A Guide to Implementing Nutrition and Food Security Surveys

Technical Handbook

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Table of contents

Preface 4

I Child Anthropometry 5

1 Childhood undernutrition and anthropometry 6
1.1 Forms of childhood undernutrition . . . 6
1.1.1 Acute undernutrition . . . 6
1.1.2 Chronic undernutrition . . . 13
1.2 Performing anthropometric measurements . . . 15

2 Measuring weight 16
2.1 Equipment . . . 16
2.1.1 Types of weighing scales . . . 16
2.1.2 General use, care and maintenance of SECA tared scales . . . 20
2.2 Personnel . . . 21
2.3 Steps in weighing a child . . . 21

3 Measuring height 26
3.1 Equipment . . . 26
3.2 Personnel . . . 27
3.3 Steps in measuring length or height of child . . . 27
3.3.1 Measuring height . . . 28
3.3.2 Measuring length . . . 30

4 Measuring mid-upper arm circumference (MUAC) 34
4.1 Equipment . . . 34
4.2 Personnel . . . 34
4.3 Steps in measuring MUAC . . . 36

5 Checking for oedema 38
5.1 Equipment . . . 38
5.2 Personnel . . . 38
5.3 Steps in checking for nutritional oedema . . . 38

6 Anthropometric measurement standardisation test 42
6.1 Objectives . . . 42
6.2 Mechanics . . . 43
6.2.1 Test parameters . . . 43

6.2.2 Test organisation and requirements . . . 44
6.2.3 Timeframe . . . 44
6.2.4 Steps in carrying out the standardisation test . . . 45

II Dietary Intake **47**

7 Measuring dietary diversity **48**
7.1 Introduction . . . 48
7.2 Minimum dietary diversity for women (MDD-W) . . . 48
7.2.1 MDD-W questionnaire . . . 49
7.2.2 MDD-W food group description . . . 51
7.3 Minimum dietary diversity (MDD) component of the infant and young child feeding (IYCF) . . . 54
7.3.1 MDD questionnaire . . . 54
7.3.2 MDD food group description . . . 55

8 Measuring food consumption **57**
8.1 Introduction . . . 57
8.2 FCS questionnaire . . . 57
8.3 Calculating the FCS . . . 58

III Food security **60**

9 Household Food Insecurity Access Scale **61**
9.1 Introduction . . . 61
9.2 HFIAS questionnaire . . . 61
9.3 HFIAS indicators . . . 63
9.3.1 Household Food Insecurity Access-related Conditions . . . 63
9.3.2 Household Food Insecurity Access-related Domains . . . 66
9.3.3 Household Food Insecurity Access Scale Score . . . 66
9.3.4 Household Food Insecurity Access Prevalence . . . 67

References **70**

Preface

Nutrition and food security surveys provide the information from which to assess the nutritional and food security status of a population. This document provides guidance on specific aspects of conducting nutrition and food security surveys. Chapters 1 to 6 focus on the various anthropometric measurements performed during nutrition surveys. Chapter 1 first describes two forms of undernutrition - acute undernutrition and chronic undernutrition - and then explains each including the signs and symptoms associated and the anthropometric indices used to diagnose them. Chapters 2, 3, 4, and 5 describe the equipment needed, the personnel required and the steps to undertake in performing weight, height, MUAC and oedema measurements respectively. Chapter 6 then discusses how survey personnel can be assessed as to their abilities to perform the various anthropometric measurements through a standardisation test.

Chapter 7 and 8 then talk about dietary diversity and food consumption, two indicator sets that are used for food security assessments. In Chapter 7, minimum dietary diversity for women (MDD-W) and minimum dietary diversity for children under 2 years (MDD) are discussed particularly the standard questionnaire used and the different food groups assessed. In Chapter 8, the food consumption score (FCS) is described including the standard questionnaire used and the different food groups assessed. Finally, Chapter 9 talks about the Household Food Insecurity Access Scale (HFIAS), the standard questions used to develop a questionnaire and the three food security domains it assesses.

Throughout this document, there are boxed texts (specific blocks of text) that are meant to provide either a note/information, a reminder, a warning related to the topic being discussed. In addition, there are boxed texts that point to downloadable forms or documents that the main body of text is referring to.

Part I

Child Anthropometry

1 Childhood undernutrition and anthropometry

Childhood undernutrition is an important global public health issue contributing to nearly half of all deaths in children under 5 and is widespread in Asia and Africa. This chapter discusses the various forms of childhood undernutrition, describes the indices used to diagnose them and the anthropometric measurements performed that will provide data to calculate the various indices.

1.1 Forms of childhood undernutrition

Childhood undernutrition manifests in various forms. It is important to note the use of the term undernutrition rather than malnutrition as this guide will not touch upon overweight and obesity. In this guide, the focus will be on two forms of undernutrition: *acute undernutrition*; and, *chronic undernutrition*. Childhood undernutrition manifested as micronutrient deficiencies will not be discussed.

1.1.1 Acute undernutrition

Childhood **acute undernutrition** is a condition related to a child's acute inadequate nutrition leading to rapid weight loss or failure to gain weight normally. Situations such as acute shortage of food and/or acute episodes of childhood illnesses such as diarrhoea, acute respiratory infections and/or malaria can bring about this rapid weight loss or weight gain failure in children.

Physical signs and symptoms

Acute undernutrition in a child can manifest in two ways.

Marasmus

This condition is also called *wasting* given that a child suffering from it presents as *wasted* with an appearance of *"skin and bones"* because of *excessive thinness* that is due to rapid loss of muscle and fatty tissue. Other physical features include the child's face looking like an old man's (*old man facies* due to loss of facial subcutaneous fat), child's rib cage is easily visible and skin folds on buttocks and thighs appearing like *"baggy pants"*.

Kwashiorkor

Some children with acute undernutrition develop *nutritional oedema*. Oedema is an accumulation of fluid in the tissue, especially the feet and legs and nutritional oedema is specifically characterised as being *bilateral and pitting*. The child with *kwashiorkor* is *withdrawn*, *irritable*, *obviously ill* and *will not eat*. The hair is thin, sparse and sometimes discoloured. The skin has symmetrical discoloured patches where the skin later cracks and peels off.

Anthropometric indices

The physical signs and symptoms of acute undernutrition described above are considered pathognomonic of the condition i.e., if these signs and symptoms are found in a child, it is very likely that the child has acute undernutrition. However, other than physical signs, there are anthropometric indices used to diagnose acute undernutrition in children.

Weight-for-height/weight-for-length

The first independent criteria for *marasmus* or *wasting* is weight-for-height (WFH)/weight-for-length (WFL). Given *child A*, this child's weight is assessed against the mean weight of a standard group of children in good health with the same height or length as *child A* (length is measured when the child is < 85 cms in height or < 24 months old). *Child A* is expected to have a weight close to the mean weight of the standard group of healthy children if *child A* is also healthy and is not undernourished. However, if *child A*'s weight deviates significantly farther from the mean weight of the standard group of healthy children, *child A* is considered to have low weight for its height and therefore considered *marasmic* or *wasted*. This deviation from the mean, also called *standard deviation (SD)* in statistics, is calculated for each child whose weight and height have been measured and is expressed in terms of *z-scores*. Therefore, the anthropometric index used for *wasting* is weight-for-height z-scores (WHZ) and classification of level of wasting is done based on the following WHZ cut-offs:

WHZ	**Classification**
WHZ < -2SD	Global Acute malnutrition (GAM)

WHZ	Classification
-3SD $\geq$ WHZ $<$ -2SD	Moderate acute malnutrition (MAM)
WHZ $<$ -3SD	Severe acute malnutrition (SAM)

Mid-upper arm circumference

The other independent criteria for *marasmus* or *wasting* is the *mid-upper arm circumference* or *MUAC*. *MUAC* is a measure of muscle mass and therefore detects loss of muscle mass due to wasting. *MUAC* is a good predictor of mortality and in many studies, *MUAC* predicted death in children better than any other anthropometric indicator. Unlike weight-for-height, *MUAC* is used as an anthropometric index without need for standardisation. The *MUAC* cut-offs used to classify a child as being *marasmic* or *wasted* are:

MUAC (mm)	Classification
MUAC $<$ 125	Global Acute malnutrition (GAM)
115 $\geq$ MUAC $<$ 125	Moderate acute malnutrition (MAM)
MUAC $<$ 115	Severe acute malnutrition (SAM)

Oedema test

The final index for acute undernutrition is *oedema testing* for *kwashiorkor* cases. This test checks whether *oedema* is present and whether it is *bilateral* and *pitting*. Any sign of bilateral pitting oedema, regardless of WHZ or MUAC classification, is considered *severe acute malnutrition*.

Referral for cases with acute undernutrition

Children with acute undernutrition are at higher risk of mortality than children who are not. Children with moderate acute malnutrition are 3 times more likely to die while children with severe acute undernutrition are 5 times more likely to die than their non-undernourished counterparts. It is therefore important that when children are identified as having acute undernutrition based on the anthropometric indices described above, they are referred accordingly for treatment. For MUAC and oedema, the diagnosis of acute undernutrition is clear and straightforward and those who measure or check for them would be able to immediately determine child's nutritional status and refer accordingly. With the weight-for-height index, the process is less straightforward because the weight and height measurements will have to be converted into z-scores which in turn are used to check against the stated cut-offs. In order to facilitate this conversion to z-scores particularly on-the-go in a field survey setting, the WHO provides reference tables that can be used to look up a child's height/length and weight in the appropriate reference table specific to the child's sex and age and then be able to determine the child's z-score. The reference tables are shown below (Figure 1.2a, Figure 1.2b, Figure 1.2c, Figure 1.2d) and can be downloaded from the links on the right.

(a) Child with bilateral oedema, skin, and hair changes

(b) Bilateral pitting oedema

Figure 1.1: Children with kwashiorkor

Download

- Reference tables for boys 0-23 months - PDF
- Reference tables for boys 24-59 months - PDF
- Reference tables for girls 0-23 months - PDF
- Reference tables for girls 24-59 months - PDF

Exercise

Case: During the survey, you found a 10 month old girl with a length of 48.0 cms and weight of 3.3 kgs.

In this example, you will have to use the reference table for girls 0-24 months old. Find the length of the child on the reference table. In the left-most column of the reference table you will find the values for the length in centimetres (Figure 1.3). So for this child, you should look for 48.0 cm length in the left-most column (Figure 1.4).

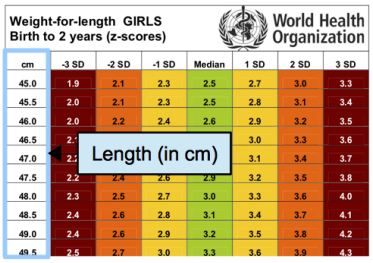


Figure 1.3: Values for length in centimetres

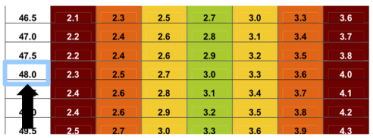


Figure 1.4: Look for 48.0 cms length

Once you have found the girl's length in the left-most column, you now have to look for the girl's weight in the body of the table (Figure 1.5). Specifically, you should look for the girl's weight along the row corresponding to her length (Figure 1.6).

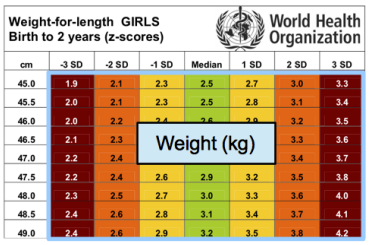


Figure 1.5: Values for weight in kilograms

Simplified field tables

Weight-for-length BOYS
Birth to 2 years (z-scores)

World Health Organization

cm	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
45.0	1.9	2.0	2.2	2.4	2.7	3.0	3.3
45.5	1.9	2.1	2.3	2.5	2.8	3.1	3.4
46.0	2.0	2.2	2.4	2.6	2.9	3.1	3.5
46.5	2.1	2.3	2.5	2.7	3.0	3.2	3.6
47.0	2.1	2.3	2.5	2.8	3.0	3.3	3.7
47.5	2.2	2.4	2.6	2.9	3.1	3.4	3.8
48.0	2.3	2.5	2.7	2.9	3.2	3.6	3.9
48.5	2.3	2.6	2.8	3.0	3.3	3.7	4.0
49.0	2.4	2.6	2.9	3.1	3.4	3.8	4.2
49.5	2.5	2.7	3.0	3.2	3.5	3.9	4.3
50.0	2.6	2.8	3.0	3.3	3.6	4.0	4.4
50.5	2.7	2.9	3.1	3.4	3.8	4.1	4.5
51.0	2.7	3.0	3.2	3.5	3.9	4.2	4.7
51.5	2.8	3.1	3.3	3.6	4.0	4.4	4.8
52.0	2.9	3.2	3.5	3.8	4.1	4.5	5.0
52.5	3.0	3.3	3.6	3.9	4.2	4.6	5.1
53.0	3.1	3.4	3.7	4.0	4.4	4.8	5.3
53.5	3.2	3.5	3.8	4.1	4.5	4.9	5.4
54.0	3.3	3.6	3.9	4.3	4.7	5.1	5.6
54.5	3.4	3.7	4.0	4.4	4.8	5.3	5.8
55.0	3.6	3.8	4.2	4.5	5.0	5.4	6.0
55.5	3.7	4.0	4.3	4.7	5.1	5.6	6.1
56.0	3.8	4.1	4.4	4.8	5.3	5.8	6.3
56.5	3.9	4.2	4.6	5.0	5.4	5.9	6.5
57.0	4.0	4.3	4.7	5.1	5.6	6.1	6.7
57.5	4.1	4.5	4.9	5.3	5.7	6.3	6.9
58.0	4.3	4.6	5.0	5.4	5.9	6.4	7.1
58.5	4.4	4.7	5.1	5.6	6.1	6.6	7.2
59.0	4.5	4.8	5.3	5.7	6.2	6.8	7.4
59.5	4.6	5.0	5.4	5.9	6.4	7.0	7.6

