

# APPENDIX FIVE

## ANTHROPOMETRIC TECHNIQUES

### SURVEY COORDINATORS:

CUSTOMIZE THESE INSTRUCTIONS ON ANTHROPOMETRIC MEASUREMENTS TO YOUR COUNTRY'S QUESTIONNAIRES AND FIELDWORK PLANS. ENSURE THAT THESE INSTRUCTIONS ARE INCLUDED IN THE MANUALS FOR INTERVIEWERS, SUPERVISORS AND EDITORS.

EXTENSIVE TRAINING SHOULD BE PROVIDED TO FIELD STAFF ON USING ANTHROPOMETRIC EQUIPMENT. IT IS IMPORTANT THAT YOU USE THE TOOLS RECOMMENDED BY UNICEF. PREVIOUS EXPERIENCE HAS SHOWN THAT, IN MANY CASES, LOCALLY PRODUCED MEASURING BOARDS HAVE FAILED TO MEET THE QUALITY STANDARDS REQUIRED IN MICS SURVEYS, WHILE VARIOUS TYPES OF ALTERNATIVE SCALES (SUCH AS HANGING SCALES) HAVE PRODUCED IMPRECISE RESULTS.

FOR INFORMATION ON ORDERING ANTHROPOMETRIC EQUIPMENT, CONTACT THE GLOBAL MICS3 COORDINATOR AT UNICEF HEADQUARTERS IN NEW YORK.



seca

The UNICEF Electronic Scale 890

## The UNICEF Electronic Scale

The UNICEF Electronic Scale was designed to help health workers monitor the weight of children and pregnant women.

The scale makes weighing fast, easy and accurate. It can be used in two ways:

1. Pregnant mothers or older children can line up for weighing, stepping on the scale one after the other.
2. Babies and very small children can be weighed while being held in the arms of a mother or helper. This second method of weighing is called 'tared weighing'.

The scale is powered by long-lasting lithium batteries. The batteries should last for at least 1 million weighing cycles, or 400 weighings every day of the year (except weekends and holidays) for at least 10 years. The batteries and the electronic 'heart' of the scale are in a sealed unit to withstand damage from heat, humidity and dust. The solar cell is used only to turn the scale on and to tare the scale.

The scale switches off automatically if it is not used for 2 minutes. This helps preserve the life of the battery.

## Preparing the UNICEF Electronic Scale for use:

1. Place the scale on a hard, level surface (wood, concrete or firm earth). Soft or uneven surfaces may cause small errors in weighing.
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 it 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 it again.
4. Handle the scale carefully:
  - Do not drop or bump the scale.
  - Do not weigh loads totalling more than 150 kilograms.
  - Protect the scale from excess moisture or humidity.
  - Do not use the scale at temperatures below 0° C or above 45° C.

## Cleaning the scale

To clean the scale, wipe surfaces with a damp cloth. *Never put the scale into water.*

## Storing the scale

Do not store the scale in direct sunlight or other hot places.

## Weighing an infant or young child held by a health worker or helper (tared weighing)

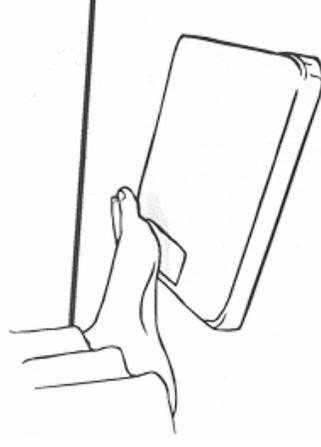
### NOTE:

 is used to represent the mother and child image that appears on the left side of the display whenever the scale has been tared.

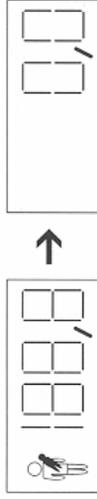
1. Turn the scale on by covering the solar cells for less than 1 second.

The display should show  18.8.8 first, then 0.0.

Wait until the display shows 0.0 before stepping on the scale.



*Cover the solar cells for less than 1 second.*



*The scale is preparing itself for use.*

*The scale is ready for use.*

2. Ask your helper to stand on the scale. Make sure the solar cells are not covered by a skirt or the person's feet. Your helper's weight will appear on the display within 2 seconds.

