

Ministry of Health  
Oswaldo Cruz Foundation



**ELSI**  
**BRASIL**

Brazilian Longitudinal  
Study of Aging

# **PHYSICAL MEASURES** **HANDBOOK**

**Belo Horizonte**

### 5.3 MODULE OF PHYSICAL MEASUREMENTS

This module will be performed by every person who is 50 years or older and lives in the household. The physical measurements include anthropometric measurements (weight, height and waist and hip circumferences), blood pressure measurement and balance, walk and strength measurements.

Anthropometry studies the size and proportions of the human body. Anthropometric measurements such as weight, height, waist and hip circumferences are used for the diagnosis of nutritional status (such as malnutrition, overweight and obesity) and the assessment of risk for certain diseases (such as *diabetes mellitus*, heart disease and hypertension) in children, adults, pregnant women and the elderly.

The measurements will be carried out preferably at the end of the interview. However, if the interviewer feels the need for a break during the interview, the measurements could be undertaken at any time.

Whenever the physical measurements are undertaken in a sequence that is different from the one established by the electronic questionnaire, the interviewer should use the **Physical Measurements Collection Form** (Annex VI) during the performance of the tests, since the instructions must be read to the interviewee. In this case the measures should be recorded on the designated field of the **Individual Registration Form** (Annex V) and then the data should be entered on the tablet.

Upon data entry on the tablet, the system will generate an average of the measures of blood pressure, weight and height and they should be copied on the **Blood pressure and anthropometric measurements results form** (Annex VII) which will be given to the interviewee. This form presents a table with the Ministry of Health recommendations for blood pressure. In case the interviewee has difficulties understanding this table of recommendations, the interviewer can help him/her locate the recommendation according to his/her own systolic and diastolic blood pressure measurements.

Prior to performing any test or taking any anthropometric or blood pressure measurements, explain the procedure to the interviewee. Demonstrate the procedure to the interviewee before each performance. After the demonstration, ask him/her if he/she feels comfortable to perform the test. Don't perform the test if the interviewee reports insecurity or is unwilling to do it.

### **5.3.1 Blood pressure**

Blood pressure will be the first physical measurement to be performed. The assessment will be done using an automatic device of the brand Omron.

#### **A) Equipment**

- 1) Automatic blood pressure device of the brand Omron;



Picture 18 – Device for blood pressure measurement.

2) Two armbands;



Picture 19 – Armband.

- 3) 4 (four) alkaline batteries type “AA”;
- 4) Measurement tape;
- 5) Marker.

## **B) Device configuration**

The picture below shows the unit front with the identification of the buttons:

## Unidade principal

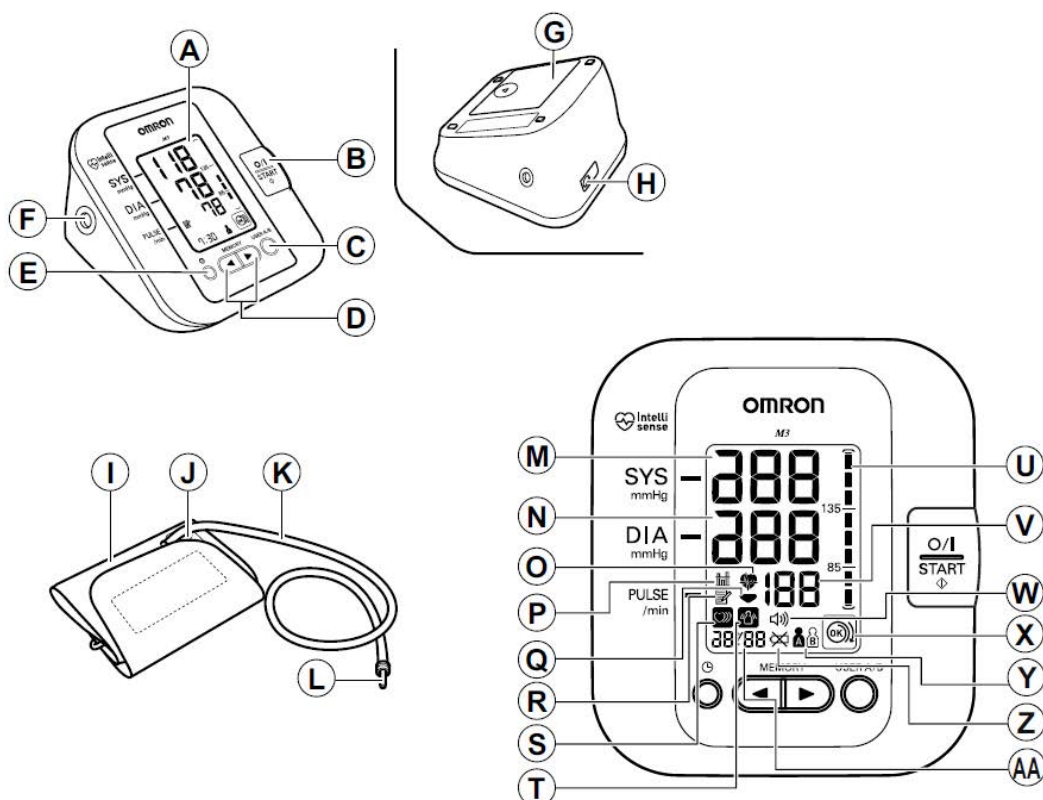
- Ⓐ Visor
- Ⓑ Botão O/I START ( ⬆ )
- Ⓒ Botão Utilizador A/B
- Ⓓ Botões Avanço/Recuo ( ⬅ / ➡ )
- Ⓔ Botão de alarme e definição de data/hora ( ⌚ )
- Ⓕ Tomada de ar
- Ⓖ Compartimento das pilhas
- Ⓗ Tomada de adaptador de CA (para adaptador de CA opcional)

