	26.3	26.6	27.0	27.3	27.7	28.0	28.4	28.7	29.1	29.4	29.8	30.1	30.4	30.8	31.1	31.5	31.8	32.2	32.5	32.9	33.2	33.6	33.9	34.3	34.6	34.9	35.3	35.6	36.0

KEY				
Severe undernutrition (BMI < 16.0)	Moderate undernutrition (BMI ≥ 16.0 to 18.4)	Normal (BMI ≥ 18.5 to 24.9)	Overweight (BMI ≥ 25.0 to 29.9)	Obese (BMI ≥ 30.0)

Annex 5. BMI and BMI-for-Age Reference Tables for Adolescents 15–18 Years

Step 1. Calculate **BMI** using the BMI Look-Up Table for Adolescents 15–18 Years of Age below.

a. Find height in the vertical column on the left (x axis). (You might have to look at more than one table to find the height.)

b. Find weight in the horizontal column (y axis) at the bottom.

c. The place where the two rows (height and weight) cross is the BMI.

Step 2. Calculate **BMI-for-age** using the BMI-for-Age Tables. There is one for girls and one for boys.

a. Round off the age to the nearest 6 months (for example, 15.0 for an adolescent who is 15 years and 2 months old and 17.0 for an adolescent who is 16 years and 10 months old).

b. Find the row corresponding to years and months in the Age column.

c. Move your finger straight across from left to right to find the child's BMI (from Step 1). Find the child's nutritional status in the top row.

Height (cm)	BMI Reference Table for Adolescents 15–18 Years of Age (118–149 cm tall)																																					
149	8.6	9.0	9.5	9.9	10.4	10.8	11.3	11.7	12.2	12.6	13.1	13.5	14.0	14.4	14.9	15.3	15.8	16.2	16.7	17.1	17.6	18.0	18.5	18.9	19.4	19.8	20.3	20.7	21.2	21.6	22.1	22.5	23.0	23.4	23.9	24.3	24.8	25.2
148	8.7	9.1	9.6	10.0	10.5	11.0	11.4	11.9	12.3	12.8	13.2	13.7	14.2	14.6	15.1	15.5	16.0	16.4	16.9	17.3	17.8	18.3	18.7	19.2	19.6	20.1	20.5	21.0	21.5	21.9	22.4	22.8	23.3	23.7	24.2	24.7	25.1	25.6
147	8.8	9.3	9.7	10.2	10.6	11.1	11.6	12.0	12.5	13.0	13.4	13.9	14.3	14.8	15.3	15.7	16.2	16.7	17.1	17.6	18.0	18.5	19.0	19.4	19.9	20.4	20.8	21.3	21.8	22.2	22.7	23.1	23.6	24.1	24.5	25.0	25.5	25.9
146	8.9	9.4	9.9	10.3	10.8	11.3	11.7	12.2	12.7	13.1	13.6	14.1	14.5	15.0	15.5	16.0	16.4	16.9	17.4	17.8	18.3	18.8	19.2	19.7	20.2	20.6	21.1	21.6	22.0	22.5	23.0	23.5	23.9	24.4	24.9	25.3	25.8	26.3
145	9.0	9.5	10.0	10.5	10.9	11.4	11.9	12.4	12.8	13.3	13.8	14.3	14.7	15.2	15.7	16.2	16.6	17.1	17.6	18.1	18.5	19.0	19.5	20.0	20.5	20.9	21.4	21.9	22.4	22.8	23.3	23.8	24.3	24.7	25.2	25.7	26.2	26.6
144	9.2	9.6	10.1	10.6	11.1	11.6	12.1	12.5	13.0	13.5	14.0	14.5	14.9	15.4	15.9	16.4	16.9	17.4	17.8	18.3	18.8	19.3	19.8	20.3	20.7	21.2	21.7	22.2	22.7	23.1	23.6	24.1	24.6	25.1	25.6	26.0	26.5	27.0
143	9.3	9.8	10.3	10.8	11.2	11.7	12.2	12.7	13.2	13.7	14.2	14.7	15.2	15.6	16.1	16.6	17.1	17.6	18.1	18.6	19.1	19.6	20.0	20.5	21.0	21.5	22.0	22.5	23.0	23.5	24.0	24.5	24.9	25.4	25.9	26.4	26.9	27.4
142	9.4	9.9	10.4	10.9	11.4	11.9	12.4	12.9	13.4	13.9	14.4	14.9	15.4	15.9	16.4	16.9	17.4	17.9	18.3	18.8	19.3	19.8	20.3	20.8	21.3	21.8	22.3	22.8	23.3	23.8	24.3	24.8	25.3	25.8	26.3	26.8	27.3	27.8
141	9.6	10.1	10.6	11.1	11.6	12.1	12.6	13.1	13.6	14.1	14.6	15.1	15.6	16.1	16.6	17.1	17.6	18.1	18.6	19.1	19.6	20.1	20.6	21.1	21.6	22.1	22.6	23.1	23.6	24.1	24.6	25.1	25.7	26.2	26.7	27.2	27.7	28.2
140	9.7	10.2	10.7	11.2	11.7	12.2	12.8	13.3	13.8	14.3	14.8	15.3	15.8	16.3	16.8	17.3	17.9	18.4	18.9	19.4	19.9	20.4	20.9	21.4	21.9	22.4	23.0	23.5	24.0	24.5	25.0	25.5	26.0	26.5	27.0	27.6	28.1	28.6
139	9.8	10.4	10.9	11.4	11.9	12.4	12.9	13.5	14.0	14.5	15.0	15.5	16.0	16.6	17.1	17.6	18.1	18.6	19.2	19.7	20.2	20.7	21.2	21.7	22.3	22.8	23.3	23.8	24.3	24.8	25.4	25.9	26.4	26.9	27.4	27.9	28.5	29.0
138	10.0	10.5	11.0	11.6	12.1	12.6	13.1	13.7	14.2	14.7	15.2	15.8	16.3	16.8	17.3	17.9	18.4	18.9	19.4	20.0	20.5	21.0	21.5	22.1	22.6	23.1	23.6	24.2	24.7	25.2	25.7	26.3	26.8	27.3	27.8	28.4	28.9	29.4
137	10.1	10.7	11.2	11.7	12.3	12.8	13.3	13.9	14.4	14.9	15.5	16.0	16.5	17.0	17.6	18.1	18.6	19.2	19.7	20.2	20.8	21.3	21.8	22.4	22.9	23.4	24.0	24.5	25.0	25.6	26.1	26.6	27.2	27.7	28.2	28.8	29.3	29.8
136	10.3	10.8	11.4	11.9	12.4	13.0	13.5	14.1	14.6	15.1	15.7	16.2	16.8	17.3	17.8	18.4	18.9	19.5	20.0	20.5	21.1	21.6	22.2	22.7	23.2	23.8	24.3	24.9	25.4	26.0	26.5	27.0	27.6	28.1	28.7	29.2	29.7	30.3
135	10.4	11.0	11.5	12.1	12.6	13.2	13.7	14.3	14.8	15.4	15.9	16.5	17.0	17.6	18.1	18.7	19.2	19.8	20.3	20.9	21.4	21.9	22.5	23.0	23.6	24.1	24.7	25.2	25.8	26.3	26.9	27.4	28.0	28.5	29.1	29.6	30.2	30.7
134	10.6	11.1	11.7	12.3	12.8	13.4	13.9	14.5	15.0	15.6	16.2	16.7	17.3	17.8	18.4	18.9	19.5	20.0	20.6	21.2	21.7	22.3	22.8	23.4	23.9	24.5	25.1	25.6	26.2	26.7	27.3	27.8	28.4	29.0	29.5	30.1	30.6	31.2
133	10.7	11.3	11.9	12.4	13.0	13.6	14.1	14.7	15.3	15.8	16.4	17.0	17.5	18.1	18.7	19.2	19.8	20.4	20.9	21.5	22.0	22.6	23.2	23.7	24.3	24.9	25.4	26.0	26.6	27.1	27.7	28.3	28.8	29.4	30.0	30.5	31.1	31.7
132	10.9	11.5	12.1	12.6	13.2	13.8	14.3	14.9	15.5	16.1	16.6	17.2	17.8	18.4	18.9	19.5	20.1	20.7	21.2	21.8	22.4	23.0	23.5	24.1	24.7	25.3	25.8	26.4	27.0	27.5	28.1	28.7	29.3	29.8	30.4	31.0	31.6	32.1
131	11.1	11.7	12.2	12.8	13.4	14.0	14.6	15.2	15.7	16.3	16.9	17.5	18.1	18.6	19.2	19.8	20.4	21.0	21.6	22.1	22.7	23.3	23.9	24.5	25.1	25.6	26.2	26.8	27.4	28.0	28.6	29.1	29.7	30.3	30.9	31.5	32.0	32.6
130	11.2	11.8	12.4	13.0	13.6	14.2	14.8	15.4	16.0	16.6	17.2	17.8	18.3	18.9	19.5	20.1	20.7	21.3	21.9	22.5	23.1	23.7	24.3	24.9	25.4	26.0	26.6	27.2	27.8	28.4	29.0	29.6	30.2	30.8	31.4	32.0	32.5	33.1
129	11.4	12.0	12.6	13.2	13.8	14.4	15.0	15.6	16.2	16.8	17.4	18.0	18.6	19.2	19.8	20.4	21.0	21.6	22.2	22.8	23.4	24.0	24.6	25.2	25.8	26.4	27.0	27.6	28.2	28.8	29.4	30.0	30.6	31.2	31.8	32.4	33.1	33.7
128	11.6	12.2	12.8	13.4	14.0	14.6	15.3	15.9	16.5	17.1	17.7	18.3	18.9	19.5	20.1	20.8	21.4	22.0	22.6	23.2	23.8	24.4	25.0	25.6	26.2	26.9	27.5	28.1	28.7	29.3	29.9	30.5	31.1	31.7	32.3	33.0	33.6	34.2
127	11.8	12.4	13.0	13.6	14.3	14.9	15.5	16.1	16.7	17.4	18.0	18.6	19.2	19.8	20.5	21.1	21.7	22.3	22.9	23.6	24.2	24.8	25.4	26.0	26.7	27.3	27.9	28.5	29.1	29.8	30.4	31.0	31.6	32.2	32.9	33.5	34.1	34.7
126	12.0	12.6	13.2	13.9	14.5	15.1	15.7	16.4	17.0	17.6	18.3	18.9	19.5	20.2	20.8	21.4	22.0	22.7	23.3	23.9	24.6	25.2	25.8	26.5	27.1	27.7	28.3	29.0	29.6	30.2	30.9	31.5	32.1	32.8	33.4	34.0	34.6	35.3
125	12.2	12.8	13.4	14.1	14.7	15.4	16.0	16.6	17.3	17.9	18.6	19.2	19.8	20.5	21.1	21.8	22.4	23.0	23.7	24.3	25.0	25.6	26.2	26.9	27.5	28.2	28.8	29.4	30.1	30.7	31.4	32.0	32.6	33.3	33.9	34.6	35.2	35.8
124	12.4	13.0	13.7	14.3	15.0	15.6	16.3	16.9	17.6	18.2	18.9	19.5	20.2	20.8	21.5	22.1	22.8	23.4	24.1	24.7	25.4	26.0	26.7	27.3	28.0	28.6	29.3	29.9	30.6	31.2	31.9	32.5	33.2	33.8	34.5	35.1	35.8	36.4
123	12.6	13.2	13.9	14.5	15.2	15.9	16.5	17.2	17.8	18.5	19.2	19.8	20.5	21.2	21.8	22.5	23.1	23.8	24.5	25.1	25.8	26.4	27.1	27.8	28.4	29.1	29.7	30.4	31.1	31.7	32.4	33.0	33.7	34.4	35.0	35.7	36.4	37.0
122	12.8	13.4	14.1	14.8	15.5	16.1	16.8	17.5	18.1	18.8	19.5	20.2	20.8	21.5	22.2	22.8	23.5	24.2	24.9	25.5	26.2	26.9	27.5	28.2	28.9	29.6	30.2	30.9	31.6	32.2	32.9	33.6	34.3	34.9	35.6	36.3	37.0	37.6
121	13.0	13.7	14.3	15.0	15.7	16.4	17.1	17.8	18.4	19.1	19.8	20.5	21.2	21.9	22.5	23.2	23.9	24.6	25.3	26.0	26.6	27.3	28.0	28.7	29.4	30.1	30.7	31.4	32.1	32.8	33.5	34.2	34.8	35.5	36.2	36.9	37.6	38.2
120	13.2	13.9	14.6	15.3	16.0	16.7	17.4	18.1	18.8	19.4	20.1	20.8	21.5	22.2	22.9	23.6	24.3	25.0	25.7	26.4	27.1	27.8	28.5	29.2	29.9	30.6	31.3	31.9	32.6	33.3	34.0	34.7	35.4	36.1	36.8	37.5	38.2	38.9
119	13.4	14.1	14.8	15.5	16.2	16.9	17.7	18.4	19.1	19.8	20.5	21.2	21.9	22.6	23.3	24.0	24.7	25.4	26.1	26.8	27.5	28.2	29.0	29.7	30.4	31.1	31.8	32.5	33.2	33.9	34.6	35.3	36.0	36.7	37.4	38.1	38.8	39.5
118	13.6	14.4	15.1	15.8	16.5	17.2	18.0	18.7	19.4	20.1	20.8	21.5	22.3	23.0	23.7	24.4	25.1	25.9	26.6	27.3	28.0	28.7	29.4	30.2	30.9	31.6	32.3	33.0	33.8	34.5	35.2	35.9	36.6	37.3	38.1	38.8	39.5	40.2
Weight (kg)	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**