**NOTE:**

The person being weighed must stand still on the scale.



*Your helper's weight appears on the display.*

3. With your helper standing still on the scale, cover the solar cell for less than 1 second. The display will read 0.0. The small picture of the mother and baby means the scale is adjusting (taring) itself to ignore the helper's

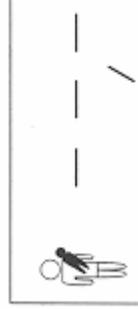
weight and preparing to weigh only the baby.



*Cover the solar cells for less than 1 second to tare the helper's weight. Once tared, the display will show 0.0.*

4. The helper can now get off the scale to get the baby. Alternatively, the mother can hand the baby to her.

If the helper gets off the scale to get the baby, the display will show ---.



*If the helper gets off the scale, the display shows that the scale has been tared for the helper's weight.*

5. After the helper steps back onto the scale and holds the baby, only the weight of the baby will be displayed.

Record the baby's weight.

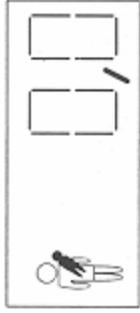
**NOTE:**

The scale will continue to show only the weight of the baby until the solar cell is covered or the helper returns the baby to its mother.



*Now the helper can hold the baby and get back on the scale. Only the baby's weight will show on the display.*

6. After the baby is given back to its mother, the display will again show 0.0 (as long as the helper remains standing on the scale). If the helper steps off the scale to get another baby, the display will show ---.



*If the helper gives the baby to someone else to hold, the tared scale will again display 0.0.*

- Repeat steps 4 and 5 to weigh another baby.

*Remember: The scale switches off automatically 2 minutes after the last weighing. If this happens, follow the instructions to turn it on again.*

## Taring weights: Important points

- The weight of the person who will hold the child must be displayed (and then tared) before the child is given to her for weighing.
- The same person whose weight is tared must also hold the child.
- The weight of the child being weighed must be more than 2 kilograms if the helper stays on the scale to receive the child.
- If the helper gets off the scale to get a child while the display shows 0.0 (tared weighing mode), the next child can weigh less than 2 kilograms.

- The tare can be de-activated by quickly covering the solar cell or by waiting until the scale switches off automatically.

- The scale will always display 0.0 if the new load weighs less than the tared weight.
- If there is too much movement on the scale during measurement, the display will switch between 1. and .1 until the load becomes stable.

## Possible reasons for the scale not taring weight:

- There was no weight on the scale to tare. Put some weight on the scale and try again.
- The solar cell was not covered completely.
- The solar cell was covered for more than 1 second. Try covering it for less than 1 second.
- It is too dark. Put the scale in a brighter place.
- The load weighs more than 120 kilograms. Use a lighter load.

## What to do if the scale display shows . . .

### **E01:**

The scale has to adjust itself. Get off the scale and wait until E01 no longer appears.

### **E02**

**and switches off automatically:**  
Make sure there is no load on the scale and try to start the scale.

### **E03**

**and switches off automatically:**  
The scale is either too cold or too hot. Move it to a different place where the temperature is between 0° C and 45° C. Wait 15 minutes for it to adjust to the new temperature, then start the scale.

### **E04**

**after measuring:**  
The load is too heavy (more than 150 kilograms). Get off the scale and reduce the load.

### **E05**

**for a few seconds after trying to start the tare function:**  
The load is too heavy for taring (more than 120 kilograms). Get off the scale and reduce the load.

## INSTRUCTIONS FOR SUPERVISORS AND EDITORS

### MEASURING PROCEDURES AND PRECAUTIONS

**(1) Procedures directed to specific individuals**

The procedures to be followed in measuring a child are directed to specific individuals, that is, the **measurer** and/or the **assistant**, indicated in bold type at the beginning of each step.

**(2) Two trained people required**

Two trained people are required to measure a child's height and length. The measurer holds the child and takes the measurements. The assistant helps hold the child and records the measurements on the questionnaire. If there is an untrained assistant, such as the mother, then the trained measurer should also record the measurements on the questionnaire. One person alone can take the weight of a child and record the results if an assistant is not available.

