

Section 5: Collecting Step 2 data: Physical Measurements

Overview

Introduction This section provides information on and is a guide to working with the topics covered under Step 2 of the STEPS Instrument.

Intended audience This section is designed for use by those fulfilling the following roles:

- Interviewers
- Field team supervisors
- STEPS Survey Coordinator.

In this section This section covers the following topics:

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Physical Measurements Overview

Introduction

Step 2 of the STEPS Instrument includes selected physical measures to determine the proportion of adults that:

- have raised blood pressure
 - are overweight and/or obese.
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What you will learn

In this section, you will learn:

- what the physical measures are and what they mean
 - what equipment is needed
 - how to assemble and use the equipment
 - how to take physical measurements and accurately record the results.
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Learning outcomes objectives

The learning outcome of this section is to understand what the physical measures are and how to accurately take the measurements and record the results.

Physical Measurements

Introduction Blood pressure is taken from the participants to determine the proportion of the population with raised blood pressure. Height and weight measurements are taken to calculate body mass index (BMI) that is used to determine the prevalence of overweight and obesity in the population.

Units of measurement The table below shows the standard units of measurement for physical measurements used in STEPS and their upper and lower limits. The Android devices will not accept values outside these limits.

Physical Measure	Unit	Minimum	Maximum
Systolic blood pressure (SBP)	mmHg	40	300
Diastolic blood pressure (DBP)	mmHg	30	200
Height	cm	100	270
Weight	kg	20	350
BMI (body mass index)	kg/m ²	11	75
Waist circumference	cm	30	200
Hip circumference	cm	45	300
Heart rate	beats/minute	30	200

Sequence of tests In most countries, the physical measurements (Step 2) are done immediately after the behavioural measurements (Step 1). Since the participant must have rested for 15 minutes before the blood pressure measurement, it is most convenient to start the Step 2 measurements with blood pressure as the participant will have already been sitting for the duration of the interview. The Step 2 measurements should hence be taken from the participant in the following order:

1. Blood pressure (and heart rate, if measured)
2. Height
3. Weight
4. Waist circumference
5. Hip circumference (if measured).

Equipment required for tests The equipment you will need for taking physical measurements include:

- blood pressure monitor and appropriate cuff sizes (or universal cuffs);
- height measuring board and weighting scales, or a combined device;
- tape measure;
- pen;
- chair or coat rack for participant's clothes;
- curtain or screen to provide privacy if no private area is available for taking measurements.

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Physical Measurements, Continued

Privacy

Where possible, all physical measurements should be conducted in a private area. In some settings, a separate room in the household may be set up with the necessary equipment to take each measurement. Where this is not possible, a separate area should be screened off to provide privacy for waist and hip circumference measurements at minimum.

Allow the participant to select the degree of privacy – some may be concerned about going behind a screen or out of sight of others with people they do not know.

When to take physical measurements and record results

It is recommended that physical measurements are taken immediately after the Step 1 interviews. Results of Step 2 measures are to be recorded on the same Android device.

If physical measurements are taken some time after Step 1 interviews (not recommended), care should be taken to ensure data are recorded correctly on the Android devices where the participant's record already exists.

Introductions and explanations

Prior to taking physical measurements, explain that the following measurements will be taken:

For Core

- blood pressure
- height
- weight
- waist circumference

For Expanded

- heart rate
 - hip circumference.
-

Taking Blood Pressure and Recording Heart Rate

Introduction	Blood pressure is taken to determine the prevalence of raised blood pressure in the population.
Equipment	<p>To take blood pressure you will need the following:</p> <ul style="list-style-type: none">• digital automatic blood pressure monitor, e.g. Bosch & Sohn Medicus UNO, or OMRON M6• appropriate size cuffs or universal cuffs.
Preparing the participant	<p>Ask the participant to sit quietly and rest for 15 minutes with his/her legs uncrossed. If physical measurements (Step 2) are done immediately after the behavioural measurements (Step 1), as recommended, the participant should have already been seated for at least 15 minutes, and the blood pressure measurements can be done immediately after finishing the Step 1 questions. If the participant has moved around during the interview, have him/her rest after the interview while you set-up the equipment.</p> <p>Furthermore, the participant should have an empty bladder when the measurements are taken, should not have coffee before or during the measurements, and should not talk during the measurements. The elbow should be supported during the measurements.</p>
Three measurements	Three blood pressure measurements should be taken. During data analysis the mean of the second and third readings will be calculated. The participant will rest for three minutes between each of the readings.
Recording the blood pressure measurements	<p>For recording the results of the blood pressure measurements, do the following:</p> <ul style="list-style-type: none">• record your Interviewer ID on the Android device;• record the device ID of the blood pressure machine you are using;• after each of the three measurements, record the results;• check that all readings are correctly filled in;• inform the participant on the last blood pressure reading only after the whole process is completed.
Recording heart rate measurements	Heart rate and blood pressure results are displayed simultaneously on the digital blood pressure monitor. If a country decides to include the expanded measurement of heart rate, the recording should be done along with the recording of the blood pressure measurements after each of the three measurements.

