

UK Biobank

Waist and Hip Measurement

Version 1.0

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

15th April 2011

This manual details the procedure for Waist and Hip measurement at an Assessment Centre of the UK Biobank

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1. Introduction

1.1: This manual details the procedure for Waist and Hip 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

	Visit station	Assessments undertaken
1	Reception	• Welcome & registration • Generating a USB key for Participants
2	Touch screen Section	• Consent • Touch screen questionnaire • Hearing Test • Cognitive function tests (Shape, Pairs, Fluid Intelligence, Snap)
3	Interview & blood pressure	• Interviewer questionnaire • Blood pressure measurement • Measurement of arterial stiffness (Pulse Wave Velocity)
4	Eye measurements	• Visual acuity • Auto-refraction • Intraocular pressure • Retinal image (OCT Scan)
5	Physical measurements	• Height (Standing and Sitting) • Hip & waist measurement • Weight and Bio-impedance (Body Composition) measurement • Hand-grip strength • Heel-bone ultrasound • Spirometry (Lung function Test)
6	Cardio (Physical fitness)	• Exercise ECG (Cycling)
7	Sample collection & exit	• Blood samples collected • Urine sample sought • Saliva sample sought • Consent & result summary printed • Travel expense claim provided
8	Web-based diet questionnaire	• Dietary assessment

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.

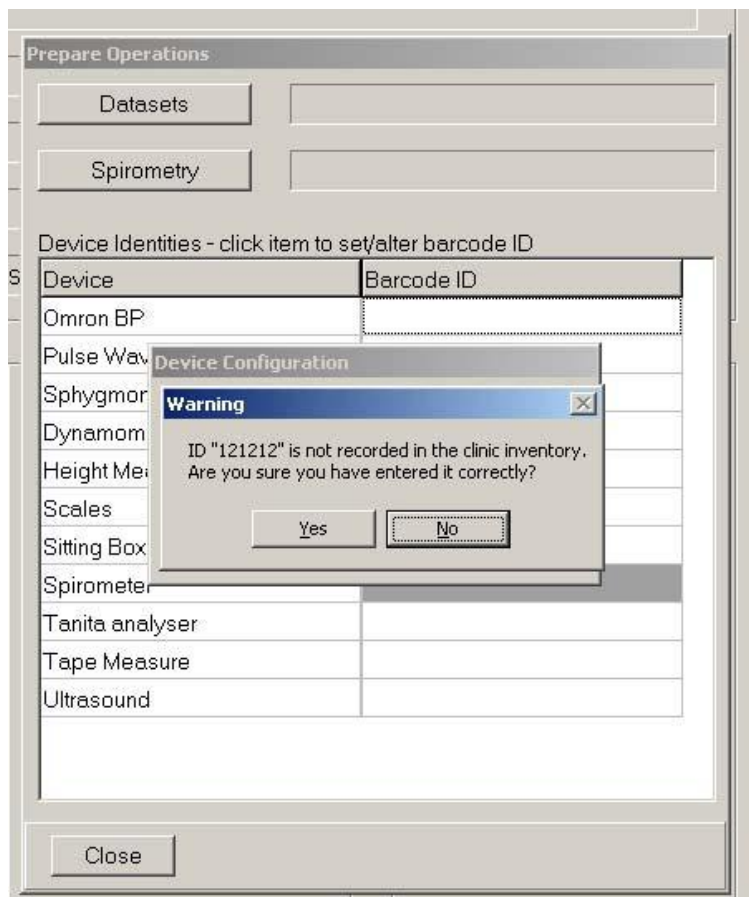
3. Order of physical measurements

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. The Seca tape measure is calibrated at the start of the day and a calibration record is maintained.

5. Measurement of waist and hip circumference

5.1: Excessive body fat is known to increase the risks of several diseases. There is considerable evidence to suggest that excessive fat stored in the intra-abdominal cavity may be especially harmful. This intra-abdominal fat mass can be reasonably inferred by waist measurement. A high waist:hip ratio = waist circumference (cm) / hip circumference (cm) implies a high degree of central obesity and is a risk factor for ischaemic heart disease (1).

