
BCS70 technical report Appendix B: Nurse Protocols

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1 NatCen Standard protocol for height

1.1 Introduction

The height measurement is a measure of anthropometry, which provides information on the size and proportions of the human body. When taken in conjunction with other anthropometric measures it is an indicator of, and can predict, the nutritional status, performance, health and survival of a population and can thus be used to determine public health policies. Moreover, height is often used as an indicator of people's quality of life. This is based on evidence that final height is a combination of genetic and environmental factors, where a taller population is indicative of a better quality of life due to access to health services and nutrition.

1.2 Exclusion criteria

Participants are excluded from the height measurement if:

- They are pregnant
- They are too stooped to obtain a reliable measurement
- After a discussion with the participant it becomes clear that they are too unsteady on their feet
- They are not able to get out of a chair
- If the participant finds it painful to stand or sit up straight

1.3 Equipment

You will need:

- A portable stadiometer (see figure 2 below) (base plate, upright rods, head plate and stabilisers)
- A Frankfort Plane card.
- Milton wipes

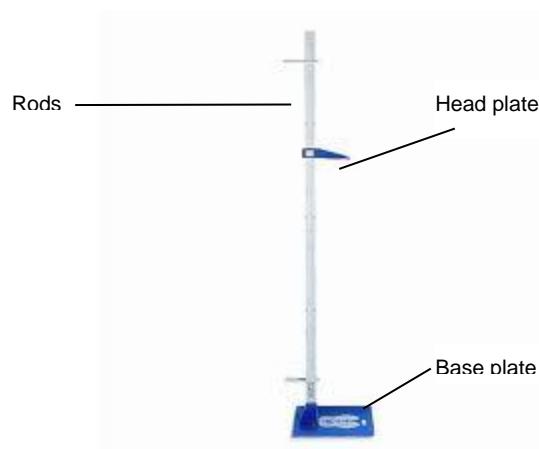


Figure 1 The stadiometer

1.3.1 Caring for the stadiometer

The stadiometer will be sent to you in a box. Always store the stadiometer in the box when it is not in use and always pack the stadiometer carefully in the box whenever you are sending it on by courier. Inside the box with the stadiometer is a special bag that you should use for carrying the stadiometer around when you are out on assignment. You may also request a wheeled holdall from the Equipment Supervisor at Brentwood to transport the stadiometer and weighing scales.

The rods

There are four plastic connecting rods marked with a measuring scale divided into centimetres and then further subdivided into millimetres. They should be put together in the correct order with the same coloured markings running along each side. The rods are made of plastic and are susceptible to bending if any pressure is put on them. Be careful not to damage the corners of the rods as this will prevent them from fitting together properly and will lead to a loss of accuracy in the measurements.

The base plate

Be careful not to damage the corners of the base plate as this could lead to a loss of accuracy in the measurements.

Protruding from the base plate is a socket into which you attach the rods in order to assemble the stadiometer. Damage to the corners of this socket may mean that the rods do not stand at the correct angle to the base plate when the stadiometer is assembled and the measurements could be affected.

The head plate

The head plate is made up of the blade and the cuff. The blade is the part that rests on the participant's head while the measurement is taken and the cuff is the part of the head plate that slips over the measurement rods and slides up and down the rods. The whole unit is made of plastic and will snap if subjected to excessive pressure. Grasp the head plate by the cuff whenever you are moving the head plate up or down the rods, this will prevent any unnecessary pressure being applied to the blade which may cause it to break.



1.3.2 Assembling the stadiometer

Practise assembling your stadiometer before you visit a participant's home.

You will receive your stadiometer with the four rods stored into the base plate and the head plate attached to the base plate so that the blade lies flat against the base plate. Once working you should store the head plate in the jiffy bag given to you to protect it further – as this is the component likely to break first with use.

Note that the rods are numbered/have symbols to guide you through the stages of assembly. (There is also an asset number identified on the base plate, this is the serial number of the stadiometer which is logged out to you). The stages of assembly are as follows:

1. Lay the base plate flat on the floor area where you are to conduct the measurements. It should be as flat as possible, ideally on an uncarpeted floor or with a thin carpet; you should avoid a deep pile carpet or rug if at all possible.
2. Take the rod marked with the arrows showing its position into the base plate. Making sure the measuring scale is on the right hand side of the rod as you look at the stadiometer face on, place rod into the base plate socket. It should fit snugly without you having to use force.
3. Place one of the two stabilisers over the first, ensuring that the stabiliser faces the wall / door frame or other upright surface being used to measure against. The stabilisers ensure that the rod is as perpendicular as possible to enable accurate measurement.
4. Take the rod marked *. Again make sure that the measuring scale connects with the scale on first rod and that the symbols match at each rod connection / junction. (If they do not, check that you have the correct rod).
5. Take the remaining two rods and put them together in order (matching the connecting symbols). Place the second stabiliser on the 3rd rod, but not at the level that the participant height might be measured at.
6. Wipe the head plate and base plate with a Milton wipe and allow to dry for 30 secs.

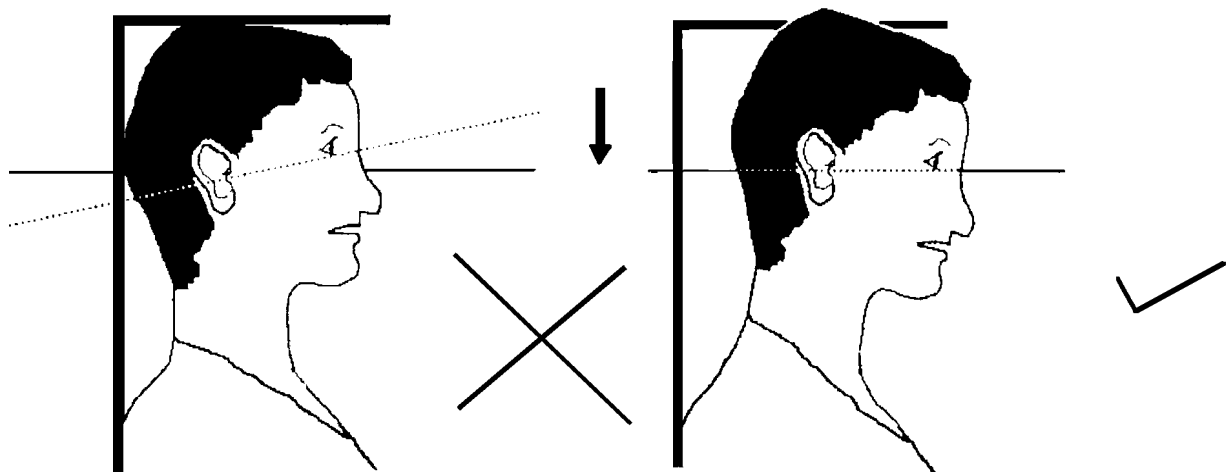
1.3.3 Dismantling the stadiometer

Follow these rules:

1. Before you begin to dismantle the stadiometer you must remember to lower the head plate to its lowest position, so that the blade is lying flat against the base plate.
2. Remove one rod at a time.
3. Wipe the head plate and base plate with a Milton wipe and allow to dry for 30 secs. Before packing rods back into the base plate and head plate into the jiffy bag.

1.4 Procedure for adults

1. Ask the participant to remove their shoes and loosen any hair accessory if possible (e.g. large hair grips; head bangs, pony tail holders etc).
2. Assemble the stadiometer, near a wall if possible, and raise the headplate to allow sufficient room for the participant to stand underneath it. Double check that you have assembled the stadiometer correctly.
3. Ask the participant to stand with their feet flat on the centre of the base plate, feet together and heels against the back of the base plate as this helps people to 'be at their highest'. The participant's back should be as straight as possible, preferably against the rod but **NOT** leaning on it. They should have their arms hanging loosely by their sides. They should be facing forwards.
4. Move the participant's head so that the Frankfort Plane is in a horizontal position (i.e. parallel to the floor). The Frankfort Plane is an imaginary line passing through the external ear canal and across the top of the lower bone of the eye socket, immediately under the eye (see Figure 3). This position is important if an accurate reading is to be obtained. An additional check is to ensure that the measuring arm rests on the crown of the head, i.e. the top back half. To make sure that the Frankfort Plane is horizontal, you can use the Frankfort Plane Card to line up the bottom of the eye socket with the flap of skin on the ear. The Frankfort Plane is horizontal when the card is parallel to the stadiometer arm.



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5. Instruct the participant to keep their eyes focused on a point straight ahead, and without moving their head position, to breathe in deeply and stretch to their fullest height. Bring the head plate gently down onto the participant's head. If after stretching up the participant's head is no longer horizontal, repeat the procedure. It can be difficult to determine whether the stadiometer head plate is resting on the participant's head. If so, ask the participant to tell you when s/he feels it touching their head.
 6. Once the head plate is in place tell the participant to relax and ask them to step forwards away from the Stadiometer. If the measurement has been done correctly the participant will be able to step off the stadiometer without ducking their head. Make sure that the head plate does not move when the participant does this.
 7. Look at the middle of the head plate cuff. There is a red or black arrowhead pointing to the measuring scale. Take the reading from this point and record the participant's height in centimetres and millimetres. If a measurement falls between two millimetres, it should be recorded to the **nearest even millimetre** (see section 2.4).



8. If the participant wishes, record their height onto the measurement record card.
9. Push the head plate high enough to avoid any member of the household hitting their head against it when getting ready to be measured. Once you have finished measuring everyone, lower the head plate to its lowest position, ready for dismantling.

1.5 Additional points

- Some surveys require the participant to be measured more than once; this will be stated in the project specific instructions. The protocol for taking the additional height measurements remains the same. Both measurements are to be recorded in CAPI and if they differ significantly CAPI will instruct you to take a third measurement.
- If the participant cannot stand upright with their back against the stadiometer and have their heels against the rod (e.g. those with protruding bottoms) then give priority to standing upright.
- If the participant has a hair style which stands well above the top of their head, or is wearing a religious head dress, with their permission, bring the head plate down until it touches the hair/head dress. You should never ask someone to remove a religious head dress. With some hairstyles you can compress the hair to touch the head. If you cannot lower the head plate to touch the head and think that this will lead to an unreliable measure, record this on CAPI. If it is a possible that can be altered e.g. a bun, if possible ask the participant to change/undo it.