## Braçadeira

- Ⓘ Braçadeira (braçadeira média: perímetro do braço 22 a 32 cm)
- Ⓙ Marcador
- Ⓚ Tubo de ar
- Ⓛ Ficha de ar

## Visor

- Ⓜ Tensão arterial sistólica
- Ⓝ Tensão arterial diastólica
- Ⓞ Símbolo de batimento cardíaco (Pisca durante a medição)
- Ⓟ Símbolo de valor médio
- Ⓠ Símbolo de esvaziamento
- Ⓡ Símbolo de memória
- Ⓢ Símbolo de batimento cardíaco irregular
- Ⓣ Símbolo de erro devido a movimento
- Ⓤ Indicador do nível de tensão arterial
- Ⓥ Indicação da pulsação e Número da memória
- Ⓦ Símbolo de alarme
- Ⓧ Guia para enrolamento da braçadeira
- Ⓨ Símbolo de IDENTIFICAÇÃO DE UTILIZADOR (A/B)
- Ⓩ Símbolo de pilhas fracas
- ⓐ Indicação de data/hora



Picture 20 – Display of the blood pressure device and identification of the buttons.

1. On the bottom of the device, remove the compartment lid and place the 4 batteries.
2. Each day, at the end of data collection, remove all batteries from the device to prevent damages, such as oxidation of batteries and compromising the contact of the device. Store batteries separately, being careful not to mix the old batteries with the new ones (extras).

**Note:** if the low battery indicator appears on the display, turn off the unit and replace all batteries at the same time. The results of the measurements will remain stored even after the replacement of the batteries.

### **C) Performing the measurement**

#### **✓ Selecting the armband**

To perform the blood pressure measurement, you need to choose the most suitable armband. The selection will be made according to the circumference of the left arm of the person, to be held at the midpoint between the acromion bone (bone at the edge of the shoulder) and olecranon (elbow tip).

When it is impossible to perform the measurement on the left arm, use the right one. Always use the same arm to perform the measurement. Specify the measurement on the right arm on the designated field for notes on the electronic questionnaire.

The measurement of the circumference of the arm must be performed as follows:

1. Ask the interviewee to stand up and fold the sleeve of the t-shirt/shirt up to the shoulder.
2. Position yourself behind the interviewee to locate the two anatomical points (acromion and olecranon).
3. Ask the interviewee to bend the left arm, with the palm of his/her hand facing upwards, forming a 90-degree angle at the elbow.

4. To find the acromion, slide your fingers along the back of the shoulder, through the spine of the scapula, until finding the end of the bone.
5. Place the measurement tape over the acromion and drop down the tape in a straight line through the lateral of the arm up to the olecranon, watching carefully if it is straight. Identifique o ponto médio entre o acrômio e o olecrano e marque-o no braço do indivíduo, com o auxílio da caneta. Identify the midpoint between the acromion and the olecranon, and mark it on the interviewee's arm, with a pen. This mark corresponds to the midpoint of the arm, where the tape will pass through to perform the measurement of the circumference.
6. Ask the interviewee to relax the arm and extend the elbow.
7. Pass the measuring tape around the arm, above the mid-point mark.
8. Adjust the tape around the entire circumference of the arm and make sure that it is parallel to the ground.
9. Attention to the tightness of the tape, which shouldn't compress the tissues, but should be well adjusted.
10. The number that represents the circumference of the arm is a reference to the armband selection: for circles equal to 32cm or smaller, use the medium adult size armband, and for circles bigger than 32cm, choose the large adult size armband.

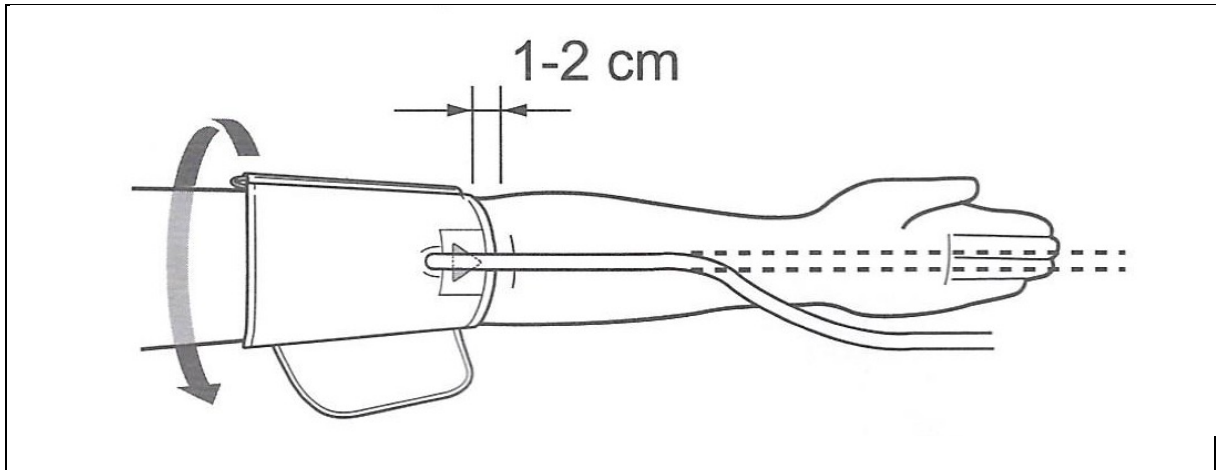
✓ **Blood pressure measurement**

1. Ask the interviewee to turn off his/her cell phone.
2. Ask the interviewee if he/she needs to go to the bathroom and explain to him/her that it is important for this procedure that the bladder is empty and that he/she will remain seated for the next 10 minutes.
3. Make sure that the interviewee doesn't smoke, doesn't eat or drink any kind of beverage, such as coffee and alcohol, for at least 30 minutes prior to the blood pressure measurement. Only water can be consumed during this period. Also, he/she shouldn't have done any physical activity in the last one hour.