Waist and Hip measurement may be unobtainable if a participant is:

- Pregnant
- Wheelchair-bound
- Wearing a colostomy bag
- Not willing to be measured

5.2: The staff member informs the participant that they would now like to measure round their waist and hips, and asks the participant to stand with feet facing directly forward and shoulder-width apart, explaining that it is not necessary to undress, but it would help if any bulky clothing could be lifted up, to allow their waist to be located. Any bulky items (such as

wallets or mobile phone) are placed in the valuables tray provided, since these may interfere with accurate measurement.

5.3: The participant stands with arms folded across their chest. Standing to the back of the participant the staff member identifies the waist as smallest part of the trunk (i.e. natural indent). If it is not possible to locate the natural indent of the trunk, the umbilicus (“belly button”) is identified and the circumference measured at this level.

5.4: Working side on to the participant, the staff member holds the Seca measuring tape housing (figure 1; Appendix 1: Equipment list) in their left hand, passing the tape measure around the participant’s body with their right hand, and checks that the tape measure is horizontal and not twisted. The white plastic end of the tape is inserted into the groove of the housing, and the participant is asked to relax and breathe in and out slowly.

Figure 1: Seca 200 tape measure



5.5: While the participant is breathing out, the measuring tape is tightened or loosened using the button catch of the spring coil. The tape should fit comfortably without feeling either loose or tight. As the participant slowly breathes out, but before they breathe in again, the waist circumference is recorded (in centimetres) and entered into the computer.

5.6: With the participant remaining in the same position the Seca measuring tape is slid down to the widest part of their hips and checked it is horizontal and not twisted. Hip circumference is recorded (in centimetres) and entered into the computer.

The screenshot shows a software interface for recording measurements. It has a title bar that reads 'UK Biobank, CeeTee Esu : Measurements, Manual Records'. The interface is divided into three main sections: 'Grip Strength', 'Circumferential', and 'Heights'. In the 'Grip Strength' section, there are two rows: 'Right Grip strength' with a value of 35 Kg, and 'Left Grip strength' with a value of 28 Kg. The 'Circumferential' section has two rows: 'Waist' and 'Hip', both with empty input boxes followed by 'cm'. The 'Heights' section has two rows: 'Standing height' and 'Sitting height', both with empty input boxes followed by 'cm'. At the bottom of the form, there are navigation buttons: '< Prev', 'Help', 'Lock', and 'Next >'. There is also a small icon of a tape measure between the 'Help' and 'Lock' buttons.

Note: The Seca 200 cm tape measure is labelled with a UK Biobank Asset Tag (barcode). Asset tag numbers are recorded when the tape is newly tagged for use and when discarded. The Assessment Centre Manager is notified by the Clinical Operations Manager when the maximum number of measurements has been reached so that the measure can be discarded.

5.7: Following waist and hip measurement, the participant remains in the assessment area for the measurement of **Standing and Sitting Height**. The Seca tape measure is cleaned with Azowipes after each participant.

6. References

1. [Yusuf S, Hawken S, Ounpuu S, et al.](#), Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet*. 2004 Sep 11-17;364(9438):937-52.

7. Appendices

7.1 Appendix 1: Equipment list

Furniture	
2 chairs (1 participant chair with armrests –no wheels on participant chairs.)	Modular partition dividers with curtains across entrance
1 desktop personal computer	1 monitor Other Equipment: 1 Jamar J00105 hydraulic hand dynamometer (Lafayette Instrument USA) 1 Seca 200 measuring tape (Seca GMBH, Germany) 1 Seca Height measure (Seca GMBH, Germany) 1 Wooden sitting height box 1 Tanita BC418ma (Tanita Europe, NL) 1 Sahara Heel Ultrasound device (Hologic, USA) 1 Vitalograph spirometer (Vitalograph Ltd, UK)
1 Barcode scanner	Tray to hold valuables (during body composition measurement) Consumables Sahara Ultrasound Coupling Gel Sahara printer paper