BMI Reference Table for Adolescents 15–18 Years of Age (126–167 cm tall)

Height (cm)																																													
175	9.8	10.1	10.4	10.8	11.1	11.4	11.8	12.1	12.4	12.7	13.1	13.4	13.7	14.0	14.4	14.7	15.0	15.3	15.7	16.0	16.3	16.7	17.0	17.3	17.6	18.0	18.3	18.6	18.9	19.3	19.6	19.9	20.2	20.6	20.9	21.2	21.6	21.9	22.2	22.5	22.9	23.2	23.5	23.8	24.2
174	9.9	10.2	10.6	10.9	11.2	11.6	11.9	12.2	12.6	12.9	13.2	13.5	13.9	14.2	14.5	14.9	15.2	15.5	15.9	16.2	16.5	16.8	17.2	17.5	17.8	18.2	18.5	18.8	19.2	19.5	19.8	20.1	20.5	20.8	21.1	21.5	21.8	22.1	22.5	22.8	23.1	23.5	23.8	24.1	24.4
173	10.0	10.4	10.7	11.0	11.4	11.7	12.0	12.4	12.7	13.0	13.4	13.7	14.0	14.4	14.7	15.0	15.4	15.7	16.0	16.4	16.7	17.0	17.4	17.7	18.0	18.4	18.7	19.0	19.4	19.7	20.0	20.4	20.7	21.0	21.4	21.7	22.1	22.4	22.7	23.1	23.4	23.7	24.1	24.4	24.7
172	10.1	10.5	10.8	11.2	11.5	11.8	12.2	12.5	12.8	13.2	13.5	13.9	14.2	14.5	14.9	15.2	15.5	15.9	16.2	16.6	16.9	17.2	17.6	17.9	18.3	18.6	18.9	19.3	19.6	19.9	20.3	20.6	21.0	21.3	21.6	22.0	22.3	22.6	23.0	23.3	23.7	24.0	24.3	24.7	25.0
171	10.3	10.6	10.9	11.3	11.6	12.0	12.3	12.7	13.0	13.3	13.7	14.0	14.4	14.7	15.0	15.4	15.7	16.1	16.4	16.8	17.1	17.4	17.8	18.1	18.5	18.8	19.2	19.5	19.8	20.2	20.5	20.9	21.2	21.5	21.9	22.2	22.6	22.9	23.3	23.6	23.9	24.3	24.6	25.0	25.3
170	10.4	10.7	11.1	11.4	11.8	12.1	12.5	12.8	13.1	13.5	13.8	14.2	14.5	14.9	15.2	15.6	15.9	16.3	16.6	17.0	17.3	17.6	18.0	18.3	18.7	19.0	19.4	19.7	20.1	20.4	20.8	21.1	21.5	21.8	22.1	22.5	22.8	23.2	23.5	23.9	24.2	24.6	24.9	25.3	25.6
169	10.5	10.9	11.2	11.6	11.9	12.3	12.6	13.0	13.3	13.7	14.0	14.4	14.7	15.1	15.4	15.8	16.1	16.5	16.8	17.2	17.5	17.9	18.2	18.6	18.9	19.3	19.6	20.0	20.3	20.7	21.0	21.4	21.7	22.1	22.4	22.8	23.1	23.5	23.8	24.2	24.5	24.9	25.2	25.6	25.9
168	10.6	11.0	11.3	11.7	12.0	12.4	12.8	13.1	13.5	13.8	14.2	14.5	14.9	15.2	15.6	15.9	16.3	16.7	17.0	17.4	17.7	18.1	18.4	18.8	19.1	19.5	19.8	20.2	20.5	20.9	21.3	21.6	22.0	22.3	22.7	23.0	23.4	23.7	24.1	24.4	24.8	25.2	25.5	25.9	26.2
167	10.8	11.1	11.5	11.8	12.2	12.5	12.9	13.3	13.6	14.0	14.3	14.7	15.1	15.4	15.8	16.1	16.5	16.9	17.2	17.6	17.9	18.3	18.6	19.0	19.4	19.7	20.1	20.4	20.8	21.2	21.5	21.9	22.2	22.6	22.9	23.3	23.7	24.0	24.4	24.7	25.1	25.5	25.8	26.2	26.5
166	10.9	11.2	11.6	12.0	12.3	12.7	13.1	13.4	13.8	14.2	14.5	14.9	15.2	15.6	16.0	16.3	16.7	17.1	17.4	17.8	18.1	18.5	18.9	19.2	19.6	20.0	20.3	20.7	21.0	21.4	21.8	22.1	22.5	22.9	23.2	23.6	24.0	24.3	24.7	25.0	25.4	25.8	26.1	26.5	26.9
165	11.0	11.4	11.8	12.1	12.5	12.9	13.2	13.6	14.0	14.3	14.7	15.1	15.4	15.8	16.2	16.5	16.9	17.3	17.6	18.0	18.4	18.7	19.1	19.5	19.8	20.2	20.6	20.9	21.3	21.7	22.0	22.4	22.8	23.1	23.5	23.9	24.2	24.6	25.0	25.3	25.7	26.1	26.4	26.8	27.2
164	11.2	11.5	11.9	12.3	12.6	13.0	13.4	13.8	14.1	14.5	14.9	15.2	15.6	16.0	16.4	16.7	17.1	17.5	17.8	18.2	18.6	19.0	19.3	19.7	20.1	20.4	20.8	21.2	21.6	21.9	22.3	22.7	23.1	23.4	23.8	24.2	24.5	24.9	25.3	25.7	26.0	26.4	26.8	27.1	27.5
163	11.3	11.7	12.0	12.4	12.8	13.2	13.5	13.9	14.3	14.7	15.1	15.4	15.8	16.2	16.6	16.9	17.3	17.7	18.1	18.4	18.8	19.2	19.6	19.9	20.3	20.7	21.1	21.5	21.8	22.2	22.6	23.0	23.3	23.7	24.1	24.5	24.8	25.2	25.6	26.0	26.3	26.7	27.1	27.5	27.9
162	11.4	11.8	12.2	12.6	13.0	13.3	13.7	14.1	14.5	14.9	15.2	15.6	16.0	16.4	16.8	17.1	17.5	17.9	18.3	18.7	19.1	19.4	19.8	20.2	20.6	21.0	21.3	21.7	22.1	22.5	22.9	23.2	23.6	24.0	24.4	24.8	25.1	25.5	25.9	26.3	26.7	27.1	27.4	27.8	28.2
161	11.6	12.0	12.3	12.7	13.1	13.5	13.9	14.3	14.7	15.0	15.4	15.8	16.2	16.6	17.0	17.4	17.7	18.1	18.5	18.9	19.3	19.7	20.1	20.4	20.8	21.2	21.6	22.0	22.4	22.8	23.1	23.5	23.9	24.3	24.7	25.1	25.5	25.8	26.2	26.6	27.0	27.4	27.8	28.2	28.5
160	11.7	12.1	12.5	12.9	13.3	13.7	14.1	14.5	14.8	15.2	15.6	16.0	16.4	16.8	17.2	17.6	18.0	18.4	18.8	19.1	19.5	19.9	20.3	20.7	21.1	21.5	21.9	22.3	22.7	23.0	23.4	23.8	24.2	24.6	25.0	25.4	25.8	26.2	26.6	27.0	27.3	27.7	28.1	28.5	28.9
159	11.9	12.3	12.7	13.1	13.4	13.8	14.2	14.6	15.0	15.4	15.8	16.2	16.6	17.0	17.4	17.8	18.2	18.6	19.0	19.4	19.8	20.2	20.6	21.0	21.4	21.8	22.2	22.5	22.9	23.3	23.7	24.1	24.5	24.9	25.3	25.7	26.1	26.5	26.9	27.3	27.7	28.1	28.5	28.9	29.3
158	12.0	12.4	12.8	13.2	13.6	14.0	14.4	14.8	15.2	15.6	16.0	16.4	16.8	17.2	17.6	18.0	18.4	18.8	19.2	19.6	20.0	20.4	20.8	21.2	21.6	22.0	22.4	22.8	23.2	23.6	24.0	24.4	24.8	25.2	25.6	26.0	26.4	26.8	27.2	27.6	28.0	28.4	28.8	29.2	29.6
157	12.2	12.6	13.0	13.4	13.8	14.2	14.6	15.0	15.4	15.8	16.2	16.6	17.0	17.4	17.9	18.3	18.7	19.1	19.5	19.9	20.3	20.7	21.1	21.5	21.9	22.3	22.7	23.1	23.5	23.9	24.3	24.7	25.2	25.6	26.0	26.4	26.8	27.2	27.6	28.0	28.4	28.8	29.2	29.6	30.0
156	12.3	12.7	13.1	13.6	14.0	14.4	14.8	15.2	15.6	16.0	16.4	16.8	17.3	17.7	18.1	18.5	18.9	19.3	19.7	20.1	20.5	21.0	21.4	21.8	22.2	22.6	23.0	23.4	23.8	24.2	24.7	25.1	25.5	25.9	26.3	26.7	27.1	27.5	27.9	28.4	28.8	29.2	29.6	30.0	30.4
155	12.5	12.9	13.3	13.7	14.2	14.6	15.0	15.4	15.8	16.2	16.6	17.1	17.5	17.9	18.3	18.7	19.1	19.6	20.0	20.4	20.8	21.2	21.6	22.1	22.5	22.9	23.3	23.7	24.1	24.6	25.0	25.4	25.8	26.2	26.6	27.1	27.5	27.9	28.3	28.7	29.1	29.6	30.0	30.4	30.8
154	12.6	13.1	13.5	13.9	14.3	14.8	15.2	15.6	16.0	16.4	16.9	17.3	17.7	18.1	18.6	19.0	19.4	19.8	20.2	20.7	21.1	21.5	21.9	22.3	22.8	23.2	23.6	24.0	24.5	24.9	25.3	25.7	26.1	26.6	27.0	27.4	27.8	28.3	28.7	29.1	29.5	29.9	30.4	30.8	31.2
153	12.8	13.2	13.7	14.1	14.5	15.0	15.4	15.8	16.2	16.7	17.1	17.5	17.9	18.4	18.8	19.2	19.7	20.1	20.5	20.9	21.4	21.8	22.2	22.6	23.1	23.5	23.9	24.3	24.8	25.2	25.6	26.1	26.5	26.9	27.3	27.8	28.2	28.6	29.0	29.5	29.9	30.3	30.8	31.2	31.6
152	13.0	13.4	13.9	14.3	14.7	15.1	15.6	16.0	16.4	16.9	17.3	17.7	18.2	18.6	19.0	19.5	19.9	20.3	20.8	21.2	21.6	22.1	22.5	22.9	23.4	23.8	24.2	24.7	25.1	25.5	26.0	26.4	26.8	27.3	27.7	28.1	28.6	29.0	29.4	29.9	30.3	30.7	31.2	31.6	32.0
151	13.2	13.6	14.0	14.5	14.9	15.4	15.8	16.2	16.7	17.1	17.5	18.0	18.4	18.9	19.3	19.7	20.2	20.6	21.1	21.5	21.9	22.4	22.8	23.2	23.7	24.1	24.6	25.0	25.4	25.9	26.3	26.8	27.2	27.6	28.1	28.5	28.9	29.4	29.8	30.3	30.7	31.1	31.6	32.0	32.5
150	13.3	13.8	14.2	14.7	15.1	15.6	16.0	16.4	16.9	17.3	17.8	18.2	18.7	19.1	19.6	20.0	20.4	20.9	21.3	21.8	22.2	22.7	23.1	23.6	24.0	24.4	24.9	25.3	25.8	26.2	26.7	27.1	27.6	28.0	28.4	28.9	29.3	29.8	30.2	30.7	31.1	31.6	32.0	32.4	32.9
Weight (kg)	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**

