

# UK Biobank

## Height Measurements

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Version 1.0

<http://www.ukbiobank.ac.uk/>

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## 1. Introduction

**1.1:** This manual details the procedure for Height Measurements at an Assessment Centre of the UK Biobank. This takes place at the 5th “station” of the Assessment Centre visit, as listed in Table 1.

**Table 1:** sequence of assessment visit

	<b>Visit station</b>	<b>Assessments undertaken</b>
1	Reception	<ul style="list-style-type: none"> <li>• <b>Welcome &amp; registration</b></li> <li>• Generating a USB key for Participants</li> </ul>
2	Touch-screen Section	<ul style="list-style-type: none"> <li>• <b>Consent</b></li> <li>• <b>Touch-screen questionnaire</b></li> <li>• <b>Hearing Test</b></li> <li>• Cognitive function tests (<b>Shape, Pairs, Fluid Intelligence, Snap</b>)</li> </ul>
3	Interview & blood pressure	<ul style="list-style-type: none"> <li>• <b>Interviewer questionnaire</b></li> <li>• <b>Blood pressure measurement</b></li> <li>• <b>Measurement of arterial stiffness</b></li> </ul>
4	Eye measurements	<ul style="list-style-type: none"> <li>• <b>Visual acuity</b></li> <li>• <b>Auto-refraction</b></li> <li>• <b>Intraocular pressure</b></li> <li>• <b>Retinal image (OCT Scan)</b></li> </ul>
5	Physical measurements	<ul style="list-style-type: none"> <li>• <b>Height (Standing and Sitting)</b></li> <li>• <b>Hip &amp; waist measurement</b></li> <li>• <b>Weight and Bio-impedance (body composition) measurement</b></li> <li>• <b>Hand-grip strength</b></li> <li>• <b>Heel-bone ultrasound</b></li> <li>• <b>Spirometry (Lung function Test)</b></li> </ul>
6	Cardio (Physical fitness)	<ul style="list-style-type: none"> <li>• <b>Exercise ECG (Cycling)</b></li> </ul>
7	Sample collection & exit	<ul style="list-style-type: none"> <li>• <b>Blood samples collected</b></li> <li>• <b>Urine sample sought</b></li> <li>• <b>Saliva sample sought</b></li> <li>• Consent &amp; result summary printed</li> <li>• Travel expense claim provided</li> </ul>
8	Web-based diet questionnaire	<ul style="list-style-type: none"> <li>• <b>Dietary assessment</b></li> </ul>

**1.2:** Throughout this document, the term “Participant” signifies a study participant who is taking part in the Assessment Centre process, regardless of whether they eventually give or withhold consent to take part in the UK Biobank study.

**1.3:** The collection of data from assessment visits uses the direct data entry system of the Assessment Centre Environment (ACE). This has five components (**Assessment Centre Environment**), of which Vox operates the Physical Measurement test station of the assessment visit.

**1.4:** At the start of their visit, each participant is issued with a USB Key at the Reception station. This USB Key acts as a participant identifier (it contains Participant ID, name, date of birth and gender) and as a temporary storage device for the recorded data. As the participant progresses between stations, the USB key acts as an identifying token and also as a data transfer mechanism. At the Reception & Exit module, all data on the USB key is removed, after it has been backed up to the Assessment Centre head PC.

## **2. Staff**

Healthcare technicians or nurses certified to conduct assessments undertaken at this station are responsible for carrying out this procedure. The Assessment Centre Manager oversees that all Assessment Centre staff work in accordance with the protocol.

