MRI Users Induction Pack (OHBA)

For those working with the MRI scanner

- OHBA Building Guide
- OHBA Building Access Request Form
- OHBA Fire Safety Guidelines
- Magnet Safety Instructions
- OHBA Accident Reporting Procedures
- WIN Computing Guide
- Data Security
- Responsibility of Researchers with Respect to Ethics
- Authorship Guidelines
- MRI Scanning Guide
- MRI Scanning Service Agreement
- OHBA MRI Minimum Attendance Policy
- OHBA MRI Emergency Subject Evacuation Procedure
- OHBA MRI Emergency Guidelines
- SOP: Dealing with Neuro Incidental Findings

All these documents are also available on the WIN intranet www.win.ox.ac.uk/support
The Oxford Centre for Human Brain Activity (OHBA) is part of the University Department of Psychiatry based at the Warneford Hospital, comprising (across two floors)

- Reception
- Siemens Prisma 3T MRI scanner and control room
- Elekta MEG scanner and control room
- EEG lab
- Brain stimulation lab
- Clinical rooms, Subject waiting area, Subject changing area and Disabled WC
- IT hub, Seminar room, Staff offices, Kitchen and Staff WCs

Access

Access into OHBA and associated buildings is enabled by swiping your University card in the reader located next to the main entry doors. If you do not have a University card then please contact the Department Administrator. Access to the main OHBA building will need to be approved by the director, Professor Kia Nobre, and is largely confined to those based within the OHBA building.

The OHBA MRI magnet is always on, and can represent a hazard. For that reason, it is important that you do not give access to anyone to OHBA unless they are your guest and you take full responsibility for them. If you lose or misplace your University Card, you must tell either the OHBA MRI Manager (01865 618215) or Lead Research Radiographer (01865 613194) as soon as you discover the loss.

Before access to the Centre is granted you need to attend magnet safety course annually and complete a one-off building induction. Magnet Safety Training is run at either FMRIB or OCMR (advertised on the WIN intranet). Differing categories of building access will be granted to different groups of staff using OHBA:

- OHBA residents: 7 days a week, 6am-10pm
- Regular users (non-resident): Monday-Friday 9am-5pm
- OHBA senior staff: 7 days a week, 24 hours

MRI control room access is restricted to radiographers, Senior MR Physicists, Siemens personnel, and members of staff who have completed advanced safety and scanner training (see SOP OHBA_006 Scan Operator Training).
Leaving the building

OHBA has an intruder alarm which automatically sets at 10pm every evening. Before leaving the main OHBA building you should check whether there are any other users still present.

If prior to 10pm and you are the last to leave the building:
- Ensure all windows and doors are closed and blinds drawn. In particular, check the window in the staff toilet downstairs.
- Switch off all lights.
- Set the alarm and leave swiftly ensuring the door shuts properly behind you.

If you remain in the building after 10pm it is your responsibility to manually deactivate the alarm prior to 10pm and activate it when you leave. You must ensure that you are the last person in the building.

General Safety & Security

Alarms

Fire: When the fire alarm is activated everyone in the building must leave by the nearest fire escape and move away from the building. The fire evacuation point is in front of the Psychiatry Main Building. There can be no delays in leaving the building except to remove a subject from the magnet. Leave all personal belongings behind.

Security: The main OHBA building is fitted with an intruder alarm, with keypads inside the main entrance lobby, next to the middle door (opposite the MEG lab) and by the staff side entrance. The alarm is activated and deactivated with a code that will be given to you during the building induction. The alarm will automatically activate at 10pm. It is your responsibility to ensure that you have vacated the building before this time.

If you mistakenly set off the alarm, or are otherwise aware of a false alarm please ring the University Security Control Room – 01865 272944 – immediately.

Scanner: There are also a number of alarms associated with the MEG/MRI scanner instrumentation. If you hear an alarm gong off in the scanner room then it is usually important that one of the members of senior staff be notified that the alarm is sounding. If you are uncertain whether someone should be notified please err on the side of caution and use the emergency contacts list on the scanner room door.

Disabled access toilet: There is a local alarm fitted in both of the disabled access toilets that is activated by pulling the red cord. Sounders activate in the OHBA reception, MEG lab area and the open plan offices. If you hear this alarm go immediately to the toilet to assess whether help is needed. If required contact the First Aider or emergency services.

Manual Handling

Activities that involve the manual lifting or moving of heavy items may only be carried out by individuals that have been on a manual-handling course. The main risk activity within OHBA is the lifting of subjects into the scanner, but this equally applies to the movement of many...
pieces of equipment about the Centre. The University runs courses throughout the year which can be booked via the Safety Office website (www.admin.ox.ac.uk/safety).

**Pregnancy**

If you become pregnant you should advise the Department Safety Officer, in complete confidence, at the earliest opportunity to discuss changes to your working practices during your pregnancy. Please note that there are no known risks to the unborn child from high magnetic fields but we recommend that you do not enter the magnet rooms during your pregnancy. For further information see the pregnant worker risk assessment at http://www.win.ox.ac.uk/support.

**Kitchen Area**

On the ground floor is the OHBA kitchen that is used for light refreshment for all staff. There is a hot water boiler, a coffee machine, a refrigerator and a microwave for your use, as well as a chilled water tap, for which a supply of reusable plastic cups is available. Tea, instant coffee and sugar sachets are provided by the department, and bottles of milk are delivered regularly and can be found in the fridge. If these run out, please replenish using stocks from the main Psychiatry department kitchen. There is also a coffee machine which uses coffee beans. If you would like to use this please see the instructions printed above the coffee machine which explain how to pay.

It is important to try to keep this area neat and reasonably clean please wash your own mugs to reduce the clutter. Also be aware that the kitchen is immediately adjacent to a work area so it is important to keep noise down to a tolerable level and consumption of odorous food should be kept to a minimum.