BMI Reference Table for Adolescents 15–18 Years of Age (176–198 cm tall)

Height (cm)																																														
198	10.5	10.7	11.0	11.2	11.5	11.7	12.0	12.2	12.5	12.8	13.0	13.3	13.5	13.8	14.0	14.3	14.5	14.8	15.0	15.3	15.6	15.8	16.1	16.3	16.6	16.8	17.1	17.3	17.6	17.9	18.1	18.4	18.6	18.9	19.1	19.4	19.6	19.9	20.2	20.4	20.7	20.9	21.2	21.4	21.7	21.9
197	10.6	10.8	11.1	11.3	11.6	11.9	12.1	12.4	12.6	12.9	13.1	13.4	13.7	13.9	14.2	14.4	14.7	14.9	15.2	15.5	15.7	16.0	16.2	16.5	16.7	17.0	17.3	17.5	17.8	18.0	18.3	18.6	18.8	19.1	19.3	19.6	19.8	20.1	20.4	20.6	20.9	21.1	21.4	21.6	21.9	22.2
196	10.7	10.9	11.2	11.5	11.7	12.0	12.2	12.5	12.8	13.0	13.3	13.5	13.8	14.1	14.3	14.6	14.8	15.1	15.4	15.6	15.9	16.1	16.4	16.7	16.9	17.2	17.4	17.7	18.0	18.2	18.5	18.7	19.0	19.3	19.5	19.8	20.0	20.3	20.6	20.8	21.1	21.3	21.6	21.9	22.1	22.4
195	10.8	11.0	11.3	11.6	11.8	12.1	12.4	12.6	12.9	13.1	13.4	13.7	13.9	14.2	14.5	14.7	15.0	15.3	15.5	15.8	16.0	16.3	16.6	16.8	17.1	17.4	17.6	17.9	18.1	18.4	18.7	18.9	19.2	19.5	19.7	20.0	20.2	20.5	20.8	21.0	21.3	21.6	21.8	22.1	22.4	22.6
194	10.9	11.2	11.4	11.7	12.0	12.2	12.5	12.8	13.0	13.3	13.6	13.8	14.1	14.3	14.6	14.9	15.1	15.4	15.7	15.9	16.2	16.5	16.7	17.0	17.3	17.5	17.8	18.1	18.3	18.6	18.9	19.1	19.4	19.7	19.9	20.2	20.5	20.7	21.0	21.3	21.5	21.8	22.1	22.3	22.6	22.9
193	11.0	11.3	11.5	11.8	12.1	12.3	12.6	12.9	13.2	13.4	13.7	14.0	14.2	14.5	14.8	15.0	15.3	15.6	15.8	16.1	16.4	16.6	16.9	17.2	17.5	17.7	18.0	18.3	18.5	18.8	19.1	19.3	19.6	19.9	20.1	20.4	20.7	20.9	21.2	21.5	21.7	22.0	22.3	22.6	22.8	23.1
192	11.1	11.4	11.7	11.9	12.2	12.5	12.7	13.0	13.3	13.6	13.8	14.1	14.4	14.6	14.9	15.2	15.5	15.7	16.0	16.3	16.5	16.8	17.1	17.4	17.6	17.9	18.2	18.4	18.7	19.0	19.3	19.5	19.8	20.1	20.3	20.6	20.9	21.2	21.4	21.7	22.0	22.2	22.5	22.8	23.1	23.3
191	11.2	11.5	11.8	12.1	12.3	12.6	12.9	13.2	13.4	13.7	14.0	14.3	14.5	14.8	15.1	15.4	15.6	15.9	16.2	16.4	16.7	17.0	17.3	17.5	17.8	18.1	18.4	18.6	18.9	19.2	19.5	19.7	20.0	20.3	20.6	20.8	21.1	21.4	21.7	21.9	22.2	22.5	22.8	23.0	23.3	23.6
190	11.4	11.6	11.9	12.2	12.5	12.7	13.0	13.3	13.6	13.9	14.1	14.4	14.7	15.0	15.2	15.5	15.8	16.1	16.3	16.6	16.9	17.2	17.5	17.7	18.0	18.3	18.6	18.8	19.1	19.4	19.7	19.9	20.2	20.5	20.8	21.1	21.3	21.6	21.9	22.2	22.4	22.7	23.0	23.3	23.5	23.8
189	11.5	11.8	12.0	12.3	12.6	12.9	13.2	13.4	13.7	14.0	14.3	14.6	14.8	15.1	15.4	15.7	16.0	16.2	16.5	16.8	17.1	17.4	17.6	17.9	18.2	18.5	18.8	19.0	19.3	19.6	19.9	20.2	20.4	20.7	21.0	21.3	21.6	21.8	22.1	22.4	22.7	23.0	23.2	23.5	23.8	24.1
188	11.6	11.9	12.2	12.4	12.7	13.0	13.3	13.6	13.9	14.1	14.4	14.7	15.0	15.3	15.6	15.8	16.1	16.4	16.7	17.0	17.3	17.5	17.8	18.1	18.4	18.7	19.0	19.2	19.5	19.8	20.1	20.4	20.7	20.9	21.2	21.5	21.8	22.1	22.4	22.6	22.9	23.2	23.5	23.8	24.0	24.3
187	11.7	12.0	12.3	12.6	12.9	13.2	13.4	13.7	14.0	14.3	14.6	14.9	15.2	15.4	15.7	16.0	16.3	16.6	16.9	17.2	17.4	17.7	18.0	18.3	18.6	18.9	19.2	19.4	19.7	20.0	20.3	20.6	20.9	21.2	21.4	21.7	22.0	22.3	22.6	22.9	23.2	23.4	23.7	24.0	24.3	24.6
186	11.9	12.1	12.4	12.7	13.0	13.3	13.6	13.9	14.2	14.5	14.7	15.0	15.3	15.6	15.9	16.2	16.5	16.8	17.1	17.3	17.6	17.9	18.2	18.5	18.8	19.1	19.4	19.7	19.9	20.2	20.5	20.8	21.1	21.4	21.7	22.0	22.3	22.5	22.8	23.1	23.4	23.7	24.0	24.3	24.6	24.9
185	12.0	12.3	12.6	12.9	13.1	13.4	13.7	14.0	14.3	14.6	14.9	15.2	15.5	15.8	16.1	16.4	16.7	16.9	17.2	17.5	17.8	18.1	18.4	18.7	19.0	19.3	19.6	19.9	20.2	20.5	20.7	21.0	21.3	21.6	21.9	22.2	22.5	22.8	23.1	23.4	23.7	24.0	24.3	24.5	24.8	25.1
184	12.1	12.4	12.7	13.0	13.3	13.6	13.9	14.2	14.5	14.8	15.1	15.4	15.7	15.9	16.2	16.5	16.8	17.1	17.4	17.7	18.0	18.3	18.6	18.9	19.2	19.5	19.8	20.1	20.4	20.7	21.0	21.3	21.6	21.9	22.2	22.4	22.7	23.0	23.3	23.6	23.9	24.2	24.5	24.8	25.1	25.4
183	12.2	12.5	12.8	13.1	13.4	13.7	14.0	14.3	14.6	14.9	15.2	15.5	15.8	16.1	16.4	16.7	17.0	17.3	17.6	17.9	18.2	18.5	18.8	19.1	19.4	19.7	20.0	20.3	20.6	20.9	21.2	21.5	21.8	22.1	22.4	22.7	23.0	23.3	23.6	23.9	24.2	24.5	24.8	25.1	25.4	25.7
182	12.4	12.7	13.0	13.3	13.6	13.9	14.2	14.5	14.8	15.1	15.4	15.7	16.0	16.3	16.6	16.9	17.2	17.5	17.8	18.1	18.4	18.7	19.0	19.3	19.6	19.9	20.2	20.5	20.8	21.1	21.4	21.7	22.0	22.3	22.6	22.9	23.2	23.5	23.8	24.2	24.5	24.8	25.1	25.4	25.7	26.0
181	12.5	12.8	13.1	13.4	13.7	14.0	14.3	14.7	15.0	15.3	15.6	15.9	16.2	16.5	16.8	17.1	17.4	17.7	18.0	18.3	18.6	18.9	19.2	19.5	19.8	20.1	20.5	20.8	21.1	21.4	21.7	22.0	22.3	22.6	22.9	23.2	23.5	23.8	24.1	24.4	24.7	25.0	25.3	25.6	25.9	26.3
180	12.7	13.0	13.3	13.6	13.9	14.2	14.5	14.8	15.1	15.4	15.7	16.0	16.4	16.7	17.0	17.3	17.6	17.9	18.2	18.5	18.8	19.1	19.4	19.8	20.1	20.4	20.7	21.0	21.3	21.6	21.9	22.2	22.5	22.8	23.1	23.5	23.8	24.1	24.4	24.7	25.0	25.3	25.6	25.9	26.2	26.5
179	12.8	13.1	13.4	13.7	14.0	14.4	14.7	15.0	15.3	15.6	15.9	16.2	16.5	16.9	17.2	17.5	17.8	18.1	18.4	18.7	19.0	19.4	19.7	20.0	20.3	20.6	20.9	21.2	21.5	21.8	22.2	22.5	22.8	23.1	23.4	23.7	24.0	24.3	24.7	25.0	25.3	25.6	25.9	26.2	26.5	26.8
178	12.9	13.3	13.6	13.9	14.2	14.5	14.8	15.1	15.5	15.8	16.1	16.4	16.7	17.0	17.4	17.7	18.0	18.3	18.6	18.9	19.3	19.6	19.9	20.2	20.5	20.8	21.1	21.5	21.8	22.1	22.4	22.7	23.0	23.4	23.7	24.0	24.3	24.6	24.9	25.2	25.6	25.9	26.2	26.5	26.8	27.1
177	13.1	13.4	13.7	14.0	14.4	14.7	15.0	15.3	15.6	16.0	16.3	16.6	16.9	17.2	17.6	17.9	18.2	18.5	18.8	19.2	19.5	19.8	20.1	20.4	20.7	21.1	21.4	21.7	22.0	22.3	22.7	23.0	23.3	23.6	23.9	24.3	24.6	24.9	25.2	25.5	25.9	26.2	26.5	26.8	27.1	27.5
176	13.2	13.6	13.9	14.2	14.5	14.9	15.2	15.5	15.8	16.1	16.5	16.8	17.1	17.4	17.8	18.1	18.4	18.7	19.0	19.4	19.7	20.0	20.3	20.7	21.0	21.3	21.6	22.0	22.3	22.6	22.9	23.2	23.6	23.9	24.2	24.5	24.9	25.2	25.5	25.8	26.1	26.5	26.8	27.1	27.4	27.8
(kg)	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**