4. In case any of the above prohibited circumstances occurs, don't perform the measurement at this time; wait 30 minutes or 1 hour when a physical activity was performed. If not, proceed normally with the procedure.
5. Explain to the interviewee that in order to start the measurements he/she must remain seated and still for at least 5 minutes counted with a timer and that during this time should avoid talking or moving so his/her blood pressure reaches resting levels allowing us to get a good measurement.
6. Inform that the device is automatic and that there will be three measurements, with two-minute gaps, to have more confidence in the assessment.
7. The interviewee should be seated, with his/her back relaxed and supported by the backrest and legs uncrossed.
8. The left arm should be free of clothing, leaning on a table or other support to sustain it. The interviewee should remain with the palm of his/her hand facing up, with the elbow slightly bent. **If there is an impossibility to perform the measurement in this arm, do it in the right arm and register the change of protocol.**
9. The interviewee's arm should be at the same height of his/her chest or heart. If necessary, request materials from the house to make adjustments, such as, cushions to high up the seat or books to raise the arm.
10. The Picture 21 shows the positioning of the armband.

Insert the tube in the unit's air inlet. Pass the arm through the armband. Place the armband on the **left arm** of the interviewee and close it with the Velcro. Adjust so that the bag is firm, but not too tight.

The lower end of the armband should be 1 or 2 cm above the elbow. Align the armband so that it is centered inside the arm with the tube pointing downwards to the hand. Close the armband.



Picture 21 – Armband positioning for blood pressure measurement.

**Note:** when performing the measurement on the **right arm**, the air tube should be on the elbow side. Be careful not to place the arm over the air tube.

11. Remind the interviewee to remain silent and still throughout the measurement and that the device will tighten a little bit his/her arm, which is normal, and will quickly return to the original condition.
12. The beginning of the measurement should be after the first 5 minutes of rest. Place the device in front of you to start the measurement, preventing the interviewee to look at the device's display and get anxious with the evaluation.
  - a. To perform the measurement press the start button O/I. The armband will inflate and deflate automatically and the device will emit a signal when it is finished.
  - b. After these procedures, it will appear on the device's display the values related to the systolic and diastolic blood pressure and the heart rate of the interviewee. Only the systolic and diastolic blood pressure values should be registered with three digits and without rounding values, right after the end of the procedure.
  - c. Unplug the armband from the device, note the time and wait two minutes before performing the second measurement. After the end of the second measurement wait two more minutes and perform the third and final measurement, always respecting the two-minute break between measurements.

**Attention:** keep cell phones off or away from the blood pressure measuring device to prevent interference. Don't handle the tablet and keep it away from the device while it is performing the blood pressure measurement (avoid placing the tablet next to the device or resting on the table). At the end of the measurement, when the values appear on the device's display, proceed with the normal recording of data.

In case the error symbols appear on the display, it will be necessary to wait two minutes and repeat the measurement. However, before proceeding with a new measurement, re-adjust the armband according to the guidelines. It is also possible that the interviewee has moved during the procedure, or that the height of the arm is not as recommended, or yet that the armband has not been adjusted enough. Observe the interviewee in general to identify the problem. If the interviewee gets frightened with something during the evaluation, for example, doorbell, telephone ringing, someone calling or coughing, discard the measurement performed. Wait two minutes and repeat the procedure, even if the device has performed the evaluation.

In some people, even if all procedures are performed correctly, the device cannot perform the measurement. After three **consecutive** unsuccessful attempts the measurement should be ended and the blood pressure values won't be obtained.

In general, the device's inability to perform the blood pressure measurement is associated with a great amount of tissue in the arm area (individuals with severe obesity), but this is characterized as a limitation of the automatic device and not as a problem of the individual and also has nothing to do with the blood pressure values. This should be explained to the interviewee so he/she won't be worried with the results of his/her blood pressure.

If by any reason the interviewee must get up during any stage of the blood pressure evaluation, which will compromise his/her rest, the process should restart. Wait again for the 5 minutes of rest and proceed with the new evaluation, so we'll have three blood pressure measurements in sequence. If the respondent refuses to continue with the procedure or restart the process (if necessary) keep the measurements that could be performed following

the rest protocol and leave it in blank the measurements that couldn't be performed. Register what happened.

[illegible]

mf8	Diastolic Blood Pressure	_ _ _ _ mmHg (9999) Didn't perform
mf9	<p>Average Systolic Blood Pressure</p> <p><b>Interviewer:</b> register this average on the form that will be handed to the interviewee.</p> <p><b>ONLY IF mf3 OR mf5 OR mf7 ≠ (999)</b></p>	<p> _ _ _ _ mmHg</p> <p><b>Amount informed by the tablet.</b></p> <p>This amount should be recorded in the <i>Blood pressure and anthropometric measurements results form</i> to be delivered to the interviewee at the end of the interview.</p>
mf10	<p>Average Diastolic Blood Pressure</p> <p><b>Interviewer:</b> register this average on the form that will be handed to the interviewee.</p> <p><b>ONLY IF mf4 OR mf6 OR mf8 ≠ (999)</b></p>	<p> _ _ _ _ mmHg</p> <p><b>Amount informed by the tablet.</b></p> <p>This amount should be recorded in the <i>Blood pressure and anthropometric measurements results form</i> to be delivered to the interviewee at the end of the interview.</p>

### **5.3.2 Height**

#### **A) Equipment**

The height measurement will be performed with a portable vertical stadiometer of the brand *Nutri-Vida*.



Picture 22 – Stadiometer.

The equipment consists of the following parts:

- 1) Extensor with numerical scale;
- 2) Base for feet support.