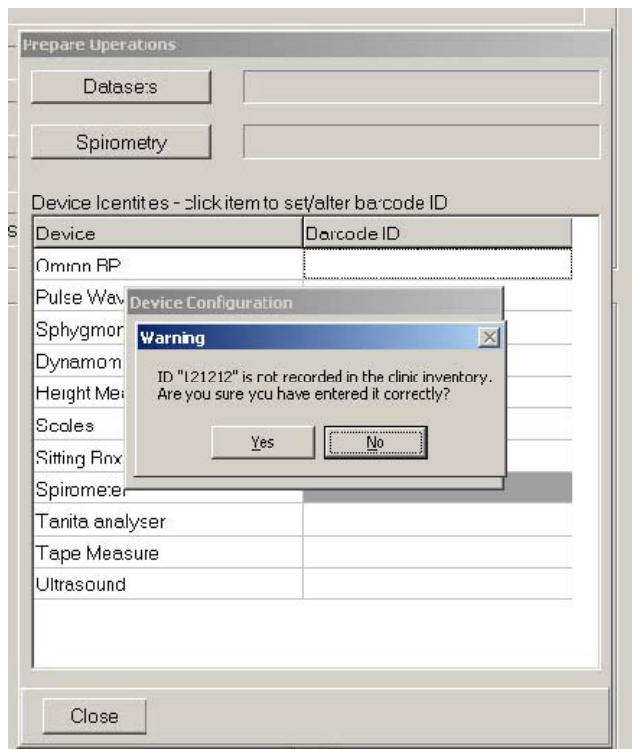
## **3. Order of physical measurements**

After completing the Interview and Blood Pressure procedures, the participant arrives at the Physical Measurements station, which follows the order:

1. Measurement of grip strength
2. Measurement of waist and hip circumference
3. Measurement of standing height
4. Measurement of sitting height
5. Measurement of weight & bioimpedance
6. Left and Right Heel ultrasound measurement
7. Spirometry

## **4. Preparations at the start of the day**

**4. 1:** The staff member opens the Vox component of the Assessment centre environment, entering their username and password. From the Vox start-up screen ‘Prepare’ is selected to display the following screen:



**4. 2:** The barcode scanner is used to enter the unique identifier for each device listed. If the equipment ID number is not recognised by the Assessment Centre inventory the coordinating centre is notified of the equipment identifier discrepancy.

## 5. Calibration of measuring equipment

**5.1:** The device for measurement of standing height is the SECA 240 Height Measure (figure 1). For seated height a 30 x 40 x 50 cm box is used for seating the participant so that their feet are flat on the floor.

**Figure 1:** SECA 240 Height Measure



**5.2:** The height measure and sitting height box are calibrated every 2 weeks using a wooden metre rule, and withdrawn from use if not correct. A calibration record is maintained.

## 6. Participant assessment

**6.1:** The participant is seated in a curtained assessment area and told that they will undergo a number of measurements lasting a total of about 10-15 minutes.

**6.2:** The participant is asked to remove any outer garments, take a seat, and remove their shoes socks/tights, with the explanation that this is for measuring their height, weight, body fat and heel bone density. The participant is also asked to empty their pockets and to place any valuables into the tray provided.

**6.3:** The participant's USB key is inserted into the computer, the staff member logs on to Vox and ensures that the 'Records' column are all coloured green up to Biometrics. The 'Biometrics' button is then selected and the identities of the staff member and participant confirmed.

The screenshot displays the UK Biobank Vox software interface. It is divided into several sections:

- Identities:** Contains input fields for Centre Name (CTSU), Assessment ID (97576), Staff User (TESTTAPE), PID code (967 505 262), and Visitor (Mrs Pamela Paterson). It also shows Computer ID (284) and the text "THIS IS A TEST CLINIC SYSTEM".
- Status:** Shows a timestamp (07/03/2007 12:28:45) and a red bar indicating "Head unknown". Other status options include "Not transferring" and "Network Unavailable".
- Control:** A vertical column of buttons including Refresh, Change User, Prepare, Training, and Exit.
- Operation:** A vertical column of buttons including Interview, Biometrics (highlighted with a dashed border), Blood, and Conclude.
- Records:** A vertical column of buttons including Welcome, Consent, Touchscreen, Interview+BP (all highlighted in green), Biometrics, Blood sample, and Conclusion.
- System:** A vertical column of buttons including Information, Synchronise, Administration, Recovery, and Technical.

**Note:** If the participant cannot, or does not wish to undergo a particular measurement, “#” is entered in the relevant field and the reason why is recorded (along with ‘P’ if participant’s decision or ‘N’ if nurse’s decision).