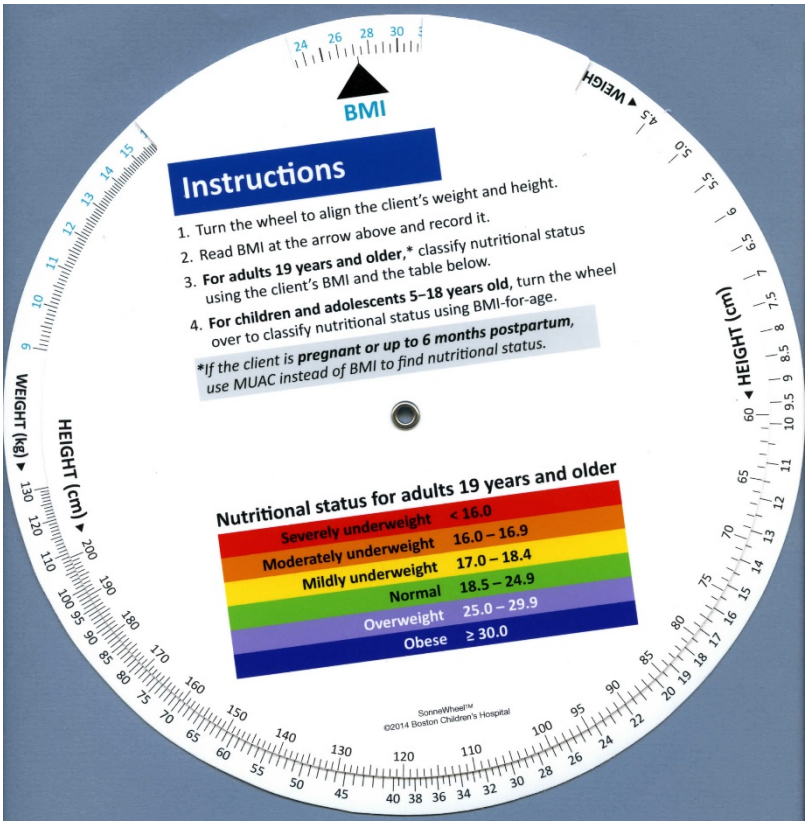
BMI-for-Age Table, Girls 15–18 Years (WHO 2007)

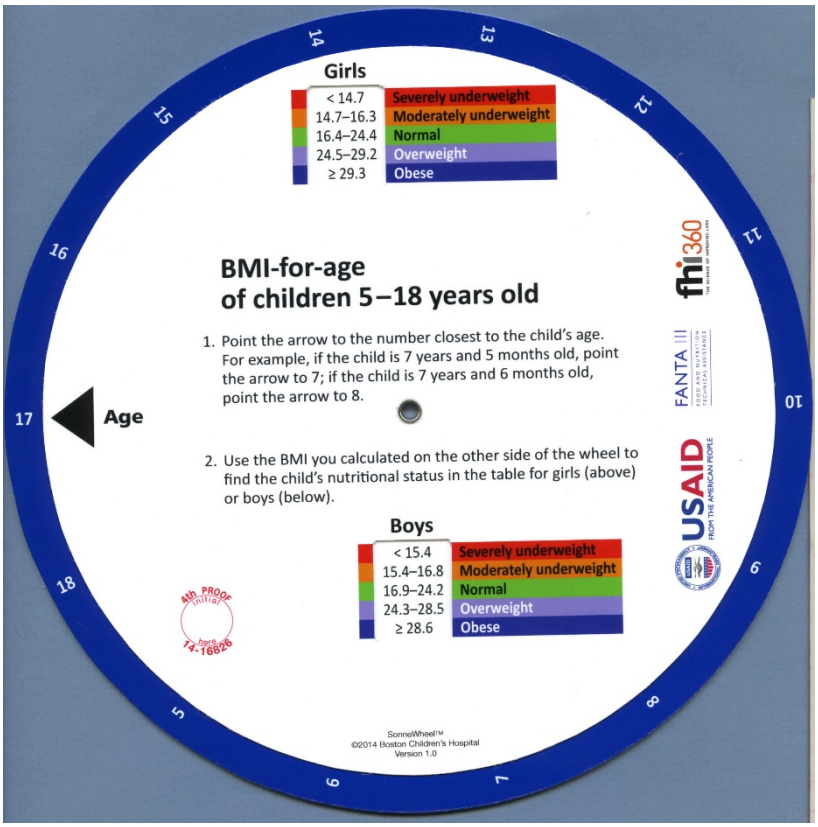
Age (years:months)	Severe undernutrition < –3 SD (BMI)	Moderate undernutrition ≥ –3 to < –2 SD (BMI)	Normal ≥ –2 to < +1 SD (BMI)	Overweight ≥ +1 to < +2 SD (BMI)	Obese ≥ +2 SD (BMI)
15:0	< 14.4	14.4–15.8	15.9–23.4	23.5–28.1	≥ 28.2
15:6	< 14.5	14.5–15.9	16.0–23.7	23.8–28.5	≥ 28.6
16:0	< 14.6	14.6–16.1	16.2–24.0	24.1–28.8	≥ 28.9
16:6	< 14.7	14.7–16.2	16.3–24.2	24.3–29.0	≥ 29.1
17:0	< 14.7	14.7–16.3	16.4–24.4	24.5–29.2	≥ 29.3
17:6	< 14.7	14.7–16.3	16.4–24.5	24.6–29.3	≥ 29.4
18:0	< 14.7	14.7–16.3	16.4–24.7	24.8–29.4	≥ 29.5

BMI-for-Age Table, Boys 15–18 Years (WHO 2007)

Age (years:months)	Severe undernutrition < –3 SD (BMI)	Moderate undernutrition ≥ –3 to < –2 SD (BMI)	Normal ≥ –2 to < +1 SD (BMI)	Overweight ≥ +1 to < +2 SD (BMI)	Obese ≥ +2 SD (BMI)
15:0	< 14.7	14.7–15.9	16.0–22.6	22.7–26.9	≥ 27.0
15:6	< 14.9	14.9–16.2	16.3–23.0	23.1–27.3	≥ 27.4
16:0	< 15.1	15.1–16.4	16.5–23.4	23.5–27.8	≥ 27.9
16:6	< 15.3	15.3–16.6	16.7–23.8	23.9–28.2	≥ 28.3
17:0	< 15.4	15.4–16.8	16.9–24.2	24.3–28.5	≥ 28.6
17:6	< 15.6	15.6–17.0	17.1–24.5	24.6–28.9	≥ 29.0
18:0	< 15.7	15.7–17.2	17.3–24.8	24.9–29.1	≥ 29.2

Annex 6. How to Find BMI and BMI-for-Age Using a BMI Wheel





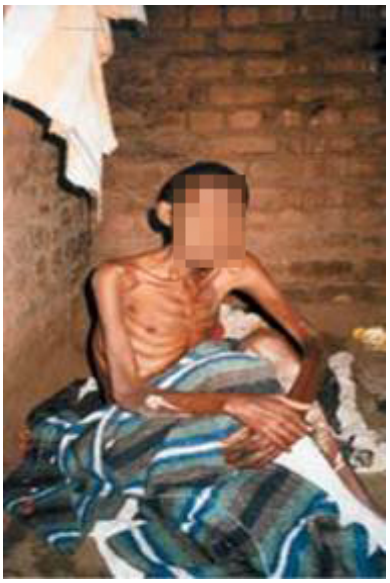
Annex 7. Laboratory Tests that Can Identify Nutrition Problems

The table below lists some laboratory tests that can identify nutrition problems, along with interpretation of results.