#### **B) Performing the measurement**

1. Ask the interviewee to remove shoes and heavy clothing (coats, jackets, thick sweaters).

2. Ask the interviewee to remove embellishments and hairpins (buckles, headbands, scarves, barrettes, tie, and belt) and undo any kind of hairstyle (ponytail, bun, braid etc.).
3. The interviewee should stand still, with parallel legs and feet, weight distributed on both feet, relaxed arms along the body and palms of hands towards the body.
4. The back of the interviewee should be facing the extensor that has the numerical scale.
5. Place the head of the interviewee in the Frankfurt plane (align horizontally the bottom edge of the orbital opening with the top edge of the external ear conductor). Use a pen to help you position the head of the interviewee in the Frankfurt plane, resting one of the pen's tip on the corner of one of the eyes and the other on the top of the external ear meatus, on the same side of the eye.

The Frankfurt plane is an imaginary line that passes laterally through the lowest point of the bottom edge of the right orbit and the highest point of the upper edge of the external ear meatus. It is used to position the head so that the longest axis that can be traced on the skull can be displayed.

6. Gently slide the device's cursor setting it against the head of the interviewee, with enough pressure to compress the hair, if necessary.
7. Press the black button located below the device's cursor to secure the tape to the equipment and **perform the measurement reading with the interviewee still positioned on the stadiometer.**
8. Perform the measurement twice and register the results on the designated field on the **Individual Registration Form** and on the tablet.

	HEIGHT	
	I would like to measure your height. Please, remove your shoes and stand up with your feet and heels together and your back and head pressed against the support. I'll show you.	
mf11	Height (first measurement)	_ _ _ _  cm  (99999) Didn't do, thought it was risky ( <b>GO TO mf14</b> ) (99888) Didn't do, incapacitated ( <b>GO TO mf14</b> ) (99777) Didn't do, bedridden ( <b>GO TO mf14</b> ) (99666) Refused ( <b>GO TO mf14</b> )
mf12	Height (second measurement)	_ _ _ _  cm (99999) Didn't do  If the participant performs only the first measurement, the system will skip to the measurement of the waist circumference.
mf13	Average height  Interviewer: register this average on the form that will be handed to the interviewee.  ONLY IF mf11 OR mf14 ≠ (999, 998, 997, 996)	_ _ _ _  cm  Amount informed by the tablet.  This amount should be recorded in the Blood pressure and anthropometric measurements results form to be delivered to the interviewee at the end of the interview.
mf14	Can you tell me your height?	(0) No ( <b>GO TO mf16</b> ) (1) Yes
mf15	Please tell me your height:	_ _ _ _  cm

### 5.3.3 Waist circumference

This measurement allows an approximate evaluation of the intra-abdominal fat mass and the total body fat. It is used in the assessment of fat distribution in adults. The fat tissue distribution pattern is directly linked to the risk of morbidity and mortality.

#### A) Equipment

Measurement tape brand Seca



Picture 23 – Measurement tape.

#### B) Performing the measurement

1. Ask the interviewee to leave the waist area free of clothes. Request that the interviewee change clothes in case he/she is dressed in a way that prevents the visualization of the abdomen area. **The measurement shouldn't be performed over clothes or belts.**
2. The interviewee should be standing up, barefoot, with raised shirt, feet apart, relaxed abdomen and breathing normally.

3. The measurement is performed by placing the tape at the midpoint between the 10th rib and the edge of the iliac crest (hip bone).
4. To locate this point ask the interviewee to inhale deeply and hold the breath for a moment. Palpate, with both hands, until you find the 10th rib, which is the last fixed rib. Then, ask the interviewee to exhale and mark with a pen. Locate, with both hands, the iliac crest, which is the highest part of the pelvic bone and mark this spot with a pen.
5. Pass the tape around the interviewee's body, in the midpoint height. Make sure that the tape is parallel to the ground. Careful not to compress the skin with the tape.
6. Ask the interviewee to inhale and completely exhale the air from the lungs, remaining like this until the measurement reading is performed.
7. The reading should be done at the eye level of the interviewer.
8. Perform the measurement twice and register the results on the designated field on the **Individual Registration Form** and on the tablet.

mf16	Waist circumference (First measurement)	_ _ _  cm (9999) Didn't do ( <b>GO TO mf18</b> ) (9988) Refused ( <b>GO TO mf18</b> )
mf17	Waist circumference (Second measurement)	_ _ _  cm (9999) Didn't do

### 5.3.4 Hip circumference

#### A) Equipment

Measurement tape brand Seca



Picture 24 – Measurement tape.

#### B) Performing the measurement

1. Ask the interviewee to use thin clothes and to remove any objects from his/her pockets on pants or skirts (mobile phone, pen, money, coins, wallet, handkerchief, paper).
2. The person should be standing with the abdomen relaxed, feet together and breathing normally.
3. Pass the tape around the interviewee's hip, at the height of the major circumference of the gluteus area. Careful not to compress the skin with the tape.
4. Perform the measurement twice and register the results on the designated field on the **Individual Registration Form** and on the tablet.

mf18	Hip circumference (First measurement)	_ _ _  cm (9999) Didn't do ( <b>GO TO mf20</b> ) (9988) Refused ( <b>GO TO mf20</b> )
mf19	Hip circumference (Second measurement)	_ _ _  cm (9999) Didn't do

### **5.3.5 Body weight**

#### **A) Equipment**

- 1) Portable digital scale, brand SECA.



Picture 25 – Portable digital scale.

- 2) 2 alkaline batteries type "AA".