There is a cafeteria in the main Warneford Hospital, which sells sandwiches and snacks between 8am and 3pm and hot lunch between midday and 2pm. There are also associated vending machines close by.

**Parking and Bikes**

Parking directly outside of OHBA is strictly for research participants and OHBA visitors only. Please do not temporarily block cars that are parked outside. All vehicles parked on the Warneford site car parks will be required to display either a valid parking permit or pay and display ticket. Contact Moira Westwood (Departmental Administrator) for details about staff permits.

Cycle racks are also available outside OHBA in the bicycle shed. Please contact reception for the door code.
OHBA Building Access Request Form

Name (BLOCK CAPS): .................................................................................................................................

Group affiliation: ...........................................................................................................................................

Phone number: ................................................................................................................................................

Contact email address: ...................................................................................................................................

University Card number: ............................................... End date of contract/project: ......................................

Supervisor or line manager: ................................................................................................................................

OHBA Building Induction session – Date attended: ..........................................................................................

Magnet Safety Training Part 1 (FMRIB/OCMR) – Date attended: ......................................................................

Please tick which staff group category you fall into:

☐ Facility User (non-resident – typically for one study)           ☐ Regular Facility User (non-resident)
☐ OHBA Resident                                             ☐ OHBA Senior Staff

(Access to the MRI control room requires additional training, see SOP OHBA_004_V2 Building Access.)

I confirm that I have received a copy of and read the Fire Safety Guidelines, the OHBA Building Guide and the Magnet Safety Instructions. I fully understand their content and agree to abide by these guidelines and comply with their conditions fully. I will attend magnet safety training on a yearly basis while I am working at OHBA. I understand lending my University Card to another individual to allow access to OHBA is not permissible.

Signature: .................................................................................................................................Date: ..............................................

Personal data supplied on this form is treated in accordance with the WIN building access data protection policy, available upon request.

----------------------------------------- FOR INTERNAL USE ONLY: ----------------------------------------

Authorised by (#): .......................................................................................................................................... 

Approved access category:

☐ Collect card from reception (non-resident one-study users)   ☐ Monday-Friday, 9am-5pm (non-resident regular users)
☐ 7 days a week, 6am-10pm (OHBA residents)                   ☐ 24/7 (OHBA senior staff only)**

Approved by (**): ........................................................................................................................................

# MRI Manager or Lead Research Radiographer
**OHBA Professor of Imaging Neuroscience for 24/7 access including MRI (see www.win.ox.ac.uk/support for contact details and SOP OHBA_004_V2 for criteria for this sign off).
OHBA Safety Guidelines

General Responsibilities in the Event of a Fire

By signing the enclosed signature sheet, I accept the responsibility:

1. to understand fully these guidelines and ask for clarification, if in doubt.

2. to prevent possible causes of fire (no smoking is allowed within OHBA and please switch off all electrical appliances when not in use or when you are the last to leave OHBA).

3. to be familiar with the operating of the Fire Alarm System (see next page)

4. to raise the alarm immediately upon discovering, suspecting, or hearing report of a fire and to call 999 to confirm a real fire stating: Fire at OHBA, Department of Psychiatry, Warneford Hospital, OX3 7JX.

5. to know where the Fire Alarm Break Glass Units are located, particularly in your work area.

6. to know the location of fire extinguishers, particularly in your work area.

7. to attend a University of Oxford Fire Safety Course.

8. to know where the fire exits are located.

9. to see that these fire exits and all staircases, landing and corridors are kept free from obstructions.

10. to see that all fire exits are immediately and easily accessible from the inside.

11. to see that fire doors are KEPT CLOSED (and NOT PROPPED OPEN) at all times and on hearing the alarm to close all doors to prevent the spread of smoke and fire.

IF YOU ARE WORKING IN THE MRI SCANNER OR MEG PLEASE SEE THE LOCAL RULES FOR THAT AREA FOR FURTHER FIRE POLICIES.
**FIRE ALARM ACTIVATION**

- By breaking the glass on any fire alarm call point (only requires push action).
- Automatically when heat or smoke from a fire is in contact with the relevant type of automatic detector head, where these are installed.

**RAISING THE ALARMS**

Any person suspecting/discovering a fire should immediately:

USE NEAREST FIRE ALARM BREAK GLASS UNIT
CALL 999 TO CONFIRM A FIRE WITHIN OHBA
CLOSE THE DOOR ON THE FIRE
EVACUATE BUILDING

**ON HEARING THE ALARM**

- Stop all work.
- Do not continue telephone calls or collect any belongings.
- Close all doors and windows behind you and leave the building.
- Evacuate the building and report to the Fire Evacuation point outside the Main Entrance to the Department of Psychiatry Building. Take any people out of the work areas en route.
- Do not re-enter OHBA until authorised to do so by the Fire Officer.

**MRI**

- If scanning, IMMEDIATELY remove subject from magnet then press the emergency power down button (not the quench button) located to the left of the scanner control computer or in the scan room, and evacuate OHBA.
- MRI Authorised members of Personnel have the responsibility of locking the MRI scan room door before leaving the unit.
- If the fire is in the MRI scan room itself, and the Fire Officer or fire brigade require emergency access to the magnet room itself, then a suitably knowledgeable member of staff should be summoned to press the EMERGENCY QUENCH button located in either the MRI scan room or MRI control room and evacuate the area.