Test	Normal results	Low number	High number
Metabolic tests			
Glucose	70–99 mg/dL	Hypoglycaemia, liver disease, adrenal insufficiency, excess insulin	Hyperglycaemia, certain types of diabetes, pre-diabetes, pancreatitis, hyperthyroidism
Blood urea nitrogen (BUN)	7–20 mg/dL	Undernutrition	Liver or kidney disease, heart failure
Creatinine	0.8–1.4 mg/dL	Low muscle mass, undernutrition	Chronic or temporary decrease in kidney function
BUN/creatinine ration	10:1 to 20:1	Undernutrition	Blood in bowels, kidney obstruction, dehydration
Calcium	8.5–10.9 mg/dL	Calcium, magnesium, or vitamin D deficiency; undernutrition; pancreatitis; neurological disorders	Excess vitamin D intake, kidney disease, cancer, hyperthyroidism
Protein	6.3–7.9 g/dL	Liver or kidney disease, undernutrition	Dehydration, liver or kidney disease, multiple myeloma
Albumin	3.9–5.0 g/dL	Liver or kidney disease, undernutrition	Dehydration
Alkaline phipotase	44–147 IU/L	Undernutrition	Paget's disease or certain cancers that spread to bone, bile duct obstruction, liver cancer
Alanine amino-transferase	8–37 IU/L	Generally not a concern	Certain toxins such as excess acetaminophen or alcohol, hepatitis
Blood tests			
White blood cell count	4,500–10,000 cells/mcL	Autoimmune illness, bone marrow failure, viral infections	Infection, inflammation, cancer, stress, intense exercise
Red blood cell count	Male: 4.7–6.1 Mill/mcL Female: 4.2–5.4 Mill/mcL	Iron, vitamin B12, or folate deficiency; bone marrow damage	Dehydration, renal problems, pulmonary or congenital heart disease
Haemoglobin (Hb)	Male: 13.8–17.2 g/dL Female: 12.1–15.1 g/dL	Iron, vitamin B12, or folate deficiency; bone marrow damage	Dehydration, renal problems, pulmonary or congenital heart disease
Haematocrit	Male: 40.7%–50.3% Female: 36.1%–44.3%	Iron, vitamin B12, or folate deficiency; bone marrow damage	Dehydration, renal problems, pulmonary or congenital heart disease
Mean corpuscular volume	80–95 femtolitres	Iron deficiency	Vitamin B12 or folate deficiency
Mean corpuscular Hb	27–31 picograms	Iron deficiency	Vitamin B12 or folate deficiency
Platelet count	150–400 thousand/mcL	Viral infections, lupus, pernicious anaemia (due to vitamin B12 deficiency)	Leukaemia, inflammatory conditions
Note: Reference numbers are not standardised, and numbers may vary from lab to lab.			
Stool sample analysis			
Helminth (hookworm and ascaris) infection			Anaemia

Annex 8. Physical Signs of Severe Undernutrition

- ☐ Bilateral pitting oedema
- ☐ Persistent fatigue
- ☐ Wasting
  - Significantly reduced fat in the thighs and arms
  - Loss of muscle bulk around the shoulders, arms, and legs
  - Outline of ribs seen easily
  - Hips small compared with the chest and abdomen



- ☐ Dull, dry, thin, or discoloured hair
- ☐ Lethargy or unconsciousness
- ☐ Dental problems
- ☐ Mouth sores, thrush or difficulty swallowing
- ☐ Shock
- ☐ Dry or flaking skin
- ☐ Pallor of the palms, nails, or mucous membranes
- ☐ Lack of fat under the skin
- ☐ Swollen gums
- ☐ Goitre
- ☐ Extensive skin lesions
- ☐ Persistent diarrhoea
- ☐ Nausea or vomiting
- ☐ Severe dehydration
- ☐ High fever (> 38.5˚C)
- ☐ Difficult or rapid breathing or increased pulse rate
- ☐ Convulsions
- ☐ Severe anaemia
- ☐ Hypothermia (temperature < 35˚C)
- ☐ Hypoglycaemia
- ☐ Extreme weakness

Annex 9. 24-Hour Recall Dietary Assessment Form

Step 1: I would like to ask you, what did you eat in the last 24 hours *(from when you woke up yesterday in the morning to when you woke up this morning)?*

Time	Food or drink*	Amount eaten or drunk	Is this unusual? Take notes in this column if unusual intake.

* Include both foods eaten alone and foods combined in a dish (e.g., soup or stew).

Use the questions listed below to probe for information on foods eaten in the last 24 hours.

- What was the first thing you ate or drank when you got up in the morning?
- Do you remember anything else you ate or drank?
- Did you eat the food plain or put something else on it?
- While you were working, did you take a break to eat or drink something?
- What foods do you especially like or dislike?
- If you were sick during the 24 hours, how did that affect your eating?

Step 2: When you are finished interviewing the client, analyse the food and drink consumed in the last 24-hours for diversity. Use the six food groups listed in the table below as a guide.

	Food Groups						Total number of food groups from which a client consumed in the last 24 hours
	Staples	**Legumes and Nuts**	**Animal Foods**	**Fruits**	**Vegetables**	**Fats**	
	Include cereal grains, such as sorghum, millet, maize; starchy fruits, such as green bananas and plantains; and starchy roots (cassava, sweet potato, and Irish potato 	Include groundnuts, soya beans, common beans, peas, cowpeas, ground beans (*nzama*), bambara nuts, and pigeon peas. 	Include all foods of animal origin, including meat, eggs, milk products, fish (e.g., *matemba*, *utaka*, *usipa*, *kapenta*, *makakana*, *chambo*), and insects (e.g., *bwanoni*, *ngumbi*, *mafulufute*, *mphalabungu*). 	Include citrus fruits, such as oranges, lemons, baobab, and tangerines; bananas; pineapples; pawpaws; mangoes; *masawu*; *bwemba*; *malambe*; *masuku*; peaches; apples; guavas; and watermelons 	Include green leafy and yellow vegetables, such as *bonongwe*, *chisoso*, *khwanya*, *mnkhwani*, *kholowa*, *rape*, *mpiru*, *kamganje*, carrots, eggplants, pumpkin, tomatoes, and mushrooms. 	Can be both healthy and unhealthy. Healthy fats are found in vegetable oils, nuts and seeds, avocado, and fatty fish (*batala*), such as lake trout and tuna. Unhealthy fats, such as butter and fat from animal products other than fish, should be eaten sparingly 	
Tick if foods within a group is consumed							

Step 3: Analyse the client's overall food intake in the last 24 hours, use the questions below to analyse intake, and identify problems

1) Was the quantity of food or drink consumed adequate?
2) What are the reasons for inadequate food intake; illness, poor appetite, or other?
3) Did the client eat from more than 4 food groups? If not, counsel and support the client to improve dietary diversity
4) Does the client have food allergies or intolerance?

Annex 10. Critical Nutrition Actions

Critical Nutrition Action	Message	Explanation
1. Get weighed regularly and have weight recorded.	• If you feel unwell, think that you are losing or gaining weight, have health-related problems, or have been diagnosed with undernutrition or overnutrition in the past, get weighed every month. • If you feel healthy and well, or have a normal nutritional status, get weighed at least every 3 months. • Keep a record of your weight in your health passport	• Periodic weighing tracks weight change to allow early action. • Unintentional weight loss or gain may mean poor health and lead to hospitalisation.
For PLHIV	• If you have HIV-related symptoms, get weighed every month. • If not or have a normal nutritional status, get weighed at least every 3 months.	• Unintentional weight loss of more than 6 kg in 2–3 months can mean that HIV is progressing rapidly to AIDS.
2. Eat a variety of foods and increase your intake of nutritious foods.	• Eat locally available foods that are in season. • Eat foods from each of the six food groups every day; enrich grains or porridge with vegetables, beans, milk, or other locally available foods that you like. • If you want to gain weight, try eating more frequently. For example, eat at least five times a day (three meals and two snacks). • Buy and consume commercially fortified foods, such as cooking oil, salt, sugar, maize and wheat flour, and *likuni phala*.	• A varied diet ensures that your body gets all the nutrients required. • Fruits and vegetables help strengthen immunity.
	If client is pregnant or lactating: • Practise exclusive breastfeeding for 6 months. • Take your iron/folate supplements every day. • Increase the size of your meals or eat additional snacks every day. • Introduce complementary foods when the infant is 6 months old. • Continue breastfeeding for up to 2 years.	• Proper feeding improves immunity and child growth and development. • Women need to eat extra energy every day to gain adequate weight during pregnancy and maintain adequate weight during lactation.
For PLHIV	• If you are HIV positive, increase your energy intake by eating more food more often, especially if you are sick.	• PLHIV need more energy every day than uninfected people of the same age, gender, and physical activity. • The extra energy needed is based on the stage of HIV. • HIV infection affects digestion and absorption.
3. Drink plenty of boiled or treated water.	• Drink about eight glasses of water a day. • Boil or treat drinking water. • Store boiled or treated water in a covered container. • Serve the water with a clean ladle so that nothing dirty (hands or cups) touches it to avoid recontamination.	• Treating water prevents infections such as diarrhoea.
For PLHIV		• The body needs water to remove toxins caused by HIV and ART.
4. Avoid habits that can lead to poor nutrition and poor health.	• Practise safe sex, using condoms.	• Safer sex avoids infection and transmission of sexually transmitted infections.
	• Avoid alcohol, especially if you are taking medicines.	• Alcohol interferes with digestion, absorption, storage, and utilisation of food.