#### **B) Performing the measurement**

1. Ask the interviewee to remove his/her shoes and heavy clothing (coats, jackets, thick sweaters).
2. Ask the interviewee to remove all accessories (sunglasses, belt, necklaces) and objects from his/her pockets on pants, skirt and shirt (mobile phone, pen, money, coins, wallet, handkerchief, papers, keys, pocket knives, nail clippers etc.).
3. Place the scale on a regular and firm surface.

4. Avoid placing the equipment on top of rugs, carpets etc.
5. Help the interviewee at the moment of stepping up on the scale.
6. Switch on the scale with the touch of your feet and wait until it reaches zero.
7. Ask the interviewee to step up on the scale and stand with both feet on the platform with the weight distributed on both feet. The arms should be extended along the body side.
8. Ask the interviewee to look at a horizontal line and not to the display of the scale.
9. Perform the measurement reading twice and register the results.
10. Help the interviewee at the moment of stepping off the scale.
11. Perform the measurement twice and register the results on the designated field on the **Individual Registration Form** and on the tablet.

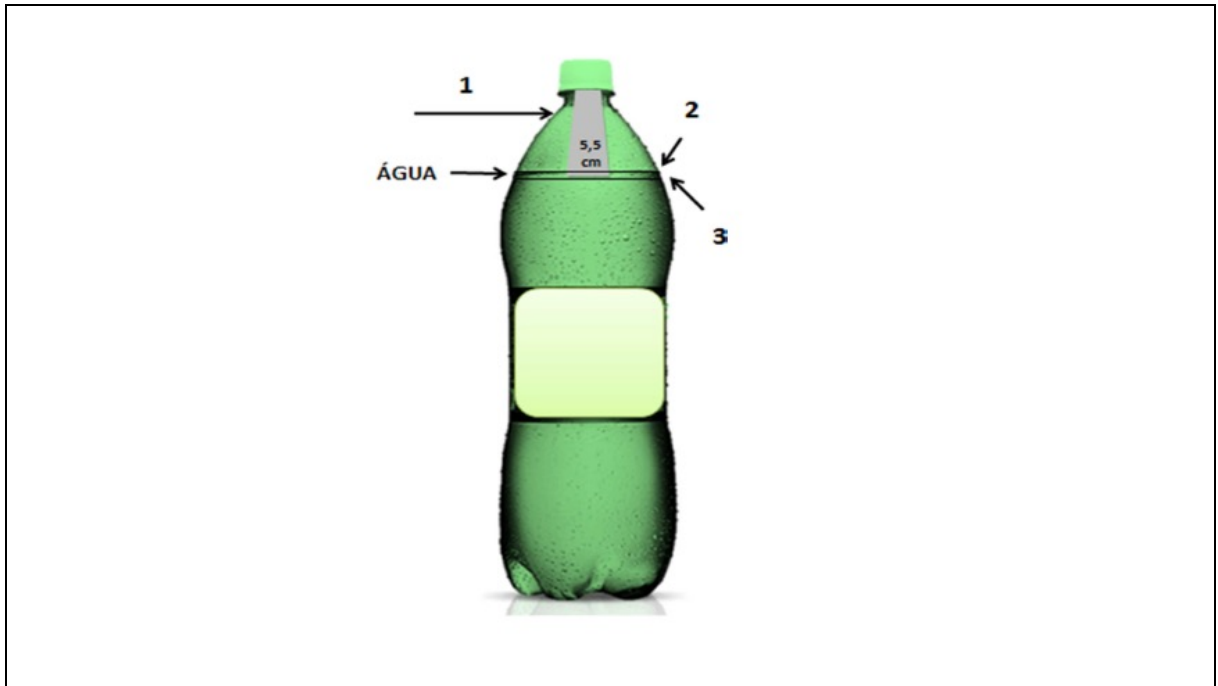
**Note:** if the battery symbol appears on the display, turn off the scale and replace the batteries all at once. Then calibrate the scale using a standard weight object.

mf20	Weight (First measurement)	_ _ _ _ _ .  _  kg (99999) Didn't do ( <b>GO TO mf23</b> ) (99999) Didn't do, thought it was risky ( <b>GO TO mf23</b> ) (99888) Didn't do, incapacitated ( <b>GO TO mf23</b> ) (99777) Didn't do, bedridden ( <b>GO TO mf23</b> ) (99666) Refused ( <b>GO TO mf23</b> )
mf21	Weight (Second measurement)	_ _ _ _ _ .  _  kg (99999) Didn't do
mf22	Average weight  <b>Interviewer:</b> register this average on the form that will be handed to the interviewee.  <b>ONLY IF mf20 OU mf21 ≠ (999, 998, 997, 996)</b>	_ _ _ _ _ .  _  kg  <b>Amount informed by the tablet.</b>  <b>This amount should be recorded in the Blood pressure and anthropometric measurements results form to be delivered to the interviewee at the end of the interview.</b>
mf23	Can you tell me your weight?	(0) No ( <b>GO TO mf25</b> ) (1) Yes
mf24	Please tell me your weight:	_ _ _ _ _  Kg

#### **5.3.5.1 Scale calibration**

The scale calibration should be performed daily before proceeding to the field work. In order to calibrate the scale 5 (five) PET 2-liter soda bottles (only *Guaraná Antarctica* or *Coca Cola* brand names may be used) will be needed.

- 1) Remove the label from all five 2 liters PET bottles, empty its contents and wash them with water to completely remove the soda.
- 2) The amount of water to be added in the bottle so that it has the exact weight of 2kg should be measured based on the gray label of 5.5 cm (Annex IX). Remove the label from the adhesive and stick it on the bottle, just below the nozzle, as shown in the arrow "1" (Picture 26).
- 3) Make sure that the label is completely bonded to the bottle without forming grooves and that they are completely in an upright position.
- 4) Place the bottle on a flat surface (or table) and sit on a chair in front of the bottle. With a glass add water slowly, until it reaches the lower limit of the label.
- 5) The bottom edge of the water must be aligned exactly with the lower limit of the label. Cover the bottle and repeat this procedure with the others.
- 6) Place the bottles on the scale and write down the total weight shown on the display. The final weight of the five bottles should be 10kg, with an allowed range of variation from 9,9 to 10,1kg. If the variation is out of the acceptable limit, the scale is out of calibration and should be replaced.