(a) Reference tables for boys 0-23 months

Simplified field tables

Weight-for-height BOYS
2 to 5 years (z-scores)

World Health Organization

cm	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
65.0	5.9	6.3	6.9	7.4	8.1	8.8	9.6
65.5	6.0	6.4	7.0	7.6	8.2	8.9	9.8
66.0	6.1	6.5	7.1	7.7	8.3	9.1	9.9
66.5	6.1	6.6	7.2	7.8	8.5	9.2	10.1
67.0	6.2	6.7	7.3	7.9	8.6	9.4	10.2
67.5	6.3	6.8	7.4	8.0	8.7	9.5	10.4
68.0	6.4	6.9	7.5	8.1	8.8	9.6	10.5
68.5	6.5	7.0	7.6	8.2	9.0	9.8	10.7
69.0	6.6	7.1	7.7	8.4	9.1	9.9	10.8
69.5	6.7	7.2	7.8	8.5	9.2	10.0	11.0
70.0	6.8	7.3	7.9	8.6	9.3	10.2	11.1
70.5	6.9	7.4	8.0	8.7	9.5	10.3	11.3
71.0	6.9	7.5	8.1	8.8	9.6	10.4	11.4
71.5	7.0	7.6	8.2	8.9	9.7	10.6	11.6
72.0	7.1	7.7	8.3	9.0	9.8	10.7	11.7
72.5	7.2	7.8	8.4	9.1	9.9	10.8	11.8
73.0	7.3	7.9	8.5	9.2	10.0	11.0	12.0
73.5	7.4	7.9	8.6	9.3	10.2	11.1	12.1
74.0	7.4	8.0	8.7	9.4	10.3	11.2	12.2
74.5	7.5	8.1	8.8	9.5	10.4	11.3	12.4
75.0	7.6	8.2	8.9	9.6	10.5	11.4	12.5
75.5	7.7	8.3	9.0	9.7	10.6	11.6	12.6
76.0	7.7	8.4	9.1	9.8	10.7	11.7	12.8
76.5	7.8	8.5	9.2	9.9	10.8	11.8	12.9
77.0	7.9	8.5	9.2	10.0	10.9	11.9	13.0
77.5	8.0	8.6	9.3	10.1	11.0	12.0	13.1
78.0	8.0	8.7	9.4	10.2	11.1	12.1	13.3
78.5	8.1	8.8	9.5	10.3	11.2	12.2	13.4
79.0	8.2	8.8	9.6	10.4	11.3	12.3	13.5
79.5	8.3	8.9	9.7	10.5	11.4	12.4	13.6

(b) Reference tables for boys 24-59 months

Simplified field tables

Weight-for-length GIRLS
Birth to 2 years (z-scores)

World Health Organization

cm	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
45.0	1.9	2.1	2.3	2.5	2.7	3.0	3.3
45.5	2.0	2.1	2.3	2.5	2.8	3.1	3.4
46.0	2.0	2.2	2.4	2.6	2.9	3.2	3.5
46.5	2.1	2.3	2.5	2.7	3.0	3.3	3.6
47.0	2.2	2.4	2.6	2.8	3.1	3.4	3.7
47.5	2.2	2.4	2.6	2.9	3.2	3.5	3.8
48.0	2.3	2.5	2.7	3.0	3.3	3.6	4.0
48.5	2.4	2.6	2.8	3.1	3.4	3.7	4.1
49.0	2.4	2.6	2.9	3.2	3.5	3.8	4.2
49.5	2.5	2.7	3.0	3.3	3.6	3.9	4.3
50.0	2.6	2.8	3.1	3.4	3.7	4.0	4.5
50.5	2.7	2.9	3.2	3.5	3.8	4.2	4.6
51.0	2.8	3.0	3.3	3.6	3.9	4.3	4.8
51.5	2.8	3.1	3.4	3.7	4.0	4.4	4.9
52.0	2.9	3.2	3.5	3.8	4.2	4.6	5.1
52.5	3.0	3.3	3.6	3.9	4.3	4.7	5.2
53.0	3.1	3.4	3.7	4.0	4.4	4.9	5.4
53.5	3.2	3.5	3.8	4.2	4.6	5.0	5.5
54.0	3.3	3.6	3.9	4.3	4.7	5.2	5.7
54.5	3.4	3.7	4.0	4.4	4.8	5.3	5.9
55.0	3.5	3.8	4.2	4.5	5.0	5.5	6.1
55.5	3.6	3.9	4.3	4.7	5.1	5.7	6.3
56.0	3.7	4.0	4.4	4.8	5.3	5.8	6.4
56.5	3.8	4.1	4.5	5.0	5.4	6.0	6.6
57.0	3.9	4.3	4.6	5.1	5.6	6.1	6.8
57.5	4.0	4.4	4.8	5.2	5.7	6.3	7.0
58.0	4.1	4.5	4.9	5.4	5.9	6.5	7.1
58.5	4.2	4.6	5.0	5.5	6.0	6.6	7.3
59.0	4.3	4.7	5.1	5.6	6.2	6.8	7.5
59.5	4.4	4.8	5.3	5.7	6.3	6.9	7.7

(c) Reference tables for girls 0-23 months

Simplified field tables

Weight-for-length GIRLS
Birth to 2 years (z-scores)

World Health Organization

cm	-3 SD	-2 SD	-1 SD	Median	1 SD	2 SD	3 SD
45.0	1.9	2.1	2.3	2.5	2.7	3.0	3.3
45.5	2.0	2.1	2.3	2.5	2.8	3.1	3.4
46.0	2.0	2.2	2.4	2.6	2.9	3.2	3.5
46.5	2.1	2.3	2.5	2.7	3.0	3.3	3.6
47.0	2.2	2.4	2.6	2.8	3.1	3.4	3.7
47.5	2.2	2.4	2.6	2.9	3.2	3.5	3.8
48.0	2.3	2.5	2.7	3.0	3.3	3.6	4.0
48.5	2.4	2.6	2.8	3.1	3.4	3.7	4.1
49.0	2.4	2.6	2.9	3.2	3.5	3.8	4.2
49.5	2.5	2.7	3.0	3.3	3.6	3.9	4.3
50.0	2.6	2.8	3.1	3.4	3.7	4.0	4.5
50.5	2.7	2.9	3.2	3.5	3.8	4.2	4.6
51.0	2.8	3.0	3.3	3.6	3.9	4.3	4.8
51.5	2.8	3.1	3.4	3.7	4.0	4.4	4.9
52.0	2.9	3.2	3.5	3.8	4.2	4.6	5.1
52.5	3.0	3.3	3.6	3.9	4.3	4.7	5.2
53.0	3.1	3.4	3.7	4.0	4.4	4.9	5.4
53.5	3.2	3.5	3.8	4.2	4.6	5.0	5.5
54.0	3.3	3.6	3.9	4.3	4.7	5.2	5.7
54.5	3.4	3.7	4.0	4.4	4.8	5.3	5.9
55.0	3.5	3.8	4.2	4.5	5.0	5.5	6.1
55.5	3.6	3.9	4.3	4.7	5.1	5.7	6.3
56.0	3.7	4.0	4.4	4.8	5.3	5.8	6.4
56.5	3.8	4.1	4.5	5.0	5.4	6.0	6.6
57.0	3.9	4.3	4.6	5.1	5.6	6.1	6.8
57.5	4.0	4.4	4.8	5.2	5.7	6.3	7.0
58.0	4.1	4.5	4.9	5.4	5.9	6.5	7.1
58.5	4.2	4.6	5.0	5.5	6.0	6.6	7.3
59.0	4.3	4.7	5.1	5.6	6.2	6.8	7.5
59.5	4.4	4.8	5.3	5.7	6.3	6.9	7.7

(d) Reference tables for girls 0-23 months

Figure 1.2: Reference look-up tables for acute undernutrition

Figure 1.6: Look for weight of girl in row for her length

The weight of the child (3.3 kg) is indicated in Figure 1.7.

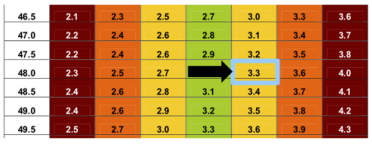


Figure 1.7: Weight of child

Then, to determine the z-score corresponding to the girl's height and weight, look up to the the uppermost row (header row) of the table where you will find the z-score values (Figure 1.8). Specifically, you should look up to the uppermost row (header row) of the column corresponding to the weight of the child (Figure 1.9).

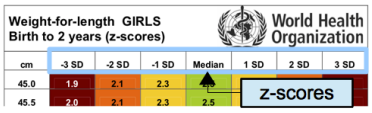


Figure 1.8: Header row

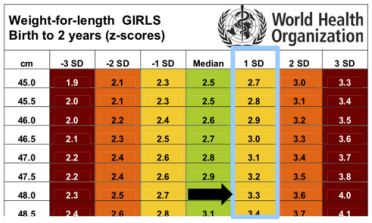


Figure 1.9: Header corresponding to weight of child

So, in this example, the girl has a z-score of **+1SD**. The girl is not acutely undernourished.

1.1.2 Chronic undernutrition

Childhood **chronic undernutrition** is a condition related to a child's exposure to inadequate nutrition over a long period of time leading to failure of linear growth. Stunted growth reflects a process of failure to reach linear growth potential as a result of suboptimal

health and/or nutritional conditions.

Physical signs and symptoms

A child suffering from chronic undernutrition is also called *stunting/stunted*. Such a child is said to be short for its age (see below).

Anthropometric indices

Like with acute undernutrition, an index is used to classify whether a child has chronic malnutrition or not. This index is called height-for-age (HFA) or length-for-age (LFA). Given *child B*, this child's length/height is assessed against the mean length/height of a standard group of children in good health with the same age as *child B*. *Child B* is expected to have a length/height close to the mean length/height of the standard group of healthy children if *child B* is also health and well-nourished. However, if *child B*'s length/height deviates significantly farther from the mean height of the standard group of healthy children, *child B* is considered to have low height for its age and therefore considered to be *stunting* or *stunted*. This deviation from the mean, also called *standard deviation (SD)* in statistics, is calculated for each child whose height has been measured and is expressed in terms of *z-scores*. Therefore, the anthropometric index used for *stunting/stuntedness* is height-for-age z-scores (HAZ) and classification of level of stunting/stuntedness is done based on the following WHZ cut-offs:

HAZ	**Classification**
HAZ $<$ -2SD	Global stunting/stuntedness
-3SD $\geq$ HAZ $<$ -2SD	Moderate stunting/stuntedness
HAZ $<$ -3SD	Severe stunting/stuntedness

1.2 Performing anthropometric measurements

As described in this chapter, to be able to assess the anthropometric indices for acute and chronic undernutrition four (4) anthropometric measurements needs to be collected: 1) *weight*; 2) *height*; 3) *mid-upper arm circumference (MUAC)*; and, 4) *oedema*. In addition to these anthropometric measurements, information on the child's *age (in months)* and *sex* will also be needed to be able to determine the appropriate reference standards to use in calculating the child's corresponding anthropometric indices. The next chapters provide detailed directions on how to perform the various anthropometric measurements accurately.

2 Measuring weight

2.1 Equipment

Weighing scales are the equipment needed for measuring weight.

2.1.1 Types of weighing scales

Various types of scales are available to measure the weight of a child: *spring scales*; *hanging scales*; *beam balance scales*; and, *digital scales*.

Spring scales are the most common type of scales used worldwide. *Hanging scales* (Figure 2.1b) are a kind of *spring scale* that is hung from a height instead of laid flat on the ground. *Hanging scales* are commonly preferred in many countries because they can be transported easily, can be used in almost any setting (particularly where a flat surface is not available) and are relatively inexpensive. However, they are not very accurate and as such are not recommended for use in nutrition surveys.

Balance beam scales (Figure 2.2) are commonly used in health centres, as they need to be positioned on a flat surface for accurate measurement and are not easily transported.

Digital scales on the other hand are highly accurate (for as long as it is powered adequately and consistently), easily transportable though requiring a flat surface on which to be laid upon. They are generally of high quality and rugged for frequent field use as is needed for a nutrition survey. This is why *digital scales* are what's currently recommended for use in anthropometric measurements in a field survey setting.

