UK Biobank

Blood Pressure

Version 1.0

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

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This manual details the Blood Pressure Measurement procedures at an Assessment Centre of the UK Biobank.

Contents

1. Introduction

1.1: This manual details the Blood Pressure Measurement procedures at an Assessment Centre of the UK Biobank. This takes place at the 3rd "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 • Refractometry • Intraocular pressure • Optical Coherence Tomography (Retinal Imaging)
5	Physical measurements	• Height (Standing and Sitting) • Hip & Waist measurement • Weight and Bio-impedance (Body Composition) measurement • Hand-grip strength • Ultrasound Bone Densitometry • 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 Interview and blood pressure measurement 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

This procedure is carried out by registered nurses, trained and certified to conduct assessments undertaken at this station. The Assessment Centre Manager oversees that all staff work in accordance with the procedure.

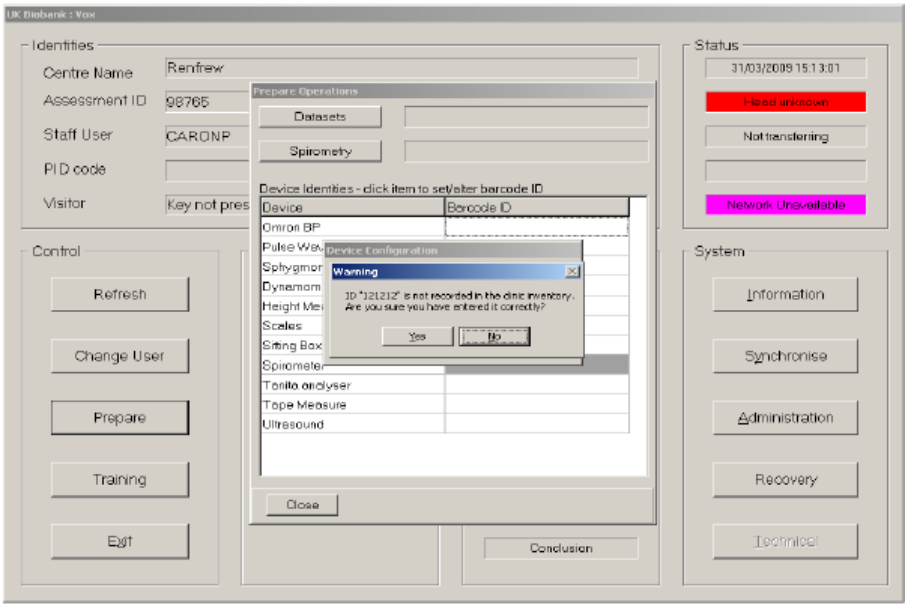
3. Order of blood pressure procedure

The following sequence is now followed:

1. Interview: Part 1
2. First measurement of blood pressure
3. Interview: Part 2
4. Measurement of Pulse Wave Velocity
5. Second measurement of blood pressure

4. Preparatory procedures at start of day

4.1: At the start of each day, the staff member logs on securely to Vox, then selects 'Prepare' to display the following screen:



4.2: The barcode scanner is used to enter the unique identifier on the Omron blood pressure and pulse trace monitor, then 'Close' is selected (Appendix 1: Equipment list). The Seca tape measure used to measure for cuff size is calibrated and its barcode scanned.

