

The NIHR Southampton Biomedical Research Centre (BRC) has a tight quality assurance system for the writing, reviewing and updating of Standard Operating Procedures. As such, version-controlled and QA authorised Standard Operating Procedures are internal to the BRC.

However, extracts that document technical aspects of the Standard Operating Procedures can be made more widely available. The content is extracted from Version 1 of the BRC Standard Operating Procedure for measuring sitting height. The document was last reviewed in April 2015 and the next review date is set for April 2017. The version number only changes if any amendments are made when the document is reviewed.

Alongside the extracts from our Standard Operating Procedures, we have also made available here an example Standard Operating Procedure and a word version of a Standard Operating Procedure template. Using the example and the Standard Operating Procedure template, institutions can generate their own Standard Operating Procedures and customise them, in line with their own institutions.

Here in the BRC we require that Standard Operating Procedures are accompanied by face-to-face training. This is provided by someone with a qualification in the area or by someone with extensive experience in making the measurements. Training is followed by a short competency assessment and performance is monitored and maintained using annual refresher sessions. If you require any extra information, clarification or are interested in attending a training session, please contact Kesta Durkin (k.l.durkin@soton.ac.uk).

NIHR Southampton Biomedical Research Centre

Procedure for Measuring SITTING HEIGHT

BACKGROUND

Sitting height, when measured alongside standing height, can provide information about the body's relative proportion. Some studies suggest that the proportions of leg and trunk length can be affected by socio-economic status and growth in childhood. Impaired growth in childhood reduces growth in a way that has a disproportionate effect on leg length. Individuals from a lower socio-economic background, which would more likely include individuals who are less well nourished and have a poorer diet, as a consequence have proportionally shorter legs compared with well nourished individuals from a higher socio-economic background. A point to note is that for measurements of both sitting and standing height, results will be affected by individuals with scrunching, scoliosis or kyphosis which may lead to problems interpreting the data. This should always be recorded on the study CRF.

PURPOSE

To ensure correct and uniform measurement of sitting height within the BRC

SCOPE

This procedure applies to any study that requires measuring sitting height within the BRC

RESPONSIBILITIES

It is the responsibility of the measurer to use this procedure when making measurements of sitting height. It is the responsibility of the Principal Investigator to ensure that staff members.

PROCEDURE

Stadiometers: <http://www.marsden-weighing.co.uk/index.php/marsden-hm-250p.html>

Stadiometers are devices specifically designed for the accurate measurement of height and when used with care yield data of the highest quality. The 'Leicester Height Measure' allows measurement accuracy of height to the nearest 1mm. It is a portable stadiometer with a range of 0 – 2.07m, in 1mm gradations.

It comes in the form of a plastic measuring rod, in four sections which slot together. There are unique codes at each end of each rod (i.e. star shape, square, triangle etc.) which line up with each other to ensure that sections are slotted together properly. It has a base plate for the individual to stand on, two stabilising side arms that make contact with the wall and a head plate with arrows indicating the point at which the measurement should be read. Each rod is marked in metric (centimetres and millimetres) and imperial (feet and inches) units.

You will require two practitioners, one holding the participant's head in the correct position, the other bringing down the head plate and reading the value.

1. Ensure that the stadiometer is wiped clean before use.
2. Assemble the stadiometer according to figure 1. You do not need to put on the 4th section. Build up to 160cm (first 3 segments).



Figure 1. Stadiometer built up to 160cm



Figure 2. Assembled stadiometer mark (first 3 segments) with positioned anthropometric box.

3. Ensure the stadiometer is checked and calibrated annually using metal rods of known height.
4. When assembled, position against a wall and place the anthropometric measuring box on the footplate, such that the narrowest part of the box is contained within the raised edges of the foot plate (figure 2).
5. Place a pillow case on top of the box as the surface is textured to make it non-slip and may damage tights and clothing if not covered.
6. Ensure that the upper and lower stabilisers are in the correct position. Put the upper one near the top and the bottom just above the level of the box. The patient will feel it digging into their back if it is higher up than just above the level of the box.
7. Wash your hands and explain the procedure to the participant, remembering to inform them that the measurement of sitting height requires them not to clench their buttocks. Explain that you will be making a minimum of 3 measurements.
8. Ensure that shoes are removed.
9. Undo or adjust hairstyles and remove hair accessories that interfere with measurement.

If the person has a hairstyle that cannot be adjusted (e.g. braids/dreadlocks), an implement of a known length (such as a short metal rod) can be placed on the crown of the head between the braids/dreadlocks when the head is in the Frankfort Plane. The total height of participant *plus* rod can then be measured and the length of the rod can be subtracted from the result in order to obtain a

height measurement. The same approach applies to individuals wearing turbans. You may ask ladies wearing headscarves if they would mind removing them. If they are unhappy to do this, you can ask to feel the top of their head/ask them how many layers of material are on top of the head and how their hair is arranged beneath the scarf. Make a note in the participant's notes if you have had to do any of these.

10. Aim to measure wearing light clothing.
11. Ask the participant to sit on the box, facing forwards. They should sit on the anthropometric box with their lower back as close to the stadiometer as possible and their shoulders touching the stadiometer (if able). If they have long enough legs, they should bend at the front of the box and they should be able to put their feet flat on the floor. If they have shorter legs they will have to sit on the anthropometric box with their legs apart (one leg either side of the box), as in figures 3a and 3b below.



Figure 3a and 3b. Participant sitting on the box positioned in the Frankfort Plane. (Always maintain the participant's head in the Frankfort Plane with your hands throughout the measurement – this is not demonstrated in the photograph which is just shown to demonstrate the participant's position on the anthropometric box).

12. Ask the participant to sit as tall and straight as possible with their arms resting loosely on their lap.
13. Ensure the participant's head is in the Frankfort plane, an imaginary line from the centre of the ear hole to the lower boarder of the eye socket.
14. Manipulate the participant's head in your hands, placing the heels of your palms either side of the face. Your fingers should come to rest on the mastoid process behind the ears. Firmly but gently, apply upward pressure lifting their head to the maximum height.

Avoid jerky movements, perform the procedure smoothly and take care not to tilt the head at an angle.

15. Check that the buttocks are as far back as possible and for any slumping of shoulders.
16. Maintaining the participant in the Frankfort Plane with your hands, ask them to take a deep breath and remind them to do so without any clenching of the buttocks. "Take a deep breath please without clenching your buttocks".
17. Ask the second measurer to lower the headpiece of the stadiometer lightly onto the head, ensuring it rests on the crown of the head and take the reading.
18. Read the result from the scale. Eyes should be level with counter/pointer and measurement should be read to the nearest millimetre (this may require a stool/small ladder).
19. Make three measurements of sitting height.
20. The three measurements should fall within 2mm of one another. If the first three measurements do not fall within this 2mm limit, then you must perform measurements of height until the 3 most recent results are within 2mm of one another. Cherry-picking the best 3 results from a choice of more than 3 measurements is not permitted.
21. Record the 3 most recent results and calculate the mean by adding the three values together and dividing by 3.
22. Should you be making repeated measurements on the same individual on different days, it is advisable to measure at the same time of day if possible. During the day our height decreases due to compression of the spine.