In addition to being a *digital scale*, it is recommended to weigh children using a scale with the following features:

- Solidly built and durable
- Electronic (digital reading)
- Measures up to 150 kg
- Measures to a precision of 0.1 kg (100g)
- Allows tared weighing

(a) Bathroom scale (spring)

(b) Hanging scale (spring)

Figure 2.1: Types of spring scales

Figure 2.2: Balance beam scales

"Tared weighing" means that the scale can be re-set to zero (*"tared"*) with the person just weighed still on it. Thus, a mother can stand on the scale, be weighed, and the scale tared. While remaining on the scale, if she is given her child to hold, the child's weight alone appears on the scale.

Digital scales that allow for **tared weighing** have very clear advantages:

- There is no need to subtract weights to determine the child's weight alone (reducing the risk of error).
- The child is likely to remain calm when held in the mother's arms for weighing.

Currently, the most commonly used digital tared weighing scale is the **UNICEF Electric Scale (UNISCALE)** which is produced by **SECA** (the non-UNICEF branded scale is the **SECA model 890** or **SECA model 874** - Figure 2.3)

Figure 2.3: SECA scale model 874

2.1.2 General use, care and maintenance of SECA tared scales

1. Place the scale on a hard, level surface (wood, concrete, or firm earth). Soft or uneven surfaces may cause small errors in weighing. It is therefore advisable that each survey team are provided with a wooden plank that can be laid on top of unlevel ground as a way to even out the surface (Figure 2.4). The plank should be big enough to cover a reasonable surface and sturdy enough to carry the weight of the scale and those being weighed.

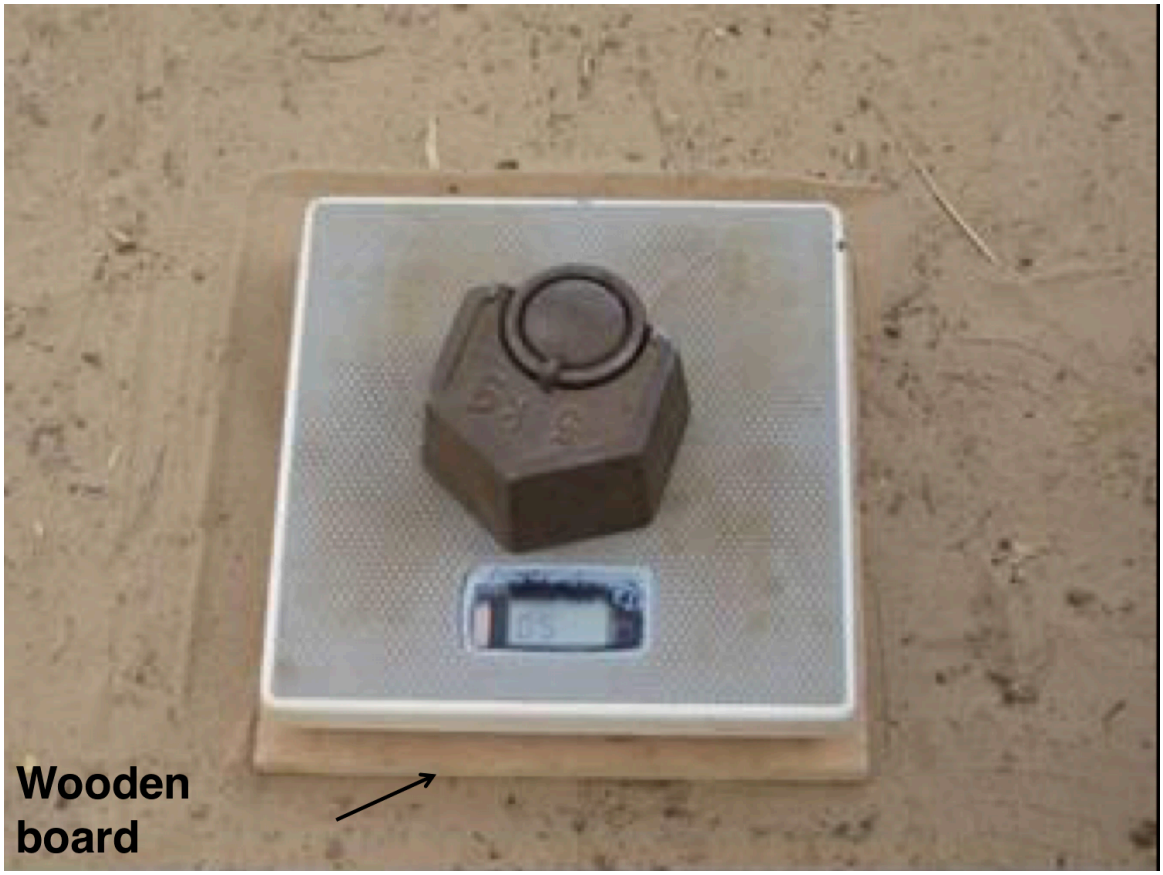


Figure 2.4: Weighing scale on a wooden plank

2. The scale will not function correctly if it becomes too warm. It is best to use the scale in the shade, or indoors. If the scale becomes hot and does not work correctly, place it in a cooler area and wait 15 minutes before using again.

3. The scale must adjust to changes in temperature. If the scale is moved to a new site with a different temperature, wait for 15 minutes before using the scale again. It is advisable to test the scale before every measurement when the scale is moved and operated in extreme weather conditions.

4. The scale must be tested every single day of fieldwork. This is best done using a labelled standard weight of 2.5 - 5.0 kg. This can be purchased locally, but must be

tested initially to ensure that the indicated weight is accurate. Record the results of the daily test of the scale, including the date and weight. Using other types of standard weights is possible, but is not recommended. Some surveys have in the past used filled water bottles for testing, but as water or other liquids evaporate, this technique is flawed. Sand is a viable alternative, but only if labelled weights are not available.

5. Handle the scale carefully:

- Do not drop or bump the scale.
- Do not weigh loads with a total weight of more than 150 kg.
- Do not store the scale in direct sunlight or other hot places.
- Protect the scale against excess humidity or wetness.
- Do not use the scale at temperatures below 10^{o} C or above 45^{o} C.

6. The scale is battery-powered. Around 120,000 weighings can be performed with a fresh set of batteries.

2.2 Personnel

At least two trained personnel are required when performing weight measurement. One is assigned as the **measurer** while the other is assigned as the **assistant**. It is important that prior to the measurement of the weight of a child that these roles are clearly specified and that each personnel knows what their role entails. Switching roles between measurement of different children is acceptable for as long as all personnel are trained on performing the tasks expected of either **measurer** or **assistant**. For specific tasks for each role, see next section.

2.3 Steps in weighing a child

1. *Prepare the child for weighing*

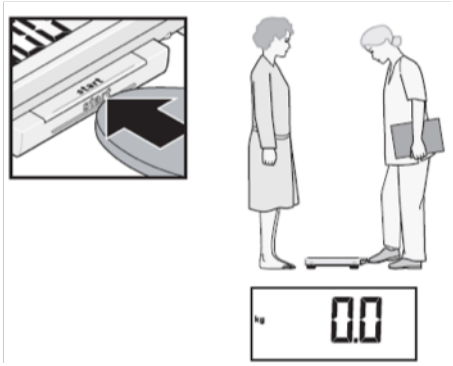
Explain to parents/caretakers that the child needs to remove outer clothing in order to obtain an accurate weight. A wet diaper, or shoes and jeans, can contribute substantially to the measured weight (up to 0.5 kgs) making the measurement inaccurate. Babies should be weighed naked but precautions needs to be put in place to ensure that the baby stay warm while waiting to be weighed and while they are being weighed. They can be wrapped in a blanket to keep them warm while waiting. When being weighed, the adult can be weighed holding a blanket that can be used to wrap around the naked baby during measurement. Older children should remove all but minimal clothing, such as their underclothes.

If it is too cold to undress a child or if the child resists being undressed and becomes agitated, please weigh the clothed child, but indicate in the questionnaire that the child could not be undressed to the minimum and take a note of the circumstances. To be able to adjust the weight of clothed children, weigh one set of child's clothing separately and record. This

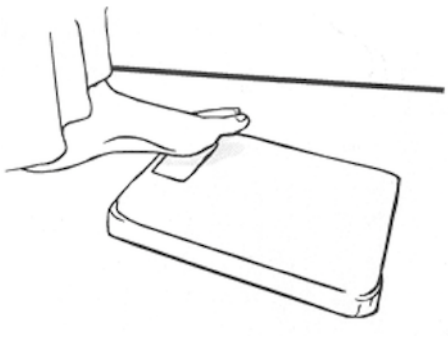
weight will be used in adjusting the weight measurement of all children weighed with clothes on.

2. *Switch on scale*

The **measurers** should switch on the scale with no weight applied. The **SECA 874** can be turned on by tapping the **start** button (Figure 2.5a). The **SECA 890** can be turned on by covering the solar cells for less than a second (Figure 2.5b).



(a) Turning on the SECA 874



(b) Turning on the SECA 890

Figure 2.5: How to turn on SECA tared scales

When the **SECA 890** is switched on, you will first notice the display showing `188.8`. Wait for the display to turn `0.0` before putting any weight onto the scale. The **assistant** on the other hand will be holding onto the paper questionnaire or the mobile device. The **assistant** will be in charge of recording the weight measurement.

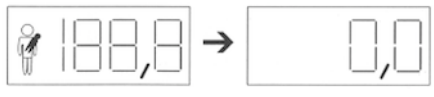


Figure 2.6: SECA 890 ready

3. *Weighing the child*

This step differs between children who are able to stand still on the scale long enough for a measurement to be read and recorded and children who are too young to do so. Generally, children 2 years and above should be able to stand on the scale still on their own long enough. However, it is to the discretion of the **measurer** whether this is the case or not.

a. *Weigh child on scale on their own*

If child is able to stand still on the scale long enough, the child can be weighed alone. **Measurer** should explain to the child that he/she will need to step on to the scale alone and standing very still. **Measurer** will ask the child to stand in the middle of the scale,

feet slightly apart and to remain still until the weight appears and that the measurement is retained on the display (about 3 seconds that the measurement is stable with child standing still and not moving the display will stop flashing signifying that the weight display has been stored). It is important that no one holds or supports the child until a weight measurement has been retained on the display successfully as this will interfere with the measurement. If the child does not stand still or is unable or does not want to stand on his/her own, then step b below should performed instead.

The **measurer** then reads out loud the child's weight from the display. The **measurer** should read the measurement entirely including the one decimal place that shows in display (to the nearest 0.1 kg). Note that when using the SECA 874, the weight is displayed with two decimal places but the second decimal number is always 0. The second decimal place is not recorded.

The **assistant** then repeats the weight that has been called out.

The **measurer** then confirms if this is the correct weight. If correct, then the **assistant** records the weight measurement on the paper questionnaire or on the mobile device. If incorrect, **measurer** reads out the measurement again until the **assistant** is able to repeat the correct weight.

The child can then step off the scale.

b. *Tared weighing*

If child is unable to stand still on the scale long enough or if child doesn't want to stand on the scale alone, then this child should be measured using *tared weighing.*

The **measurer** asks the mother/caretaker to step onto the scale and then to stand still (Figure 2.7). After about 3 seconds, the weight of the mother/caretaker will be displayed.

Figure 2.7: Weighing the adult first on the SECA 874

If using the **SECA 874**, the **measurer** will have to press the **2 in 1** key found on the scale (Figure 2.8). This will store the weight of the mother/caretaker. The display on the device would show `0.0` reading and the word **NET** indicating that the weight of the mother/caretaker has been stored.

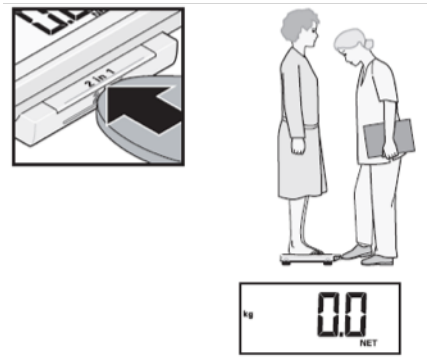


Figure 2.8: Taring the SECA 974

If using the **SECA 890**, the **measurer** will have to cover the solar cell of the device (Figure 2.9) for less than a second and the display will revert back to `0.0` reading. This indicates that the weight of the mother/caretaker has been stored.

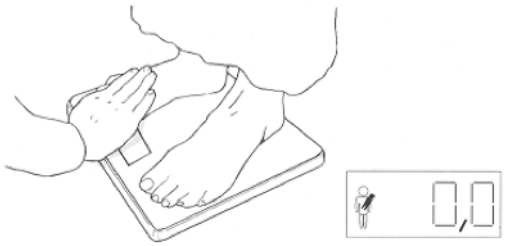


Figure 2.9: Taring the SECA 890

The **measurer** then asks the mother/caretaker to hold/carry the baby/child on their arms and to again stand as still as possible. The display will show a weight measure. If the weight display and the message `HOLD` are flashing, it means that the scale is waiting for the measurement to stabilise (Figure 2.10). The **measurer** should wait for the weight display and the message `HOLD` to stop flashing before reading the weight measurement.