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- If the participant is tall, it can be difficult to line up the Frankfort Plane in the way described. When you think that the plane is horizontal, take one step back to check from a short distance that this is the case.
 - You may need to tip the stadiometer to read the height of tall participants.
 - If the participant has long hair then they may need to tuck it behind their ear in order for the head to be positioned properly. Always ask the participant to tuck their hair behind their ears.

2 NatCen standard protocol for weight and body fat

2.1 Introduction

Similar to the height measurement, the weight measurement is an indicator of and can predict the nutritional status and health of a population. When used in conjunction with the height measurement it can be used to derive the Body Mass Index, a statistical measure used to determine if an individual's weight falls within a healthy range.

A person's body fat percentage is the total weight of the person's fat divided by the person's weight. Some regard the body fat percentage as the better measure of an individual's fitness level, as it is the only body measurement which directly calculates the particular individual's body composition without regard to the individual's height or weight. Body fat is measured by sending a weak electrical current around the body from one foot to the other.

2.2 Exclusion criteria

Respondents are excluded from this measurement if they are:

- Pregnant
- Too frail or unable to stand upright

If you are concerned that being on the scales may cause them to be too unsteady on their feet then do not weigh them. Alternatively you can place the scales next to something that they can steady themselves on.

- Over 130kg (20 ½ stone) in weight

The maximum weight registering accurately on the scales is 130kg. If you think that they exceed this limit then code it appropriately in CAPI and follow the prompts. Do not attempt to weigh them.

- Respondent is fitted with a pace-maker or an internal defibrillator.

2.3 Equipment

You will need:

- Tanita BF - 522W scales
- AA batteries (x4)
- Pack of Milton Wipes

These scales measure weight and body fat percentage sequentially.



2.3.1 Calibrating the scales

The scales will need to be sent to Brentwood at regular intervals to be recalibrated to ensure that they provide accurate measurements. **On each set of scales there is a label with a date that they need to be recalibrated by, ensure that they have been sent to Brentwood by this date.**

2.4 Procedure

Place scales on a flat firm floor surface, with room for the respondent to step on safely. Ideally the respondent should be bare footed for the bio-impedance to be effective, however it can be done through light or thin material e.g. socks, tights and stockings. Ask the respondent to remove any heavy garments (e.g. jumpers) or items they may have in their pockets (e.g. keys; coinage)

Wipe the footplate on the scales with a Milton Wipe and ensure the foot plate has had time to dry before asking a respondent to step on them.

Before asking the respondent to step on the scales, it is also necessary to enter the respondent's age, gender, body type and height in whole centimetres into the scales. These details will be displayed in CAPI. This is in order that body fat percentage can be correctly calculated. This means that the **height measurement MUST be taken before the weight and body fat measurements.**

1. Switch the scales on by pressing the yellow ON/SET button on the right hand side of the hand-held console. The console will beep and the display screen will flash with the default age (30).

2. Enter the respondent's age in years by using the yellow arrow keys to scroll up or down to the desired age. Holding down the arrow buttons will enable you to do this quickly. Press the 'SET' key to confirm the selection. The console will beep.

3. Select the appropriate gender and body type by using the yellow arrow keys. There are four options: 'standard male', 'standard female', 'athletic male', 'athletic female'. **Always select standard body type.** Press the up or down arrow to scroll through the four different options. Then press the 'SET' key to confirm the selection. The console will beep.

4. Next enter the respondent's height in whole centimetres. The console will display the default height (170). Use the arrow keys to scroll up or down to the desired height. Holding down the arrow buttons will enable you to do this quickly. Press the 'SET' key to confirm the selection.

NOTE: If you **make a mistake** when entering these numbers, turn off the scales (using the red OFF button) and start again.

5. The console will beep twice and the display will show '0.0'. Ask the respondent to step onto the scales.

6. The respondent should stand with both feet flat on the surface of the foot pads. **Make sure their feet are positioned touching the front and back foot pads.** This is essential in order for the current to be passed through the body. The respondent should face forward with their legs straight and should stand still.

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7. Once stabilised, the weight measurement will appear in the display and the scales will beep. You should not attempt to note the weight at this point.
 8. The respondent should remain on the scales while their body fat is measured. Five zeros (00000) will appear on the display. They will disappear one by one from left to right. After they have all disappeared, the scales will beep twice to indicate that body fat has been measured. The respondent may then step-off the scales. This should take about 10 seconds.
 9. The body fat percentage will appear in the display. The display will rotate between body fat percentage, body water percentage and the weight for about 30 seconds. You should record the weight, body-fat percentage and the body water percentage in the respondent's measurement record card.
 10. Record the measurement in CAPI.
 11. In order to take the measurement again, you should turn the scales off and back on again. **Note that the scales will turn off automatically after about 30 seconds.**

The kg/lb key can be pressed when the scales are turned off to change the measurement settings. There are 3 possible options: kilograms (kg), pounds (lb) and stones and pounds (st-lb). However, **you should always use the scales in 'kg mode'** as we want to enter height in centimetres and measure weight in kilograms. If you are asked to enter height in feet and inches or the weight is displayed in stones and/or pounds, this means that the measurement settings are incorrect and should be changed. Once the scales are in 'kg mode', they should stay in this mode unless the kg/lb button is pressed.

Before packing the scales away ensure the footplate is wiped again to reduce potential cross infection between households.

3 NatCen standard protocol for blood pressure

3.1 Introduction

Blood pressure is the exertion that the blood applies to the arterial walls as it is pumped through the circulatory system by the heart. Having a high blood pressure is a contributory risk factor for cardiovascular disease and stroke. The exact cause of high blood pressure is not completely known; however some factors known to affect blood pressure are smoking, family history, physical fitness and diet. It is important that we examine blood pressure using a standard method to see the distribution of blood pressure measurements across the population. This is vital for monitoring change over time.

3.2 Exclusion criteria

Participants are excluded from the blood pressure measure if they are:

- Aged 4 years and below
- Pregnant

If a pregnant woman wishes to have her blood pressure measured, you may do so, but do not record the readings in CAPI.

3.3 Consent

In addition to the verbal consent required to conduct all NatCen procedures (refer to section 2.1), written consent is required for the results to be sent to the participant's GP. The appropriate form must be signed and dated by the participant.

3.4 Equipment

You will need:

- An Omron HEM 907 blood pressure monitor
- Child/ small adult cuff (17-22 cm)
- Standard adult cuff (22-32 cm)
- Large adult cuff (32-42 cm)
- An AC adapter (for putting Monitor on charge at home)

Please note you will not get all of the cuff sizes in some of the studies, this is dependent on the sample involved in the individual surveys.

You should also ensure that the monitor surfaces are cleaned periodically with Milton wipes to reduce risks of cross infection and to ensure the cuffs are also cleaned with

wipes. Should cuffs become soiled or damaged then the Equipment store at Brentwood should be informed for a new set to be sent out to you. The soiled set should be disposed of in your household waste.

3.4.1 Using the Omron HEM 907

Figure 7 shows the monitor of the Omron

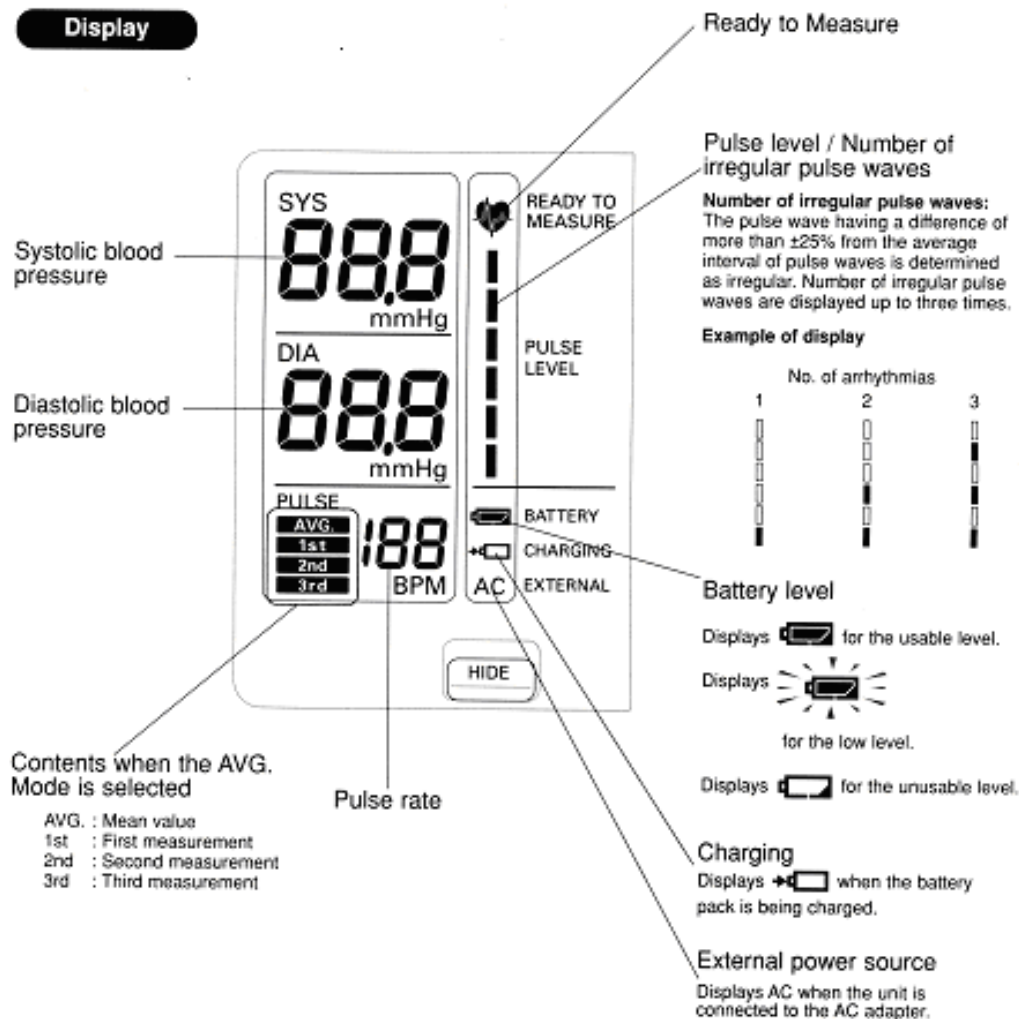


Figure 3 The Omron HEM 907 monitor

1. Switch the monitor on by pressing the ON/OFF button. Wait for the READY TO MEASURE symbol to light, indicating the monitor is ready to start the measurement (approximately 2 seconds).
2. Check that the MODE selector is set to AVG (average) and P-SET Volume (pressure setting) is set to auto.
3. Press the start button to begin the measurement. The cuff will start to inflate and take the first measurement. When the first measurement is complete, the LCD screen will show the systolic pressure, diastolic pressure and pulse rate. It will continue to do this at one minute intervals.

