

# UK Biobank

## 12-lead (at rest) ECG

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Version 1.0

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

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This document details the procedure for the 12-lead (at rest) ECG performed at an Imaging assessment centre for UK Biobank.

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## 1. Introduction

**1.1:** This manual details the procedure for the 12-lead (at-rest) electrocardiogram (ECG) measurement at a UK Biobank Imaging Assessment Centre.

**Table 1:** Sequence of assessment visit

	Visit station	Assessments undertaken
1	Reception	<ul style="list-style-type: none"> <li>Welcome &amp; registration</li> <li>Generating a USB key for Participants</li> </ul>
2	Eligibility Section	<ul style="list-style-type: none"> <li>Eligibility questionnaire</li> <li>Consent</li> </ul>
3	Imaging scans	<ul style="list-style-type: none"> <li>Cardiac MRI scan</li> <li>Body MRI scan</li> <li>Brain MRI scan</li> <li>Whole body DXA scan</li> <li>Carotid ultrasound</li> <li>12-lead (at-rest) ECG</li> </ul>
4	Touchscreen	<ul style="list-style-type: none"> <li>Touchscreen questionnaire</li> <li>Hearing Test</li> <li>Cognitive function tests</li> </ul>
5	Interview & blood pressure	<ul style="list-style-type: none"> <li>Interviewer questionnaire</li> <li>Blood pressure measurement</li> <li>Measurement of arterial stiffness</li> </ul>
6	Physical measurements	<ul style="list-style-type: none"> <li>Height (Standing and Sitting)</li> <li>Hip &amp; Waist measurement</li> <li>Weight and Bio-impedance measurement</li> <li>Hand-grip strength</li> <li>Ultrasound Bone Densitometry</li> <li>Spirometry (Lung function test)</li> </ul>
7	Sample collection & exit	<ul style="list-style-type: none"> <li>Blood, urine and saliva sample collection</li> </ul>

**1.2:** At the start of their visit, each participant is issued with a USB key at the Reception station. This contains Participant ID, name, date of birth and gender. As the participant progresses between stations the USB key acts as an identifying token. The USB key is encrypted so can only be read by assessment centre computers. None of the participant's

test data is transferred to the USB key. At the end of the assessment visit all identifying data on the USB key is removed.

**1.3:** The Imaging Centre Environment Software (ICE) provides staff the required information to allow them to correctly identify and register a participant at the carotid ultrasound station.

**1.4:** This procedure is performed by a member of staff who has received suitable training and has been granted the relevant module permissions.

**1.5:** This procedure is performed immediately after the carotid ultrasound scan.

## 2. Equipment Preparation

**2.1:** The ECG GE Cardiosoft program is loaded into the workstation.

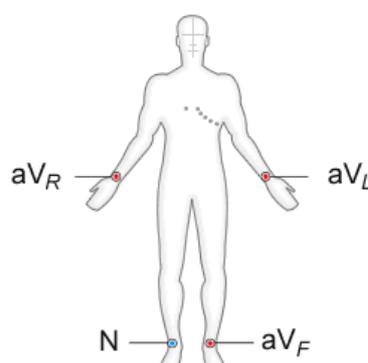
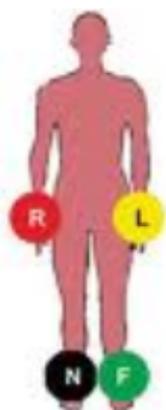
## 3. Participant Preparation

**3.1:** With the participant lying on the same couch used to perform the carotid ultrasound measurement, the ECG leads and electrodes are positioned as outlined below.

**3.2:** If the participant is particularly hirsute and the leads are not attached securely, then the chest area (where the leads are to be placed) may need to be shaved.

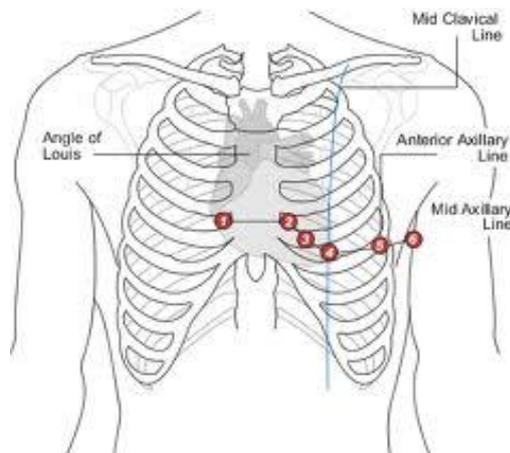
**3.3:** The limb leads are positioned as follows:

Lead	Description	Position of Limb Leads
aV <sub>R</sub>	Right arm (red)	Right forearm, proximal to wrist
aV <sub>L</sub>	Left arm (yellow)	Left forearm, proximal to wrist
N	Left leg (green)	Left lower leg, proximal to ankle
aV <sub>F</sub>	Right leg (black)	Right lower leg, proximal to ankle



**3.4:** The chest leads are positioned as follows:

Lead	Position of Chest Leads
C1	4 <sup>th</sup> Intercostal space, right sternal edge
C2	4 <sup>th</sup> Intercostal space, left sternal edge
C3	Midway between C2 and C4
C4	5 <sup>th</sup> intercostal space, mid-clavicular line
C5	Left anterior axillary line, level to C4
C6	Left mid-axillary line, level to C4



## 4. Modality measurement

**4.1:** Once the leads are positioned, the staff member selects 'ECG acquisition', then 'select again' and a 10 second countdown will complete (100% acquisition appears at the bottom of the screen).

**4.2:** After the 10 second period the member of staff is asked to click 'post-test review'. A summary screen is displayed (the 'interpretation' screen is not viewed).

**4.3:** The member of staff selects 'Initial screen' and 'quit program'. A brief ECG summary is shown.

## **5. Data collected**

The following data are collected and available in Showcase:

- ECG dataset
- Device identifier
- P and QRS duration
- Ventricular rate
- Suspicious flag raised by the device
- Number of automated diagnostic comments