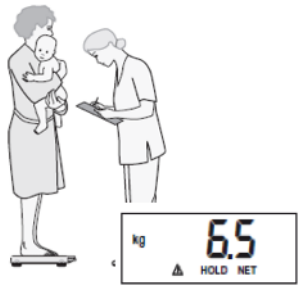


Figure 2.10: SECA 874 on hold

Once the weight display has stopped flashing, The **measurer** reads out loud the child's weight from the display. The **measurer** should read the measurement entirely including the one decimal place that shows in display. Note that when using the SECA 874, the

weight is displayed with two decimal places but the second decimal number is always 0. The second decimal place is not recorded.

The **assistant** then repeats the weight that has been called out.

The **measurer** then confirms if this is the correct weight. If correct, then the **assistant** records the weight measurement on the paper questionnaire or on the mobile device. If incorrect, **measurer** reads out the measurement again until the **assistant** is able to repeat the correct weight.

Reminders

- Always calibrate scales ever day in the morning before data collection.
- Always measure weight before height.
- If there is more than 1 eligible child in a household, always weigh the less agitated one first.
- Try and obtain scales that are sturdy but light enough to be carried easily by the team.
- Measure weight without clothes.

3 Measuring height

3.1 Equipment

A height board, sometimes called a heightometer or stadiometer, is the tool used to measure height of children. It is usually constructed based on a ruler with a sliding horizontal headpiece which adjusts to rest on top of the head. Some common types of height boards are the wooden 2-piece and wooden 3-piece, plastic free-standing, aluminium free-standing and locally-produced boards. Of these, it is preferable to use wooden measuring boards as opposed to aluminium boards which can get very hot in the sun and burn children. The measuring board should be at least 130 cm long and made of hardwood with a hard water-resistant finish. Choice of woods is important. The board should be light enough to be easily carried in the field from house to house. The board should have two tape measures attached to it, one on each side, and they should be marked out in 0.1 cm increments. The board should be easily set upright to measure height with the head piece of the length board becoming the base when the board is set upright.

(a) 2-piece height board standing up

(b) 2-piece height board lying down

(c) 2-piece height board folded and carried

Figure 3.1: Different kinds of height boards

3.2 Personnel

A minimum of two personnel are needed to measure the height or length of a child. If human resources are not an issue, a three-person team would be ideal especially when taking the length of the child. For a two-person team, one is assigned as the **measurer** while the other is assigned as the **assistant**. It is important that prior to the measurement of the height of a child that these roles are clearly specified and that each personnel knows what their role entails. Switching roles between measurement of different children is acceptable for as long as all personnel are trained on performing the tasks expected of either **measurer** or **assistant**. For specific tasks for each role, see next section.

3.3 Steps in measuring length or height of child

Depending on the age of the child, either the weight or the length is measured. For children less than 24 months old (or for height less than 85 cms), length should be measured i.e., height board on recumbent position with the child lying down using a length board which should be placed on a flat, stable surface such as a table (Figure 3.2).

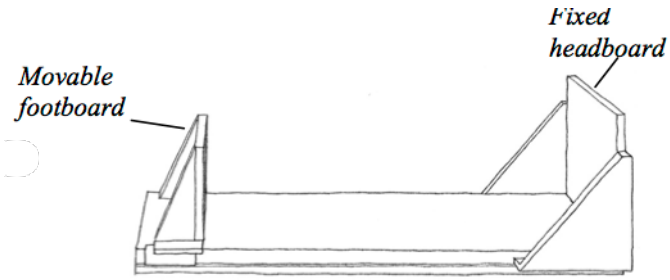


Figure 3.2: Length board flat on a table surface

For children 24 months and older, height should be measured i.e., height board on the vertical position with the child standing up (unless child is unable to stand). Use a height board mounted at a right angle between a level floor and against a straight, vertical surface such as a wall or pillar (Figure 3.3).

i Challenges with measuring length

Measuring children standing up is much easier. Length is much more difficult to measure than height.
Standing height is about 0.7 cm less than recumbent length. This difference was taken into account in developing the WHO growth standards. Therefore, it is important to adjust the measurements if length is taken instead of height, and vice versa.

- If a child less than 2 years old will not lie down for measurement of length, measure standing height and add 0.7 cm to convert it to length.

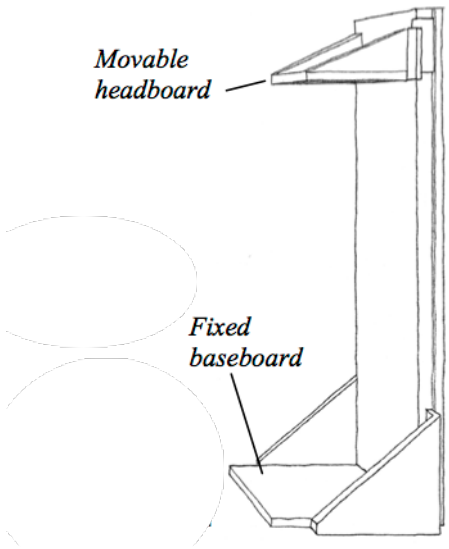


Figure 3.3: Height board mounted upright

- If a child aged 2 years or older cannot stand, measure recumbent length and subtract 0.7 cm to convert it to height.

It is recommended that this adjustment to not be made by enumerators during the survey. Instead, an entry in the data collection form / survey instrument should be included that indicates whether measurement made was a height or a length measurement. This will allow adjustments to be made to the height/length measurements post-survey.

3.3.1 Measuring height

1. **Measurer** or **Assistant** should place the measuring board on a hard flat surface against a wall, table, tree, staircase, etc. Make sure the board is stable. Check that shoes, socks and hair ornaments have been removed.
2. **Measurer** or **Assistant** should ask the mother to remove the child's shoes and unbraid any hair that would interfere with the height measurement. Ask mother to walk the child to the board and to kneel in front of the child.
3. **Assistant** should place the paper questionnaire or mobile device on the ground (**arrow 1**) and kneel with both knees on the right side of the child (**arrow 2**).
4. **Measurer** should kneel on their right knee only, for maximum mobility, on the child's left side (**arrow 3**).
5. **Assistant** should place the child's feet flat and together in the centre of and against the back and base of the board. The assistant should place right hand just above the child's ankles on the shins (**arrow 4**) with left hand on the child's knees (**arrow 5**)

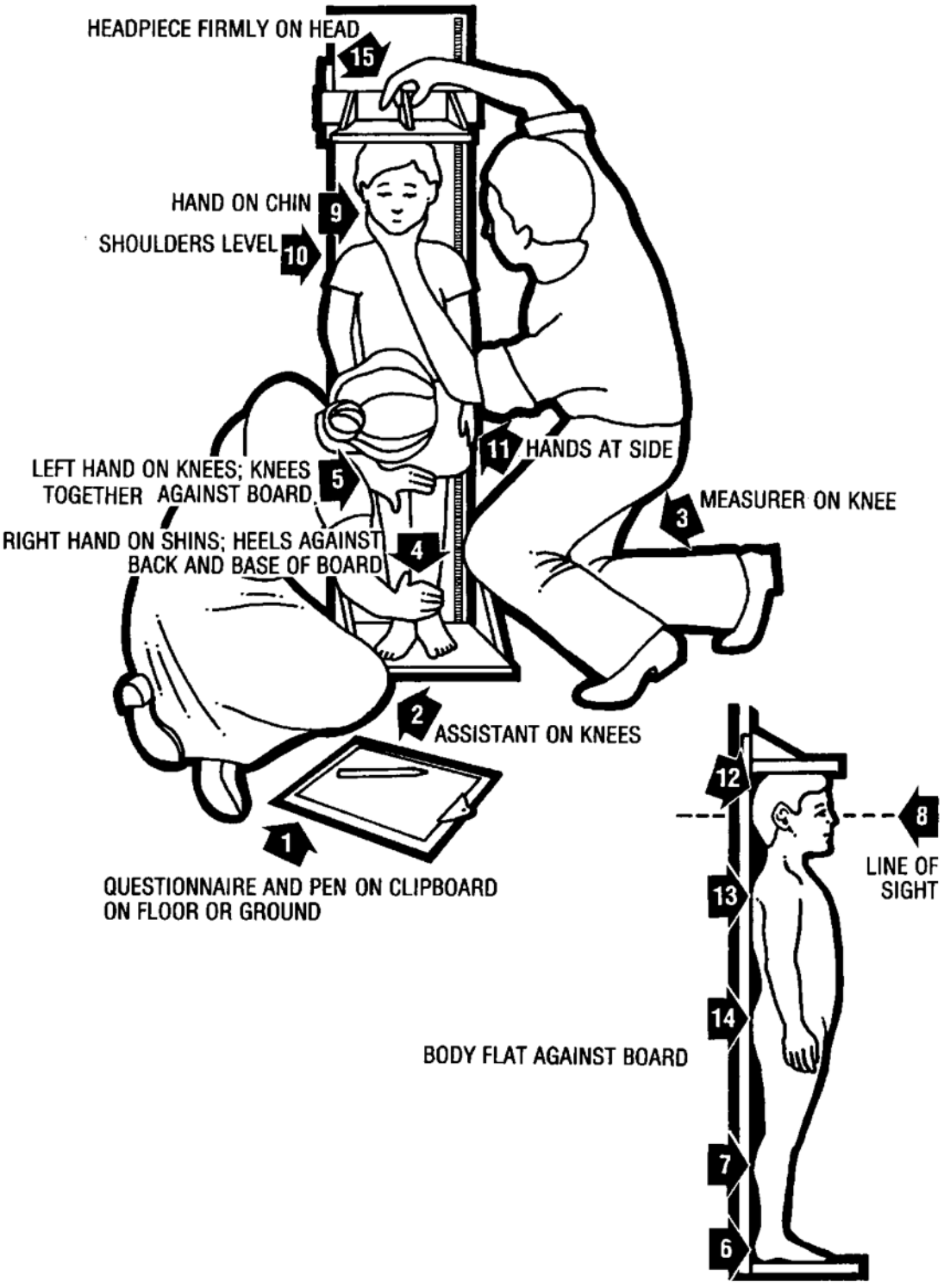


Figure 3.4: Steps in measuring height

and push against the board making sure the child's legs are straight and the heels and calves are against the board (**arrows 6** and **7**). The **assistant** then notifies the measurer when positioning of the feet and legs is complete.

6. **Measurer** tells the child to look straight ahead at the mother if she is in front of the child. Make sure the child's line of sight is level with the ground (**arrow 8**). **Measurer** places open left hand on the child's chin and gradually closes hand (**arrow 9**) taking care that the child's mouth or ears are not covered. The **measurer** makes sure the shoulders are level (**arrow 10**), the hands are at the child's side (**arrow 11**), and the head, shoulder blades and buttocks are against the board (**arrows 12**, **13** and **14**). With the right hand, the **measurer** lowers the headpiece on top of the child's head making sure that the headpiece pushes through the child's hair (**arrow 15**).
7. **Measurer** and **Assistant** should check the child's position (**arrow 1-15**) and repeating any steps necessary.
8. When the child's position is correct, the **measurer** reads and calls out the measurement to the nearest 0.1cm. Then, the **measurer** removes the headpiece from the child's head and releases the left hand from the child's chin and supports the child during the recording.
9. **Assistant** immediately records the measurement and shows it to the **measurer**.
10. **Measurer** checks the recorded measurement on the questionnaire for accuracy and legibility and instructs the **assistant** to erase and correct any errors.

i Uncertainty about child's age

If you are unsure or not confident in the precision of the child's age (over age 2), please take measurement as described above. If the child's height is measured to less than 85 cm, you must instead measure the child's length (see Section 3.3.2).

⚠ Common mistakes when measuring height

- child leaning to one side;
- heels not touching the board; and,
- hands not at side.

3.3.2 Measuring length

1. **Measurer** or **assistant** places the measuring board on a hard flat surface, such as the ground, floor or a steady table. Cover the length board with a thin cloth or soft paper for hygiene and for the baby's comfort.