4. Press the ON/OFF button to turn it off.
5. If at any stage while you are taking the measurement you need to stop the monitor, press STOP and start the procedure again, as described in section 11.6.

3.4.2 Charging the battery

The Omron HEM 907 is equipped with a rechargeable battery, which is usable for approximately 300 measurements when fully charged.

When the battery symbol in the BATTERY display starts to flash there are 20-30 measurements left, you need to charge the battery soon. When a light battery symbol appears in the BATTERY display the battery needs to be put on charge immediately.

To recharge the battery:

Connect the monitor to the mains. A battery symbol will appear in the CHARGING display when the battery is charging. When ready to use the symbol will disappear. A dark battery symbol in the BATTERY display indicates that the battery is charged and the machine is usable. The battery can be charged in approximately 12 hours.

Connect the AC adapter to the DC jack of the main unit and the electric outlet.

NOTE: when the AC adapter is connected and the unit is turned off, the AC adapter charges the installed rechargeable battery. The Omron 907 is NOT designed to work off the mains adaptor, it should be run off the battery power pack. The mains adaptor should ONLY be used to charge the battery pack.



Figure 8 Charging the battery

3.4.3 Technical faults/error readings

Refer to table 4 when error readings appear on the LCD screen.

Table 4 Troubleshooting for the Omron HEM 907

Error No.	Action
Er1, Er2	<ul style="list-style-type: none">• Check that the tube connecting the cuff to the monitor is properly inserted and is not bent• Check that the cuff is properly wrapped around the arm• Repeat the measure
Er3	<ul style="list-style-type: none">• Check that the tube connecting the cuff to the monitor is not bent• Repeat the measure
Er4	<ul style="list-style-type: none">• Ask the participant to sit as still as possible• Repeat the measure• If it persists, it may be because the participant has very high blood pressure• Reset the P-SET Volume to 260 and repeat the measure.
Er5, Er6	<ul style="list-style-type: none">• Check that the cuff is properly wrapped around the arm• Repeat the measure
Er7, Er8	<ul style="list-style-type: none">• Ask the participant to sit as still as possible• Repeat the measure• If it persists, it may be because the participant's pulse is irregular, record that it wasn't possible and explain that this sometimes happens.
Er9	<ul style="list-style-type: none">• Technical fault – Contact Brentwood and report that fault

3.5 Preparing the participant

During the initial interview, the participant would have been informed not to eat, smoke, drink alcohol or participate in vigorous exercise 30 minutes before the nurse visit as this can cause blood pressure to be higher than normal. Before the procedure ask to see if they have carried out any of these activities and note their response in CAPI.

Select the right arm unless this is impossible. Ask the participant to remove outer garment (e.g. jumper, cardigan, jacket) and expose their upper right arm by rolling up their sleeve. If the sleeve constricts the arm, restricting the circulation of blood, ask the participant if they would mind taking their arm out of the sleeve for the measurement.

3.5.1 Selecting the correct cuff

Do **not** measure the upper arm circumference to determine which cuff size to use. Instead, choose the correct cuff size based on the acceptable range which is marked on the inside of the cuff. You will note that there is some overlap between the cuffs. If the participant falls within this overlap range then use the **standard** cuff where possible.

3.6 Procedure

1. Check that the monitor is working.
2. Use the right arm, unless this is impossible. If the left arm is used, record this in CAPI.
3. Get the participant to sit in a comfortable chair with a suitable support so that the **right arm** is resting at a level to bring the antecubital fossa (elbow) to approximately heart level. They should be seated in a comfortable position with legs uncrossed and feet flat on the floor.
4. Wrap the correct sized cuff round the upper **right arm** and check that the index line falls within the range lines. Do not put the cuff on too tightly as bruising may occur on inflation. Ideally it should be possible to insert two fingers between the cuff and the arm.
5. Locate the brachial pulse just medial to the biceps tendon and position the arrow on the cuff over the brachial artery. The lower edge should be about 1-2 cm above the antecubital fossa (elbow crease).
6. Explain to the participant that you need them to sit quietly for five minutes and that during that time they cannot eat, drink or smoke.
7. During this 'quiet time' follow the procedure for taking ambient air temperature (section 9) and just before taking the blood pressure reading, make a note of the air temperature (this is not applicable for all surveys, refer to the project specific instructions).
8. After five minutes explain that you are starting the measurement, also explain that the cuff will inflate three times and each time they will feel some pressure on their arm. Ask them to relax, be seated in the position detailed in step 3 and not to speak until the measurement has been completed, as it may affect their reading.
9. Press start on the Omron HEM 907 to start the measurement. When the first measurement is complete it will be displayed on the LCD screen. Record this.
10. The unit will produce readings at one minute intervals thereafter; record the next two so you have three sets of readings in total. To check the readings press the 'Deflation' button. It is important that the three readings are recorded as the first reading is usually higher, and thus less accurate, than the other two readings as the participant may be feeling nervous.
11. Press ON/OFF on the Omron to switch the unit off and remove the cuff from the participant's arm.
12. If the participant wishes, you should record details of their readings on the measurement record card.

3.7 Participant feedback

When answering queries about a participant's blood pressure it is very important to remember that it is NOT the purpose of the survey to provide participants with medical advice, nor are you in a position to do so as you do not have the participant's full medical history.

What you may say in each situation has been agreed with the Survey Doctor and CAPI will instruct you to read out the appropriate interpretations of the participant's results. It is very important that the agreed script in the CAPI is read word for word and that personal interpretation is never offered.

The participant feedback protocol should be strictly followed. It is very important that as little anxiety as possible is caused, but at the same time we have a duty to advise people to see their GP if the measurements indicate that blood pressure is raised.

3.7.1 Adult participants

As stated previously we have a duty to inform people that they need to see their GP if their blood pressure is high. It is important that the instructions below are carefully read and guidelines always followed precisely.

The computer tells you which readings your advice should be based on. This will be based on the **lowest** systolic and **lowest** diastolic reading from the last two readings (this is a change from previous practice when the highest readings were used). This will usually, but not always, be from the same reading. For example, occasionally it may be the systolic from the second reading and the diastolic from the third reading. Furthermore if the lowest systolic reading falls in one category and the lowest diastolic reading falls in another category, the higher of the two categories will be used to trigger the advice to participants. For example the lowest systolic reading is 138 (normal) and the lowest diastolic is 96 (mildly raised) then the advice given will be based on a mildly raised reading. If the first reading is higher than the other two it should be explained that the first reading can be high because people are nervous of having their pressure taken.

Definitions of raised blood pressure differ slightly. The Survey Doctor has recommended the blood pressure ratings given below based on the most recent guidelines from the British Hypertension Society. It is important that you adhere to these definitions, so that all participants are treated in an identical manner. These are shown in table 5.

Table 5 Definition of blood pressure ratings

ADULTS ONLY			
SURVEY DEFINITION OF BLOOD PRESSURE RATINGS			
For men and women aged 16+			
<u>Rating</u>	<u>Systolic</u>		<u>Diastolic</u>
Normal	<140	and	<90
Mildly raised	140 - 159	or	90 – 99
Raised	160 - 179	or	100 – 114
Considerably raised	180 or more	or	115 or more

Points to make to a participant about their blood pressure (given on screen):

Normal:

'Your blood pressure is normal.'

Mildly raised:

'Your blood pressure is a bit high today.'

'Blood pressure can vary from day to day and throughout the day so that one high reading does not necessarily mean that you suffer from high blood pressure.'

'You are advised to visit your GP within 2 months to have a further blood pressure reading to see whether this is a one-off finding or not.'

Raised:

'Your blood pressure is a bit high today.'

'Blood pressure can vary from day to day and throughout the day so that one high reading does not necessarily mean that you suffer from high blood pressure.'

'You are advised to visit your GP within 2 weeks to have a further blood pressure reading to see whether this is a one-off finding or not.'

Considerably raised:

'Your blood pressure is high today.'

'Blood pressure can vary from day to day and throughout the day so that one high reading does not necessarily mean that you suffer from high blood pressure.'

'You are strongly advised to visit your GP within 5 days to have a further blood pressure reading to see whether this is a one-off finding or not.'

(For all of the above points, you can also advise the participant to see their practice nurse, if this is who they would typically see in relation to their blood pressure.)

Note: If the participant is elderly and has considerably raised blood pressure, amend your advice so that they are advised to contact their GP within the next week or so about this reading. This is because in many cases the GP will be well aware of their high blood pressure and we do not want to worry the participant unduly. It is however important that they do contact their GP about the reading within 7 to 10 days. In the meantime, contact the Survey Doctor who will inform the participant's GP of their result, providing the participant has given their permission (refer to table 6).

3.8 Action to be taken by the nurse after the visit

If you need to contact the Survey Doctor, unless there is a hypertensive crisis, do not do this from the participant's home - you may cause unnecessary distress.