Picture 26 – PET bottle marked for scale calibration.

### **5.3.6 Hand grip strength**

#### **A) Equipment**

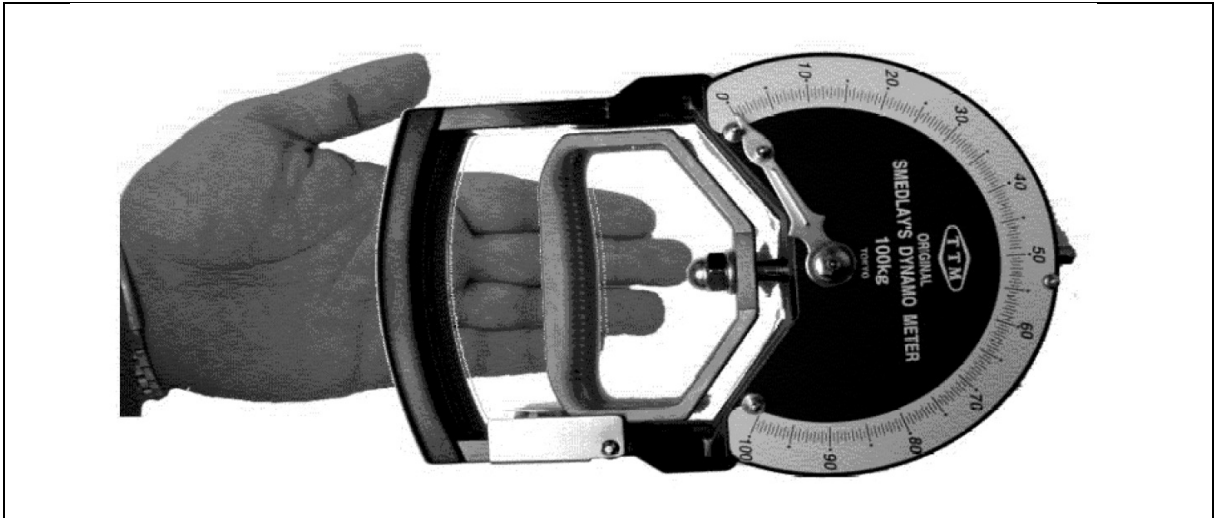
##### **1) Dynamometer**



Picture 27 – Dynamometer.

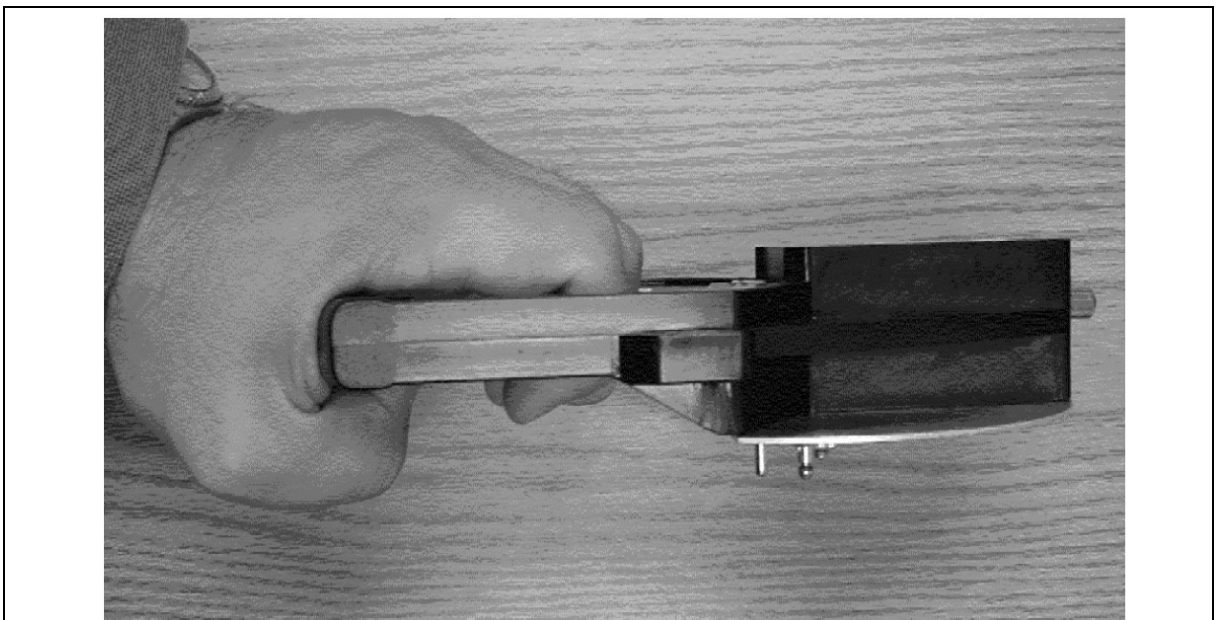
#### **B) Performing the measurement**

1. Ask the person to sit comfortably in a regular chair, without armrests, and keep his/her feet flat on the floor.
2. Identify the dominant hand.
3. Place the arm close to the body and the elbow flexed to 90 degrees. The forearm should be in a neutral position, with the thumb pointing towards the ceiling. The wrist position should be comfortable (Picture 28).



Picture 28 - Hand and dynamometer position.

