

# RAPIER: Can a new hearing referral pathway reduce the time taken to diagnose and treat hearing problems in military personnel?

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<b>Registration date</b> 14/02/2020	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 12/12/2023	<b>Condition category</b> Ear, Nose and Throat	<input type="checkbox"/> Individual participant data <input type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

This study is exploring the potential for a change in the way that hearing healthcare is provided for people who work in the military. Due to their jobs, Armed Forces personnel are at much higher risk of hearing injury than the general public and therefore have more frequent tests of their ears and hearing as part of their work. This research will compare how long it takes for patients who have a hearing problem picked up on their routine hearing test to be reviewed, diagnosed and treated through the current pathway or through a new pathway.

### Who can participate?

Adults working in the Armed Forces

### What does the study involve?

The new pathway will use pictures/video taken of the ears with an automated hearing test performed with a boothless headset, meaning that a soundproof booth is not needed, and complete a questionnaire on a tablet computer. In order to do this people who are due for their routine hearing test will be offered the chance to join the study, if they chose to join they will be randomly allocated to either have their routine test or their routine test plus the new tests as well. The results of the hearing test and pictures will be sent securely to the Queen Elizabeth Hospital Birmingham where they will be reviewed by a team of specialists. The results will be returned electronically to the patient and GP. If a problem is found the patient will be offered an appointment in an optimised clinic the following week with the aim of requiring only a single visit.

### What are the possible benefits and risks of participating?

There are minimal risks as all tests are non-invasive and painless. There is also no immediate direct benefit to study participants. Patients in the new model arm may receive their diagnosis and management plan more quickly.

### Where is the study run from?

Queen Elizabeth Hospital, Birmingham (UK)

When is the study starting and how long is it expected to run for?  
April 2018 to June2024

Who is funding the study?  
The Ministry of Defence (UK)

Who is the main contact?  
Christopher Coulson, Christopher.coulson@uhb.nhs.uk

## Contact information

### Type(s)

Principal investigator

### Contact name

Mr Christopher Coulson

### Contact details

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## Additional identifiers

Clinical Trials Information System (CTIS)  
Nil known

Integrated Research Application System (IRAS)  
272239

ClinicalTrials.gov (NCT)  
Nil known

Protocol serial number  
CPMS 43759, IRAS 272239

## Study information

Scientific Title  
Remote Audiometric Performance Innovation Evaluation and Review (RAPIER) study

Acronym

## **Study objectives**

This study is exploring the potential for a change in the way that hearing healthcare is provided for people that work in the military. Due to their jobs Armed Forces personnel are at much higher risk of hearing injury than the general public and therefore have more frequent tests of their ears and hearing as part of their work. We will compare how long it takes for patients that have a hearing problem picked up on their routine hearing test to be reviewed, diagnosed and treated through the current pathway or through a new pathway. The new pathway will use pictures/video taken of the ears with an automated hearing test performed with a boothless headset, meaning that a soundproof booth is not needed, and complete a questionnaire on a tablet computer. In order to do this people that are due for their routine hearing test will be offered the chance to join the study, if they chose to join they will be randomly allocated to either have their routine test or their routine test plus the new tests as well. The results of the hearing test and pictures will be sent securely to the Queen Elizabeth Hospital Birmingham where they will be reviewed by a team of specialists. The results will be returned electronically to the patient and GP. If a problem is found the patient will be offered an appoint in an optimised clinic the following week with the aim of requiring only a single visit.

## **Ethics approval required**

Old ethics approval format

## **Ethics approval(s)**

Approved 21/02/2020, MOD Research Ethics Committee (MODREC Secretariat, Bldg 005, G02 Dstl Porton Down, Salisbury, Wiltshire, SP4 0JQ, UK; +44 (0)1980 956351; MODREC@dstl.gov.uk), ref: 996/ModREC/2020

## **Study design**

Randomized; Interventional; Design type: Screening, Diagnosis, Prevention, Device, Other

## **Primary study design**

Interventional

## **Study type(s)**

Screening

## **Health condition(s) or problem(s) studied**

Hearing injury

## **Interventions**

The population will solely include Defence personnel presenting to primary care for routine occupational hearing screening or due to self-reported problems with their hearing. The population will be drawn from four fixed locations, one of which will be Reservists, and one special forces.

Intervention: New model of hearing assessment with automated hearing testing, tympanometry, pictures/video of ear drums and structured history questionnaire.