3.8.1 Adults

Table 6 summarises what action to take based on the readings you have obtained for a participant. For this purpose you should only take into account the last two of the three readings you take, as the first reading is prone to error.

Table 6 Nurse action due to blood pressure readings

BLOOD PRESSURE	ACTION
Normal/mildly raised/raised BP	No further action necessary
Systolic less than 180 mmHg and Diastolic less than 115 mmHg	If you feel that the circumstances demand further action, inform the Survey Doctor who will then inform the participant's GP immediately if she deems it necessary.*
Considerably raised BP Systolic at or greater than 180 mmHg or Diastolic at or greater than 115 mmHg	Contact the Survey Doctor at the earliest opportunity and she will inform the participant's GP if written consent has been given, or the participant if not.* If the participant has any symptoms of a hypertensive crisis** contact the survey doctor immediately or call an ambulance. The Survey Doctor must be informed as soon as possible.

* You must still contact the Survey Doctor even if participants tell you that their GP knows about their raised BP.

** A hypertensive crisis is an extremely rare complication of high blood pressure. Its signs and symptoms include diastolic bp > 135 mmHg, headache, confusion, sleepiness, stupor, visual loss, seizures, coma, cardiac failure, oliguria, nausea & vomiting.

The Survey Doctor will look at all high or unusual readings when they reach the office. If the reading is high, then the Survey Doctor will contact the participant directly. The Survey Doctor will also routinely check fast and slow pulse rates so no further action is necessary regarding these.

Contact details for your Survey Doctor can be found in the project instructions. The Survey Doctor is generally available from 8.00-22.00. Calls outside these hours are either unnecessary or an emergency, in which case, the survey doctor is unlikely to be in a position to do anything practical and you should be using your professional judgement whether to call an ambulance or seek other urgent advice.

4 NatCen standard protocol for grip strength

4.1 Introduction

The grip strength is a test of physical ability. It is used in a number of studies and is thus useful for drawing comparisons between countries and cultures. Hand grip strength is important as it affects every day function, such as raising the body weight and lifting heavy objects, and declines with age.

4.2 Exclusion criteria

Respondents are excluded from taking the grip strength test if:

- They have swelling or inflammation, severe pain or a recent injury to their hands
- They have had surgery on their hands in the last 6 months

If there is a problem with only one of the respondent's hands, just take measurements on the other hand.

4.3 Equipment

You will need:

- A gripometer
- Milton Wipes

4.4 Preparing the respondent

Explain to the respondent the reasons why the grip strength test is required and what is involved. Explain that it is very important that they try their hardest for the most accurate reading of their grip strength. Where possible have the respondents remove any large rings.

4.4.1 Demonstrating

- The respondent is not to begin the grip strength test until it has been demonstrated.
- If after the demonstration the respondent does not understand, the test should be demonstrated again rather than relying on verbal instructions.
- The demonstration should be repeated only once.
- If the respondent still does not understand, skip the test and continue the interview.
- Do not coach the respondent

4.5 Procedure

1. Adjust the lever of the gripometer to suit the respondent's hand. To do this:
 - a. Put the black bar of the gripometer on the pads at the top of their palm (see Figure 1).
 - b. Check to see if it is a good fit by asking the respondent to grip the gripometer-the middle section of their fingers should be flat across the top of the metal bar (see Figure 2). If they are not you will need to adjust it.
 - c. To adjust it, you need to lift the metal lever on the side of the gripometer and rotate the grip until it is in a more suitable position. Repeat step b.
 - d. When you have a good fit, replace the lever on the side of the gripometer.

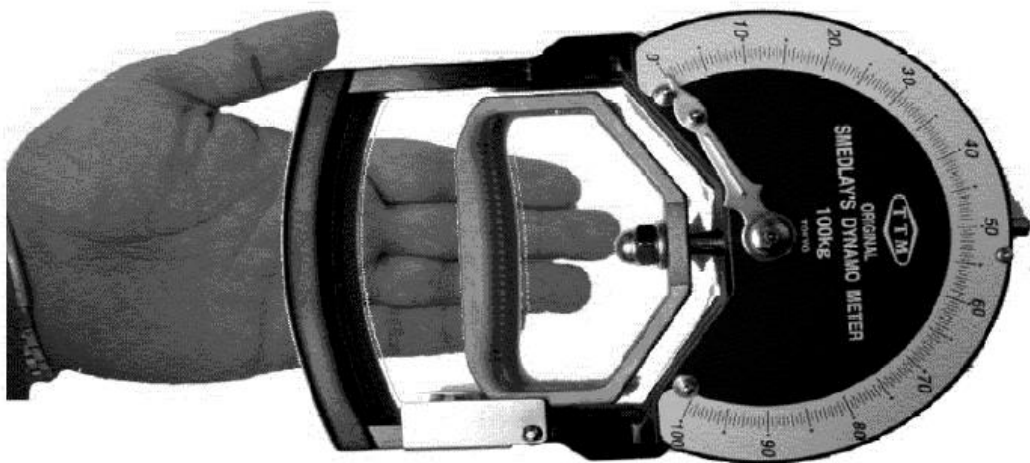


Figure 1 Aligning the gripometer with the hand

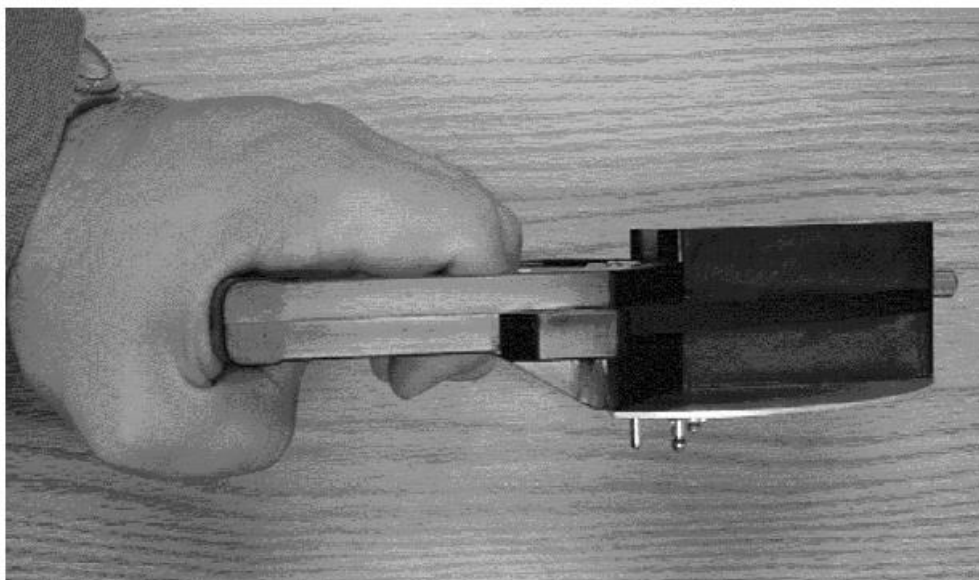


Figure 2 Gripometer lever on second phalanx in gripping action

2. If possible get the respondent to stand up with their arms by their side.

-
3. Hand the respondent the gripometer and allow them to have one practice with it in their dominant hand.
 4. After they have had one practice, ask them to put it in their non dominant hand with their upper arm against their trunk and their forearm at a right angle to the upper arm. If the respondent is finding the gripometer too heavy to hold, they can use their other hand to support their gripometer or you can support it if appropriate.
 5. Have the dial of the gripometer face outward.
 6. Before commencing the measurement check to make sure that the arrow is resting at zero.
 7. Ask the respondent to squeeze as hard as they can for two seconds with their non dominant hand.
 8. Record the value on the scale to the nearest whole number, no decimal places. The most accurate reading is achieved if you look directly down on the scale.
 9. Repeat steps 7 and 8 three times for each hand, alternating hands each time. You should have six values altogether.
 10. If the respondent wishes, record the results on their measurement record card.

4.6 Additional points

- If a respondent is unable to stand to carry out the grip strength test, they can sit in a chair provided they can keep their upper arm against the trunk of their body with their forearm at right angles to their upper arm. If they are finding the gripometer too heavy to hold they can use their hand to support the gripometer.
- If a respondent is unable to complete the required number of 'squeezes' of the gripometer then record what they have been able to do and code the remaining 'squeezes' as measurement not obtained.
- If the respondent is only able to carry out the procedure using one arm, make a note of this in CAPI and continue to conduct the procedure as above using only one arm. The results for the arm that cannot be used should be coded as measurement not obtained.
- Between respondents, and before packing away, wipe the handle of the gripometer with a Milton Wipe to reduce potential cross infection.

5 BCS70 protocol for leg raise measurement

5.1 Introduction

The 'Leg Raise' test measures balance and coordination. Balance and coordination are necessary to carry out every day locomotor functions successfully, at reasonable speeds and to prevent falls. They are also related to general health.

5.2 Exclusion Criteria

Respondents are excluded from the leg raise if:

- They are chair bound or wheelchair bound
- Need to use an aid for walking or standing
- After discussion with the participant it becomes clear that they are too unsteady on their feet for the measurement, and thus consider it unsafe to conduct the measurement
- They find it too painful to stand or balance on one leg, due to surgery or longstanding or current short term illness or injury.
- They are pregnant

5.3 Equipment

You will need:

- A stopwatch

5.4 Procedure – Stage 1 – Leg Raise eyes open

CAPi will guide you through the leg raise (stage 1) procedure. Introduce and explain the test, as outlined below.

1. Explain:
 - a. That you will ask them to stand on their preferred leg and raise the other foot off the ground a few inches to try to balance on the one leg.
 - b. To hold the position for as long as possible up to 30 seconds.
 - c. While balancing:
 - i. they may use their arms, bend their knee, or move their body to maintain their balance, but try not to move their standing foot.
 - ii. that you will stop them after 30 seconds
 - d. They may support themselves on a chair, table or wall while getting into position.
2. Demonstrate the test.
3. Ask the respondent if they feel safe to do the test.