4. After positioning correctly the upper limb, place the dynamometer in the interviewee's dominant hand and adjust it as follows: the device's movable handle should be placed in the position II, or in another position above or below this mark. Check the fitting by asking the interviewee to press the dynamometer. The middle part of the fingers must lie flat on the top part of the metal bar (Picture 29).



Picture 29 – Position of the fingers on the equipment.

5. The test can't be performed without being previously demonstrated to the interviewee.  
The instructions should be read to the interviewee.
6. Before starting the test check whether the pointer of the equipment is reset.
7. To start the test give the verbal command "Now press very hard. As hard as you can. Tell me if you feel any pain or discomfort."

Verbal command: "Attention, ready, now!"

Encouragement during the test: "Harder, harder, harder!"

8. The interviewee should press the equipment throughout two seconds.
9. The procedure should be repeated three times, letting the interviewee rest for a minute between each test.
10. Read the result by checking where the pointer stopped and register only the integers.
11. After the completion of each test turn the pointer to the anti-clockwise direction, leaving it reset to the next test.
12. If the interviewee has difficulties on holding the dynamometer due to its weight, let him/her use the other hand to help support the equipment.

	Now I will use an instrument called dynamometer to test the strength of your hand. This test can only be performed if you hadn't undergone any arm surgery in the last three months.	
mf25	IN THE LAST THREE MONTHS, have you had any surgery performed on the arm or hand that you use most frequently (dominant hand)?	(0) No (1) Yes ( <b>GO TO mf31</b> )

	<p><b>Instruction</b></p> <p>I'll show you how to perform the test.</p> <p>Use the arm that you think it's stronger. Bend your elbow about 90° and keep the wrist in a neutral position. Don't let the arm touch the body or flex it while pressing the device. Take both metal pieces together like this (<a href="#">demonstrate it</a>). Do I need to adjust the device for your size?</p> <p>When I tell you "now", press very hard. As hard as you can. The two metal pieces won't move, but I'll be able to see the intensity of your strength. I'll perform this test three times. Let me know if you feel any pain or discomfort.</p> <p>You can test once using your non-dominant hand and then you must perform the test three times.</p> <p><b>Interviewer:</b> make sure the device is adjusted to the interviewee's hand.</p>	
mf26	Hand used in the test	(0) Right (1) Left
mf27	<p><b>First attempt</b></p> <p>Now press very hard. As hard as you can. Tell me if you feel any pain or discomfort.</p> <p><a href="#">Verbal command to perform the Hand Strength Test</a></p> <p><a href="#">Verbal command: "Attention, ready, now!"</a></p> <p><a href="#">Encouragement during the test: "Harder, harder, harder!"</a></p>	<p> _ _ _ _  kg</p> <p>(9555) Tried, but failed            (9666) Didn't try, thought it was risky            (9777) Incapacitated            (9888) Refused</p>
mf28	<p><b>Second attempt</b></p> <p>Now press very hard. As hard as you can. Tell me if you feel any pain or discomfort.</p> <p><a href="#">Verbal command to perform the Hand Strength Test</a></p> <p><a href="#">Verbal command: "Attention, ready, now!"</a></p> <p><a href="#">Encouragement during the test: "Harder, harder, harder!"</a></p>	<p> _ _ _ _  kg</p> <p>(9555) Tried, but failed            (9666) Didn't try, thought it was risky            (9777) Incapacitated            (9888) Refused</p>

mf29	<p><b>Third attempt</b></p> <p>Now press very hard. As hard as you can. Tell me if you feel any pain or discomfort.</p> <p>Verbal command to perform the Hand Strength Test</p> <p>Verbal command: "Attention, ready, now!"</p> <p>Encouragement during the test: "Harder, harder, harder!"</p>	<p> _ _ _ _  kg</p> <p>(9555) Tried, but failed  (9666) Didn't try, thought it was risky  (9777) Incapacitated  (9888) Refused</p>
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### **5.3.7 Balance test**

Three balance tests will be performed. They will assess the balance of the interviewee by having him/her standing on three different positions which are presented below.

<b>FEET SIDE BY SIDE</b>


<b>ONE FOOT A LITTLE AHEAD OF THE OTHER</b>

<b>ONE FOOT BEHIND THE OTHER</b>





**A) Performing the test**

1. The tests should only be performed after being previously demonstrated to the interviewee.
2. The interviewee can move his/her body to balance, can use his/her arms, bend his/her knees, but may not move his/her feet.
3. The time limit to perform the first two tests is 10 seconds. The timer should be stopped as soon as the interviewee gets out of the position or when the 10 seconds time limit is reached.
4. Register the test performance time on the designated field on the **Individual Registration Form**, registering the hundredths of a second if the time is less than 10 seconds.
5. The time limit to perform the third test (one foot behind the other) will be 10 seconds for those who are 70 years or older and 30 seconds for those who are 69 years or younger.

	Now I would like to perform some tests to measure your mobility and flexibility. First I'll show you how to do each movement and, then, I would like you to try to repeat the movements. If you feel you can't do it or if you don't want to do it, please let me know and we'll proceed to another test.
	<b>Feet side by side</b>
	<p>I would like you to stand up, with your feet together, side by side, keeping your eyes opened. You can use either foot, the one that gives you more stability. <b>I'll show you how.</b></p> <p>You can move your body to balance, you can use your arms, bend your knees, but try not to move your feet.</p> <div style="text-align: center;">  </div>

mf30	<p>When I tell you, you may start.</p> <p>Please keep this position until I tell you.</p> <p><b>Interviewer: give the command to start.</b></p> <p><b>Interviewer: stop the timer at 10 (ten) seconds.</b></p> <p><b>Register the performance time.</b></p>	<p> _ _ _ .  _ _ _  seconds</p> <p>(9666) Didn't try, thought it was risky (9888) Refused to try (9999) Incapacitated</p>
	<b>One foot a little ahead of the other</b>	
	<p>Now I would like you to try to stand up with the heel of one foot leaning against the toe side of the other foot. You can use either foot, the one that gives you more stability. <b>I'll show you how.</b></p> <p>You can move your body to balance, you can use your arms, bend your knees, but try not to move your feet.</p> <div> </div>	
mf31	<p>When I tell you, you may start.</p> <p>Please keep this position until I tell you.</p> <p><b>Interviewer: give the command to start.</b></p> <p><b>Interviewer: stop the timer at 10 (ten) seconds.</b></p> <p><b>Register in seconds how long the interviewee was able to keep the position.</b></p>	<p> _ _ _ .  _ _ _  seconds</p> <p>(9666) Didn't try, thought it was risky (9888) Refused to try (9999) Incapacitated</p>
	<b>One foot behind the other</b>	