## 7. Measuring height

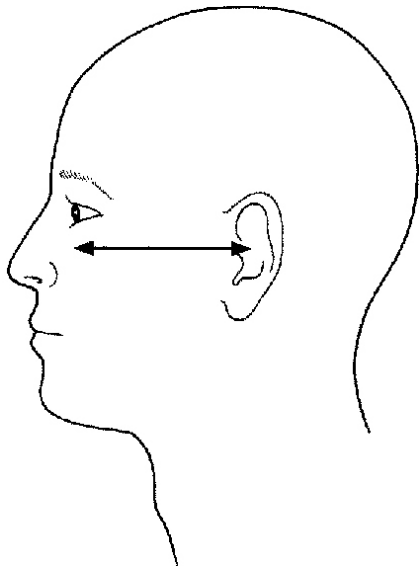
**7.1:** Both standing and sitting height are measured during the assessment. Standing height gives an overall assessment of growth that can be used to compare the general health and nutrition of populations and groups such as ethnic, social and economic groups. It is also used to assess the Body Mass Index (BMI = weight in kilograms/ height in metres<sup>2</sup>) which is

a measure of obesity. Standing height also allows the lung function tests to be interpreted, since lung capacity varies with height.

**7.2:** Sitting height measures the truncal height. There is less variation between people in truncal height than total height and so it provides additional information about the general health and nutrition of populations and groups such as ethnic, social and economic groups.

**7.3:** Much of the error in the height measurement is due to variation in the positioning of the body and head during the measurement. Therefore, it is important that the same procedure to position the body correctly is followed for all measurements of height, and that the head is positioned in the 'Frankfort Plane', a standard craniometric reference plane passing through the right and left ear holes and the lower margin of the left orbit (figure 2).

**Figure 2:** Head positioned in the Frankfort plane



**Source:** <http://www.answers.com/topic/frankfort-plane>

It may not be possible to obtain Height measurements where the participant:

- Cannot weight-bear
- Is wheelchair-bound
- Has had neck surgery
- Has scoliosis
- Is wearing a turban

## 8. Measurement of standing height

**8.1:** The staff member informs the participant that they would now like to measure their standing and sitting height. The participant is asked to stand barefoot with their back against the vertical scale, feet parallel to each other, toes pointing forward and soles flat on the floor. The participant is checked to be standing unsupported, with legs straight and with buttocks and shoulder blades touching the vertical scale. Their shoulders should be relaxed, with arms by sides, and they should not be slouching or leaning to one side.

**8.2:** The staff member checks with the participant that they have no neck problems or recent neck surgery. With permission the participant's head is gently positioned so that they are looking straight forward (not nose in the air), with their ear holes in same horizontal plane as the lower border of their eye sockets.

**8.3:** The participant is asked to stand as tall as possible, to take a deep breath in then out, and to relax their shoulders. While the participant is taking a deep breath in, the staff member applies gentle pressure upwards to the bony prominence just behind their ears and brings the horizontal measure down on top of their head. The measurement is read on the vertical scale (as indicated by the red or black arrows / line) to the nearest centimetre and the value entered into the computer.

## **9. Measurement of sitting height**

**9.1:** The wooden box is positioned directly in front of the height device, at 30cm, 40 cm or 50cm height, whichever allows the participant to place both feet flat on the floor. The participant is asked to sit on the box with their back as straight as possible, sitting erect and not slouching or leaning to one side.

**9.2:** With permission, the participant's head is gently positioned so that they are looking straight forward (not nose in the air), with their ear holes in same horizontal plane as the lower border of their eye sockets.

**9.3:** The participant is asked to sit as tall as possible, take a deep breath in then out, and relax their shoulders. While the participant is taking a deep breath in, gentle pressure is applied upwards to the bony prominence just behind their ears, and the horizontal measure is brought down on top of their head.

**9.4:** Measurement is read on the vertical scale to the nearest centimetre, and entered into the computer, followed by the height of the box.

UK Biobank, Gen Every Where : Biometrics, Manual Records

### Grip Strength

Dynamometer : not-set

Right Grip strength  Kg

Left Grip strength  Kg

### Circumferential

Tape Measure : not-set

Waist  cm

Hip  cm

### Heights

Height Measure : not-set

Standing height  cm

Sitting Box : not-set

Sitting height  cm

Box height  30  40  50 cm

< Prev   Help   Lock   Next >

**9.5:** Following the measurement of height, the participant remains in the assessment area and proceeds to **Body Composition Measurement**.