**MEG**

- No specialist precautions need to be followed.
- Evacuate the area and building as per the general OHBA fire guidance listed in Section 5 above.
MEDICAL GASES IN FIRE CONDITIONS

- Gas cylinders must be kept in designated areas only. In the event of a fire, all cylinders not involved in the fire should be moved to a safe place, if possible. Make sure that before moving cylinders, valves are turned OFF.
- Cylinders and medical gas installations should be kept as far as possible from all sources of heat and temperatures above 49°C (120°F).
- Oil, grease or other combustible substances should never be used on valves, gauges, regulators or any fitting associated with medical gas cylinders or installations.
- Oxygen presents particular hazards. Use of open flame or soldering equipment should be strictly prohibited if oxygen from a piped supply or cylinder is in use within 6 metres.
Magnet Safety Instructions

For anyone working in buildings housing MRI Magnets

The MRI scanners at WIN are built around high field superconducting magnets. The magnets are at least 50,000 times stronger than earth's magnetic field and are always on. The following procedures must be followed at all times when working in the magnet areas.

1. The magnets are always on, 24 hours/day, 365 days/year; therefore, these instructions must be followed at all times.

2. The magnets are within ‘Controlled Areas’, which can only be accessed by a trained operator. If you are running an experiment, the operator will give you access to the controlled area for the duration of your scanning session.

3. The biggest safety concern is the strong pull that the magnets exert on some metallic items. This includes keys, coins, scissors, wheelchairs, screwdrivers etc. No ferromagnetic item may be taken into the magnet rooms, and must be left in the lockers outside the controlled area, or in the subject room.

4. Some individuals may have metal in their bodies, either as a result of surgery or an accident. Therefore, it is essential that anyone who enters the controlled area be screened using the Magnet Safety Screening Form.

5. All researchers must fill in a Magnet Safety Screening Form annually. If there are any changes to a researcher’s condition (for example surgery or pregnancy) that could affect their suitability to enter the magnet rooms, they should not enter the controlled area, and seek advice from the radiography staff.

6. Any person, whether visitor or scanner subject, that wishes to enter the controlled area must be screened using the Magnet Safety Screening Form. The procedure is outlined in the SOP: Screening Subjects for Safety to Scan, which should be read by all those admitting someone to the controlled area.

7. In the event of an emergency around the magnet areas follow the appropriate emergency procedure (posted on the walls in the control room). Make sure that a physicist or operator has been informed – contact phone numbers are posted near the magnet rooms if the emergency is out of normal hours.
In the event of an emergency, the appropriate emergency services should be summoned.

- Call 999 for emergency medical assistance
- Call 999 in the event of a fire
- Call 01865 289999 for University Security Services

In the case of a medical emergency or any other form of accident, however small, you should report it. Examples would include cuts, bruises, needle jabs etc. that occur as accidents or incidents within OHBA.

As a first point of call speak to the lead radiographer or MEG physicist (Juliet Semple or Sven Braeutigam).

Other than for very minor incidents, an accident/incident form should be completed, signed by your supervisor or line manager and sent to the Departmental Safety Officer.

The senior radiographer and MEG physicist should also be informed if staff are aware of a near-miss incident, for example where someone could have been injured or put at risk, even if no injury actually occurred.

Department Safety Officer: Phil Burnet – 01865 223621 - phil.burnet@psych.ox.ac.uk
Centre Safety Rep: Sven Braeutigam – 01865 283816 – sven.braeutigam@psych.ox.ac.uk
WIN houses advanced data processing and storage facilities, which are available to researchers working at FMRIB or OHBA.

A flat fee charging model is now in place. The charges are:

- £125 per month (£1500 p.a.) for a normal account
- £17.50 per month (£210 p.a.) for a low usage account

In addition, there are free accounts for users that only need to download data. If you will be collecting MRI scans at the Centre you will require an account to access the data, even if you plan to analyse this elsewhere.

**Low usage accounts** have no access to the cluster and 10GB of storage space.

**Normal accounts** have full access to the cluster plus 200GB of scratch (temporary) storage space and 20GB of storage space in the home directory.

There are no charges based on compute time.

Additional disk charges will be incurred for space beyond the normal account allocation. Charges start at £15 pa for a 50 GB block, but prices for very large storage requirements will be negotiated on an individual basis, depending on current prices and provisions.

It is a University IT statute that accounts are NOT shared, so every individual who needs access to the Centre’s IT facilities will require their own account.

**To obtain a WIN computing account:**

1. Log-in to [https://register.fmrib.ox.ac.uk/](https://register.fmrib.ox.ac.uk/) using your Oxford username (SSO).
2. Click on update profile and fill in your details. Use the Computer Account(s) box at the top right of the page to request an account. Please make sure to enter your grant code provided by your PI. If the code is new, you will need to contact computing-help@win.ox.ac.uk to add it to the system for the first time.
3. You will be notified when your account has been set up. You will need to visit FMRIB in person to collect your login details.
4. An introduction to the computing facilities and extensive user guides are available at [www.win.ox.ac.uk/support](http://www.win.ox.ac.uk/support).

**Display Screen Equipment Assessment**

Please be aware that the use of computer equipment (Display Screen Equipment) for extended periods can result in upper limb disorders. Users are advised that frequent short breaks from their computers, for example 5-10 minutes after 50-60 minutes of activity should be planned to reduce the risk. Your department can arrange for an online training and assessment procedure and should this reveal problems. If you are experiencing discomfort you can request an assessment by a DSE Assessors, (Duncan Mortimer: duncan.mortimer@ndcn.ox.ac.uk or Dave Flitney: david.flitney@ndcn.ox.ac.uk for those at FMRIB), who can advise or refer you to the University’s Occupational Health Service. Your Department Safety Officer can also give details on how to arrange for an eyesight test, the cost of which, for University employees, will be met by the Department.
Data Security
Guidance for Researchers

All data containing personal details needs to be dealt with in a responsible manner, protecting the individual’s identity and complying with General Data Protection Regulation (GDPR).

The Data Protection Act requires that any personal data held is secure, accurate and relevant.

Personal Data includes any material that contains personal details (name, date of birth, contact details, initials etc). Within WIN, this includes paper and electronic files containing contact information, patient history or un-anonymised image data.

Data that does not contain personal details are not subject to the same restrictions, but should be handled in a careful, sensitive and responsible manner, with care taken to avoid loss of the data.