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Taking Blood Pressure and Recording Heart Rate, Continued

Procedure for measuring blood pressure

The instructions below apply to the use of automatic blood pressure monitors. However, more detailed operating instructions are included with each device and should be reviewed before taking any blood pressure measurements.

Applying the cuff

Follow the steps below to select an appropriate size and apply the cuff:

Step	Action								
1	Place the left arm * of the participant on the table with the palm facing upward.								
2	Remove or roll up clothing on the arm (make sure rolled up clothing isn't tight).								
3	Use a universal cuff, or select the appropriate cuff size for the participant using the following table: <table><tr><th>Arm Circumference (cm)</th><th>Cuff Size</th></tr><tr><td>17 -22</td><td>Small (S)</td></tr><tr><td>22-32</td><td>Medium (M)</td></tr><tr><td>> 32</td><td>Large (L)</td></tr></table>	Arm Circumference (cm)	Cuff Size	17 -22	Small (S)	22-32	Medium (M)	> 32	Large (L)
Arm Circumference (cm)	Cuff Size								
17 -22	Small (S)								
22-32	Medium (M)								
> 32	Large (L)								
4	Position the cuff above the elbow so that the lower band is positioned 1-2 cm above the elbow joint.								
5	Wrap the cuff snugly onto the arm and securely fasten with the Velcro.								
6	Keep the level of the cuff at the same level as the heart during measurement.								

***Note:** If the right arm is used, note this in the comments for the household in the STEPS app.

Taking the measurement

Follow the instructions below to take the blood pressure measurement:

Step	Action
1	Switch the monitor on.
2	The monitor will start measuring when it detects the pulse. The systolic and diastolic blood pressure readings should be displayed within a few moments (systolic above and diastolic below).
3	Record the reading in the Android device.
4	Switch the monitor off, but leave the cuff in place.
5	Wait three minutes, then repeat steps 1-4 two more times.
6	Record the last reading on the participant feedback form as well.

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Taking Blood Pressure and Recording Heart Rate, Continued

When to use a Sphygmomanometer

The sphygmomanometer is generally **not recommended**, but may be used in the following circumstances:

- the automatic blood pressure monitor is not functioning;
- the automatic blood pressure monitor display shows multiple errors;
- to cross check automatic blood pressure monitor readings in various clinical states such as irregular pulse, peripheral circulatory disturbance, extreme hypotension;
- for calibration of the automatic blood pressure monitor.

Procedure for Sphygmomanometer

Follow the steps below or refer to the operating instructions included with the device to measure the blood pressure of a participant using the sphygmomanometer.

Step	Action
1	Apply the cuff (as detailed above).
2	Put stethoscope earpieces in ear and set to bell.
3	Palpate pulse at either brachial or radial artery. Take a pulse count for one full minute.
4	Pump up pressure and inflate cuff until unable to feel pulse.
5	Continue to inflate cuff 30 mmHg beyond this point.
6	Apply the bell of the stethoscope to the right antecubital fossa.
7	Listen for pulse sounds while deflating the cuff slowly.
8	Record the systolic blood pressure (SBP) when a pulse is first audible.
9	Record the diastolic blood pressure (DBP) when the pulse sound disappears.
10	Deflate the cuff fully and let the arm rest for three minutes (between each of the readings).
11	Repeat Steps 2-10 twice to obtain three readings.
12	Check that all readings are correctly filled in on the Android device.
13	Inform the participant about the blood pressure readings only after the whole process is completed, and record the last reading on the participant feedback form.

Measuring Height

Introduction The height of eligible participants is taken to help calculate their body mass index (BMI), which is their weight relative to their height, and therefore to determine the prevalence of overweight and obese people in the population.