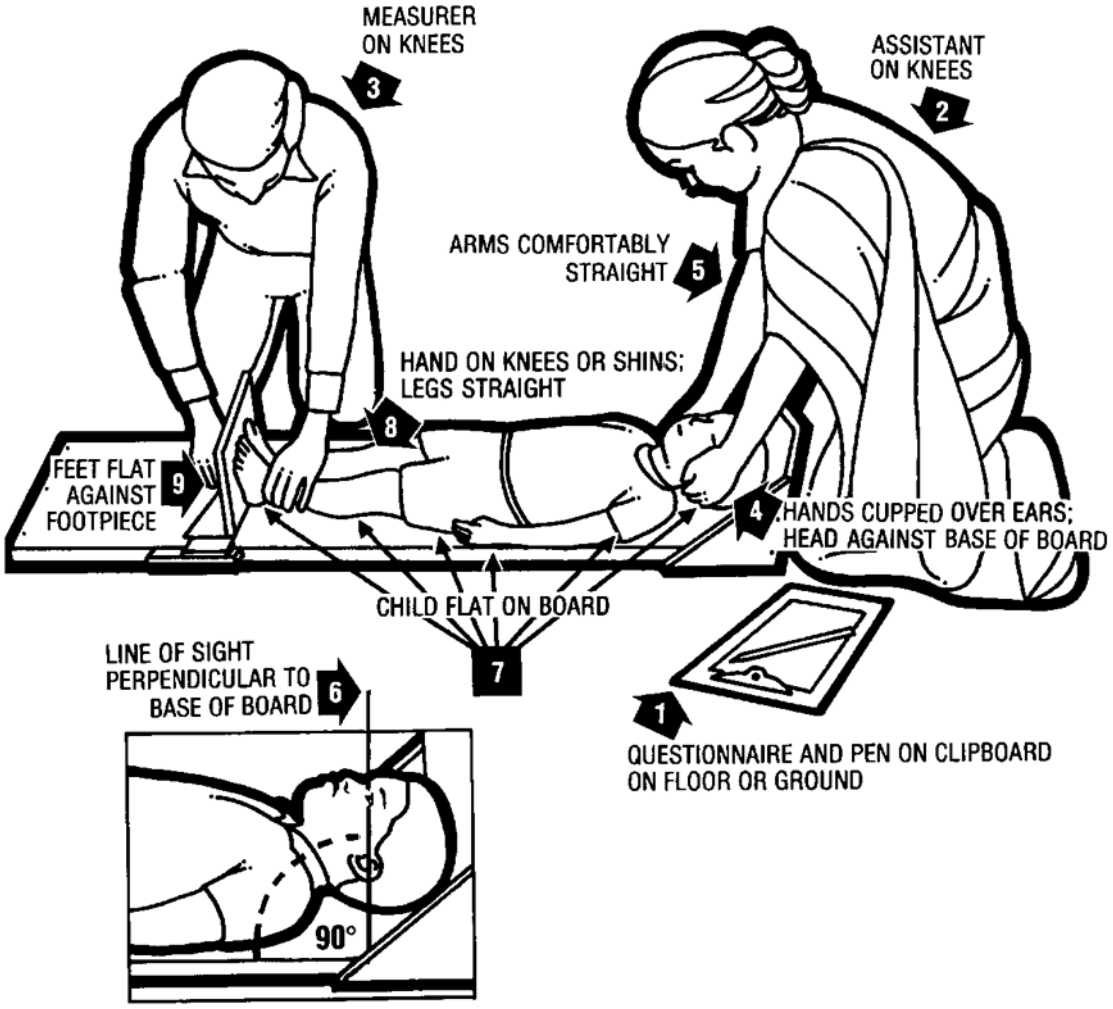


Figure 3.5: Steps in measuring length

2. **Assistant** places the paper questionnaire or the mobile device on the ground, floor or table (**arrow 1**) and kneels with both knees behind the base of the board, if it is on the ground or floor (**arrow 2**).

3. **Measurer** kneels on the child's right side and holds the footpiece with right hand (**arrow 3**).

4. With the mother's/caretaker's help, the **measurer** and **assistant** should lay the child on the board. The **assistant** should support the back of the child's head with hands and gradually lower the child onto the board. The **measurer** on the other hand supports the child at the trunk of the body.

5. **Measurer** or **assistant** asks the mother/caretaker to kneel on the opposite side of the board facing the measurer to help keep the child calm.

6. **Assistant** cups hands over the child's ears (**arrow 4**). With arms comfortably straight (**arrow 5**), **assistant** places the child's head against the base of the board so that the child is looking straight up (Figure 3.6). The child's line of sight should be perpendicular to the ground (**arrow 6**). The **assistant's** head should be straight over the child's head and looking directly into the child's eyes.

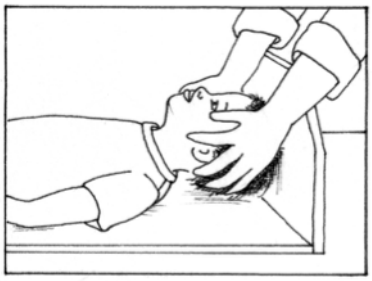


Figure 3.6: Positioning child's head against the base of the board

7. **Measurer** makes sure the child is lying flat and in the centre of the board (**arrow 7**) and places left hand on the child's shins (above the ankles) or on the knees (**arrow 8**) pressing them firmly against the board (Figure 3.7). Note that with the right hand, **measurer** places the footpiece firmly against the child's heels (**arrow 9**).

8. **Measurer** and **assistant** checks the child's position (**arrows 4-9**) and repeats any steps as necessary to correct child's position.

9. When the child's position is correct, **measurer** reads and calls out the measurement to the nearest 0.1 centimetre. The **measurer** then removes the footpiece, releases left hand from the child's shins or knees and supports the child during the recording.

10. The **assistant** then immediately releases the child's head, records the measurement on the paper questionnaire or mobile device and shows it to the **measurer**. Alternatively, the **assistant** calls out the measurement and have the **measurer** confirm by repeating back.

11. **Assistant** records whether the child was measured lying down or standing up.

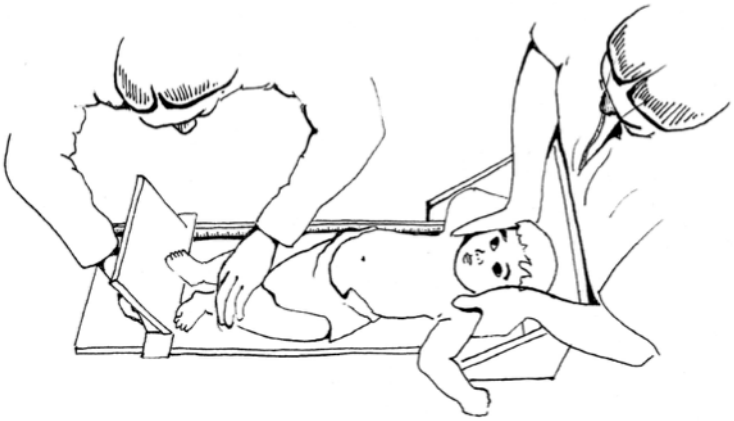


Figure 3.7: Measurer and assistant working together to position child

12. **Measurer** checks the recorded measurement on the questionnaire for accuracy and legibility then instructs the assistant to cancel and correct any errors.

Uncertainty about child's age

If you are unsure or not confident in the precision of the child's age (under age 2), take measurement as described above. If the child's length is measured to 85 cm or more, you must instead measure the child's height (see Section 3.3.1).

Common mistakes when measuring length

- toes pointed;
- knees bent; and,
- head lifted off the board.

Reminders with measuring height/length

- The measuring boards should be at least 130 cm in length and be made of treated wood.
- There should be measuring tape on both sides of the measuring board.
- The measuring board must be cleaned before being stored.
- Record measurements to the nearest 0.1 cm.

4 Measuring mid-upper arm circumference (MUAC)

4.1 Equipment

Figure 4.1: MUAC tape with colour cut-offs at 115 mm and 125 mm

MUAC is a quick and simple way to determine whether or not a child is malnourished using a simple coloured plastic strip. There are different types of MUAC tape available. All are graduated in millimetres and some are colour coded (red, yellow and green) to indicate the nutritional status of a child or adult. The colour codes and gradations vary depending on the tape type.

The most appropriate MUAC tape to use would be the tapes that use the latest WHO Growth Standards cut-offs for acute malnutrition. These are the tapes that have three colours (red, yellow, green) with colour cut-offs at 115 mm and 125 mm. The MUAC tapes should also be precise up to 1 mm. The material for the MUAC tape needs to be flexible but non-stretchable. An example of this kind of MUAC tape is shown in Figure @ref(fig:muac1).

4.2 Personnel

Only a single **measurer** is required to measure the MUAC of a child. If with an **assistant** is available, he/she records the MUAC measurement.

4.3 Steps in measuring MUAC

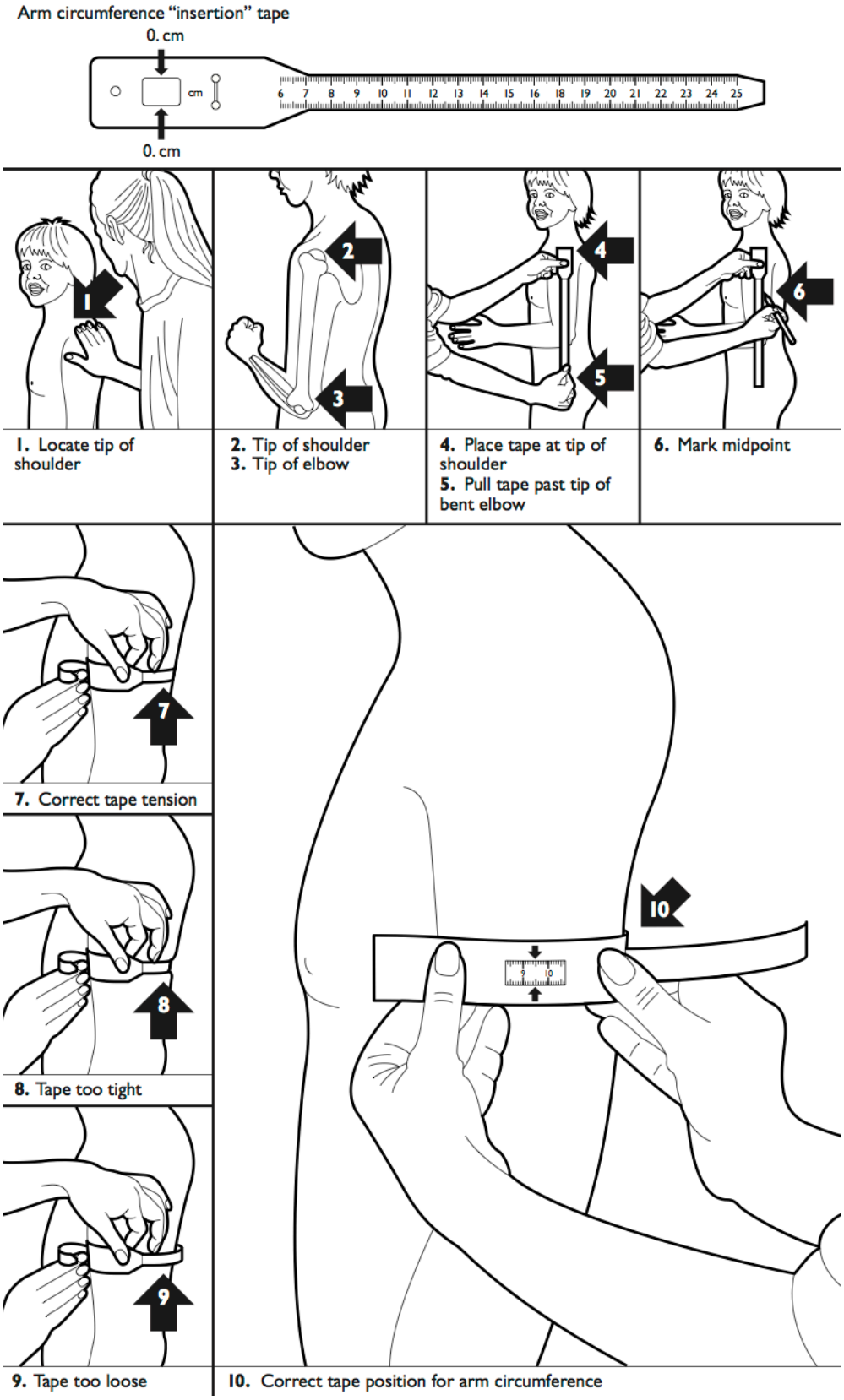


Figure 4.2: Steps in measuring MUAC

1. When measuring MUAC, ensure work at eye level. Sit down when possible. Very young children can be held by their mother during this procedure. Ask the mother to remove clothing that may cover the child's left arm.
2. **Measurer** calculates the midpoint of the child's left upper arm by first locating the tip of the child's shoulder (**arrows 1** and **2**) with finger tips. Bend the child's elbow to make a right angle (**arrow 3**). Place the tape at zero, which is indicated by two arrows, on the tip of the shoulder (**arrow 4**) and pull the tape straight down past the tip of the elbow (**arrow 5**). Read the number at the tip of the elbow to the nearest centimetre. Divide this number by two to estimate the midpoint. As an alternative, bend the tape up to the middle length to estimate the midpoint. A piece of string can also be used for this purpose. Either you or an assistant can mark the midpoint with a pen on the arm (**arrow 6**).
3. **Measurer** straightens the child's arm and wraps the tape around the arm at midpoint. Make sure the numbers are right side up. Make sure the tape is flat around the skin (**arrow 7**).
4. **Measurer** and **assistant** inspects the tension of the tape on the child's arm. Make sure the tape has the proper tension (**arrow 7**) and is not too tight or too loose (**arrows 8-9**). Repeat any steps as necessary.
5. **Assistant** is on ready with the paper questionnaire or the mobile device.
6. When the tape is in the correct position on the arm with the correct tension, **measurer** reads and calls out the measurement to the nearest 0.1 cm. (**arrow 10**).
7. **Assistant** immediately records the measurement on the questionnaire or the mobile device and shows it to the **measurer**.
8. While the assistant records the measurement, **measurer** loosens the tape on the child's arm.
9. **Measurer** checks the recorded measurement on the questionnaire or mobile device for accuracy and legibility then instructs the assistant to erase and correct any errors.
10. **Measurer** removes the tape from the child's arm.