For full and up-to-date guidance on data security visit
- www.infosec.ox.ac.uk
- researchsupport.admin.ox.ac.uk/gdpr

Area of greatest risk

The areas of greatest risk are portable media (portable hard drive, memory stick etc) and laptops, which can easily be removed from the Centre and be lost or stolen, or data that is stored on cloud services (Google Drive, Dropbox etc.). Particular attention should be paid to these. Your attention is also drawn to image data within presentations (see below), which are often given outside the Centre.

Action points

- Personal Data must be kept in a secure manner that minimises the risk of loss or inappropriate access.
- Paper (including lab books, image printouts) or removable media (CDs, memory sticks) containing Personal Data must be appropriately filed, preferably in locked cabinets/drawers. They must not be left lying around the Centre.
- Personal Data stored in computer files (e.g. excel files, databases, contact details, test scores) must be either stored on the WIN central file server or encrypted to an appropriate standard (see below). Efforts should be taken to avoid other users viewing such data, such as changing the access permissions using the chmod command (https://sharepoint.nexus.ox.ac.uk/ZGZNPW)
- All image data should be anonymised, and the key held either in a secure database (such as the WIN scan database), on the WIN central file server, or encrypted (see below). Image files that contain subject details (e.g. un-anonymised DICOM) must be securely stored (CDs/memory sticks locked away, directories encrypted).
- Anonymised data must not be stored in directories that would identify the subject (e.g. by initials or name).
- All Personal Data should remain within WIN as a general principle. If data needs to be removed from the centre (e.g. for analysis at home/another site), the personal details must be removed from the data, or the data encrypted to an appropriate standard (see below).
Deletion of data and disposal of media

Data that are no longer needed must be disposed of in an appropriate way to ensure destruction of the personal data.

- Personal data must be deleted from hard drives when no longer used. Merely deleting the file on the disk is not enough, but it needs to be securely erased.
- Paper records should be shredded.
- CDs should be shredded or given to WIN IT staff for destruction.
- Hard drives should be securely erased (see above website for details) or given to WIN IT staff for destruction.

Presentations

It is important that any presentations you give do not contain personal data. This particularly applies to image data that can contain personal information, either on the image itself or embedded within the DICOM header (if DICOM-based formats are used). For still and movie images of subjects/patients, a non-DICOM based file should be used (e.g. JPEG, GIF, TIF, AVI, MPEG), and created without personal data incorporated into the image.

Subject names or initials should not be used on any slides.

Encryption

Encryption involves the use of a unique code to disguise data, and without the code, the data are nearly impossible to decipher. The process can be straightforward but involves installing encryption software, of which there are several versions available freely. Full instructions on this can be found at https://internal.fmrib.ox.ac.uk/i-wiki/Computing/Data.
Responsibility of Researchers

with respect to research ethics

1. WIN seeks to promote best practice in research ethics in all studies carried out at the Centre.

2. All scans done at WIN must be carried out with due attention to the appropriate ethical practices, whether that be CUREC or NRES ethics, or the technical development SOP.

3. The Principal Investigator who is named on the ethics application is primarily responsible for ensuring that all procedures carried out are in line with their protocol and ethical approval, and that all researchers with delegated responsibilities are appropriately trained and competent to carry out their tasks. WIN does not take on responsibility to check every detail.

4. The primarily responsibility of the radiographer or scanner operator during scanning is to ensure the safe scanning of the participant. If the radiographer or scanner operator is not confident that the participant can be scanned safely they will decline to scan the participant.

5. In line with the guidance given in the HCPC Standard of Conduct, Performance and Ethics, radiographers or scanner operators, should only scan when they have seen a signed consent form for that participant and that study. In the case of scans done under the technical development SOP this would be the signature on the participant’s scanning log. This is their check that some form of ethics approval and consent process has been undertaken, however it remains the researchers, and ultimately the PI’s responsibility to ensure that consent was appropriately given.

6. Recommended procedures and practices relating to MRI research can change over time, and radiographers and other centre staff are there to help with this. If current best practice changes then researchers should ensure that these new procedures are followed and, when necessary, ethics amendments made in a timely way.

7. If any researcher or centre member has concerns that best practice in research ethics is not being followed then they would take this up, in the first instance, with the PI. If concerns remain then the issue should be raised with the Centre Director and if necessary CTRG.

8. As well as any auditing or checks that may be carried out by CTRG, the centre will periodically carry out random checks on the site file of one study to ensure that proper procedures are being carried out. This includes correct forms being used, dates being appropriate, delegate logs being up-to-date and subject paperwork being in order.
Authorship Guidelines
For WIN Researchers

WIN, and its predecessor centres, has always aimed to have a constructive and appropriately inclusive approach to paper authorships. To ensure that credit is given not only to researchers who have contributed intellectual material and effort, but also those that contribute “behind the scenes”, WIN has guidelines on “early-use” tool and data co-authorships and identifying co-authorships and acknowledgements in practice.

Guideline for “early-use” tool/data co-authorships

If a tool/data creator has significant direct involvement in a study, then in general they can expect to be included as an author in a resulting paper (regardless of how long the tool has been in existence). This “early-use” guideline is not related to these cases, but rather to the case where a researcher has created a valuable new tool/dataset, and this is then used by other researchers without direct involvement of the creator. It is reasonable for the very first studies that take advantage of the tool/dataset creation to include the creator as a co-author, but the number of “early-use” studies doing this needs to be limited in a reasonable way.

The guideline is that the number of “early-use” studies (that should include the tool/dataset creator as a co-author without their significant direct involvement in the study) should be the square root of the number of full-time-equivalent months of work that went into the tool/dataset. For example, a researcher spending a solid year to develop a new MRI pulse sequence could expect to be included on the first 4 papers utilizing that sequence (in addition to their own papers that they should be generating from the research).