5. Procedure at Blood Pressure station

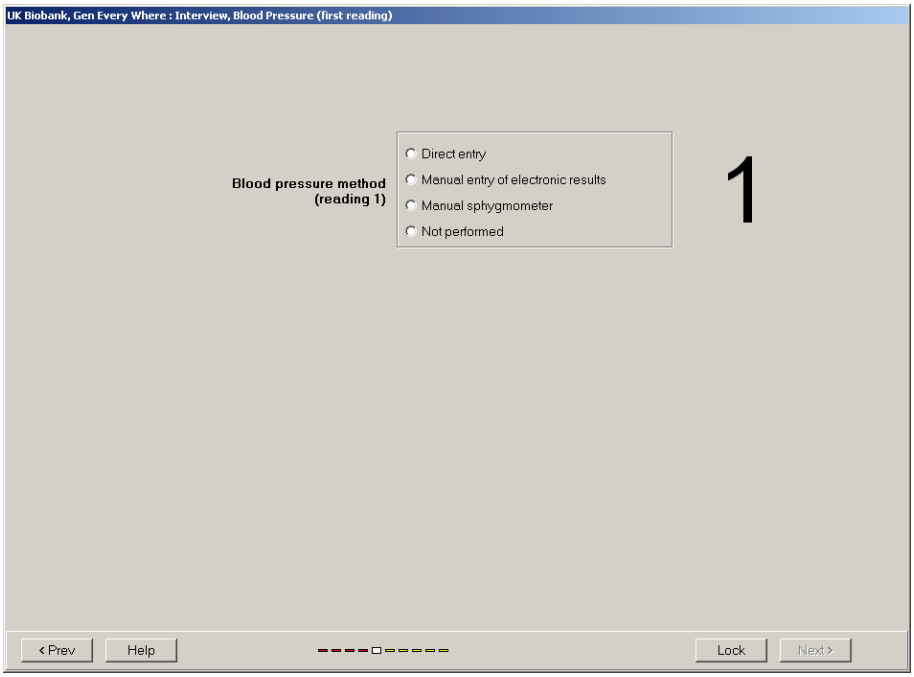
5.1: The next available participant is collected from the waiting area and is seated in a curtained office. The participant's USB key is inserted into the computer and the Vox system is used to check their identity.

5.2: The participant takes the first part of the interview questionnaire (Interview: Part 1). After completing this, the staff member informs the participant that they will now take the first of two measurements of blood pressure.

6. First measurement of blood pressure

6.1: The participant is asked to sit with their feet parallel to each other, toes pointing forward and soles of feet flat on the floor. There should be no restrictive clothing to impede the circulation to their left upper arm: the participant is asked to loosen or remove any restrictive clothing. The right arm is only used if the left is not practical: e.g. amputee, shunt, mastectomy, axiliary clearance). Since resting blood pressure is to be measured, the staff member takes care not to engage the participant in conversation.

6.2: The blood pressure monitor is switched on, 'Direct entry' is selected on the screen (below) and the computer automatically connects to the monitor.



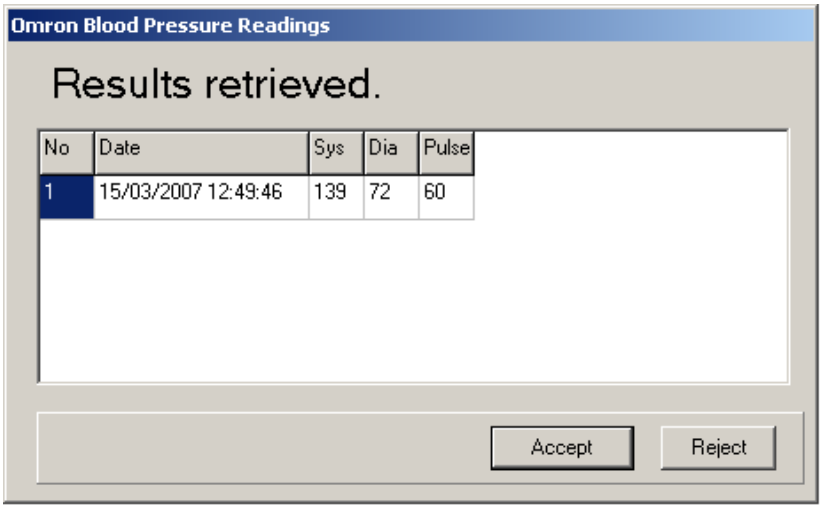
6.3: A Seca tape measure is used to determine the circumference of midpoint of upper arm, and the appropriate size of blood pressure cuff is selected, based on the table below:

Circumference of midpoint of upper arm	Size of cuff
17 – 22 cm	Small
22 – 32 cm	Regular
32 – 42 cm	Large

6.4: The appropriate sized cuff is put on the upper arm of participant (it may, depending on size of upper arm, encircle the arm several times). The cuff is rotated so that the green marker tab indicating the centre of the cuff bladder lies over the brachial artery, which is located at the inner part of front of the elbow. The rubber inflation tubing sits over the brachial artery in line with the participant's middle finger, and the bottom of cuff sits 1-2 cm above the elbow joint. When the cuff is correctly positioned it is secured with Velcro fasteners.