4. Shoes/slippers should be removed unless they have flat heels on their footwear at the time.
5. Explain to start the test you will say “Ready, begin”.
6. Make sure there is a firm support nearby for the participant to steady themselves with, when getting into position. Stand by the side of the respondent. If necessary, provide gentle support to the respondent's arm to help them into position.
7. Ask the participant to decide which leg they are going to balance on. Enable them to have **one practice only**, on each leg, if they need to, to decide.
8. Say “Ready, begin!” If you are supporting the respondent’s arm, let go.
9. **Start** the stop watch timing as soon as the participant raises one leg off the ground and removes their hand from the support.
10. **Stop** the stop watch and say “Stop!” either when:
 - a. They lose balance and/or touch their free foot on the floor
 - b. They lose balance and/or touch anything with their hands / arms,
 - c. They lose balance and/or their balancing foot moves position on the floor (including raising their heel from the floor), or
 - d. After 30 seconds, whichever happens first.
11. Record the outcome in CAPI (in seconds to 2 decimal places) and proceed to stage 2 if applicable.
12. Thank the participant and proceed to stage 2 if they held their position in stage 1 for 30 seconds. CAPI will determine whether stage 2 is appropriate based on the result coded at stage 1.

5.5 Procedure – Stage 2 – Leg Raise eyes closed

CAPI will guide you through the leg raise (stage 2) procedure. Introduce and explain this stage of the test, as outlined below.

1. Explain:
 - a. That you will ask them to stand on their preferred leg again and raise the other foot off the ground a few inches to try to balance on the one leg. This time with their eyes closed.
 - b. They need to try to stay balanced for as long as possible up to 30 seconds.
 - c. While balancing:
 - i. they may use their arms, bend their knee, or move their body to maintain their balance, but try not to move their standing foot.
 - ii. that you will stop them after 30 seconds
 - d. They may support themselves on a chair, table or wall while getting into position.
2. Demonstrate the test.

-
3. Ask the respondent if they feel safe to do the test.
 4. Explain that to start the test you will say “Ready, begin”.
 5. Make sure there is still a firm support nearby for the participant to steady themselves with, when getting into position.
 6. Ask the participant to decide which leg they are going to balance on. Enable them to have **one practice only**, on each leg, if they need to, to decide.
 7. Say “Ready, begin!” If you are supporting the respondent’s arm, let go.
 8. **Start** the stop watch timing as soon as the participant raises one leg off the ground and removes their hand from the support.
 9. **Stop** the stop watch and say “Stop!” when any of the criteria in 4.10 are met. You should also stop the stopwatch if the participant opens their eyes before 30 seconds.
 10. Record the outcome in CAPI (in seconds to 2 decimal points).
 11. Thank the participant.

5.6 Points to note

5.6.1 How to use the stopwatch

The make and model of stopwatches in the field may vary so it is important to ensure you are familiar with the type you will be using. In general the following apply:

- To change from time mode to stopwatch mode (if necessary):
Press the middle button labelled “Mode”.
- To reset the stopwatch:
Press the button on the left-hand side (if this restarts the stopwatch, press the right button once to stop it, then the left button twice, until zero appears).
- To start and stop the stopwatch:
Press the button on the right hand side labelled “Start/Stop”.

It is recommended that you practice using the stopwatch, to familiarise yourself with the model that you have, before carrying out an interview.

5.6.2 Encouragement

Do not provide additional encouragement beyond the language provided by the detailed instructions. After the measure, acknowledge the participant’s efforts but do not give feedback. Neutral phrases such as “Thank you” or “That’s fine” are examples of the kinds of things you could say. Results will be analysed on a population level not on an individual performance level as there may be specific issues that may affect the participant’s performance on the day the measurement is taken. As with other Biomeasure protocols,

if you feel that anything has made the measurement unreliable then you should make a note in CAPI.

5.6.3 Safety precautions and prevention of injuries

- Ensure the leg raise measure is carried out on a level floor and be aware of loose rugs or carpets.
- If a participant is uncomfortable performing the test or if it is felt that the leg raise is not safe for a given individual, the test should not be performed.
- If they feel unsteady, even with support, don't let them try the procedure.
- When the participant is performing the test, stand close enough to assist them if they begin to falter but far enough away not hinder them if they have to use their arms to maintain their balance.
- The participant should ideally be positioned between you and a stable surface, such as a wall or table.

5.6.4 In the event of an accident

If you find yourself in a situation where the participant appears to lose balance, you may want to help them to recover their balance. If, however, the participant begins to fall it is not safe to try to catch them. It is more appropriate to attempt to steady them.

If the participant does fall, call for help if appropriate. If they are not injured, help them by first having them get on their knees or on all fours. Place a chair next to the participant and have them support themselves onto the chair. If assistance is needed, lift under the shoulders – do not hold their arm, hold around their body. Do not try to lift the participant alone from the floor or put yourself at risk. Remember to seek help if it is needed and to complete a Special Report Form for any incident of this kind.

5.6.5 Footwear

It is strongly suggested that this activity is performed in shoes with very low or no heels. It is hard to perform normally with shoes with heels on. Ask the participant if the footwear they are wearing is what they wear most of the time around the house. Soft soled, heel-less slippers, or just socks or tights should not be worn, since they may cause the participant to slip. The participant can do the measure in bare feet if they do not have appropriate shoes.

6 NatCen standard protocol for blood sampling (non fasting)

The protocol for taking blood samples set out below is written in accordance with the Clinical Procedure Guidelines: Venepuncture. All nurses are to read this document before carrying out any venepuncture procedure.

6.1 Introduction

Blood samples are taken from participants as they provide information on various analytes, giving a detailed description of the health of an individual. They are integral to the research NatCen undertakes as they give a comprehensive representation of the health of the population that cannot be obtained from any other source.

Each study is interested in different analytes and the ones to be analysed for each survey can be found in the project specific instructions.

The blood will **not** be tested for any viruses, such as HIV (AIDS).

6.2 Exclusion criteria

All participants with the following exceptions are eligible to give blood:

- Pregnant women
- Participants who are HIV positive or who have hepatitis B or C (see section 6.8.6)
- People with clotting or bleeding disorder
By clotting or bleeding disorders we mean conditions such as haemophilia and low platelets, i.e. thrombocytopenia. There are many different types of bleeding/clotting disorders but they are all quite rare. The reason these participants are excluded from blood sampling is that:

- a) the integrity of their veins is extremely precious
- b) we do not wish to cause prolonged blood loss

For the purposes of blood sampling, those who have had, for example, a past history of thrombophlebitis, a deep venous thrombosis, a stroke caused by a clot, a myocardial infarction or an embolus are NOT considered to have clotting disorders.

- Those aged 16 and over who have had a fit (e.g. epileptic fit or convulsion) in the **last 5 years** should not be asked to provide a blood sample. Children, those aged 15 and under, who have **ever** had a fit should not be asked to provide a blood sample, even if the fit occurred some years ago.
- People who are **currently** on anticoagulant drugs, e.g. Warfarin therapy
Check if the participant has a clotting or bleeding disorder or is on anticoagulant drugs, such as Warfarin, and record this in CAPI. These are very uncommon. If you

find someone with these problems, do not attempt to take blood, even if the disorder is controlled.

Aspirin therapy is **not** a contraindication to blood sampling. If you are uncertain whether a condition constitutes a contraindication to blood sampling, the Survey Doctor will be happy to answer your queries.

- Adults who are not willing or able to give their consent in writing or children whose parent/guardian is unwilling or unable to give consent in writing.

6.3 Consent

As blood sampling is an invasive procedure we need to ensure that fully informed written consent is obtained from each participant. Information on what they are consenting to is mainly given in the Stage 2 leaflet, and the participant confirms that they have been provided with this information on the consent form.

The leaflet 'Giving a blood sample' also provides useful information about the risks around giving a sample and after-care. This is information that you should be giving verbally in any case, and you therefore do not need to ensure that the participant has read this leaflet in advance as long as you make sure you have covered all the points yourself.

On **no** account should you ever take blood before you have obtained written consent to do so from the participant.

There are two further written consents we wish to obtain in **most** surveys in respect to blood sampling:

- a. Consent to send the results to the GP (verbal consent only is required for results to be sent back to the participant)
- b. Consent to store a small amount of the blood, anonymously, for future research purposes

You should seek to obtain all of the required consents before you take any blood.

Small quantities of blood are being stored in special freezers for further analysis in the future. Stored blood will only be analysed in future studies if permission for that particular study is obtained from the survey client and from a Research Ethics Committee. Any future analysis will be unlinked which means that the researcher doing the analysis will not be able to link it back to the participant. Participants will therefore not receive the results of any tests done on their blood in the future.

The questions on the CAPI questionnaire will take you step by step through all the procedures for obtaining consents. Make sure you follow these carefully - recording consent codes as instructed and giving reasons for refusals, if applicable.

In summary:

- Ask the participant if they would be willing to have a blood sample taken. Try to reassure participants about the process, and be prepared to answer their concerns. You will need to explain the importance of written consent to the participant

-
- Obtain written consents on the appropriate consent form (including initials **and full signature** where required).
 - Remember to enter their name or serial number on each page of the form before asking the participant to sign.
 - Remember to enter your name in the qualified nurse space provided on each form.
 - Check that you have circled the correct consent codes on the front of the consent booklet, and that this corresponds with the CAPI instructions on screen.

6.4 Equipment

The equipment required is listed in the Clinical Practice Guideline for Venepuncture (CPG). Any additional equipment, specific to a project, will be listed in the project instructions.

6.5 Preparing the participant

Protocol on preparing the participant can be found in the Venepuncture CPG.

Further points to note include:

- Ask the participant to remove any jackets, thick garments and/or roll their sleeves up.
- Instruct the participant to remain as still as possible

6.6 Procedure

The procedure for taking the blood sample can be found in the Venepuncture CPG. This procedure is to be followed. It is to be used in conjunction with CAPI which will guide you through the blood sampling process.