**(3) Placement of the measuring board and scale**

Begin to observe possible places where the electronic scale and board can be positioned as soon as you walk into a sample household. Be selective about where you place the measuring board and electronic scale. During daylight hours, it is best to measure outdoors. If it is cold, rainy or if too many people congregate and interfere with the measurements, it may be more comfortable to weigh and measure a child indoors. Make sure there is adequate light.

**(4) Assessing the age of the child**

Before you measure, determine the child's age. If the child is less than 2 years old, measure length. If the child is 2 years of age or older, measure height. If accurate age is not possible to obtain, measure length if the child is less than 85 centimetres. Measure height if the child is equal to or greater than 85 centimetres.

**(5) When to weigh and measure**

Begin weighing and measuring after verbal information has been recorded on the questionnaire. This will allow you to become familiar with the members of the household. DO NOT weigh and measure at the beginning of the interview, that is, as soon as you enter a household, since this would likely be perceived as overly intrusive.

**(6) Weigh and measure one child at a time**

In cases when there is more than one eligible child of the same mother/caretaker, complete all the questionnaires for the mother/caretaker, and then weigh and measure her/his children. If there is more than one eligible child and more than one mother/caretaker, you should be careful about the timing of the measurements, and use your judgement in such cases. If you think that leaving all of the measurements until after the completion of all questionnaires will cause confusion and errors, then you must carry out measurements of children by the same mother/caretaker once the questionnaires administered to that mother/caretaker have been completed, and then move on to the next mother/caretaker. However, in reality, it is often the case that interviewing all mothers/caretakers first, and measuring all children at the end is more practical – use this option if you are sure that this will not cause confusion.

**(7) Control the child**

When you weigh and measure, you must control the child. The strength and mobility of even very young children should not be underestimated. Be firm yet gentle. Your own sense of calm and self-confidence will be felt by the mother and the child.

When a child comes into contact with any measuring equipment, that is, a measuring board or electronic scale, you must hold the child so that he or she doesn't trip or fall. Never leave a child alone with a piece of equipment. Always maintain physical contact with the child, except for the few seconds while taking his or her weight.

**(8) Coping with stress**

Since weighing and measuring requires touching and handling children, normal stress levels for this type of survey work are higher than for surveys where only verbal information is collected.

Explain the weighing and measuring procedures to the mother and, to a limited extent, the child, to help minimize possible resistance, fear or discomfort. You must determine if the child or mother is under so much stress that the weighing and measuring must stop. Remember, young children are often uncooperative; they tend to cry, scream, kick and sometimes bite. If a child is under severe stress and is crying excessively, try to calm the child or return the child to the mother for a moment before proceeding with the weighing and measuring.

Do not weigh or measure a child if:

- The mother refuses.
- The child is too sick or too distressed.
- The child is physically deformed, which will interfere with or give an incorrect measurement. To be kind, you may want to measure such a child and make note of the deformity on the questionnaire.

**(9) Recording measurements and being careful**

Record the measurements in pen. If you make an error, cancel it and rewrite the correct numbers. Keep objects out of your hands and pens out of your mouth, hair or breast pocket when you weigh and measure so that neither you nor the child will get hurt due to carelessness. When you are not using a pen, place it in your equipment pack, pen case or on the survey form. Make sure you do not have long fingernails. Remove rings and watches before you weigh and measure to prevent them from getting in the way. Do not smoke when you are in a household or when you weigh and measure.

**(10) Strive for improvement**

You can be an expert measurer if you strive for improvement and follow every step of every procedure the same way every time. The quality and speed of your measurements will improve with practice. You may be working with a partner to form a team. If so, you will be responsible not only for your own work, but that of your team.

You will be required to weigh and measure many children. Do not take these procedures for granted, even though they may seem simple and repetitious. It is easy to make errors when you are not careful. Do not omit any steps. Concentrate on what you are doing.