Critical Nutrition Action	Message	Explanation
	• Avoid smoking cigarettes and taking drugs without prescription.	• Smoking interferes with appetite and increases your risk of cancer and respiratory infections, particularly TB.
	• Avoid drinking sweetened, coloured drinks sold in shops and eating sugary and fatty foods.	• These foods have little nutritional value and can even harm your health.
	• Get at least 7 hours of sleep every night	• Too little sleep makes you fatigued and affects your appetite and strength.
For PLHIV	• Seek help at the nearest health facility or with community support groups to manage depression and stress	• Stress and depression may interfere with your appetite and therefore reduce food intake.
5. Maintain good personal hygiene	• Wash your hands under poured or running water with soap after using the toilet and before handling and preparing food	• Food- and water-borne infections cause weakness, vomiting, diarrhoea, and appetite loss.
	• Avoid buying ready-to-eat foods that may not be hygienically prepared.	• Food that is not prepared hygienically may cause diarrhoea and vomiting. Diarrhoea removes essential nutrients from your body.
6. Get exercise whenever physically possible.	• Exercise regularly, at least 30 minutes each day, by doing household chores, walking, jogging, or doing another vigorous activity that you enjoy.	• Regular exercise builds and strengthens muscle, improves appetite, manages stress, and improves health and alertness.
7. Seek early treatment of infections and advice on managing symptoms	• Seek immediate clinical help for management of illness.	• Illness affects food intake, digestion, absorption, and utilisation. Treating illness late worsens nutritional status.
	• Always seek advice from a health care worker on traditional remedies or nutrition supplements you are taking.	• Nutrition supplements should not replace food. • Some traditional herbs affect how other drugs work and can produce side effects.
	• Try managing symptoms with changes to dietary practices. See **Annex 11** for information on dietary management of common symptoms of illness.	• Dietary management can make symptoms less severe and help you continue eating.
For PLHIV		• Some supplements claim to treat HIV, but there is no cure for HIV.
8. Take medicines as prescribed and seek advice on how to manage drug side effects and drug-food interactions	• Take all medicines as advised by your health care worker.	• If you do miss doses or stop taking them, your body can become resistant. The drugs will be less effective, and you may need stronger drugs.
	• Work with a health care provider or counsellor to make and maintain a drug-food schedule.	• Some drugs have to be taken with food and some without. If you don't follow these directions, the medicine will not work properly.
	• Ask your health care worker about possible side effects of drugs you are taking. • Ask how you can manage drug side effects at home.	• You can manage many drug side effects by changing your diet.

Annex 11. Dietary Management of Common Symptoms of Illness

Illness	Diet
Anorexia (appetite loss)	• Stimulate appetite by eating favourite foods. • Eat small amounts of food more often. • Eat more energy-dense foods. • Avoid strong-smelling foods.
Diarrhoea	• Drink plenty of fluids (e.g., soups, diluted fruit juices, boiled water, and light herbal teas) to prevent dehydration. • Avoid citrus fruits, which irritate the stomach. • Eat foods rich in soluble fibre (e.g., bananas, peas, and lentils) to help retain fluids. • Eat fermented foods such as yoghurt. • Eat easily digestible foods, such as rice, bread, porridge, potatoes, and crackers. • Eat small amounts of food frequently. • Continue to eat frequently after illness to recover weight and nutrient loss. • Eat soft, mashed fruits and vegetables. • Drink non-fat milk if there is no problem with lactose. • Boil or steam foods if diarrhoea is associated with fat mal-absorption. • Avoid or reduce intake of dairy products, caffeine, alcohol, fatty foods, fried foods, and gas-forming foods, such as cabbage, onions, and carbonated soft drinks.
Fever	• Eat soups with nutrient-rich ingredients, such as grains, potatoes, and carrots. • Drink plenty of fluids to prevent dehydration. • Continue to eat small, frequent meals as tolerated. • Seek medical treatment for a fever that lasts 2 days and is not relieved with analgesics.
Nausea and vomiting	• Avoid an empty stomach, which makes nausea worse. • Eat small, frequent meals. • Eat soups, unsweetened porridge, and fruits such as bananas. • Eat slightly salty and dry foods, such as crackers, to calm the stomach. • Avoid spicy and fatty foods. • Avoid caffeine and alcohol. • Drink liquids such as clean boiled water and herbal teas and lemon juice in hot water. • Avoid lying down immediately after eating—wait at least 20 minutes. • Rest between meals.
Thrush	• Eat soft, mashed foods, such as rice, carrots, scrambled eggs, potatoes, bananas, and soup. • Eat cold or room-temperature foods. • Avoid spicy, salty, or sticky foods that may irritate mouth sores. • Avoid sugary foods that help yeast grow. • Drink plenty of fluids, but avoid citrus juices and alcohol. • Use a spoon or cup to eat small amounts of foods. • Tilt your head back when eating to help with swallowing. • Rinse your mouth with boiled warm, salty water after eating to reduce irritation and keep yeast from growing.
Constipation	• Eat more high-fibre foods, such as rice, green leafy vegetables, and washed fruits with the peel. • Drink plenty of fluids. • Avoid processed or refined foods. • Avoid cleansing practices, such as enemas and medications.
Anaemia	• Eat iron-rich foods, such as animal products (eggs, fish, meat, liver), green leafy vegetables (spinach), legumes (beans), nuts, oil seeds, and fortified cereals. • If available, take one iron tablet a day with food. • Eat meals with a source of vitamin C, such as fresh tomatoes or oranges to help absorb iron from plant-based foods • Avoid drinking tea or coffee within 2 hours before or after meals.
Bloating or heartburn	• Eat small, frequent meals. • Avoid gas-forming foods (cabbage, soda). • Drink plenty of fluids. • Eat long enough before sleeping to allow food to digest.

Annex 12. WASH Counselling Messages

Choose one or two areas from the messages below that clients feel they can improve.

1. Use treated water for drinking and store it safely.

- Treat water to make it safe to drink using one of these options:
  - Hypochlorite (chlorine) solution
  - Boiling
  - Commercial filter
- Store treated water in a covered container with a narrow neck and a tap if possible.
- Do not touch the water in the container with your hands. Pour it into a clean pitcher to serve it or hang a ladle on the wall to dip the water to serve it.

2. Wash hands properly.

- Hand washing with soap prevents infection spreading from person to person.
- Rinsing hands is not enough—use soap or ash every time you wash your hands.
- Wash your hands under poured or flowing water to remove dirt and germs. Do not wash your hands in a basin of water that many people use to wash their hands in. The water becomes dirty, and washing your hands in this water does not prevent infection.
- Wash your hands **before** you handle, prepare, or eat food; before you feed someone or give them medicines; and often while you are preparing food.
- Wash your hands **after** you go to the toilet, clean someone who has defecated, blow your nose, cough, sneeze, or handle an animal or animal waste.
- Wash your hands **both before and after** you take care of someone who is sick.

3. Always use a latrine.

- Keep latrines as far away from houses or cooking areas as possible.
- Upgrade pit latrines with cleanable platforms, covers over the pits, housing that provides privacy, and nearby hand washing stations.
- Clear the path to the latrine by removing stones and branches and filling in holes.
- Keep the latrine platform, seat, walls, and other surfaces clean and free of faeces. Put all anal cleaning materials in the latrine. Put a scoop of lime or ash in the latrine after defecating to reduce odour and keep flies away.
- Build supports (e.g., poles, ropes, stools) for children or weak household members so that they can use the latrine comfortably.
- If you do not have a latrine, put a bedside commode or bedpan next to the bed of children or weak household members and empty it regularly.
- Always wash your hands after defecating.
- If you do not have a latrine, bury faeces away from your house.

4. Keep food preparation areas clean.

- Wash all surfaces and equipment used to prepare or serve food with soap and water (and bleach, if possible).
- Protect food from insects and animals by covering it with netting or cloth or keeping it in containers.

5. Separate raw and cooked food.

- Keep raw eggs, meat, poultry, fish, and seafood away from other foods because they can contain bacteria that cause illness.
- Use separate knives and cutting boards for raw animal foods.
- Store food in covered containers to avoid contact between raw and cooked foods.

6. Cook food thoroughly.

- Cook meat, poultry, eggs, fish, and seafood until they are well done. For meat and poultry, cook until the juice is clear, not pink.
- Bring soups and stews to a boil, at least until you see the first big bubbles.
- Reheat cooked food thoroughly by bringing it to a boil or heating it until it is too hot to touch. Stir the food while reheating it.

7. Keep foods at safe temperatures.

- Do not leave cooked food out at room temperature for more than 2 hours.
- Reheat already prepared food before serving it.
- Do not store food in a refrigerator for more than 2 days.
- Do not thaw frozen food at room temperature.

8. Eat safe foods.

- Buy only fresh and healthy foods.
- Do not use food beyond its expiry date.
- Use pasteurised milk or boil fresh milk before use.
- Wash raw vegetables and fruits with treated water or peel the skin before eating.

Annex 13. Specifications of Supplementary Foods Used in Malawi

SuperCereal

Nutrient	Amount per 100 g	Amount in 300 g
Energy (kcal)	410 kcal	1,230
Protein (g)	13.3 g (16%)	39.9
Total Lipid (fat) (g)	2.5 g (9%)	7.5
Calcium (mg)	512	1,536
Iodine (µg)	43	129
Iron (mg)	11.77	35.31
Magnesium (mg)	146	438
Phosphorous (mg)	596	1788
Potassium (mg)	724	2172
Selenium (µg)	16	48
Copper (mg)	0.5	1.5
Zinc (mg)	7.71	23.13
Vitamin C, total ascorbic acid (mg)	91.2	273.6
Thiamine (mg)	0.68	2.04
Riboflavin (mg)	1.73	5.19
Niacin (mg)	11.18	33.54
Vitamin B6 (mg)	1.56	4.68
Folate, DFE (µg)	200	600
Vitamin B12 (µg)	2	6
Vitamin A (mg)	3,632	10,896
Vitamin E (alpha-tocopherol) (mg)	8.85	26.55
Vitamin D (+D3) (µg)	44.61	133.83
Pantothenic Acid (mg)	2.18	6.54
Vitamin K (phylloquinone) (µg)	39.6	118.8

Vitameal

Nutrition Facts

Serving Size (128g)
Servings Per Container 15 (30 child servings)

Amount Per Serving		
Calories	480	
Calories from Fat	90	
Calories from Saturated Fat	15	
		% Daily Value
Total Fat	10g	16%
Saturated Fat	1.5g	7%
Stearic Acid	0g	
Polyunsaturated Fat	5g	
Monounsaturated Fat	2.5g	
Cholesterol	0mg	0%
Sodium	10mg	0%
Potassium	690mg	25%
Total Carbohydrates	85g	28%
Dietary Fiber	14g	56%
Sugars	1g	
Other Carbohydrates	67g	
Protein	16g	

Vitamin A	50%	•	Vitamin C	100%
Calcium	50%	•	Iron	45%
Vitamin D	50%	•	Vitamin E	120%
Vitamin K	50%	•	Thiamin	120%
Riboflavin	110%	•	Niacin	60%
Vitamin B_6	120%	•	Folate	70%
Vitamin B_{12}	100%	•	Biotin	35%
Pantothenic Acid	110%	•	Phosphorus	70%
Iodine	80%	•	Magnesium	80%
Zinc	70%	•	Selenium	100%
Copper	70%	•	Manganese	120%
Chromium	70%			

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat. Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrates		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 * Carbohydrate 4 * Protein 4

INGREDIENTS: Roasted Maize, Roasted Soybeans, Dicalcium Phosphate, Potassium Chloride, Magnesium Oxide, Calcium Carbonate, Ascorbic Acid, Zinc Gluconate, Vitamin E, Foil Acid, Beta-Carotene, Pantothenic Acid, Niacinamide, Copper Gluconate, Manganese Sulfate, Reduced Iron, Vitamin K, Vitamin A, Sodium Selenite, Vitamin B_6, Vitamin D_3, Thiamine Mononitrate, Riboflavin, Vitamin B_{12}, Chromium Chloride, Potassium Iodide, Biotin.