6.5: The participant is asked to place their arm on the desk top, so that the cuff is at about same level as their heart, and to breathe in and out slowly five times in a relaxed fashion. The rubber inflation tubing is connected to the Omron blood pressure monitor and, 'Start' on the monitor is pressed.

6.6: When the blood pressure result is displayed on monitor, the 'Retrieve' button on the computer is selected to transfer results from the monitor and then 'Accept' to complete the first measurement (see below). If there was a problem with the measurement, 'Reject' is selected and the measurement repeated.



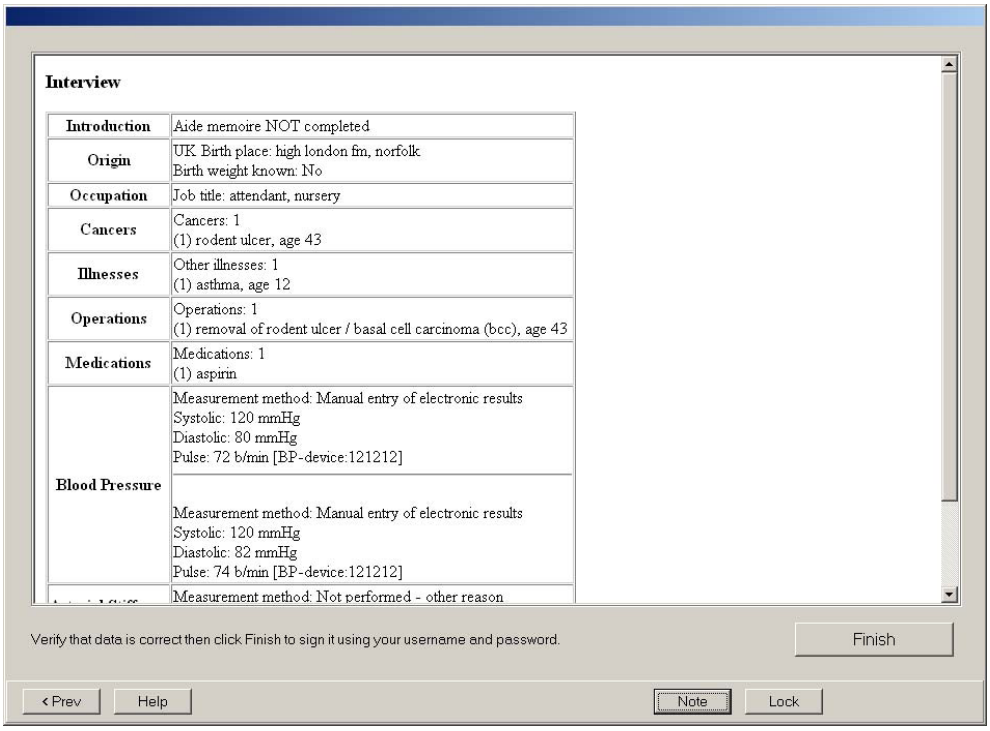
6.7: If the largest cuff size is too small for the participant, or if the electronic blood pressure monitor fails to produce a reading, a sphygmomanometer with an inflatable cuff is used in conjunction with a stethoscope. The IT system prompts the staff member to scan the sphygmomanometer by using the barcode reader before taking the measurement.

6.8: After completing the first measurement, the rubber inflation tubing is disconnected from the Omron monitor, with the cuff left in place. The participant is asked to gently shake their arm, and open and close their hand a few times. A timer in the computer ensures that the second blood pressure reading cannot be taken until at least 1 minute has elapsed. This rest period is used to complete the second part of the interview (Interview: Part 2).

7. Second measurement of blood pressure

7.1: The inflation tubing is reconnected to the Omron blood pressure monitor and a second reading is made using the same procedure as before (Section 6). Then the cuff is removed and 'Next' is pressed.

7.2: Interview and blood pressure data are checked on screen (see below) and any incorrect data corrected using the 'Prev' button to return to the relevant page, then 'Finish' is selected.