- The vacutainers should be filled to the specified capacity in turn (according to the order of draw specified in the project instructions) and inverted gently 5 times on removal to ensure complete mixing of blood and preservatives.

IMPORTANT WARNING – PREVENTING NEEDLESTICK INJURY

Never re-sheath a needle after use

Do not allow the sharps disposal box to become overfull as this can present a potential

6.7 Labelling & packaging the sample(s)

Label the tubes according to your CAPI instructions, immediately after completing the venepuncture procedure. Refer to the project specific instructions for further guidance about labelling and packaging the blood samples.

It cannot be stressed enough the importance of correctly labelling each tube with the correct serial number for the person from whom the blood was obtained. Apart from the

risk of matching up the blood analyses to the wrong person's data, we will be sending the GP the wrong results. Imagine the implications of an abnormal result being reported to the wrong participant.

Some projects provide participant specific barcode labels. You must therefore take great care to ensure the right labels are used on the right blood samples prior to packing and dispatching the samples.

6.8 Other important points

6.8.1 'Giving a blood sample' leaflet

We need to be sure that each participant is left with information about giving a blood sample, including information about who to contact should they experience any side effects as a result of the blood sample.

To provide them with this information, leave the participant with the leaflet '**Giving a blood sample**'. The leaflet includes information on any possible side effects they may experience such as pain and bruising, and how to care for the puncture site. It is also a useful leaflet to leave behind to reassure the friends and family of the participant of the procedure used should they have any concerns after your visit.

6.8.2 Venepuncture check questions

Always complete the Venepuncture checklist on CAPI for every participant from whom you attempt to take blood. This shows that you have followed the correct procedure, and noted, where applicable, any abnormalities, and the action you took. The checklist is usually towards the end of the CAPI.

Please remember to check the participant's venepuncture site just before you leave and note any changes in their physical appearance in CAPI.

6.8.3 Fainting participants

If a participant looks or feels faint during the venepuncture procedure, it should be discontinued. The participant should be asked to lie down with feet elevated.

If they agree for the test to be continued after a suitable length of time, the procedure should be performed with the participant lying down and the circumstances should be recorded in CAPI.

If a participant fully faints, then you should apply the principles of first aid by:

- Calling for help / assistance, if there is another adult relative within the house
- Ensure the participant is supported safely or eased into a position lying down on their side, where they can recover. Loosen tight clothing and elevate the legs.
- Remain with the participant until they come round and feel able to slowly move to a sitting position.
- Discontinue the interview unless, in your professional opinion you and the participant feels it is safe to continue.

-
- Ensure you submit a Special Report Form to the Freelance Resources Unit detailing what happened, what course of action you took and how the participant appeared when leaving.
 - **NB: - Should a participant not recover as quickly as expected from a fainting episode then the course of action is to phone the Emergency Services and hand over the situation to them.**

6.8.4 Fitting participants

It is rare for a participant to experience a fit or a convulsion during the venepuncture procedure, especially as those with a declared history of fitting or convulsion within the previous 5 yrs will have been excluded.

If a participant appears to have an episode of fitting or convulsion during or immediately after venepuncture procedure, then you should apply the principles of first aid by:

- Calling for help / assistance, if there is another adult relative within the house. **If there isn't any other person in the household to support / assist you, then you should call the emergency services.**
- Ensure the participant is supported safely or eased into a position lying down on their side, with their airway supported open and where they can recover safely
- Remain with the participant until they come round, monitor their level of response, pulse and breathing.
- Ensure you submit a Special Report Form to the Freelance Resources Unit detailing what happened, what course of action you took and how the participant appeared when leaving.

6.8.5 Handling & disposal of needles and other materials

Safe disposal of needles is required to control the risk of injury from the disposed sharps. Without the safe disposal of needles there is an increased risk of needle stick injuries and/or psychological trauma due to fear of potential infection. NatCen's policy is that only safety sharps will be provided for use on projects and therefore the safety sharps should be used as a matter of course.

Precautions

- Wear gloves at all times when performing the venepuncture procedure to reduce blood 'transmission load' if a needlestick injury occurs
- Sharps should be disposed of at the point of use
- Do not carry sharps unnecessarily
- Handling must be kept to a minimum
- Needles must not be passed directly from hand to hand
- Needles must not be bent or broken prior to use
- Needles should not be resheathed by hand
- Never lay sharps down on beds or work surfaces, or leave lying amongst paper towels or linen
- Never hand sharps to anyone

Disposal

Do's:

- Continue to wear gloves when disposing of sharps and related contaminated waste
- Sharps must always be disposed of in the approved orange top 'sharps bins' provided by NatCen immediately after use
- A Sharps bin should be available beside you before opening and using the sharp
- Dispose of the sharp bin when the manufacturer's marked line has been reached or when it is three quarters full (see Sharps Disposal Policy)
- Check to ensure that the sharps bin lid is securely closed and sealed as per Sharps Disposal Policy

Don'ts:

- Overfill sharps bins
- Fill sharps containers above the manufacturer's marked line
- Dispose of sharps with other clinical waste
- Put your hands into sharps bins
- Never return any used sharps bins by post or courier to the Operations Department or other member of the freelance nurse or interviewer panel by a postal / courier service.

Any non sharps venepuncture waste (e.g. gauze swab, gloves, plaster covering etc) can be disposed of in the participant's household waste.

Needle stick injury

In the event of a Needlestick injury (by participant or nurse) – follow NatCen's specific needlestick injury protocol.

6.8.6 Participants who are HIV or Hepatitis B / C positive

If a participant volunteers that they are HIV, Hepatitis B or Hepatitis C positive, **do not** take a blood sample. Record this as the reason for not taking a blood sample in the CAPI. You should never, of course, seek this information.

6.8.7 Participants who declare they are HIV or Hepatitis B positive during or after venepuncture procedure

If a participant volunteers this information whilst blood is actively being taken – then inform the participant politely that you must stop the procedure, at that point, as any blood taken for research purposes cannot be sent to the laboratory for processing. Dispose of the tubes already filled into the sharps bin and once all sharps are within the bin, the bin should be fully sealed and advice should be sought from the office as soon after the visit as possible to ensure the contaminated sharps and bottles are disposed of according to the Sharps Disposal Procedure.

Record the relevant information into the CAPI – including completion of the venepuncture check questions.

Ensure you submit a Special Report Form to the Freelance Resources Unit detailing the situation, what course of action you took and how the participant appeared when leaving.

6.9 Participant feedback

Results from blood tests can be sent to the participants GP if consent has been given and can also be sent to the participant if required.

7 BCS70 protocol for activity monitoring

7.1 Introduction

Measuring physical activity is challenging because self-reported information tends to be inaccurate. Activity monitors allow us to objectively measure respondents' physical activity levels. It is important to measure physical activity as research has shown that lifestyle factors such as the amount of time people spend being active, the time spent being inactive, and the types of activity they do have an important impact on their health.

7.2 Exclusion criteria

Respondents are excluded from the activity monitoring task if they:

- Are allergic to plasters or adhesives
- Are allergic to low-density polyethylene (LDPE) (the plastic packaging the activity monitors are sealed in)
- Have a skin condition that would prevent them from wearing the monitor (e.g. broken skin / eczema on their legs)
- Are pregnant (as this will affect their activity levels)

If the respondent is chair-bound, they can still wear the activity monitor, as it will provide information on changes in their position during the day and at night.

If the respondent is travelling in the next 7 days and passing through an airport/Eurostar security checkpoint, we suggest that they wear the monitor up until the day they travel, and remove the activity monitor before passing through the scanner. The participant should not reattach the monitor once it has been removed.

The monitor should not set off a metal detector or scanner, so if the respondent needs to pass through one somewhere else, for example their place of work, there is no need for them to remove it unless they feel it would be a problem if the device was identified.

7.3 Consent

Written consent will be required for respondents to participate in the activity monitoring task. The appropriate form must be signed and dated by the respondent

7.4 Equipment

The activity monitor we are using in BCS70 is called an **activPAL** and manufactured by PAL Technologies.

For each respondent you will need:

-
- Activity monitor
 - 'Activity Monitor - More Information' leaflet (please send/hand to respondent when you have arranged their appointment)
 - Sleep diary
 - Pre-paid return packaging
 - Waterproofing packaging bag and sealing machine
 - Medical grade waterproof dressing – 10cm square covering
 - Scissors
 - A USB to micro-USB lead to connect the activity monitor to your laptop

You will also have the following equipment for you to charge the activity monitors, which you should keep at your home:

- A charging hub with 4 USB ports
- 4 additional USB to micro-USB leads to connect the activity monitors to the charging hub
- A USB wall plug

7.5 The activity monitor

The activity monitors are light-weight devices called accelerometers. They measure information about physical activity patterns. There is a small micro-chip inside the monitor which records the information the monitor collects about movement. The monitor **cannot** tell where the wearer is or see what they are doing – it does not have GPS technology or a camera.

Activity monitors are worn on the front of the thigh. You will be asked to affix it to the respondent's thigh. However, very occasionally the respondent will wish to affix it themselves and must only do so once you have instructed them how to, as it is important to ensure the monitor is placed the correct way up and facing forwards. The monitor should be placed on the anterior aspect of the thigh midway between the top of femur and knee, and the dressing applied directly over the top of the monitor, and stuck down onto the surrounding skin. The activity monitor should be placed with the rounded edge facing upwards (if the respondent is standing), and the orange sticker facing outwards (so it is visible to you).