## NUTRITIONAL STATUS MEASUREMENT

### SUMMARY PROCEDURES

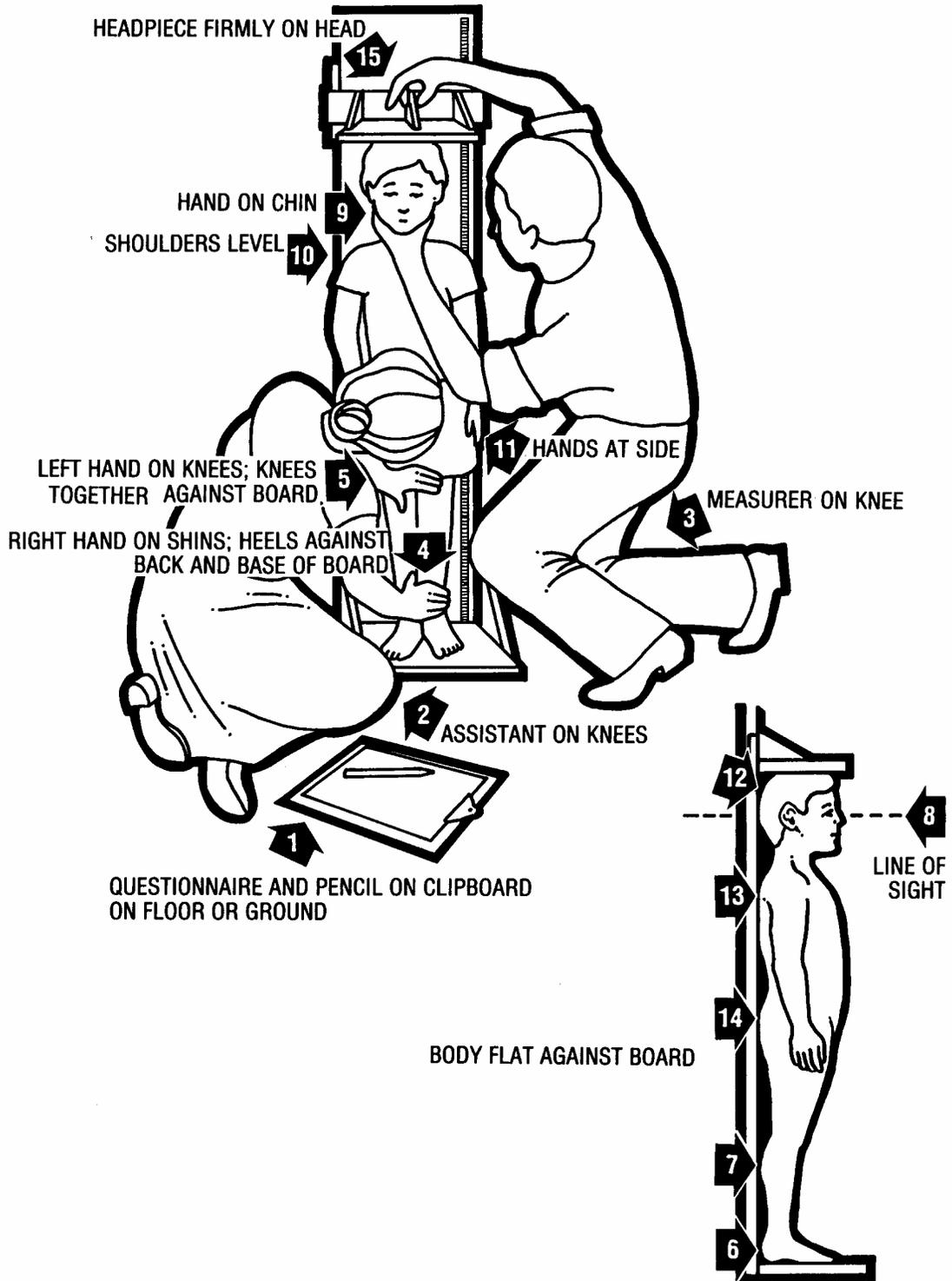
#### MEASURING A CHILD'S HEIGHT: SUMMARY OF PROCEDURES (SEE ILLUSTRATION 1)<sup>1</sup>