> ⚠ Warning
>
> Common mistakes when measuring MUAC include **1)** measuring on the right arm; **2)** estimating (rather than measuring) the mid-point of the upper arm; **3)** bending the MUAC tape when measuring the midpoint; **4)** not measuring the midpoint from the tip of the shoulder to the elbow bend; **5)** pulling the MUAC tape too tight; **6)** not pulling the MUAC tape tight enough (too slack); **7)** not reading the tape accurately (to nearest smillimetre).

5 Checking for oedema

Nutritional oedema, manifested as bilateral pitting oedema, is a sign of severe acute malnutrition. Nutritional oedema always starts from the feet and extends upwards to other parts of the body. Children with nutritional oedema are at high risk of mortality hence require immediate therapeutic care. This chapter describes how to check nutritional oedema.

5.1 Equipment

No tool or equipment is needed for checking for nutritional oedema.

5.2 Personnel

Oedema check can be performed by a single person.

5.3 Steps in checking for nutritional oedema

1. Press both feet with thumbs

Using both thumbs of your hands, apply normal pressure on top of both feet of the child for about three seconds as shown below. You can estimate three seconds by counting ***'one thousand and one, one thousand and two, one thousand and three'*** in English. It takes roughly 3 seconds to be able to say these words.

Figure 5.1: Press both feet with thumbs

2. Release pressure from feet

After three seconds, release the pressure you are applying on the child's feet. Observe the resulting effect on the child's feet.

If there is oedema, an impression remains on both feet for a few seconds as shown below.

Figure 5.2: Bilateral pitting oedema observed after releasing thumbs

3. Move up to check on the lower legs If there is nutritional oedema present on the feet, perform the same test described in step 2 but now move up to the lower legs.
4. Move up to the upper body and/or face If there is nutritional oedema present on the lower legs, perform the same test described in step 2 but now move up to the upper body and/or the face.

Step 3 and **Step 4** are performed to be able to grade or classify the level of nutritional oedema the child is suffering from (if present).

Oedema Description	**Grade**
Oedema below the knees	+
Oedema in both feet and legs, below the knees	++
Oedema in both feet, legs, arms and sacral pad and eyelids	+++

5. Record on the paper questionnaire or the mobile device the presence or absence of oedema. If oedema is present, record also the grade of the oedema.

Note

Children with oedema (any grade) are at a high risk of dying and should be immediately referred to a health care facility (ideally a facility that manages severe acute undernutrition).

Important

- Oedema is a very rare event.
- It is the most common source of errors.
- Be careful of misclassifying oedematous child.
- Team leader and/or supervisor should confirm oedema.

6 Anthropometric measurement standardisation test

The survey personnel should go through theoretical discussions and demonstrations on how to perform the anthropometric measurements. This should then be followed by practical demonstration of the measurement techniques, measurement readings and recording ideally with a large number of children particularly if there is a large number of survey personnel. Once all personnel have had the opportunity to adequately practice their measurement and recording techniques, a standardisation test or exercise must be carried out. Chapter @ref(standard) provides detailed instructions on how to carry out an anthropometric measurement standardisation test as part of a training process in preparation for a nutrition survey.

6.1 Objectives

The standardisation test evaluates the **precision** and the **accuracy** of the measurements taken by each survey personnel.

The **accuracy** of measurements taken by survey personnel is determined by how close they are to the true value with repeated measurements. On the other hand, the **precision** of measurements taken by survey personnel is determined by how similar the values are of repeated measurements made. In preparation for a nutrition survey while the survey personnel are in training, the aim is for survey personnel to be *highly accurate* and *highly precise* with their anthropometric measurements.

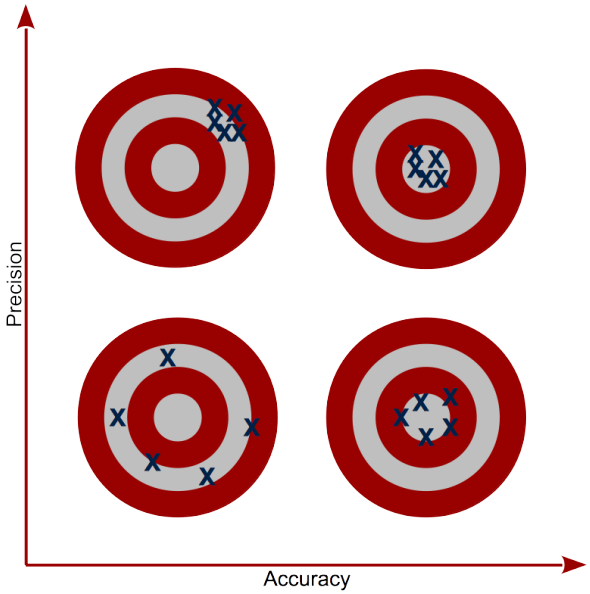


Figure 6.1: Relationship between accuracy and precision

6.2 Mechanics

The general process of the standardisation test is for each survey personnel to take measurements of at least 10 children 6-59 months, twice, with an interval of time between the 1st and 2nd measurements.

6.2.1 Test parameters

The following test parameters need to be followed when conducting an anthropometric standardisation test:

1. The same type of equipment must be used both during the standardisation test and the survey
2. Each child is measured with the same equipment
3. The supervisor must observe how measurements are being taken
4. Survey personnel measurements are compared to the reference (supervisor) values
5. Survey personnel measurements are compared to the repeated measures taken (intra-observer)

6.2.2 Test organisation and requirements

The following test organisation and requirements need to be met in order to conduct a credible standardisation test:

1. Spacious and shady area
2. Healthy children between 6 and 59 months or according to the age group targeted by the survey
3. Incentives provided for the mother and children
4. Survey personnel are grouped into pairs, but each personnel will carry out the measurements in turn
5. There should only be one pair of survey personnel per child at any time during the test
6. Each survey personnel is given a unique ID. For example if there are 20 survey personnel, a unique ID from 1 to 20 is given to each survey personnel. The supervisor's ID is always 0
7. Each measurement station should have a height board, weighing scale and a MUAC tape
8. Each child must remain with their mother in a fixed station with a unique ID number. For example if there are 10 mother and children pairs, a unique ID from 1 to 10 is given to each pair
9. It is not allowed for pairs of survey personnel to speak with other pairs during the test

6.2.3 Timeframe

In order to follow the test parameters specified above and organise the test appropriately, a considerable amount of time needs to be set aside for conducting the test.

For a survey team of about 20 survey personnel, the test can be carried out in 2 half-days such that half of the survey personnel (first half of each team) measures 10 children in the morning and the other half (second half of each team) measures the same 10 children in the afternoon.

It would be possible to have a different set of 10 children for the afternoon session. However, the results of the first half who took the test in the morning cannot be combined with the results of the second half who took the test in the afternoon.

For larger scale surveys with survey personnel more than 20, more days will be required to conduct the test to appropriately and to correct specifications.

6.2.4 Steps in carrying out the standardisation test

1. The supervisor carefully performs the measurements on each child without allowing the teams to see the values. The supervisor records his/her measurements on the standardisation test form for the first round of measurements.

Standardisation Test Form - Measurement Round 1

Enumerator ID: _____ Enumerator Name: _____

Child ID	Weight (kg)	Height (cm)	MUAC (mm)	Oedema (yes/no)
01				
02				
03				
04				
05				
06				
07				
08				
09				
10				

> **Note**
>
> Download the standardisation test form here.

2. Each team starts with a different child, and the first half of the team measures the child once and records the results in a standard form for the 1st measurement (as above). The current measurer should make sure that he/she is entering data in the row corresponding to the child ID of the child he/she is currently measuring.
3. When the first half of the team has done the measurements for the current child, they should move on to the next child. After the first half of all the teams has measured 10 children once, the first measurement round forms are handed in. The teams and the children then take a break. Appropriate incentives including food and drinks to snack on during the break should be provided to the mothers and children.
4. After the break, the first half of the team repeats the whole process and measures each child for the second time and records his/her measurements onto the standardisation test form for the second round of measurements. After the the first half of all the teams has measured 10 children twice, the second measurement round forms are handed in. The teams and the children then take a break for lunch (end of first half of the day/first half of the test). Appropriate lunch arrangements should be prepared for the mothers and children.

5. After the lunch break or on a new day altogether, the whole process is done all over again but this time, the second half of the teams will be performing the measurements. Ideally, the same set of mother and child pairs should be utilised for the second half day of testing. However, it may be that some of the mothers will be unable to come back to help. If for the second half day of testing the mother and child pairs are different from the first half day, then measurements made in the second half day cannot be mixed with the data from the first half day when reporting on the performance in the standardisation test of the survey personnel.

Part II

Dietary Intake

7 Measuring dietary diversity

7.1 Introduction

Dietary diversity can be measured in various ways with the traditional approach being time consuming, expensive, and requiring a high level of technical skill both in data collection and analysis. Recent development work in this indicator has brought about the use of a qualitative approach to food consumption that reflects household access to a wide variety of foods, and is also a proxy of the nutrient adequacy of the diet for individuals. The approach uses a specifically designed and tested dietary diversity questionnaire as a tool to elicit food consumption information in a more rapid, user-friendly and cost-effective approach. Administration of the questionnaire is straightforward and can be handled easily by trained enumerators. The scoring and/or analysis of the information gained from the questionnaire is easy to understand, quick to implement, and can be applied with minimal technical expertise.

In general, dietary diversity indicators are created by summing either the number of individual foods or food groups consumed over a reference period. This chapter describes how an individual dietary diversity indicator is created through a simple count of food groups that an individual has consumed over the past 24 hours. Specifically, this chapter discusses how the minimum dietary diversity indicator for women (MDD-W) and the minimum dietary diversity indicator for children under 2 years old (MDD) are calculated using a standard dietary diversity questionnaire.

7.2 Minimum dietary diversity for women (MDD-W)

MDD-W is a dichotomous indicator of whether or not women 15–49 years of age have consumed at least five out of ten defined food groups the previous day or night. The proportion of women 15–49 years of age who reach this minimum in a population can be used as a proxy indicator for higher micronutrient adequacy, one important dimension of diet quality.

The indicator is calculated as follows:

$$\text{MDD-W} = \frac{\text{Women 15-49 years of age who consumed 5 out of 10 food groups in the previous day or night}}{\text{Women 15-49 years of age}}$$

The ten food groups are:

1. Grains, white roots and tubers, and plantains
2. Pulses (beans, peas and lentils)
3. Nuts and seeds
4. Dairy
5. Meat, poultry and fish
6. Eggs
7. Dark green leafy vegetables
8. Other vitamin A-rich fruits and vegetables
9. Other vegetables
10. Other fruits

7.2.1 MDD-W questionnaire

The following is a model questionnaire used for eliciting dietary diversity information from a women 15-49 years old.

1. Following are required elements of the questionnaire

	Food categories	**Description and/or examples (to be adapted to local context)**	**Consumed?**
A	Food made from grains	Porridge, bread, rice, pasta/noodles or other foods made from grains	Yes = 1 No = 2
B	White roots and tubers	White potatoes, white yams, manioc/cassava/yucca, coco yam, taro or any other foods made from white-fleshed roots or tubers, or plantains	Yes = 1 No = 2
C	Pulses (beans, peas and lentils)	Mature beans or peas (fresh or dried seed), lentils or bean/pea products, including hummus, tofu and tempeh	Yes = 1 No = 2
D	Nuts and seeds	Any tree nut, groundnut/peanut or certain seeds, or nut/seed "butters" or pastes	Yes = 1 No = 2
E	Milk and milk products	Milk, cheese, yoghurt or other milk products but NOT including butter, ice cream, cream or sour cream	Yes = 1 No = 2
F	Organ meat	Liver, kidney, heart or other organ meats or blood-based foods, including from wild game	Yes = 1 No = 2
G	Meat and poultry	Beef, pork, lamb, goat, rabbit, wild game meat, chicken, duck or other bird	Yes = 1 No = 2
H	Fish and seafood	Fresh or dried fish, shellfish or seafood	Yes = 1 No = 2
I	Eggs	Eggs from poultry or any other bird	Yes = 1 No = 2
J	Dark green leafy vegetables	List examples of any medium-to-dark green leafy vegetables, including wild/foraged leaves	Yes = 1 No = 2

	Food categories	Description and/or examples (to be adapted to local context)	Consumed?
K	Vitamin A-rich vegetables, roots and tubers	Pumpkin, carrots, squash or sweet potatoes that are yellow or orange inside	Yes = 1 No = 2
L	Vitamin A-rich fruits	Ripe mango, ripe papaya, some melons	Yes = 1 No = 2
M	Other vegetables	List examples of any other vegetables	Yes = 1 No = 2
N	Other fruits	List examples of any other fruits	Yes = 1 No = 2

2. Optional components of the questionnaire

	Food categories	Description and/or examples (to be adapted to local context)	Consumed?
O	Insects and other small protein foods	Insects, insect larvae/grubs, insect eggs and land and sea snails	Yes = 1 No = 2
P	Red palm oil	Red palm oil	Yes = 1 No = 2
Q	Other oils and fats	Oil; fats or bu er added to food or used for cooking, including extracted oils from nuts, fruits and seeds; and all animal fat	Yes = 1 No = 2
R	Savoury and fried snacks	Crisps and chips, fried dough or other fried snacks	Yes = 1 No = 2
S	Sweets	Sugary foods, such as chocolates, candies, cookies/sweet biscuits and cakes, sweet pastries or ice cream	Yes = 1 No = 2
T	Sugar-sweetened beverages	Sweetened fruit juices and “juice drinks”, soft drinks/fizzy drinks, chocolate drinks, malt drinks, yoghurt drinks or sweet tea or coffee with sugar	Yes = 1 No = 2