Annex 14. Therapeutic Food Specifications

F-75 and F-100 Nutritional Composition

Constituent	F-75 Amount in 100 ml	F-100 Amount in 100 ml
Energy	75 kcal	100 kcal
Protein	1 g (5% of total energy)	3 g (11% of total energy)
Lipids	2.5 g (32% of total energy)	5.8 g (53% of total energy)
Carbohydrate	12 g (64% of total energy)	9 g (36% of total energy)
Lactose	1.4 g max	4.2 g max
n-6 fatty acid	6.5% of total energy	6.5% of total energy
n-3 fatty acid	1.5% of total energy	2.8% of total energy
Ash	Max 4%	Max 4%
Moisture	Max 4%	Max 2.5%

F-75 and F-100 Minerals

Constituent	F-75 Amount in 100 ml	F-100 Amount in 100 ml
Sodium	17 mg maximum	55 mg maximum
Potassium	122 – 156 mg	210 – 270 mg
Calcium	50 – 100 mg	55 – 115 mg
Phosphorous*	50 – 100 mg	55 – 115 mg
Magnesium	8.5 – 11 mg	15 – 25 mg
Iron	0.05 mg maximum	0.05 maximum
Zinc	1.8 – 3.0 mg	2.0 – 3.0 mg
Copper	0.2 – 0.3 mg	0.25 – 0.35 mg
Selenium	3.5 – 7 mcg	3.5 – 7.7 mcg
Iodine	12.3 – 24.5 mcg	13 – 27 mcg

*excluding phytate in F-100

F-75 and F-100 Vitamins

Constituent	F-75 Amount in 100 ml	F-100 Amount in 100 ml
Vitamin A	0.1-0.3 mg	0.15-0.32 mg
Vitamin D3	2.5-5.0 mcg	3.0-5.3 mcg
Vitamin E	3.3-6.5 mg	4-6.5 mg
Vitamin K	2.5 mcg minimum	3 mcg minimum
Thiamine	0.8 mg minimum	0.1 mg minimum
Riboflavin	0.3 mg minimum	0.3 mg minimum
Ascorbic acid	10 mg minimum	9.6 mg minimum
Vitamin B6	0.1 mg minimum	0.1 mg minimum
Vitamin B12	0.3 mcg minimum	0.3 mcg minimum
Folic acid	35 mcg minimum	38 mcg minimum
Niacin	0.8 mg minimum	1.0 mg minimum
Pantothenic acid	0.5 mg minimum	0.6 mg minimum
Biotin	10 mcg minimum	11 mcg minimum

Ready-to-Use Therapeutic Food (RUTF)

RUTF is an integral part of outpatient care management of severe undernutrition, as it allows adolescent and adult clients to be treated at home rather than at inpatient care facilities. RUTF is an energy-dense, mineral- and vitamin-enriched food, which is equivalent to F-100 therapeutic milk.

There are several commercial types of RUTF produced in Malawi. The products have nutritional quality similar to F-100.

RUTF should be soft or crushable, palatable, and easy to eat without any preparation. At least half of the proteins contained in the product should come from milk products.

	For 100 g	Per 92 g sachet		For 100 g	Per 92 g sachet
Energy	545 kcal	500 kcal	Vitamin A	910 mcg	840 mcg
Protein	13.6 g	12.5 g	Vitamin D	16 mcg	15 mcg
Fat	35.7 g	32.86 g	Vitamin E	20 mg	18.4 mg
Calcium	300 mg	276 mg	Vitamin C	53 mg	49 mg
Phosphorus	300 mg	276 mg	Vitamin B1	0.6 mg	0.55 mg
Potassium	1 111 mg	1 022 mg	Vitamin B2	1.8 mg	1.66 mg
Magnesium	92 mg	84.6 mg	Vitamin B6	0.6 mg	0.55 mg
Zinc	14 mg	12.9 mg	Vitamin B12	1.8 mcg	1.7 mcg
Copper	1.8 mg	1.6 mg	Vitamin K	21 mcg	19.3 mcg
Iron	11.5 mg	10.6 mg	Biotin	65 mcg	60 mcg
Iodine	100 mcg	92 mcg	Folic acid	210 mcg	193 mcg
Selenium	30 mcg	27.6 mcg	Pantothenic acid	3.1 mg	2.85 mg
Sodium	< 290 mg	< 267 mg	Niacin	5.3 mg	4.88 mg

Annex 15. How to Conduct RUTF Appetite Test

All adults and adolescents with HIV and/or TB who are classified as having severe undernutrition should take a ready-to-use therapeutic food (RUTF) appetite test to determine the next step for treatment. If an adult or adolescent with severe undernutrition has no appetite and cannot eat enough of the RUTF, he or she should be referred for treatment in inpatient care.

Steps for conducting an appetite test:

1. Conduct the appetite test in a quiet, separate area.

2. Explain to the adolescent/adult or caregiver the purpose of the appetite test and outline the procedures involved.

3. Wash hands before giving the RUTF, and have the client wash his/her hands before eating the RUTF.

4. Offer the client plenty of clean water in a cup to drink while eating the RUTF.

5. Observe the adolescent/adult eating the RUTF and determine if he/she passes or fails the appetite test within 30 minutes.

****Adult clients should finish at least one sachet of RUTF to pass the appetite test.**

Annex 16. Recipes for Making F-75 and F-100 by Adding CMV

It is possible to make F-75 and F-100 from a variety of products if commercial product is not available. Tables A15-1 and A15-2 contain recipes for making F-75 and F-100 using dry skimmed milk (DSM), dry whole milk (DWM), or fresh cow's milk. Sugar and oil are added to all recipes. Three of the recipes include addition of cereal powder (maize flour) when preparing F-75. Add cooled boiled water to all the recipes.

Table A15-1. Recipes to Make F-75

Type of Milk	Milk (g)	Sugar (g)	Oil (g)	Cereal Powder (g)	Water (ml)
DSM	50	140	54	70	Make up to 2,000 ml*
DWM	70	140	40	70	Make up to 2,000 ml*
Fresh cow's milk	560	65	20	70	Make up to 2,000 ml
DSM	50	200	54	0	Make up to 2,000 ml*

* For the dry milk powder recipes, add about 1.82 litres to make up to 2 litres.

Mix the sugar, oil, cereal, and milk to make a paste then slowly add the cooled boiled water. Make up to 2 litres. If available, use a food blender or whisk to make the mix. Use the red scoop found inside the CMV tin to measure the amount of CMV to add to the prepared F-75 or F-100. **Add one scoop of CMV (6.35 g) to 2 litres of 'made' F-75 or F-100.**

When using cereal in the F-75, add the CMV after the cereal mix has been cooked to prevent loss of minerals and vitamins during the cooking process.

If CMV is not available, prepare mineral and vitamin mix as described in Appendix 4 of WHO's Physicians Manual on *Management of Severe Malnutrition*.

Table A15-2. Recipes to Make F-100

Type of Milk	Milk (g)	Sugar (g)	Oil (g)	Cereal Powder (g)	Water (ml)
DSM	160	100	120	70	Make up to 2,000 ml*
DWM	220	100	60	70	Make up to 2,000 ml
Fresh cow's milk	1,800	100	50	70	Make up to 2,000 ml

* Add 1.7 litres to make up to 2 litres of milk.

One red scoop of CMV is added to 2 litres of 'made' F-75 or F-100.

Annex 17. Adolescent and Adult Nutrition Register

No.	Program # (ART/ANC/ PMTCT/ TB. etc.)	Date	Client Name	Sex (M/F)	Adolescents (15–18 years) ☑	Adults (≥ 19 years) ☑	Pregnant/ ≤ 6 months post-partum ☑	Bilateral pitting oedema (0, +, ++, +++)	Weight (kg)	Weight loss or gain? (change in kg since last visit)	Height (cm)	BMI	BMI-for-age z-score	MUAC	Complications (Y/N)?	Counselled on diet? (Y/N)	Referred for therapeutic or supplementary food (Y/N)?	HIV status ☑			Classification of Nutritional Status ☑					Next appointment date (should be the same as the next appointment date for HIV, TB, ANC/PMTCT, or other health service)
																		+	–	Unknown	Severe (Inpatient)	Severe (Outpatient)	Moderate	Normal	Overweight or obese	
TOTALS																										

Annex 18. Undernourished Client Management Form for Adolescent and Adults

Name: _____ **Type of service (entry point)/Referred From** (*tick one* ☑): ☐ANC/PMTCT ☐ART ☐TB/DOTS ☐OPD ☐Other__

Client #: _____ **Sex** (*tick one* ☑): ☐M ☐F **Age** (*tick as appropriate)* ☑): ☐15–18 years ☐19+ years ☐Pregnant ☐Lactating (up to 6 months post-partum)

Village:_____ **Date Admitted to Treatment/Nutrition Support:** _____ **Date of Exit from Treatment/Nutrition Support:** _____

Visit no.	Date	Weight (kg)*	Amount of weight lost since last visit	Amount of weight gained per month since last visit	Height (cm)**	BMI	BMI for-age z-score	MUAC ***	Bilateral pitting oedema (0, +, ++, +++)	Medical complications *(Y/N)*?	Dietary assessment conducted? *(Y/N)*	Counselled on diet? *(Y/N)*	Referred for ES/L/FS Support? *(Y/N)*	Nutritional status ☑					Therapeutic or supplementary food given at each visit ☑			Exit reason ☑					Next appointment date
														Severe (inpatient)	Severe (outpatient)	Moderate	Normal	Overweight or Obese	RUTF (sachets)	*Likuni phala* or CSB+ (kg)	Vegetable oil (Litres)	Recovered (Transitioned to	Defaulted (lost to follow-up)	Died	Non-recovered (treatment failure)	Transferred Oot	
1																											
2																											
3																											
4																											
5																											
6																											
7																											
8																											
9																											
10																											
11																											
12																											

* **Weight** should be taken at every visit

** **Height**: If adolescent is 12–18 years old, measure at every visit. If adult (> 19 years old), measure height ONLY once.