Equipment To measure height, you need a portable height/length measuring board, such as from SECA. Alternatively, a BMI scale measuring both height and weight (e. g. Growth Management Scale) can be used.

Assembling the measuring board Follow the steps below to assemble the measuring board:

Step	Action
1	Separate the pieces of the board (usually 3 pieces) by unscrewing the knot at the back.
2	Assemble the pieces by attaching each one on top of the other in the correct order.
3	Lock the latches in the back.
4	Position the board on a firm surface against a wall.

Procedures Follow the steps below to measure the height of a participant:

Step	Action
1	Ask the participant to remove their: <ul style="list-style-type: none">• footwear (shoes, slippers, sandals, etc)• head gear (hat, cap, hair bows, comb, ribbons, etc).• any fancy or high hairdos may have to be pressed. Note: If it would be insensitive to seek removal of a scarf or veil, the measurement may be taken over light fabric.
2	Ask the participant to stand on the board facing you.
3	Ask the participant to stand with: <ul style="list-style-type: none">• feet together• heels against the back board• knees straight.
4	Ask the participant to look straight ahead and not tilt their head up.
5	Make sure eyes are the same level as the ears.
6	Move the measure arm gently down onto the head of the participant and ask the participant to breathe in and stand tall.
7	Read the height in centimetres at the exact point to the nearest mm.
8	Ask the participant to step away from the measuring board.
9	Record the height measurement in centimetres in the Android device, along with the device ID and your Technician ID.

Measuring Weight

Introduction The weight of eligible participants is taken to help determine their body mass index (BMI), which is their weight relative to their height, and therefore to determine the prevalence of overweight and obese people in the population.

Equipment To measure weight, you will need a portable weighting scale, such as a SECA scale or the Tanita HS301 Solar Scale. Alternatively, a BMI scale measuring both height and weight (e. g. Growth Management Scale) can be used.

Set up requirements Make sure the scales are placed on a firm, flat surface. Do not place the scales on:

- carpet
 - a sloping surface
 - a rough, uneven surface.
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Set up scales Follow the steps below to put the scales into operation:

Step	Action
1	Put the scale on a firm, flat surface.
2	Connect the adaptor to the main power line or generator, if the scale is not battery operated.
3	Turn on the scale and wait until the display shows 0.0.

Procedures Follow the steps below to measure the weight of a participant:

Step	Action
1	Ask the participant to remove their footwear (shoes, slippers, sandals, etc) and socks. They should also take off any heavy belts and empty out their pockets of mobiles, wallets and coins.
2	Ask the participant to step onto scale with one foot on each side of the scale.
3	Ask the participant to: <ul style="list-style-type: none">• stand still• face forward• place arms on the side and• wait until asked to step off.
4	Record the weight in kilograms on the Android device, along with the device ID and your Technician ID. If the participant wants to know his/her weight in pounds, convert by multiplying the measured weight by 2.2.

Measuring Waist Circumference

Introduction	Waist circumference measurements are also taken to provide additional information on overweight and obesity.
Equipment	<p>To take waist circumference measurements you will need a:</p> <ul style="list-style-type: none">• constant tension tape (for example, Figure Finder or Myo Tape Body Tape Measure);• chair or coat stand for participants to place their clothes.
Privacy	A private area is necessary for this measurement. This could be a separate room, or an area that has been screened off from other people within the household.
Preparing the participant	<p>This measurement should be taken without clothing, that is, directly over the skin.</p> <p>If this is not possible, the measurement may be taken over light clothing. It must not be taken over thick or bulky clothing. This type of clothing must be removed.</p>
How to take the measurement	<p>This measurement should be taken:</p> <ul style="list-style-type: none">• at the end of a normal expiration;• with the arms relaxed at the sides;• at the midpoint between the lower margin of the last palpable rib and the top of the iliac crest (hip bone).

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Measuring Waist Circumference, Continued

Procedure

Follow the steps below to measure the waist circumference of a participant:

Step	Action
1	Standing to the side of the participant, locate the last palpable rib and the top of the hip bone. You may ask the participant to assist you in locating these points on their body.
2	Ask the participant to wrap the tension tape around themselves and then position the tape at the midpoint of the last palpable rib and the top of the hip bone, making sure to wrap the tape over the same spot on the opposite side. Note: Check that the tape is horizontal across the back and front of the participant and as parallel with the floor as possible.
3	Ask the participant to: <ul style="list-style-type: none">• stand with their feet together with weight evenly distributed across both feet;• hold the arms in a relaxed position at the sides;• breathe normally for a few breaths, then make a normal expiration.
4	Measure waist circumference and read the measurement at the level of the tape to the nearest 0.1 cm, making sure to keep the measuring tape snug but not tight enough to cause compression of the skin.
5	Record the measurement on the Android device, along with the device ID. Note: Measure only once and record.