It will be the responsibility of group leaders to keep a list of the relevant tools, MRI pulse sequences and datasets, created by their group members, along with the estimated effective number of months' work that went into creating these. This list will be kept up to date on the WIN intranet, at http://www.win.ox.ac.uk/support. The group leaders will also email around the centre when a new tool/sequence/dataset becomes available, primarily to let people know about its availability, but also to let them know who the creator is; this should help minimize surprise at later authorship requests.

Support from Core Centre Staff

WIN is fortunate to have some extremely experienced support physicists, radiographers, experimental, IT and other support staff to facilitate the research of the Centre. Many Centre members benefit in some way from their specific support in a study and acknowledging this help is always appropriate. We do not prescribe a form of words to put in acknowledgements, but we encourage authors to acknowledge teams, and in some cases individuals, without whom the research would not be possible. For example, scanning projects acknowledging the radiography team, and high-performance computing projects acknowledging the computing team.

Some projects benefit from significant direct involvement of a radiographer, physicist, computing expert, or other member of the core support staff who invests specific time, expertise and intellectual input into a project. In these cases, it is generally appropriate to include that individual as an author. If you are unsure as to whether it is appropriate to include a member of core staff as an author, then seek advice from your group leader or member of the WIN management board.
Guideline for identifying co-authorships and acknowledgements in practice

To ensure that the above guidelines are implemented in as fair and simple a way as possible we want to give people the opportunity to request co-authorships when appropriate. Such requests need to be reasonable, and final decisions on authorships will of course continue to rest with any given study’s senior researcher (typically the senior author on the paper).

We request that a paper’s first author will notify all WIN members the paper title; author-list; abstract; acknowledgements, shortly before submission (minimum 2 weeks is recommended), in order to allow for any additional co-authorships to be requested. This should be done by emailing these details to admin@win.ox.ac.uk and we will ensure that the notification is circulated to all WIN members, within a week.

If someone has contributed to the study and feels they have been overlooked, this is their chance to discuss this with their supervisor/line-manager. Where a group leader is keeping a list of “early-use” authorships, this is their chance to request an “early-use” co-authorship on behalf of the tool/dataset creator. We would try to limit the number of “early-use” authorships to just one for any given paper, which may require a little co-ordination between group leaders.

Following these guidelines will require almost no extra work on the part of the paper authors, will not delay their submission, and will be very little work for centre members and group leaders who would briefly read upcoming paper titles & abstracts. This might even help raise awareness of what research is going on across the centre and increase collaboration! Ultimately, the most important aim is to be fair and support the work of all centre members.

Heidi Johansen-Berg
Director, Wellcome Centre for Integrative Neuroimaging
MRI Scanning Guide
Running Projects on the FMRIB and OHBA scanners

Starting a new project at the WIN, particularly if you do not already have a close link, can appear daunting. However, we welcome new researchers and collaborators, and the following document is intended to help you find the right help, and complete the necessary procedures as quickly and easily as possible.

**Step 1 - Making Initial Contact**

All studies carried out at **FMRIB** need to be signed off by the WIN Centre Director, Heidi Johansen-Berg ([heidi.johansen-berg@ndcn.ox.ac.uk](mailto:heidi.johansen-berg@ndcn.ox.ac.uk)). If you have not had contact with her already, it is a good idea to do so as early as possible.

To manage the scanner schedule at FMRIB, projects are divided into group allocations, each one managed by a different booker (listed below). Again, it is a good idea to contact the relevant group early on to discuss your requirements. If you are not clear which is the appropriate group then contact [nancy.rawlings@ndcn.ox.ac.uk](mailto:nancy.rawlings@ndcn.ox.ac.uk), who can advise.

<table>
<thead>
<tr>
<th>Project Group</th>
<th>Booking Group Moderator</th>
</tr>
</thead>
</table>
| Physics and Development       | Alex Smith  
alex.smith@ndcn.ox.ac.uk                                      |
| Pain and Anaesthetics         | Katie Warnaby  
katie.warnaby@ndcn.ox.ac.uk
Vishvarani Wanigasekera  
vishvarani.wanigasekera@ndcn.ox.ac.uk |
| Plasticity and Rehabilitation | Iske Marshall  
iske.marshall@ndcn.ox.ac.uk
Melanie Fleming  
melanie.fleming@ndcn.ox.ac.uk |
| Psychiatry and Neurology      | Ludovica Griffanti  
ludovica.griffanti@ndcn.ox.ac.uk |
| Cognition                     | Patricia Lockwood  
patricia.lockwood@psy.ox.ac.uk |

All studies carried out at **OHBA** need to be signed off by Kia Nobre ([kia.nobre@ohba.ox.ac.uk](mailto:kia.nobre@ohba.ox.ac.uk)). If you have not had contact with her already, it is a good idea to do so as early as possible. To discuss MRI projects at OHBA please contact Clare Mackay ([clare.mackay@psych.ox.ac.uk](mailto:clare.mackay@psych.ox.ac.uk)).
Step 2 – Project Planning and Ethics

Planning a Project
With many things to arrange to get your project started, you will find that making early contact with our Radiography Team invaluable. They can help you think about practical issues to do with running your MRI project, advise on sequences and show you how to get help with stimulus presentation, recruitment, screening and other issues. You may find it useful to start filling in a project code request form (see below) at this stage, which will prompt you on a number of things to think about when planning your study. You can contact the Radiography Team at radiographers@win.ox.ac.uk. The team can also put you in touch with Centre physicists if your MRI protocols need development.

Standard Operating Procedures
It is essential that you are familiar with the Centre’s Standard Operating Procedures, particularly in relation to dealing with incidental findings on participants’ scans. A copy of this SOP is in the induction pack.