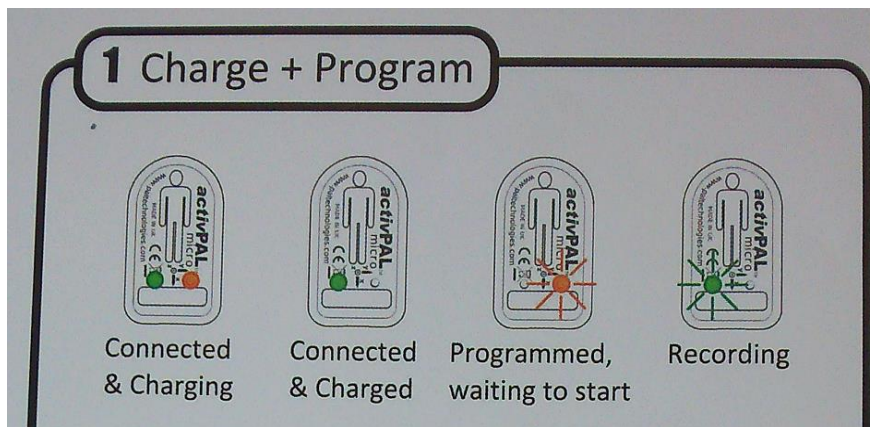
Respondents will be asked to wear the activity monitor for the seven full days after your visit.

Respondents will be asked to post the activity monitor and a sleep diary back to the office once they have completed the task.



7.5.1 Charging the activity monitors

1. The activity monitors are battery powered and you will need to charge them at home. These monitors have a short battery life (up to 10 days from fully charged) so you will need to **charge them the day before each appointment.**
2. The activity monitors must be fully charged when you place them with a respondent. This is to ensure that the battery has sufficient charge to allow the monitor to collect data for the full 7 days. It usually takes **3 hours** to fully charge the batteries, so you will not have sufficient time to do this during the visit. The activity monitors should not be left charging longer than necessary after they have been fully charged as this reduces the battery life over time.
3. Four activity monitors can be charged at the same time using the USB hub. You will need to connect this to a wall socket using a USB wall plug. Please make sure you fully charge enough activity monitors for all the appointments you may have the next day.
4. The activity monitors have 2 lights to indicate their status:
 - When an activity monitor is connected to a power source and charging, **both the green and orange light will be showing constantly.**
 - When an activity monitor is connected and fully charged, **just the green light will be showing constantly.**
 - When the activity monitor is recording, the **green light will flash.** Note the green light will only flash when the activity monitor is **disconnected** from the laptop.
 - If no LED light comes on when you place the device in the charger then the activity monitor battery has drained completely. Please leave it charging until just the green light shows constantly.
 - Note that the light sequence (e.g. to indicate charging) will be different if the activity monitor has been programmed or has started recording. You should not be concerned if you notice the lights behaving in a slightly different way.



7.6 Placing the activity monitor

The CAPI will prompt you to place the activity monitor near the end of your visit.

1. Read out the brief explanation of the task from CAPI (first question in activity monitor module: ACTINTRO)
2. Check that the respondent does not meet any of the exclusion criteria.
3. Ask the respondent if they have read the "Activity Monitor - More Information" leaflet (which you sent to them before their interview). If they have not read it please ask them to do so – provide them with another copy if necessary. If they are unable to read the leaflet, go through it with them to ensure they fully understand the task.
4. If the respondent is willing and able to wear an activity monitor, ask them to read the consent form, and initial, sign and date it. You need to sign and date this too. Please give the respondent their copy of the form to keep.
5. Connect the activity monitor to your laptop using the USB to micro-USB lead provided.
6. Press 'Next' to initialise the activity monitor so that it starts recording data. The application window will start, with a message to indicate that it is attempting to establish a connection to the activPAL (the program which sets up the monitor).
7. If the activity monitor is set up successfully, a **green** box will appear with 'setup successful'. The activity monitor will start recording immediately and will continue recording for 8 days. Please disconnect the device and follow the instructions on screen.
8. If there is a problem with the set up a **red** box with an error message will appear. Press the X in the top hand corner to close this box and follow the instructions on the screen. If the error message has not told you the battery is low, CAPI will instruct you to check that the lead is connected properly and to try initialising the monitor again. If that does not work you will be instructed to initialise another monitor. If the second monitor also fails to initialise then you will be instructed to go on to the next question

9. After the activity monitor has been initialised, record the serial number of the activity monitor in CAPI. The serial number is 6 digits; see photo below for where to find the number on the activity monitor. The serial number will also be written in larger letters on the back of the activity monitor (although it will be prefixed with 'ACC' – please ignore these letters when entering the serial number into CAPI).



10. Seal the activity monitor into the waterproof packaging, following the “Use of heat sealing machine protocol”.
11. Once the activity monitor is fully sealed, you can then affix it to the respondent’s thigh using the adhesive dressing. To do this, first peel the backing from the adhesive dressing.



12. Place the activity monitor in the centre of the dressing, orange side facing down.



13. Place the monitor on the anterior aspect of the respondent's thigh, midway between the top of femur and knee, and stick the dressing down firmly onto the surrounding skin. The activity monitor should be placed with the **rounded edge facing upwards** (if the respondent is standing), and the **orange sticker facing outwards** (so it is visible to you). (Note that some respondents may wish to attach the monitor themselves, so you will need to explain to them how to do this. CAPI will ask you to code whether it was you or the respondent that attached the monitor.)



14. Peel the second layer of backing off the adhesive tape by pulling the white tabs apart.



15. Ensure the adhesive tape is stuck firmly to the respondent's skin on all edges.
16. Attach the 'Sleep Diary' barcode label from the labels sheet of the consent booklet onto the sleep diary. Fill in your nurse ID number and respondent's first name, date of birth and sex on the front.
17. Write the day (Mon-Sun) and date of the **following** day in the 'Day 1' column of the sleep diary. Just to be clear, Day 1 is the **day after** you have conducted the interview. CAPI will tell you this date.
18. Briefly explain the sleep diary to the respondent, using the prompts from CAPI. Tell them:
 - It starts tomorrow and say what they need to complete each day.
 - They may want to keep the sleep diary by their bed so it is easier to fill in.
 - When they need to take the activity monitor off (i.e. before going to bed on day 7)
 - They need to complete the diary the day after they take the activity monitor off (i.e. day 8) too.
19. Now put the sleep diary into the pre-paid return packaging and give to the respondent.
20. Read out the full explanation of the task from CAPI (ACTPACK).

7.7 Additional points

7.7.1 Can the activity monitor harm respondents?

No. The activity monitor cannot harm respondents. It does not emit radiation, electrical current, vibration or heat. It does not have GPS technology and cannot track the respondent's whereabouts. However, some respondents may have an allergy to adhesives – if this is the case, they are not eligible for the activity monitor task. If the respondent finds they have a skin reaction to the adhesive dressing around the monitor then they should take the monitor off and record why they did so in the sleep diary. You should advise them that although a skin reaction is very rare, if they are worried about this then they should visit their GP.

7.7.2 When and how to wear it

Respondents are asked to wear the activity monitor for the seven full days following your visit. The device is waterproof to 10 metres depth and can be worn in the bath or shower. We want respondents to wear it when doing sports, including swimming (but not diving further than 10m depth).

The activity monitor can also be worn comfortably at night. We do not want the respondent to take the activity monitor off at any time during this period. If the activity monitor is removed, we will miss out on the data collected at this time. The respondent should NOT reattach the activity monitor if it is removed, or comes off for any reason.

If the respondent is sick or cannot do much physical activity for any reason during the days they are wearing the activity monitor we still want them to wear the monitor as normal.

The only exception is that respondents should remove the activity monitor before travelling through an airport or Eurostar security checkpoint.

If the respondent does take the monitor off, or it falls off, before the end of the 7 days, we have asked them to record the date and time it happened, and, if applicable, why they took it off, in the sleep diary.

Please note that it is possible for the activity monitor to fall off before the 7 days are over. Please let the respondent know this, and reassure them that if this happens the data are still useful to us, and we do not want them to reattach the monitor. They should just record in the sleep diary when it fell off, then post it back to us.

7.7.3 Addressing concerns regarding data security

Note that:

- If the activity monitor is lost, data cannot be downloaded from it without the correct software.
- The activity monitor has no information programmed into it that could be used to identify any individual. The serial number on the activity monitor does not contain any identifying information about the respondent.

7.7.4 Returning the activity monitor

- Instruct the respondent to return the activity monitor in the pre-paid envelope with the sleep diary.
- The respondent will receive a text message and an email after 7 days, reminding them to remove the activity monitor and return it. They will also receive reminders on day 11 and day 25 prompting them to return the monitor if they have yet to do so. In CAPI there is text for you to read out about this. If the respondent spontaneously tells you that they are not happy to receive a text or email then you will be asked to code this in CAPI to ensure that none are sent to them.

7.7.5 Respondent feedback about activity levels

Respondents will receive a summary report of their activity levels from the week they wore the activity monitor. We will send this to the respondent after we receive their activity monitor. It may take a few weeks for us to send them the report after they return the activity monitor (**this is likely to be even longer in Wave 1**).

7.7.6 Care of the Equipment

Please store the activity monitors carefully to ensure that you do not lose them. Activity monitors will have been cleansed in the Equipment Unit before they are despatched to you for placement on your point of work.

Activity monitors should be stored in ambient temperatures, i.e. 5°C – 40°C.

If you find that any of the activity monitors or charging equipment are not functioning properly then please report this to the Nurse Centre immediately. Please also refer to the NatCen Lost / Malfunctioning Equipment policy (June 2016).

8 BCS70 protocol for heat sealing the activity monitor

8.1 Introduction

Most nurses will be provided with a Parker Heat Sealing machine. A small number of nurses will be given a smaller model (unfortunately we could not find a supplier to provide us with a greater number of these machines). The two models work in the same way.

The Parker Heat Sealing machine is only to be used when applying the BCS70 Activity Monitoring protocol. It is used to seal the activPAL activity monitors in a small bag to make them fully waterproof, prior to attaching the activity monitor to the participant's thigh.