3. Other required components of the questionniare but don’t count in the food groups

	Food categories	Description and/or examples (to be adapted to local context)	Consumed?
U	Condiments and seasonings	Ingredients used in small quantities for flavour, such as chilies, spices, herbs, powder, tomato paste, flavour cubes or seeds	Yes = 1 No = 2

	Food categories	Description and/or examples (to be adapted to local context)	Consumed?
V	Other beverages and foods (optionally, specify if not listed)	Tea or co ee if not sweetened, clear broth, alcohol Pickles, olives and similar	Yes = 1 No = 2

7.2.2 MDD-W food group description

1. Grains, white roots and tubers, and plantains

- Also called as "starchy staples" "
- Examples include
  - breads and flatbreads
  - stiff porridges of maize, sorghum, millet or cassava (manioc)
  - pasta
  - potatoes
  - white-fleshed sweet potatoes
  - white yams
  - yucca
  - plantains (white-fleshed)

2. Pulses (beans, peas and lentils)

- Beans, peas and lentils the seeds of which are dried and used as food for processed into other food products
- Does not include the same plants eaten fresh in the pod or still green/immature (these are categorised as "other vegetables")
- Groundnut (peanut), a legume, is not included in this group (these are categorised as "nuts")
- Examples include
  - beans - black, kidney, pinto
  - broad bean - fava, field bean
  - chickpea (garbanzo)
  - pigeon pea
  - cowpea
  - lentil and soybean/soybean products or other legume products

3. Nuts and seeds

- Comprise mostly of tree nuts but also includes peanuts (groundnuts)
- Certain seeds consumed in substantial quantities (otherwise categorised as "condiments and seasonings")

- Includes nut and seed butters such as peanut butter, cashew butter or sesame butter (tahini)
- Examples of nuts are
  - cashew
  - macadamia
  - Brazil nut
  - almond
  - chestnut
  - hazelnut
  - pistachio
  - walnut
- Examples of seeds are
  - sesame
  - sunflower
  - pumpkin/squash/gourd
  - pine nut

4. Dairy

- Includes
  - Almost all liquid and solid dairy products from cows, goats, buffalo, sheep or camels.
  - Tinned, powdered or ultra-high temperature (UHT) milk
  - Soft and hard cheeses
  - Yoghurt and kefir
- Excludes
  - Butter
  - Cream
  - Sour cream
  - Ice cream
  - Sweetened condensed milk
  - Processed/packaged "yoghurt drinks"

5. Meat, poultry and fish

- Sometimes referred to as "flesh foods"
- All meats, organ meats, poultry and other birds
- Fresh and dried fish and seafood/shellfish
- Wild birds and mammals ("bush meat"),
- Snakes, frogs and other reptiles and amphibians

6. Eggs

- Includes eggs from any type of bird (domesticated poultry and wild birds)

- Excludes fish roe (categorised with small protein foods)

7. Dark green leafy vegetables

- All medium-to-dark green leafy vegetables
- Only very light green leaves, such as iceberg lettuce, are not.
- Medium green leaves, such as Chinese cabbage, romaine and bibb lettuce, along with darker greens are included
- Dark green leafy vegetables that are wild and foraged
- Dark green leafy vegetbles of other food crops such as cassava leaves, bean leaves, pumpkin leaves, amaranth leaves)

8. Other vitamin A-rich fruits and vegetables

- Vitamin A-rich fruits are
  - Ripe mango (not when eaten green; categorised as "other fruits")
  - Ripe papaya (not when eaten green; categorised as "other fruits")
  - Red palm fruit/pulp
  - Passion fruit
  - Apricot
  - Several types of melon
  - Ripe, deep yellow-fleshed or orange-fleshed bananas (distinguish from white-fleshed bananas)
- Vitamin A-rich vegetables
  - Orange-fleshed sweet potato (if white-fleshed, categorised as roots and tubers)
  - Carrot
  - Pumpkin
  - Deep yellow or orange-fleshed squash

9. Other vegetables

- Includes legumes when the fresh/green pod is consumed (as in fresh peas, snow peas, snap peas or green beans)
- Includes stems, fruits and owers of plants when generally consumed in savoury dishes and considered as vegetables in culinary systems such as cucumber, tomato and okra
- Excludes white potatoes, white yams, cassava and coco yam

10. Other fruits

- Includes most fruits, excluding vitamin A-rich fruits
- Does not include tomatoes
- Plantains are classified with starchy staples but sweet white bananas are classified with fruit.

7.3 Minimum dietary diversity (MDD) component of the infant and young child feeding (IYCF)

MDD component of the IYCF indicators is a dichotomous indicator of whether or not children 6-23 months of age receive foods from 4 or more food groups (out of a total of 7 food groups for children). The proportion of children 6–23 months of age who receive foods from 4 or more food groups is associated with better quality diets for both breastfed and non-breastfed children. Consumption of foods from at least 4 food groups on the previous day would mean that in most populations the child had a high likelihood of consuming at least one animal-source food and at least one fruit or vegetable that day, in addition to a staple food (grain, root or tuber).

The indicator is calculated as follows:

$$\text{MDD} = \frac{\text{Children 6–23 months of age who received foods from} \geq \text{ 4 food groups during the previous day}}{\text{Children 6–23 months of age}}$$

The 7 foods groups used for tabulation of this indicator are:

1. Grains, roots and tubers
2. Legumes and nuts
3. Dairy products (milk, yoghurt, cheese)
4. Fresh foods (meat, fish, poultry and liver/organ meats)
5. Eggs
6. Vitamin-A rich fruits and vegetables
7. Other fruits and vegetables

Consumption of any amount of food from each food group is sufficient to "count", i.e., there is no minimum quantity, except if an item is only used as a condiment.

7.3.1 MDD questionnaire

Following is a model questionnaire used for MDD component of IYCF

	Questions and filters	**Response**
A	Porridge, bread, rice, noodles, or other foods made from grains	Yes = 1 No = 2
B	Pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside	Yes = 1 No = 2
C	White potatoes, white yams, manioc, cassava, or any other foods made from roots	Yes = 1 No = 2
D	Any dark green leafy vegetables	Yes = 1 No = 2
E	Ripe mangoes, ripe papayas, or (insert other local vitamin A-rich fruits)	Yes = 1 No = 2

	Questions and filters	Response
F	Any other fruits or vegetables	Yes = 1 No = 2
G	Liver, kidney, heart, or other organ meats	Yes = 1 No = 2
H	Any meat, such as beef, pork, lamb, goat, chicken, or duck	Yes = 1 No = 2
I	Eggs	Yes = 1 No = 2
J	Fresh or dried fish, shellfish, or seafood	Yes = 1 No = 2
K	Any foods made from beans, peas, lentils, nuts, or seeds	Yes = 1 No = 2
L	Cheese, yoghurt, or other milk products | Yes = 1 No = 2	
M	Any oil, fats, or butter, or foods made with any of these	Yes = 1 No = 2
N	Any sugary foods such as chocolates, sweets, candies, pastries, cakes, or biscuits	Yes = 1 No = 2 Yes = 1 No = 2
O	Condiments for flavour, such as chillies, spices, herbs, or fish powder	Yes = 1 No = 2
P	Grubs, snails, or insects	Yes = 1 No = 2
Q	Foods made with red palm oil, red palm nut, or red palm nut pulp sauce	Yes = 1 No = 2

7.3.2 MDD food group description

The food group description for MDD-W is about the same for the IYCF MDD with a few exceptions:

1. Ice cream

In MDD-W, ice cream is categorised as "sweets" because it is a high fat/high sugar food. For IYCF MDD, ice cream is categorised as dairy.

This difference is primarily due to increasing concerns with other dimensions of diet quality in the context of the nutrition transition given that ice cream is a high fat and high sugar food and also because many low-quality ice cream products contain very little dairy.

2. Garlic

In MDD-W, garlic is categorised as "condiments and seasonings" given that it is usually consumed in small quantities. In IYCF MDD, there is no particular concern for food quantity so garlic is categorised as "other fruits and vegetables".

3. Olives

In MDD-W, olives are categorised as "other foods and beverages" given that it is usually consumed in small quantities. In IYCF MDD, olives are categorised as "other fruits and vegetables".

4. Red palm oil

In MDD-W, this is totally excluded from the indicator calculation. In IYCF MDD, it is counted under "vitamin A-rich fruits and vegetables"

5. Fish roe

In MDD-W, categorised with "insects and other small protein foods". In IYCF MDD, categorised under "fish and seafood"

6. Seaweed

In MDD-W, categorised as "other vegetables". In IYCF MDD, categorised as "dark green leafy vegetables".

8 Measuring food consumption

8.1 Introduction

The **Food Consumption Score (FCS)** is an index developed by the World Food Programme (WFP) in 1996. The **FCS** is a household level indicator that aggregates food group diversity and frequency over the past 7 days. These food groups are then weighted according to their relative nutritional value. This means that food groups that are nutritionally-dense such as animal products are given greater weight than those containing less nutritionally dense foods such as tubers. The weights are then added up to come up with a household score which are then used to classify households into either poor, borderline, or acceptable food consumption. The **FCS** is a measure of quantity of caloric intake.

8.2 FCS questionnaire

A brief questionnaire is used to ask respondents about the frequency of their households' consumption of eight different food groups over the previous seven days. The eight food groups are:

1. Main staples
2. Pulses
3. Vegetables
4. Fruit
5. Meat/fish
6. Milk
7. Sugar
8. Oil

Following is a model questionnaire that can be used for collecting data on **FCS**.

Question: I would like to ask you about all the different foods that your household members have eaten in the last 7 days. Could you please tell me how many days in the past week your household has eaten the following foods?

(for each food, ask what the primary source of each food item eaten that week was, as well as the second main source of food, if any)

	Food item	Number of days eaten in the past	Primary source (see codes)	Secondary source (see codes)
1	Maize			
2	Rice			
3	Bread/wheat			
4	Tubers			
5	Groundnuts and pulses			
6	Fish (eaten as a main food)			
7	Fish powder (used for flavour only) | | |			
8	Red meat (sheep/goat/beef)			
9	White meat (poultry)			
10	Vegetable oil, fats			
11	Eggs			
12	Milk and dairy products (main food)			
13	Milk in tea in small amounts			
14	Vegetables (including leaves)			
15	Fruits			
16	Sweets, sugar			

Food source codes:

Purchase = 1; Own production = 2; Traded goods/services, barter = 3; Borrowed = 4; Received as gifts = 5; Food aid = 6; Others: (specify) = 7

This model questionnaire should be adapted to each survey context in which it is to be used.

8.3 Calculating the FCS

The **FCS** or the frequency weighted diet diversity score is a score calculated using the frequency of consumption of different food groups consumed by a household during the 7 days before the survey. Following are the steps to calculate the FCS:

Step 1. Using the standard questionnaire above, group all the food items into specific food groups (see groups in table below).

	Food items	Food groups	Weight
1	Maize , maize porridge, rice, sorghum, millet pasta, bread and other cereals Cassava, potatoes and sweet potatoes, other tubers, plantains	Main staples	2
2	Beans, peas, groundnuts and cashew nuts	Pulses	3
3	Vegetables, leaves	Vegetables	1
4	Fruits	Fruits	1
5	Beef, goat, poultry, pork, eggs and fish	Meat and fish	4
6	Milk yoghurt and other diary	Milk	4
7	Sugar and sugar products, honey	Sugar	0.5
8	Oils, fats and butter	Oil	0.5
9	Spices, tea, coffee, salt, fishpowder, small amounts of milk for tea.	Condiments	0

Step 2. Sum all the consumption frequencies of food items of the same group, and recode the value of each group above 7 as 7.

Step 3. Multiply the value obtained for each food group by its weight (see food group weights in table below) and create new weighted food group scores.

Step 4. Sum the weighed food group scores, thus creating the food consumption score (FCS).

Step 5. Using the appropriate thresholds (see below), recode the variable food consumption score, from a continuous variable to a categorical variable.

FCS	**Profiles**
0 - 21	Poor
21.5 - 35	Borderline
> 35	Acceptable

Part III

Food security

9 Household Food Insecurity Access Scale

9.1 Introduction

Household Food Insecurity Access Scale (HFIAS) is one of the experience-based food insecurity scales. Experience-based indicators are constructed from a short questionnaire that captures households' behavioural and psychological manifestations of insecure food access, such as having to reduce the number of meals consumed or cut back on the quality of the food due to a lack of resources. HFIAS was developed in 2006 by the USAID-funded Food and Nutrition Technical Assistance II project (FANTA) in collaboration with Tufts and Cornell Universities, among other partners.

9.2 HFIAS questionnaire

The HFIAS uses a questionnaire of 9 items which are called **occurence questions** (i.e., whether condition stated in the question has happened or not) based on a 30-day recall. If condition has happened, a further question is then asked which is called a **frequency-of-occurence question**. The possible responses for the **frequency-of-occurence** are categorical - *rarely* (once or twice in the past four weeks); *sometimes* (three to ten times in the past four weeks); and *often* (more than ten times in the past four weeks).