Measuring Hip Circumference

Introduction	Hip circumference measurements are taken in some countries as an expanded option to measure overweight and obesity.
Equipment	<p>To take hip circumference measurements you will need a:</p> <ul style="list-style-type: none">• constant tension tape (for example, Figure Finder or Myo Tape Body Tape Measure);• chair or coat stand for participants to place their clothes.
Privacy	A private area is necessary for this measurement. This could be a separate room, or an area that has been screened off from other people within the household. Hip measurements are taken immediately after waist circumferences.
Preparing the participant	<p>This measurement should be taken without clothing, that is, directly over the skin.</p> <p>If this is not possible, the measurement may be taken over light clothing. It must not be taken over thick or bulky clothing. This type of clothing must be removed.</p>
How to take the measurement	<p>This measurement should be taken:</p> <ul style="list-style-type: none">• with the arms relaxed at the sides• at the maximum circumference over the buttocks.

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Measuring Hip Circumference, Continued

Procedure

Follow the steps below to take hip circumference measurements.

Step	Action
1	Stand to the side of the participant, and ask them to help wrap the tape around themselves.
2	Position the measuring tape around the maximum circumference of the buttocks.
3	Ask the participant to: <ul style="list-style-type: none">• stand with their feet together with weight evenly distributed over both feet;• hold their arms relaxed at the sides.
4	Check that the tape position is horizontal all around the body and snug without constricting.
5	Measure hip circumference and read the measurement at the level of the tape to the nearest 0.1 cm.
6	Record the measurement on the Android device, along with the device ID. Note: Measure only once and record.

Completing the Participant Feedback Form (Step 2)

Introduction

After having completed the Step 2 measurements, the participant should be informed on his/her results. You can use the Participant Feedback Form (Step 2) in order to give the participant feedback on his body measurements (see Part 6, Section 2). This form stays with the participant after having completed the survey.

Filling in the Participant Feedback Form

Please follow the following guidelines when completing the Participant Feedback Form:

- blood pressure: record reading 3 for both systolic and diastolic blood pressure;
 - blood pressure classification: tick the appropriate box;
 - heart rate: record reading 3;
 - height and weight: record height in cm (to the nearest mm) and weight in kg (to the nearest 0.1 kg);
 - body mass index: calculate the body mass index and record (weight in kg divided by meters squared: kg/m^2), the BMI Classification Chart helps calculating the BMI (see Part 6 Section 2). If a BMI scale is used measuring both height and weight, record BMI as displayed on the scale;
 - BMI classification: tick the appropriate box, the BMI Classification Chart helps finding the BMI category;
 - waist and hip circumference: record waist and hip circumference (if applicable) in cm (to the nearest mm).
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Referrals and Information for Step 3 Measurements

Referrals for Step 3 measurements

If your country plans to take biochemical measurements for Step 3, including spot urine and blood samples, you will need to

- provide the participant with a small container (50 ml), a plastic bag to carry the sample and instructions for the urine collection that is done in the evening before fasting for the blood measurements;
- schedule and appointment for the blood measurements with the participant;
- provide the participant with a copy of the appointment card and the fasting instructions (see Part 6, Section 2);
- remind the participant to bring the appointment card and the urine sample to the appointment the next day.

Scheduling

Follow the steps below to schedule and brief participants:

Step	Action
1	Advise the participant the day and time they should come to the Step 3 site for blood tests using the times assigned to your team.
2	If necessary, provide a map showing the venue.
3	Record the time in the appropriate box on the Step 3 Appointment Card (see Part 6, Section 2). Leave this card with the participant. Take note of the appointment time for communication to the field team supervisor.
4	Provide a copy of the Fasting Instructions and explain the importance of fasting properly.
5	Remind the participant to bring to the Step 3 site their own copy of the signed consent form as well as the Step 3 Appointment Card as a means of identification.
6	Remind the participant to bring the urine sample to the designated place at their appointment time.
7	In cases where participants need transportation to the Step 3 site for blood tests, make the arrangement and inform your supervisor.