The other SOPs that may be relevant to your research are
- Screening subjects for safety to scan
- Informed consent
- Ethical considerations for technical development scans
- Safety considerations for rapidly acting drugs
- MRI scanning in children aged 6-15

All SOPs are available on the WIN intranet at www.win.ox.ac.uk/support.
If you plan to use tDCS/tACS, EEG or pain devices in the scanner environment then additional procedures or training may be required.

Applying for Ethics
There are several routes that you can take to apply for the necessary ethics approvals for your project:
- CUREC - https://researchsupport.admin.ox.ac.uk/governance/ethics
- HRA - well summarised at www.admin.ox.ac.uk/researchsupport/ctrg/

If your project fits within the standard MRI protocol defined by CUREC then you can apply for a CUREC1 approval. If your experiment doesn’t fit within the standard MRI protocol then it may fit under a CUREC2 process. To apply for either of these approvals:
- Download the latest forms from the CUREC website (https://researchsupport.admin.ox.ac.uk/governance/ethics), enter the relevant details and make appropriate edits to the forms.
- Download the WIN CUREC1/2 checksheet (www.win.ox.ac.uk/support) and make all the necessary checks.
- Email all documents to ethics@win.ox.ac.uk who will check your application and give you the necessary Department signature.
- Submit your forms to the Medical Sciences Division IDREC (ethics@medsci.ox.ac.uk) to receive approval.
- Please note that you must submit your application for the WIN check before submitting it to the Medical Sciences Division. Failure to do so may result in a delay in starting your study.

If your study is more complex or involves patients then you may need to use the HRA or CUREC3 routes. Further details are at www.win.ox.ac.uk/support or on the CUREC and CTRG websites. If you have questions about the ethics procedures involving MRI scans then email Nancy.Rawlings@ndcn.ox.ac.uk.
Some scanning can be done without CUREC ethics approval if it is for the purposes of technical development. If you think that this applies to your scanning then read the SOP on Technical Development Scanning available from [www.win.ox.ac.uk/support](http://www.win.ox.ac.uk/support). Discuss with the WIN physics group or the radiography team if you think this applies to you.

**Work in Progress Meetings**

Any study that runs at WIN needs to be presented at a ‘Work in Progress’ meeting which are held on Wednesdays. This allows others in the lab to give you valuable input into your study design, execution and analysis. You can choose whether to present before ethics approval is sought, or after, but you will not be able to start scanning if this has not been done. To arrange to present then please contact Janine.Bijsterbosch@ndcn.ox.ac.uk at FMRIB or Nico Filippini at OHBA (nicola.filippini@psych.ox.ac.uk).

**Experienced researchers**

Since running an MRI experiment is complex, involves risks and is expensive, it is essential that researchers are suitably experienced to deal with the participant, run the stimulus presentation and support in the case of an emergency. New MSc or DPhil students or those new to MRI must be supervised by an experience researcher for the first few sessions until the supervisor and the Centre staff are confident that the individual can run the study on their own.

**Stimulus presentation and analysis advice**

All the scanners have computers which run the ‘Presentation’ software for stimulus presentation. Extensive help on the stimulus presentation options are available at [www.win.ox.ac.uk/support](http://www.win.ox.ac.uk/support). If you have questions on any aspect of stimulus presentation then contact the Experiment Support Team (Sebastian.Rieger@psych.ox.ac.uk; Chris.Gallagher@ndcn.ox.ac.uk; Nicola.Filippini@psych.ox.ac.uk). If you are taking new equipment into the magnet room, then an equipment protocol will need to be written and its safety checked by one of the Centre staff. Template equipment protocols are at [www.win.ox.ac.uk/support](http://www.win.ox.ac.uk/support).

If you have questions about how to analyse your data, then others in your research group with MRI experience are often an excellent place to start. If you need further advice, or don’t have anyone locally you can speak to then contact Mark.Jenkinson@ndcn.ox.ac.uk.

**WIN Project Code**

A Project Code request form is available at [www.win.ox.ac.uk/support](http://www.win.ox.ac.uk/support). You can start filling this in at any time, as it prompts you about many of the important aspects of running your study. Once completed send the form to radiographers@win.ox.ac.uk, who will get in touch and arrange a meeting to discuss the study with you. Once the details of the study (including scan charges) have been agreed and signed off by the Centre Director, the radiographers will then assign you a project code which you use to book time on the scanners.

**Step 3 – Scan Costs and Charging Policy**

**Scan costs**

Scans are billed on a monthly basis, when a list of scans completed on project codes are sent to the PI and researcher. Researchers are charged on a ‘per-scan’ basis, where the appropriate charge per scan should reflect the scanner-hours required by the project including appropriate set up time. Indications of the amount of scanning time that can be accommodated in sessions of various lengths are given below. Advice on protocol durations can be obtained from the radiographers at any point, from grant proposal to pilot.
The current per-hour rate for scans are £550/hour on 3 Tesla scanners and £750/hour on the 7 Tesla scanner. Overnight scans (e.g. for scanning post mortem tissue) are charged at £1100 on the 3T and £1500 on the 7T.

If a lower scan rate was used in a grant application, then the use of this rate must be approved by the WIN Centre Director at the time of project registration. Similarly, if scans are requiring more time than initially planned for and additional funding is not available, researchers may contact the WIN Centre Director to discuss the use of a different rate.

Up to two pilot scans per project can be obtained without charge. These should be booked under the researcher’s own scan code and the operator will indicate these at the time of scan registration so that no charge is made. Researchers can use a reasonable amount of late availability time (time not booked within 1 week of the session start) for testing stimulus presentation, setting-up or troubleshooting a protocol by booking under a generic testing project, without charge. Radiographers will make these bookings.

Failed or Partial Scans
If a full data set is not collected due to a fault of the scanner, errors by the scanner operator or failure of the shared stimulus presentation equipment then the scan will not be chargeable. However, if researchers are using a developmental scanning method as part of their protocol, and this scan fails, then the scan will still be chargeable.