8.2 The machine

- The Parker Heat Sealing machine is an electrical device used to seal plastic bags (of different thicknesses) to keep the contents fresh or safe.
- The machine weighs 2.7kg and thus must be handled in a safe way when being carried. The machine **should not** be carried by its arm when the storage clip is in place.
- The machine has two moving parts – the **handle arm** and the **timer knob**. When not in use the handle arm should be held down with the **plastic retaining clip**.
- The machine also has a covered heating element. This element will only heat when connected to the power supply, and the handle arm is closed and then pressed down. The element has a fast heat and cool facility; however please be careful not to touch the heating element.
- When pressed down, the handle arm will trigger an audible click as the heating element turns on and then a click when the heating element turns off. This usually takes approximately 1-2 seconds. The **indicator light** will illuminate red at the first click and go out at the second click once the seal time is complete.

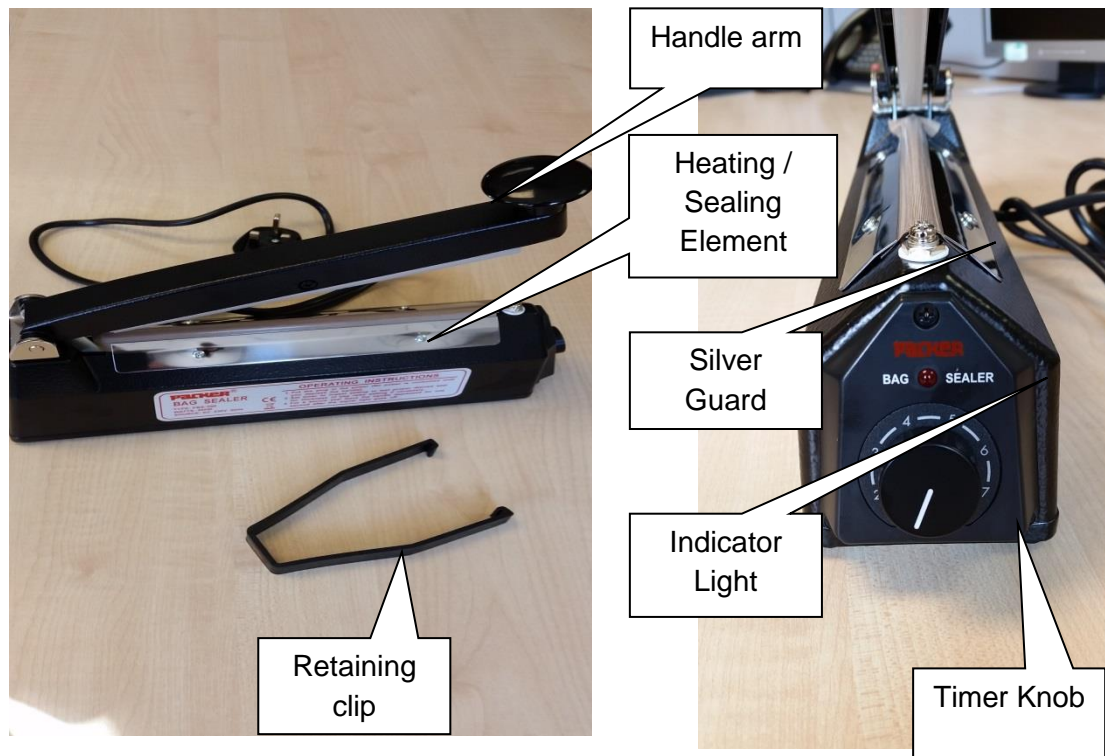


Figure 1: the heat sealing machine

8.3 Before using the machine

- Place the machine on a dry, flat and level surface within reach of an electrical power socket.
- Connect to the correct voltage supply (i.e. normal household 230v plug socket).
Note: Power will only be used when the handle arm is pushed down onto the heating element.
- Set the timer knob to No. 1 setting (the smaller heat sealer should be set to the No. 4 setting).

8.4 Equipment

You will need:

- The Parker heat sealer machine
- Activity monitor
- Plastic sealing bag
- Pair of scissors



8.5 Sealing an Activity Monitor

- a) Check the **timer knob** is on the No.1 setting (the smaller heat sealer should be set to the No. 4 setting).
- b) Place the activity monitor into a sealing bag so it lays lengthways at the bottom of the bag (see Figure 3).



Figure 3: positioning the monitor in the bag

- c) Lay the bag over the centre of the **heating element** so that the side of the activity monitor is in line with the **silver guard** of the heating element (see Figure 4).



Figure 4: positioning the monitor in the sealing machine

- d) Press the **handle arm** down firmly for 2 seconds (listen for the audible double click) and then release the pressure for 3 further seconds (ie count to 5). You may notice the **indicator light** turn on and off briefly.
- e) Lift the **handle arm** and remove the bag to inspect the seal. It should be fully welded (see *Figure 5*).



Figure 5: weld in bag

- f) Cut the sealed pocket down to size by trimming off the spare / open top of the bag, ensuring the welded section is not cut into (see *Figure 6*).



Figure 6: trimming the bag

8.6 Trouble shooting

Problem:	Possible Fault	Answer:
The sealer does not seem to produce a seal at all	<ul style="list-style-type: none"> ➤ Power supply failure ➤ General fault with machine ➤ Heating element has failed 	<ul style="list-style-type: none"> ➤ Check the machine is plugged into a standard socket and the socket switch is on. If no change – do not attach the activity monitor to the respondent. Contact Equipment Unit for a replacement machine.
The seal produced is not complete and pulls apart	<ul style="list-style-type: none"> ➤ Not enough time for heat to create the seal ➤ Handle arm is not held down firmly enough ➤ The bag is not flat across the heating element 	<ul style="list-style-type: none"> ➤ Ensure the handle arm is held firmly down on the bag for the full 5 secs count. Ensure the bag is held flat across the heating element. If no change – increase timer knob to the next highest setting and repeat sealing process. If still no change increase the setting by 1 and try again. If still no seal at maximum setting – do not attach the activity monitor to the respondent. Contact Equipment Unit for a replacement machine.
The bag stays stuck to the handle arm	<ul style="list-style-type: none"> ➤ The bag has been overheated 	<ul style="list-style-type: none"> ➤ Remove all the plastic from the handle arm and attempt to reseal it with another plastic bag by following these steps: ➤ Change the timer knob to a lower setting (if possible). Ensure the handle arm is held down for only 5 seconds. If the bag is stuck again attempt to reseal with another plastic bag – this time holding the handle arm down for only 2 seconds. If bag is stuck again – do not attach the activity monitor to the respondent. Contact Equipment Unit for a replacement machine.

8.7 Manufacturer's Cautions

- Do not use outdoors or in a wet or humid location.
- If using an extension lead, ensure that it is undamaged before connecting to the Heat Sealer
- When sealing the plastic bag it is important to keep the timer setting down to the minimum.

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- Start by setting the timer knob to the No. 1 setting (or No. 4 setting for the smaller model) and then test on the bag. Then increase by small increments until a satisfactory seal is achieved.
 - Operating the Sealer at too high a setting for the thickness and type of bag being used (or without any bag at all) will cause the heating element to fail prematurely.
 - Do not clean the Sealer using a wet/water-based cloth.

8.8 NatCen Specific Note

- As with any NatCen equipment, the Nurse Interviewer is responsible for ensuring the equipment is used as safely as possible in the participant's homes and remains vigilant to the potential hazards in using this piece of equipment in particular.
- Any incident or near miss when using this piece of equipment should be reported immediately through the Special Report form and sent to the Nurse Centre at Brentwood.
- A risk assessment has been carried out in relation to the use of this equipment on the BCS70 project.

9 BCS70 protocol for placing the Online Dietary Questionnaire

9.1 Introduction

We are collecting information about eating habits because the links between diet and health are well-established, and information about what people eat and drink is an important part of helping to understand health and illness.

9.2 Exclusion criteria

Participants are excluded from the activity monitoring task if they:

- Do not have access to the internet.

9.3 Equipment

For each cohort member you will need:

- 'Dietary questionnaire - More Information' leaflet
- Log in sticker (from the labels page of the consent booklet)

9.3.1 The online dietary questionnaire

Respondents will be asked to complete the dietary questionnaire for two days after your visit.

In order to access the questionnaire, respondents will need to type **www.bcs70survey.co.uk** into their web browser (e.g. Internet Explorer) and log in using the details you will give them. The questionnaire then asks them to report everything they had to eat and drink during a 24 hour period. The online questionnaire will take about 10-20 minutes to complete on each day.

9.4 Procedure

The online dietary questionnaire placement should occur at the end of your visit, alongside the activity monitoring task.

Placing the online dietary questionnaire:

- I. Ask the respondent to read the 'Dietary questionnaire - More Information' leaflet. If the respondent is unable to do this, go through it with them.
- II. Record the dietary questionnaire login code in CAPI. It is a 6-digit code found on the labels page of the consent booklet.
- III. CAPI will automatically select two days on which we want the respondent to complete the questionnaire.
- IV. Write the day (Mon-Sun) and date of each of the two days onto the 'Dietary questionnaire - More Information' leaflet.

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- V. Stick the dietary questionnaire login label onto the 'Dietary questionnaire – More Information' leaflet.
 - VI. Read out the explanation of the task from CAPI.

9.5 Additional points

9.5.1 When should the respondent complete their dietary questionnaire?

The questionnaire should be completed by the respondent on each of the selected days. The questionnaire itself asks respondents to report what they ate the previous day.

9.5.2 Selection of days

CAPI will select two random days from the seven day period following your visit. The cohort member must complete the dietary questionnaire on both selected days, answering about what they ate the day before. The selected days are chosen at random and cannot be changed. New days cannot be assigned because they are 'atypical', for instance because the cohort member is busy, on holiday, travelling etc., or because they would prefer different days.

All of the questions in the questionnaire ask about 'yesterday', so if they miss their allocated day they should answer about the day before the day on which they are completing it. If they miss their first allocated day it would be good if they can try to complete the questionnaire before their second allocated day. They cannot complete the questionnaire more than once on any one day.

9.5.3 Addressing concerns regarding data security

Note that:

- All data is held and transferred securely, in line with UK Data Protection legislation.
- The online questionnaire will not collect any information from the device which might allow the cohort member to be located or identified, such as location data, GPS data or internet usage data.