The generic occurrence questions are as follows:

Q1	In the past four weeks, did you worry that your household would not have enough food?	0 = No; 1 = Yes
Q1a	How often did this happen?	1 = Rarely 2 = Sometimes 3 = Often
Q2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No; 1 = Yes
Q2a	How often did this happen?	1 = Rarely 2 = Sometimes 3 = Often
Q3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	0 = No; 1 = Yes

Q3a	How often did this happen?	1 = Rarely 2 = Sometimes 3 = Often
Q4	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	0 = No; 1 = Yes
Q4a	How often did this happen?	1 = Rarely 2 = Sometimes 3 = Often
Q5	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No; 1 = Yes
Q5a	How often did this happen?	1 = Rarely 2 = Sometimes 3 = Often
Q6	In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?	0 = No; 1 = Yes
Q6a	How often did this happen?	1 = Rarely 2 = Sometimes 3 = Often
Q7	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0 = No; 1 = Yes
Q7a	How often did this happen?	1 = Rarely 2 = Sometimes 3 = Often
Q8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No; 1 = Yes
Q8a	How often did this happen?	1 = Rarely 2 = Sometimes 3 = Often
Q9	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No; 1 = Yes
Q9a	How often did this happen?	1 = Rarely 2 = Sometimes 3 = Often

Questions 1 to 9 are the **occurence questions** while questions 1a to 9a are the **frequency-of-occurence questions**.

9.3 HFIAS indicators

Four types of indicators can be calculated to help understand the characteristics of and changes in household food insecurity in the surveyed population. These indicators are:

- Household Food Insecurity Access-related **Conditions**
- Household Food Insecurity Access-related **Domains**
- Household Food Insecurity Access Scale **Score**
- Household Food Insecurity Access **Prevalence**

9.3.1 Household Food Insecurity Access-related Conditions

This indicator set consists of the responses to the individual **occurence questions** and **frequency of occurence questions**. The indicators in this set provide specific, disaggregated information about the behaviours and perceptions of the surveyed households. The indicators present the percent of households that responded affirmatively to each question, regardless of the frequency of the experience. Thus they measure the percent of households experiencing the condition at any level of severity. Each indicator can be further disaggregated to examine the frequency of experience of the condition across the surveyed households.

1. Percent of households that worried about not having enough food in the past four weeks

$$\frac{\text{Number of households with response = 1 to Q1}}{\text{Total number of households responding to Q1}} \times 100$$

1a. Percent of households that **often** worried about not having enough food in the past four weeks

$$\frac{\text{Number of households with response = 3 to Q1a}}{\text{Total number of households responding to Q1}} \times 100$$

2. Percent of households with a household member/s not able to eat the kinds of food preferred because of a lack of resources

$$\frac{\text{Number of households with response = 1 to Q2}}{\text{Total number of households responding to Q2}} \times 100$$

2a. Percent of households with a household member/s who **often** are not able to eat the kinds of food preferred because of a lack of resources

$$\frac{\text{Number of households with response = 3 to Q2a}}{\text{Total number of households responding to Q2}} \times 100$$

3. Percent of households with a household member/s who have to eat a limited variety of foods due to a lack of resources

$$\frac{\text{Number of households with response = 1 to Q3}}{\text{Total number of households responding to Q3}} \times 100$$

3a. Percent of households with a household member/s who **often** have to eat limited variety of foods due to a lack of resources

$$\frac{\text{Number of households with response = 3 to Q3a}}{\text{Total number of households responding to Q3}} \times 100$$

4. Percent of households with a household member/s who have had to eat some foods they really didn't want to eat due to a lack of resources to obtain other types of food

$$\frac{\text{Number of households with response = 1 to Q4}}{\text{Total number of households responding to Q4}} \times 100$$

4a. Percent of households with a household member/s who **often** have had to eat some foods they really didn't want to eat due to a lack of resources to obtain other types of food

$$\frac{\text{Number of households with response = 3 to Q4a}}{\text{Total number of households responding to Q4}} \times 100$$

5. Percent of households with a household member/s who have had to eat a smaller meal than they felt they needed because there was not enough food

$$\frac{\text{Number of households with response = 1 to Q5}}{\text{Total number of households responding to Q5}} \times 100$$

5a. Percent of households with a household member/s who **often** have had to eat a smaller meal than they felt they needed because there was not enough food

$$\frac{\text{Number of households with response = 3 to Q5a}}{\text{Total number of households responding to Q5}} \times 100$$

6. Percent of households with a household member/s who have had to eat fewer meals in a day because there was not enough food

$$\frac{\text{Number of households with response = 1 to Q6}}{\text{Total number of households responding to Q6}} \times 100$$

6a. Percent of households with a household member/s who **often** have had to eat fewer meals in a day because there was not enough food

$$\frac{\text{Number of households with response = 3 to Q6a}}{\text{Total number of households responding to Q6}} \times 100$$

7. Percent of households in which there was ever no food to eat of any kind because of lack of resources to get food

$$\frac{\text{Number of households with response = 1 to Q7}}{\text{Total number of households responding to Q7}} \times 100$$

7a. Percent of households in which there was **often** ever no food to eat of any kind because of lack of resources to get food

$$\frac{\text{Number of households with response = 3 to Q7a}}{\text{Total number of households responding to Q7}} \times 100$$

8. Percent of households with a household member/s who had gone to sleep at night hungry because there was not enough food

$$\frac{\text{Number of households with response = 1 to Q8}}{\text{Total number of households responding to Q8}} \times 100$$

8a. Percent of households with a household member/s who **often** had gone to sleep at night hungry because there was not enough food

$$\frac{\text{Number of households with response = 3 to Q8a}}{\text{Total number of households responding to Q8}} \times 100$$

9. Percent of households with a household member/s who had gone a whole day and night without eating anything because there was not enough food

$$\frac{\text{Number of households with response = 1 to Q9}}{\text{Total number of households responding to Q9}} \times 100$$

9a. Percent of households with a household member/s who **often** had gone a whole day and night without eating anything because there was not enough food

$$\frac{\text{Number of households with response = 3 to Q9a}}{\text{Total number of households responding to Q9}} \times 100$$

9.3.2 Household Food Insecurity Access-related Domains

The concurrence questions can be grouped into 3 domains to which they relate to with regard to food insecurity that have been found to be common across cultures. These domains are:

- Anxiety and uncertainty about the household food supply
- Insufficient Quality (includes variety and preferences of the type of food)
- Insufficient food intake and its physical consequences

This indicator set on **domains** consists of responses to the individual **occurence questions** referring to each of the domains. The indicators in this set provide specific, disaggregated information about the behaviours and perceptions of the surveyed households as they pertain to the domains. The indicators present the percent of households that responded affirmatively to each question within a domain, regardless of the frequency of the experience. Thus they measure the percent of households experiencing the condition within a domain at any level of severity.

1. Percent of households with anxiety and uncertainty about the household food supply

$$\frac{\text{Number of households with Q1} = 1}{\text{Total number of households responding to Q1}} \times 100$$

2. Percent of households with insufficient good quality

$$\frac{\text{No. of households with Q2} = 1 \text{ OR Q3} = 1 \text{ OR Q4} = 1}{\text{Total no. of households responding to Q2 OR Q3 OR Q4}} \times 100$$

3. Percent of households with insufficient food intake

$$\frac{\text{No. of households with Q5} = 1 \text{ OR Q6} = 1 \text{ OR Q7} = 1 \text{ OR Q8} = 1 \text{ OR Q9} = 1}{\text{Total no. of households responding to Q5 OR Q6 OR Q7 OR Q8 OR Q9}} \times 100$$

9.3.3 Household Food Insecurity Access Scale Score

The HFIAS score is a continuous measure of the degree of food insecurity (access) in the household in the past four weeks (30 days).

Following are the steps in calculating the HFIAS score.

1. Code the **frequency-of-occurrence** as 0 for all cases where the answer to the corresponding occurrence question was **"no"** (i.e., if **Q1=0** then **Q1a=0**, if **Q2=0** then **Q2a=0**, etc.).

2. Calculate a HFIAS score variable is calculated for each household by summing the codes for each **frequency-of-occurrence question**. The maximum score for a household is 27 (the household response to all nine frequency-of-occurrence questions was "often", coded with response code of 3); the minimum score is 0 (the household responded "no" to all occurrence questions, frequency-of-occurrence questions were skipped by the interviewer, and subsequently coded as 0 by the data analyst.) The higher the score, the more food insecurity (access) the household experienced. The lower the score, the less food insecurity (access) a household experienced.

$$\text{HFIAS Score} = Q1a + Q2a + Q3a + Q4a + Q5a + Q6a + Q7a + Q8a + Q9a$$

3. Next, the average Household Food Insecurity Access Scale Score, is calculated using the household scores calculated above.

$$\text{Average HFIAS score} = \frac{\sum \text{HFIAS scores in the sample}}{\text{Number of households sampled}}$$

9.3.4 Household Food Insecurity Access Prevalence

The final indicator is a categorical indicator of Food Insecurity Status. The Household Food Insecurity Access Prevalence (HFIAP) Status indicator can be used to report household food insecurity (access) prevalence and make geographic targeting decisions.

Because the average HFIAS score is a continuous variable, it is more sensitive to capturing smaller increments of changes over time than the HFIAP indicator. Therefore, the HFIAP indicator should be reported in addition to, rather than instead of, the average HFIAS Score for program monitoring and evaluation.

The HFIAP indicator categorizes households into four levels of household food insecurity (access): **food secure**, and **mildly**, **moderately** and **severely** food insecure. Households are categorized as increasingly food insecure as they respond affirmatively to more severe conditions and/or experience those conditions more frequently.

Following are the steps in calculating the HFIAP indicator.

1. The data analyst should have coded **frequency-of-occurrence** as 0 for all cases where the answer to the corresponding occurrence question was **"no"** (i.e., if **Q1=0** then **Q1a=0**, if **Q2=0** then **Q2a=0**, etc.)
2. Calculate a HFIA category variable for each household by assigning a code for the food insecurity (access) category in which it falls. The four food security categories should be created sequentially, in the same order as shown below, to ensure that households are classified according to their most severe response.

Category 1: Food secure

$$\begin{aligned}\text{HFIA category 1 if } (&Q1a = 0 \textit{ or } Q1a = 1) \textit{ and } Q2 = 0 \textit{ and}\\ &Q3 = 0 \textit{ and } Q4 = 0 \textit{ and } Q5 = 0 \textit{ and } Q6 = 0 \textit{ and}\\ &Q7 = 0 \textit{ and } Q8 = 0 \textit{ and } Q9 = 0\end{aligned}$$

Category 2: Mildly food insecure access

$$\begin{aligned}\text{HFIA category 2 if } (&Q1a = 2 \textit{ or } Q1a = 3 \textit{ or } Q2a = 1 \textit{ or}\\ &Q2a = 2 \textit{ or } Q2a = 3 \textit{ or } Q3a = 1 \textit{ or } Q4a = 1) \textit{ and}\\ &Q5 = 0 \textit{ and } Q6 = 0 \textit{ and } Q7 = 0 \textit{ and } Q8 = 0 \textit{ and } Q9 = 0\end{aligned}$$

Category 3: Moderately food insecure access

$$\begin{aligned}\text{HFIA category 3 if } (&Q3a = 2 \textit{ or } Q3a = 3 \textit{ or } Q4a = 2 \textit{ or} Q4a = 3 \textit{ or}\\ &Q5a = 1 \textit{ or } Q5a = 2 \textit{ or } Q6a = 1 \textit{ or } Q6a = 2) \textit{ and}\\ &Q7 = 0 \textit{ and } Q8 = 0 \textit{ and } Q9 = 0\end{aligned}$$

Category 4: Severely food insecure access

$$\begin{aligned}\text{HFIA category 4 if } &Q5a = 3 \textit{ or } Q6a = 3 \textit{ or } Q7a = 1 \textit{ or}\\ &Q7a = 2 \textit{ or } Q7a = 3 \textit{ or } Q8a = 1 \textit{ or } Q8a = 2 \textit{ or}\\ &Q8a = 3 \textit{ or } Q9a = 1 \textit{ or } Q9a = 2 \textit{ or } Q9a = 3\end{aligned}$$

3. Next, the prevalence of different levels of household food insecurity (access) is calculated.

- Percentage of households that are **food secure**

$$\%\text{ households that are food secure } = \frac{\text{No. of households with HFIA category} = 1}{\text{Total no. of households with a HFIA category}}$$

- Percentage of households that are **mildly food insecure**

$$\%\,\text{households that are mildly food insecure } = \frac{\text{No. of households with HFIA category} = 2}{\text{Total no. of households with a HFIA category}}$$

- Percentage of households that are **moderately food insecure**

$$\%\,\text{households that are moderately food insecure } = \frac{\text{No. of households with HFIA category} = 3}{\text{Total no. of households with a HFIA category}}$$

- Percentage of households that are **severely food insecure**

$$\%\text{ households that are severely food insecure } = \frac{\text{No. of households with HFIA category} = 4}{\text{Total no. of households with a HFIA category}}$$

References