7.3: Any incidental findings are noted and recorded by clicking on the 'Note' button. Supplementary notes on the management of any incidental findings are included in Appendix 2: Procedures for dealing with potentially serious results and incidental findings.

7.4: The staff member logs off, removes the USB key from the computer and hands it to the participant, who is directed to the designated waiting area for the Physical Measurements station, or the Eye Measurements station in more recent versions of UK Biobank (see Assessment Centre Environment for history of changes).

8. Appendices

8.1 Appendix 1: Equipment list

Furniture	1 desk 2 chairs Modular partition dividers with curtains across entrance
Computing	1 desktop personal computer 1 monitor
Other Equipment	Omron 705 IT electronic blood pressure monitor (*OMRON Healthcare Europe B.V. Kruisweg 577 2132 NA Hoofddorp)* (with 4x AA rechargeable batteries) 1 small BP cuff 1 regular BP cuff 1 large BP cuff 1 tape measure 1x manual blood pressure monitor (backup if required) AA batteries (spares: non-rechargeable) PulseTrace PCA2 (*CareFusion,* San Diego, USA)

8.2 Appendix 2: Procedures for dealing with potentially serious results and incidental findings

8.2.1: Background

8.2.1.1: The Information Leaflet advises participants that the baseline assessment visit is not a health check. With the exception of the feedback of a limited range of measures (e.g. blood pressure, weight, lung function and bone density) at the end of the assessment visit, participants will not receive any feedback of their individual results. (The overall findings from research based on UK Biobank will, however, be made available to participants.)

8.2.1.2: Staff do not have the same duty of care that they would have in a clinical setting. Rather, their legal duty of care is determined by the research context, and relates to safe and competent collection of consent, questionnaire data, physical measurements, and blood and urine samples.

8.2.1.3: Assessment centre staff are trained not to provide interpretation of results. There may, however, be occasions when it is appropriate to draw attention to results (e.g. very high blood pressure) or incidental findings (e.g. suspected melanoma) that may be potentially serious (i.e. life-threatening).

8.2.2: Dealing with potentially serious results

8.2.2.1: At the end of the assessment visit, participants receive a printed summary of the results of a limited number of physical measurements made during the visit. This summary indicates whether any of these results fall outside defined desirable ranges depending on age, sex and weight (as relevant).

8.2.2.2: Staff may draw these findings to the attention of the participant, but should not attempt to interpret them. Instead, the person should be directed for relevant advice (e.g. stopping smoking; reducing dietary fat and salt) to leaflets available in the Assessment Centre and to NHS Direct (telephone 0845-4647 or www.nhsdirect.nhs.uk).

8.2.2.3: Participants found to have high blood pressure levels at the assessment visit are to be asked whether this is already being managed by their own doctor. If not, the person should be advised to discuss the result with their GP at the earliest opportunity.

8.2.3: Dealing with potentially serious incidental findings

8.2.3.1: An incidental finding is defined as an unexpected finding which is not part of the research assessment and may have clinical significance. Incidental findings may be identified at any stage of the assessment visit.

8.2.3.2: Incidental findings can be divided into two main types:

- Observational findings: Staff may identify observational findings that range from physical evidence (e.g. skin discolouration suggestive of melanoma) through to comments made by participants (e.g. threatened suicide); and
- Disclosed findings: Participants may voluntarily raise health concerns with staff during the course of the assessment visit (e.g. severe chest pain on exercise).

8.2.3.3: Potentially serious incidental findings identified during the Assessment Centre visit by any member of staff should be reported immediately to the Assessment Centre manager or their deputy. This senior member of staff should use their professional judgement to decide what action to take.

8.2.3.4: This may involve discussing the finding with the participant in a neutral manner (e.g. “Are you aware of changes in this mole?”) and, if it remains a serious concern, enquiring about any action already taken (e.g. “Have you asked your GP to look at this mole?”). Where no action has been taken regarding a potentially serous incidental finding, the participant should be advised to discuss it with their GP at the earliest opportunity. [Note: In an emergency, it would be appropriate to call for an ambulance or other appropriate assistance.]

8.2.3.5: A record is to be made in the comments section of the ACE IT system of actions taken for potentially serious incidental findings that are identified. These records will be monitored by the Coordinating Centre on a regular basis.