Comparison: Currently occupational hearing screening and secondary care referral system.

Outcomes: Time from presentation to diagnosis and management, proportion of referrals that can be managed remotely (for both routine screening and acute presentations). Measurement of time required to assess and manage referrals via this model to predict resource implications.

This observational study will be run concurrently in four military locations remote to University Hospitals Birmingham. The use of multiple physical locations will increase the number of potential participants in the study, allow qualitative feedback to be collected from a larger number of clinicians and provide a more generalised estimate of effect size than a single location which may have a non-standard population. Service personnel due for routine hearing screening as part of their occupational health programme or presenting complaining of problems with their hearing will be offered the opportunity to join the study. If they consent they will be randomised to either the current hearing referral model or to have their routine assessment plus screening through the RAPIER service. Results will be securely linked back to UHB for review at the military hearing MDT. Following the weekly MDT diagnosis and treatment plan information will be returned to the unit medical officer via the same system. Comparison will be made between pure tone audiometry obtained in their base and audiometric results captured by the RAPEIR service.

### Test Measures

In addition to their routine screening protocol participants will receive:

Pure Tone Audiometry, tympanometry and endoscopic examination.

Unaided thresholds will be obtained via the Wireless Automated Hearing Test System (WAHTS) using pure tones up to 8kHz, tympanometry and i-endoscopic examination.

### Participant's questionnaires

A standardised history proforma will be used covering details of: age, previous noise exposure, previous ear problems/surgery, otological symptoms such as pain, discharge, tinnitus or balance problems as well as any previous hearing investigations.

All of these tests are non-invasive and non-painful.

Completing the additional tests will take less than 30 minutes and each subject will only complete the test battery once within the study period. The test will be completed in the following order: a) history via structured proforma b) video examination of the ears c) automated hearing test d) tympanometry (pressure testing). This is the most practicable order as this allows a patient to complete the history proforma without the attention of the medical officer or medic prior to clinical examination. Of the clinical tests the ears need to be inspected first to ensure the canals are not blocked with wax (which would falsely alter the results of the other tests) and tympanometry is an objective measure which does not require a patient's active participation so should be performed after the subjective pure tone audiogram.

### Data Analysis

Data will be collected on the time taken from screening abnormality to definitive diagnosis, the duration of time held on a temporary grading (if any) and the proportion of referrals that can be dealt with entirely remotely. The distributions of the times within each group will be assessed by visual inspection of Normal Q-Q plots and an independent samples t test will be used for the comparison of the two groups if the data for both groups appear to be approximately Normally distributed and a Mann-Whitney test will be used if they do not. Data will be compared to existing audit data on the Military Hearing Referral Pathway.

**Intervention Type**

Procedure/Surgery

**Primary outcome(s)**

1. Time from presentation to diagnosis and management
  2. Proportion of referrals that can be managed remotely (for both routine screening and acute presentations)
  3. Time required to assess and manage referrals via this model to predict resource implications
- The methods of measurement of these outcome measures cannot be disclosed at this time.

**Key secondary outcome(s)**

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**Completion date**

30/06/2024

**Eligibility****Key inclusion criteria**

1. Armed Forces personnel aged over 18 years
2. Written and spoken English of sufficient standard to complete hearing history on a tablet computer

**Participant type(s)**

Patient

**Healthy volunteers allowed**

No

**Age group**

Adult

**Lower age limit**

18 years

**Sex**

All

**Key exclusion criteria**

Does not meet inclusion criteria

**Date of first enrolment**

01/03/2020

**Date of final enrolment**

30/04/2024

**Locations****Countries of recruitment**

United Kingdom

England

**Study participating centre**

**Queen Elizabeth Hospital**

Mindelsohn Way

Edgbaston

Birmingham

United Kingdom

B15 2TH

## **Sponsor information**

**Organisation**

University Hospitals Birmingham NHS Foundation Trust

**ROR**

<https://ror.org/014ja3n03>

## **Funder(s)**

**Funder type**

Government

**Funder Name**

Ministry of Defence

**Alternative Name(s)**

MOD

**Funding Body Type**

Government organisation

**Funding Body Subtype**

National government

**Location**

United Kingdom

# Results and Publications

## Individual participant data (IPD) sharing plan

The data sharing plans for the current study cannot be disclosed at this time.

## IPD sharing plan summary

Data sharing statement to be made available at a later date

## Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Participant information sheet</a>	Participant information sheet	11/11/2025	11/11/2025	No	Yes