If a subject does not undertake the scan at all due to claustrophobia, not being safe to scan or similar reason then, provided the researcher has taken appropriate steps to avoid this happening (see below), the scan will not be chargeable. If a partial data set is acquired before the subject decides to withdraw then a pro-rata charge can be requested. If a scan is not completed due to the subject turning up late, not turning up at all, or cancelling at the last minute, then the full scan rate will not be chargeable, provided the researcher has taken steps to avoid this happening (see below).

Cancelled Scans
If a researcher does not turn up for a slot they have booked then they will be charged the full scan rate for that slot. Researchers will also be charged if they cancel within 24 hours of the slot starting for a reason other than a subject cancellation or researcher illness.

If a researcher cancels a slot within 1 week of the slot starting, and another researcher does not eventually use the slot, then they may be charged the full scan rate for that slot. This is intended to reduce researchers ‘blocking’ slots.

If a researcher is not taking appropriate steps to avoid subjects arriving late or cancelling at the last minute (see below) then these slots will be treated as a researcher ‘no-show’ and a full scan rate charge will be made. If a scan is not completed due to failure of researcher specific stimulus presentation equipment or the researcher not booking enough time for their requirements, then a full scan charge will be made.

**Guidance on protocol lengths for a given scan slot**

<table>
<thead>
<tr>
<th>Scan session duration</th>
<th>Length of protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 minutes</td>
<td>15 minutes</td>
</tr>
<tr>
<td>1 hour</td>
<td>45 minutes</td>
</tr>
<tr>
<td>1 hour 30 minutes</td>
<td>70 minutes</td>
</tr>
</tbody>
</table>
Budgeting for scan fees in grant applications

It is vital that researchers have sufficient funding for MRI scans in their grant proposal. To assist researchers in their grant proposals, the radiographers, with input from physicists and other centre staff, are happy to advise on estimated protocol durations to achieve the goals.

Researchers should also factor into their subject numbers some level of subject attrition.

It is appreciated that it is often a considerable time between the grant submission and a project starting, and protocols may need to be lengthened in the light of recent scanning development. However, a compelling scientific case for extending the scan time without increasing the charge will need to be made to the WIN Centre Director.

Step 4 – Making scanner bookings

Registering for the booking system

To book the scanning facilities you need a WIN Project Code. To do this you first need to register your username with the WIN Bookings system. At present, you have to do this yourself, as it is not possible to automate the process.

1. Visit https://calendo.fmrib.ox.ac.uk/bookings/ and ‘Register New User’.
2. Enter your Oxford Single-Sign On (SSO).
3. You will shortly receive confirmation that you have been registered with the system.
4. Return to the same page as above and now login with your username and password.

You can then use this system to make bookings on the scanner, testing rooms and offices. Further guides on how to do this are at www.win.ox.ac.uk/support.

FMRIB Scanner Booking Policy

Booking period

- Bookings are made within a two-month booking period. These are Jan/Feb, Mar/Apr, May/Jun, Jul/Aug, Sep/Oct, Nov/Dec.
- If you have a clear need to book beyond one these booking periods, then please contact your group moderator with the request. However, such a booking would be unconfirmed at this time.
- At least one month before the start of each booking period, the group moderators will ask for estimates of the scanner time required by each project. These will be discussed and allocations for the booking period under discussion will be agreed.
- Straight after this meeting, advanced requests will be entered into the calendar. After this, general booking for that period will be opened up.

Allocations

- Each project may book within its allocation, subject to any rules determined by the group moderator, and subject to the approval of that moderator.
- Should, for some specific reason, you need to book within an allocation of another group then you should contact your group moderator who will negotiate an appropriate time swap and make the booking.
- Although most slots are covered by radiographers or scan-ops, a message box will pop up during booking if it is not. Please only book these slots if you have arranged operator cover with the radiographers separately.
- The Physics and Cardiac allocations have slightly different rules which the relevant groups can make you aware of.

Making bookings

- Please make an individual booking for each subject, even if you are running several subjects back-to-back, so that the radiographers can see how the schedule will run.
- Please also use the correct project code, again so that the radiographers can prepare for the slot. If, for whatever reason, you have had to make a booking under a different project code then please update it to the correct project code as soon as possible.
● For weekend bookings, please put the scan-op (or if it’s TBC) in the booking comment.

Radiographer/Scan-op cover
● Radiographer or scan-op cover is provided for nearly all of the period between 8am and 8pm from Monday to Friday. Please make use of this provision.
● If you need to book outside of the covered time then please speak to the radiographers about how you arrange operator cover.

OHBA Scanner Booking Policy
● Bookings can be made up to 8 weeks in advance.
● Projects with specific requirements for a longer-term booking can be negotiated with the OHBA Director/associate Directors.
● Radiographer cover for slots will be established up to 8 weeks in advance and indicated on the calendar.
● Bookings for one project should not exceed 6 hours per 15-day period.
● Projects with specific requirements for a higher frequency slots can be negotiated with the OHBA Director/associate Directors.

Making bookings
● Each separate scan should be made as an individual booking. If a session is to be used for several subjects, then multiple individual bookings should be made. Bookings cannot be made for longer than the time specified in the project, however it is possible to book for a shorter time if, for example, doing multiple subjects back-to-back does not require as much time.
● Bookings should be made using the correct project code. If, for whatever reason, researchers have had to make a booking under a different project code then it should be updated to the correct project code before the scan takes place.

Length of bookings
● The single biggest cause of overruns and delays is due to an insufficient amount of time being booked for a scanning session. Overruns frequently lead to lost data and acrimony between groups and studies.
● Your scanner booking does not just cover scan time. Pre-scan screening, equipment setup, volunteer setup (explaining the session, earplug fitting, positioning, settling time if required), removing the volunteer from the scanner, equipment removal all must occur within the booked slot.
● Especially when starting a new study, it is best to err on the side of caution when deciding on slot length. It is much easier to shorten bookings than increase them at a later date.