- (1) **Measurer or assistant:** Place the measuring board on a hard flat surface against a wall, table, tree, staircase, etc. Make sure the board is stable.
- (2) **Measurer or assistant:** Ask the mother to remove the child's shoes and unbraid any hair that would interfere with the height measurement. Ask her to walk the child to the board and to kneel in front of the child (if she is not the assistant).
- (3) **Assistant:** Place the questionnaire and pen on the ground (Arrow 1). Kneel with both knees on the right side of the child (Arrow 2).
- (4) **Measurer:** Kneel on your right knee only, for maximum mobility, on the child's left side (Arrow 3).
- (5) **Assistant:** Place the child's feet flat and together in the centre of and against the back and base of the board. Place your right hand just above the child's ankles on the shins (Arrow 4), your left hand on the child's knees (Arrow 5), and push against the board. Make sure the child's legs are straight and the heels and calves are against the board (Arrows 6 and 7). Tell the measurer when you have completed positioning the feet and legs.
- (6) **Measurer:** Tell 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). Place your open left hand on the child's chin. Gradually close your hand (Arrow 9). Do not cover the child's mouth or ears. Make 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 your right hand, lower the headpiece on top of the child's head. Make sure you push through the child's hair (Arrow 15).
- (7) **Measurer and assistant:** Check the child's position (Arrow 1-15). Repeat any steps as necessary.
- (8) **Measurer:** When the child's position is correct, read and call out the measurement to the nearest 0.1 centimetre. Remove the headpiece from the child's head, your left hand from the child's chin and support the child during the recording.
- (9) **Assistant:** Immediately record the measurement and show it to the measurer.  
**NOTE:** If the assistant is untrained, the measurer records the height.
- (10) **Measurer:** Check the recorded measurement on the questionnaire for accuracy and legibility. Instruct the assistant to cancel and correct any errors.

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<sup>1</sup> If the assistant is untrained (for example, the mother), then the measurer should help the assistant with the height procedure.

ILLUSTRATION 1. MEASURING A CHILD'S HEIGHT



**MEASURING A CHILD'S LENGTH: SUMMARY OF PROCEDURES ( SEE ILLUSTRATION 2)<sup>2</sup>**

- (1) **Measurer or assistant:** Place the measuring board on a hard flat surface, such as the ground, floor or a steady table.
- (2) **Assistant:** Place the questionnaire and pencil on the ground, floor or table (Arrow 1). Kneel with both knees behind the base of the board, if it is on the ground or floor (Arrow 2).
- (3) **Measurer:** Kneel on the right side of the child so that you can hold the footpiece with your right hand (Arrow 3).
- (4) **Measurer and assistant:** With the mother's help, lay the child on the board by doing the following:  
**Assistant:** Support the back of the child's head with your hands and gradually lower the child onto the board.  
**Measurer:** Support the child at the trunk of the body.
- (5) **Measurer or assistant:** If she is not the assistant, ask the mother to kneel on the opposite side of the board facing the measurer to help keep the child calm.
- (6) **Assistant:** Cup your hands over the child's ears (Arrow 4). With your arms comfortably straight (Arrow 5), place the child's head against the base of the board so that the child is looking straight up. The child's line of sight should be perpendicular to the ground (Arrow 6). Your head should be straight over the child's head. Look directly into the child's eyes.
- (7) **Measurer:** Make sure the child is lying flat and in the centre of the board (Arrow 7). Place your left hand on the child's shins (above the ankles) or on the knees (Arrow 8). Press them firmly against the board. With your right hand, place the footpiece firmly against the child's heels (Arrow 9).
- (8) **Measurer and assistant:** Check the child's position (Arrows 1-9). Repeat any steps as necessary.
- (9) **Measurer:** When the child's position is correct, read and call out the measurement to the nearest 0.1 centimetre. Remove the footpiece, release your left hand from the child's shins or knees and support the child during the recording.
- (10) **Assistant:** Immediately release the child's head, record the measurement and show it to the measurer.  
**NOTE:** If the assistant is untrained, the measurer records the length on the questionnaire.
- (11) **Measurer:** Check the recorded measurement on the questionnaire for accuracy and legibility. Instruct the assistant to cancel and correct any errors.

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<sup>2</sup> If the assistant is untrained (for example, the mother), then the measurer should help the assistant with the length procedure.

ILLUSTRATION 2. MEASURING A CHILD'S LENGTH