	<p>In this test, I would like you to try to stand up, with the heel of one foot in front of the other (touching the toes of the other foot). You can use either foot, the one that gives you more stability. <b>I'll show you how.</b></p> <p>You can move your body to balance, you can use your arms, bend your knees, but try not to move your feet.</p> <div style="text-align: center;">  </div>	
mf32	<p><b>Interviewer: elderly of 69 years of age or younger, the time of the test will be 30 seconds.</b></p> <p>When I tell you, you may start.</p> <p>Please keep this position until I tell you.</p> <p><b>Interviewer: give the command to start.</b></p> <p><b>Interviewer: stop the timer at 10 (ten) seconds.</b></p> <p><b>Register in seconds how long the interviewee was able to keep the position.</b></p>	<p> _ _ _ . _ _ _  seconds</p> <p>(9666) Didn't try, thought it was risky  (9888) Refused to try  (9999) Incapacitated</p>
mf32	<p><b>Interviewer: elderly of 70 years or older, the time of the test will be 10 seconds.</b></p> <p>When I tell you, you may start.</p> <p>Please keep this position until I tell you.</p> <p><b>Interviewer: give the command to start.</b></p> <p><b>Interviewer: stop the timer at 10 (ten) seconds.</b></p> <p><b>Register in seconds how long the interviewee was able to keep the position.</b></p>	<p> _ _ _ . _ _ _  seconds</p> <p>(9666) Didn't try, thought it was risky  (9888) Refused to try  (9999) Incapacitated</p>

### **5.3.8 Walking speed**

#### **A) Equipment**

A 3 meters long steel chain



Picture 30 – Steel chain.

#### **B) Location setting**

1. Find a flat space that is at least 3,5 meters, free of irregularities on the ground or any other obstacles that makes it difficult to walk.
2. Stretch the chain to measure the space required for the test performance. Place a tape to mark the starting point of departure and another tape indicating the arrival point.

**DO NOT PERFORM THE TEST WITH THE CHAIN.**

#### **C) Performing the test**

1. Ask the interviewee to wear the footwear that he/she uses most of the time (shoes, sneakers, sandals or slippers).
2. If the interviewee uses any device to assist him/her walk (cane or walker), the test should be performed with this device.

3. Explain to the interviewee that for the test performance it will be counted (in seconds) the time he/she spends to travel, in usual pace, the distance of 3 meters that is marked on the floor with a tape.
4. Ask the interviewee to walk comfortably on the test path once or twice to make sure he/she properly understood the procedure.
5. Sit the interviewee down for a few minutes before positioning him/her for the test performance.
6. Ask the interviewee to be in a standing position, with both feet together and looking ahead, behind the line that signals the beginning of the path.
7. Guide him/her to walk the path in a usual pace or “walk with the same speed of your regular daily walking”, without running or leaving the path.
8. Give the command "Attention, now!".
9. The timer should be set when the first leg of the interviewee touches the ground, immediately after the starting mark, and stopped when the either foot overcomes the finishing line marked on the floor.
10. Follow the interviewee during the test performance. The interviewer should position himself a little behind the interviewee, so that the one being evaluated doesn't walk on your speed or imitating your walk.
11. Repeat the test twice with one-minute breaks between each test. The interviewee should remain in the standing position during the breaks between tests.

	<p>Now I will ask you to walk from one point to another in this path. Please walk in your normal walking speed, that is, just as you walk on the street to go to a store. We'll perform this test TWICE. <b>I'll show you how.</b></p> <p><b>Interviewer:</b> use the chain to measure the three meters distance on the ground. Place the masking tape to indicate the starting and finishing points.</p> <p style="text-align: center;"><b>DO NOT PERFORM THE TEST WITH THE CHAIN</b></p> <p>During the test walk a little behind the interviewee so you won't interfere on the test performance, but at a distance that allows you to help him/her if necessary.</p> <p>The timer must be stopped when the interviewee overcome the finishing line with one of his/her feet.</p>	
mf33 mf34 mf35	<p><b>First attempt</b></p> <p>When I tell you, you may start.</p> <p><b>Interviewer:</b> give the command to the interviewee start walking. Record the performance time in seconds.</p>	<p> _   _  minutes  _   _  seconds  _   _  hundredths of a second</p> <p>(9666) Didn't try, thought it was risky (9888) Refused to try</p>
mf36 mf37 mf38	<p><b>Second attempt</b></p> <p>Now let's repeat the walk. Remember that you need to walk from one point to another in your normal walking speed.</p> <p>When I tell you, you may start.</p> <p><b>Interviewer:</b> give the command to the interviewee start walking. Record the performance time in seconds.</p>	<p> _   _  minutes  _   _  seconds  _   _  hundredths of a second</p> <p>(9666) Didn't try, thought it was risky (9888) Refused to try</p>
mf39	<b>Interviewer:</b> Did the respondent use any device or support instrument to perform the walk?	(0) No (1) Yes
mf40	Relevant observations	

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**Contact**

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