

*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.*

*The Standard Operating Procedure from which information in this document has been extracted, is a version controlled document, managed within a Quality Management System. However, extracts that document the technical aspects can be made more widely available. Standard Operating Procedures are more than a set of detailed instructions; they also provide a necessary record of their origination, amendment and usage within the setting in which they are used. They are an important component of any Quality Assurance Framework, but in themselves are insufficient and need to be used and interpreted with care.*

*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.*

*Simply offering a list of instructions to follow does not assure that the user is able to generate a value that is either accurate or precise so 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 Dr Kesta Durkin ([k.l.durkin@soton.ac.uk](mailto:k.l.durkin@soton.ac.uk)).*

*This document has been prepared from Version 4 of the BRC Standard Operating Procedure for measuring adult height. It was last reviewed in June 2014 and the next review date is set for June 2016. The version number only changes if any amendments are made when the document is reviewed.*

# NIHR Southampton Biomedical Research Centre

## Procedure for Measuring ADULT HEIGHT

### BACKGROUND

This procedure is to be used for measuring adult height. Height measurement can be affected by posture, foot wear, feet and head positioning. It is necessary therefore to have a technique to measure height that can be replicated by other measurers; over time; and in the same subject. For the purposes of both longitudinal follow-up studies of individuals or populations, and cross-sectional group studies, accurate and reproducible measurements of height are essential.

### PURPOSE

To ensure correct and uniform measurement of adult height.

### SCOPE

This procedure applies to any study that requires measuring adult height, within the BRC.

### RESPONSIBILITIES

It is the responsibility of the measurer to use this procedure when making measurements of adult height. It is the responsibility of the Principal Investigator to ensure that staff members who are working on specific studies have adequate experience to do so.

### 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. There are a few different stadiometer models in the BRC. The Leicester Height Measure is very “user friendly” but many stadiometer models can yield equally accurate and precise results if the measurer adheres strictly to the procedure.

The ‘Leicester Height Measure’ is lightweight and portable and allows measurement accuracy of height to the nearest 1mm. The range is from 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, circle 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 reading the value.

1. Ensure the stadiometer is checked and validated using metal rods of known height.
2. Ensure that the stadiometer is wiped clean before use.
3. Wash your hands and explain the procedure to the participant. Explain you will want them to stand as tall and straight as possible and that you will be making 3 measurements of their height.
4. Ensure that heavy outer clothing and shoes are removed and if necessary, trousers/jeans are rolled up to enable the measurer to check the position of the heels.
5. Undo or adjust hairstyles and remove hair accessories that interfere with measurement.

If the person has a hairstyle that can not 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 for 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 medical notes if you have had to do any of these.

6. Aim to measure wearing light clothing.
7. Ask the participant to stand on the stadiometer, facing forwards as tall and straight as possible with their arms hanging loosely at their sides.

8. Their feet should be flat on the base plate of the stadiometer and positioned slightly apart, in line with their hips, to aid balance. There is an outline of feet on the base plate but it is not necessary for the participant to stand on the feet marks. There will be some exceptions (e.g. participants with a larger chest/belly) but when possible their heels should be touching the back plate.
9. Their knees should be straight and their buttocks and shoulders should touch the stadiometer. Again, there may be some exceptions (e.g. participants with a bigger bottom) but if they are able to do so then they should.
10. Ensure the participant's head is in the "Frankfort plane". This position is an imaginary line from the centre of the ear hole to the lower boarder of the eye socket. This is a midline position.
11. If will be necessary for one person to manipulate the participant's head in your hands by placing the heels of your palms either side of the face and the fingers of each hand resting on the back of the skull above the neck. 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.
12. The other measurer should stand to the side to double check the Frankfort Plane is correct. Both measurers can check for any bending of the knees, slumping of shoulders or raising of heels.
13. Ask the participant to take a deep breath and hold.
14. The assisting measurer standing at the side should then bring the head plate down onto the head, ensuring it rests on the crown of the head, i.e. the top back half.
15. The nurse should then read the measurement.
16. Nurse's eyes should be level with counter/pointer and measurement read to the nearest 1mm (this may require a stool/small ladder). Record the measurement, plot on growth chart and sign/initial with date.
17. The participant should be able to step off the stadiometer without ducking their head.
18. Make three measurements of height, asking the participant to stand off the stadiometer between each measurement.
19. The three measurements should all 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. Choosing the closest 3 results from a choice of more than 3 measurements is not permitted.
20. Record the three most recent results and calculate the mean by adding the 3 values together and dividing by 3.
21. 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.