*** **MUAC:** Only measure if the client is a pregnant woman, lactating woman up to 6 months post-partum, or non-pregnant/non-lactating client who is too ill to have their height taken.

Definition of Terms

Recovered (transitioned to another care plan): Client reached the target BMI, BMI-for-age, or MUAC. **Defaulted (lost to follow-up):** Client did not return for two consecutive visits after the last appointment. **Died:** Client died while receiving NCST services.
Non-recovered (treatment failure): Failed to attain the targeted transition criterion. **Transferred out:** Clients who leave the health facility to continue with care at another facility.

Annex 19. MOH Stock Card

Commodity/Item Name: _____

Date	Reference Number	Unit Measure	In	Out	Balance	Storekeeper's Name	Storekeeper's Signature

Annex 20. NCST Monthly Report

Health Facility:_____ **District:** _____ **Month:** _____ **Year:** _____

Indicator	Pre-ART/ART	TB	ANC/PMTC	OPD	Other_____
1) Total who received health services (HIV, TB, ANC/PMTCT, OPD):					
2) Total who received nutrition assessment at contact point:					
a) Of those assessed # with **Severe Undernutrition**					
b) Of those assessed # with **Moderate Undernutrition**					
c) Of those assessed # with **Normal Nutritional Status**					
d) Of those assessed # with **Overweight/Obese**					
3) Total who received nutrition counselling at contact point:					

		Total at the start of the month (Old cases) **(A)**	**New Admissions (B)**	**Total in treatment** (Old + New) **(C)=A+B**	**EXITS**						**Total at the end of the month (J)**	**Total who received therapeutic and/or supplementary food**
					Recovered (transitioned) **(D)**	**Default** (lost to follow-up) **(E)**	**Died (F)**	**Non-recovered** (treatment failure) **(G)**	**Transferred out (H)**	**TOTAL Exits (I) = D+E+F+G+H**		
Severe Undernutrition in Adolescents (15–18 years) and Adults (19 years or older)	Adolescent 15–18 years											
	Adults 19 years or older											
	Pregnant/lactating women*											
	TOTAL											
Moderate Undernutrition in Adolescents (15–18 years) and Adults (19 years or older)	Adolescent 15–18 years											
	Adults 19 years or older											
	Pregnant/lactating women*											
	TOTAL											

	Commodity	**Packaging and unit**	**Stock on the first day of the month**	**Deliveries received in the month**	**Quantity distributed to beneficiaries**	**Quantity used for cooking demonstration**	**Quantity lost****	**Stock on the last day of the month**	**Request for the following month**
Therapeutic and Supplementary Food Supplies	RUTF	Sachets							
	F-75	Sachets/Tins							
	F-100	Sachets/Tins							
	CSB+/Likuni Phala	Kg							
	Vitameal	Kg							
	Vegetable oil	L (litres)							
	Other specify_____								

***** up to 6 months postpartum

**** Indicate the reason for loss:** _____

Report Prepared by: _____ **Checked by:** _____

Annex 21. NCST Competencies and Minimum Standards

Competency	Minimum Standards
1. Use anthropometric methods to assess and classify nutritional status	Measure weight
	Measure height
	Calculate BMI
	Look up BMI using reference tables or BMI wheel
	Look up BMI-for-age of an adolescent using reference tables or BMI wheel
	Measure MUAC
2. Use biochemical methods to assess and classify nutritional status	Interpret blood haemoglobin results
	Take the needed action based on results
3. Use clinical methods to assess and classify nutritional status	Identify medical conditions and complications that can affect nutritional status
	Conduct RUTF appetite test for a client who is severely undernourished
	Identify physical signs of wasting
	Assess and classify bilateral pitting oedema
4. Use dietary methods to assess food intake and respond to nutritional status	Use a 24-hour recall to assess a client's food intake
	Use findings of the dietary assessment to identify food intake and dietary diversity problems
5. Uses the ALIDRAA checklist to counsel a client on nutrition	Establish rapport with a client
	Ask questions on the client's nutritional status, food intake, and nutrition problems and concerns
	Listen and learn from the client
	Identify food intake problems with a client
	Discuss with the client different options to overcome a problem
	Recommend and negotiates doable actions with the clients
	Agree with the client to try one or more options to overcome a problem
	Make an appointment for a follow-up visit
6. Conduct a nutrition education session	Plan for a nutrition education session
	Deliver a nutrition education session to adolescent and adult clients
7. Provide nutrition support to an adolescent or adult with normal nutritional status	Identify normal nutritional status in adolescents, adults, pregnant and lactating women (up to 6 months post-partum)
	Provide medical care and support for a client
	Provide nutrition care and support to a client
	Refer and follow up a client

Competency	Minimum Standards
8. Provide nutrition support to an adolescent or adult with moderate undernutrition	Identify moderate undernutrition in adolescents, adults, pregnant and lactating women (up to 6 months post-partum)
	Provide medical care and support for a client
	Provide nutrition care and support to a client
	Refer and follow up a client
	Transition a client from the care plan for moderate undernutrition to normal nutritional status
9. Provide nutrition support to an adolescent or adult with severe undernutrition without medical complications	Identify severe undernutrition without medical complications in adolescents, adults, and pregnant and lactating women (up to 6 months post-partum)
	Provide medical care and support for a client
	Provide nutrition care and support to a client
	Refer and follow up a client
	Transition a client from the care plan for severe undernutrition without medical complications to moderate undernutrition
10. Provide nutrition care and support to an adolescent or adult with severe undernutrition with medical complications	Identify severe undernutrition with medical complications in adolescents, adults, and pregnant and lactating women (up to 6 months post-partum)
	Provide medical care and support to a client
	Provide nutrition care during the initial phase of inpatient care
	Transition a client from the initial phase to rehabilitation phase
	Refer and follow up a client from inpatient to outpatient care
11. Provide nutrition support to an adolescent or adult who is overweight or obese	Identify overweight and obesity in adolescents, adults, and pregnant and lactating women (up to 6 months post-partum)
	Provide medical care and support to a client
	Provide nutrition care and support to a client
	Refer and follow up a client
12. Monitor and report on adolescent and adults receiving nutrition assessment, counselling, and support	Record client data in the adult and adolescent nutrition register
	Monitor severely and moderately undernourished clients using the client management forms
	Prepare and submit NCST monthly report
13. Use the 'model for improvement' method to improve quality of NCST service delivery	Identify a problem that needs to be addressed
	Analyse available information on how the problem occurs, its causes and effects
	Develop improvement change ideas
	Test and implement change ideas using the PDSA cycle

Annex 22. Division of NCST Roles and Responsibilities at the Facility Level

Category of Service Provider	Roles and Responsibilities
Expert clients, ward attendants, and volunteers	Assist with measuring weight
	Assist with measuring height
	Assist with measuring MUAC
	Assist with assessing for bilateral pitting oedema
	Assist with delivering nutrition education messages
	As a member of the facility QI team, participant in nutrition quality improvement activities
HSAs, home craft workers, and medical clerks	Weigh and record clients' weight
	Measure and record clients' height
	Measure and record clients' MUAC
	Calculate/look up and record BMI for adults and BMI-for-age for adolescents
	Assess for bilateral pitting oedema and other physical signs of undernutrition
	Conduct dietary assessment
	Counsel clients on nutrition
	Conduct nutrition education
	Provide nutrition care and support to clients based on nutritional status: normal, severe underweight, moderate underweight, overweight, or obese
	Complete NCST registers, forms, and reports
	As a member of the facility QI team, participant in nutrition quality improvement activities
Doctors, clinical officers, medical assistants, nurses, and midwives	Supervise the taking of anthropometric measurements: weight, height, MUAC, BMI, and BMI-for-age
	Interpret biochemical nutrition assessment methods and take necessary action
	Assess medical conditions and complications that can affect nutritional status
	Assess for bilateral pitting oedema
	Conduct dietary assessment
	Counsel clients on nutrition
	Supervise the delivery of nutrition education sessions
	Provide medical care and support to clients based on nutritional status: normal, severe underweight, moderate underweight, overweight, or obese
	Review NCST records and reports for accuracy and completeness
	Participant in nutrition quality improvement activities
	As a member of the facility QI team, participant in nutrition quality improvement activities
	Manage the quality of nutrition service providers at the facility level

Annex 23. NCST Equipment, Supplies, and Materials

	Item	Minimum per health facility
Equipment and nutrition supplies	Height board (measures up to 0.1 cm)	4 (one at each contact point)
	Tape stuck to the wall, for height measure (measures up to 0.1 cm)	4 (if height board is not available)
	Adolescent/adult MUAC tape (measures to nearest 1 mm or 0.1 cm)	8 (two at each contact point)
	Adolescent/adult weighing scale (measures up to 100 g/0.1 kg)	4 (one at each contact point)
	RUTF	2 months' supplies for the total number of severely undernourished clients
	Supplementary food, e.g., CSB+ (*likuni phala*), Vitameal	2 months' supply for the total number of severely and moderately undernourished clients
	Iron/folic acid supplements	2 months' supply for the total number of pregnant and lactating women
Technical reference materials	NCST/Nutrition Register for Adolescent and Adults	1 at each contact point providing NCST services
	NCST/Nutrition Client Management Forms	1 booklet with 100 forms
	NCST report forms	1 booklet with 50 sheets
	NCST District Mentoring and Coaching Checklists	at least 3 checklists
	NCST Competencies, Standards, and Verification Criteria Checklist	1
	NCST guidelines	At least 1 copy
	NCST job aids	At least 1 set
	BMI reference charts or BMI wheels	At least 4 charts or BMI wheels
	BMI-for-age reference charts or wheels	Same as above
	Nutrition counselling materials for adolescents, adults, and pregnant and lactating women	4 (one at each contact point)

Annex 24. NCST Quality Improvement Gap Analysis Checklist for Health Facilities

Principles	*Review each of the following components of NCST and indicate (Y/N) if the principles of QI are being met.*						
	A) Assessment	**B) Classification of nutritional status**	**C) Counselling**	**D) Education**	**E) Therapeutic or supplementary food support**	**F) Referral and follow-up within the health facility**	**G) Referral/linkage to community ES/L/FS support**
1. Do all qualified patients receive the following components of NCST services?							
2. Are activities listed in columns A, B, C, D, E, F, and G implemented as part of the routine health care services?							
3. Is there a team to oversee improvement of the services?							
4. Is data routinely recorded according to the national guidelines?							
5. Is data analysed to understand the results achieved at the facility level?							
6. Are results used for decision making at the facility level?							