Additional time for testing
● When setting up a study or in the early scans, it may be necessary to allow for a bit of extra time on the scanner. Such time can be booked by the radiographers under the TESTING project code. You are encouraged to speak to the radiographers prior to your first booking to arrange this.

Step 5 – Recruiting Subjects

Initial Screening
● To avoid a scanning slot needing to be cancelled at the last minute it is essential that you go through each of the screening questions of the entire 3T or 7T Volunteer Screening Form at the initial volunteer recruitment stage.
● Any ‘yes’ responses that are not covered by the scanner specific Surgery and Implant Safe List (available via www.win.ox.ac.uk/support) should be checked with the radiographers via MRIsafety@win.ox.ac.uk as soon as possible.
● Please refer to the applicable Surgery/Implant Safe List for details on how to do this.
Please make your volunteers aware of the following –

- In preparation for their scan, and their comfort and safety, they will normally be asked to change into pocketless and metal free "pyjama-style" top and trousers, which are available in a range of sizes.
- They may keep their underwear and socks on but we would ask ladies to remove underwired bras. If they have a suitable non-wired bra (no sports/therapeutic fabrics e.g. anti-odor, anti-stink fabrics) they may wear this instead.
- Metal jewellery including body piercings will also need to be removed.
- Eye shadow and mascara should also be avoided, since some types contain materials that can interact with the magnetic field. If they wish to wear eye makeup to their scan we can provide makeup removal wipes but they are advised to bring their own makeup to reapply.

Steps to improve subject attendance and completion

Researchers are expected to take appropriate steps to ensure subject attendance and completion. The appropriate steps will depend very much on the subject population, but examples include:

- Clear information to the subject: Depending on the age of the subject this could be by letter, with the date and time clearly should ensure that the subject is clear on where they have to attend and at what highlighted in bold, or by email with links to maps.
- A timely reminder: A reminder by email or phone, a day or so before the scan session.
- A suitable start time: Subjects should be asked to arrive suitably in advance of the scan slot. This will depend on the age and clinical condition of the subject and nature of the study. This should also allow for subjects having transport or parking problems, or difficulty finding us.
- Safety screening in advance: Subjects should be asked about their suitability to be scanned either by sending them the safety screening form or going through it on the phone.

Step 6 – Running the Study: Researcher Preparation

Magnet Safety Reminders

- Never take an unscreened volunteer, visitor or researcher into an MR Controlled Area. These are the Control Rooms, Magnet Rooms and Equipment Rooms (NB there are a few differences with the 7T control room that we will explain to you if applicable).
- Never take a screened volunteer into a MR Controlled Area without first getting the permission of the radiographer or scan-op.
- Never prop or hold open the Console/Control Room door.
- The Equipment Room door must remain locked at all times. If you need items from this room you must lock the door after retrieving them.
- Never take new equipment into the Magnet Rooms without its safety having been checked (usually this will be in the form on an equipment protocol).
- Equipment that has been modified or serviced should be rechecked before being taken in to the Magnet Room.

On Arrival

- When you arrive for your session it’s a good idea to check in with the radiographer or scan-op to see if the current study is running on time.
- If there is a free magnet area access card you may take one.
- Occasionally there are sensitive studies where it’s critically important that there are no interruptions. If this is the case, there will be a sign advising of this on the door and we request that you respect this.
- Before starting your session, you need to make sure that you are magnet safe. You may be required to enter the magnet room at any time during your session (e.g. to explain how the button box works or in the event of an emergency).
Lockers
- Lockers are provided for volunteers and researchers.
- Please do not take any personal belongings or equipment into the MR Console/Control Room unless it is required for the scanning session.
- Personal belongings should be placed in the lockers when you arrive. The only exceptions to this rule are laptops and mobile phones.
- If you haven’t used the card key padlocks before, one of the radiographers or scan-ops will be happy to show you how.

Use of the testing/preparation rooms
- Shared facilities and a busy scanner schedule require some cooperation and flexibility in order to make the best use of our finite resources.
- The 7T testing room and all OHBA testing rooms are bookable via Calpendo.
- The FMRIB 3T Prep Room is a dual use room. While some basic pre-scan testing can be done here please remember that the changing cubicle may need to be used at the same time. The room can be subdivided with curtains and if they are drawn please remember that someone may be behind them!
- When you finish using the testing/preparation room remember to take all equipment, magazines, cups etc. with you.

Stimulus Equipment and Setup
- There is detailed information on the WIN intranet on the stimulus setup and interfaces for both scanners.
- Stimulus equipment and its setup is wholly the investigator’s responsibility.
- The radiographers and scanops responsibilities are ensuring the safety of all those involved in the session and operating the MR systems and cannot debug/trouble-shoot your experiment.
- The golden rule with the stimulus equipment is that you must return it to its default state, which should be how you found it. Even forgetting to return a single cable to its correct port could result in days of stimulus data, and therefore scanning data, being lost (this has happened).

End of Session
- Please check that stimulus setup is returned it to its default state (this should be how you found it).
- Used scrubs need to go in the scrubs bins and the trug (bucket) should be returned to the stack.

Step 7 – Running the Study: Participant Preparation

Vision Correction
- If you are using the visual stimuli on the LCD or projector screen please ask all volunteers if they require glasses or contact lens to see at a distance of 127cm (50 inches) for the 3T and 61cm (24 inches) for the 7T.
- We have MR safe glasses and a range of corrective lenses in plus and minus dioptres. However, if you don’t know what your volunteer’s prescription is, it could take you some time to find the right combination of lenses.
- If the volunteer can wear contact lenses for the scan it is recommended they do so.

Getting Your Participant Scan Ready
- We suggest you give your participants 10 minutes to get changed and an opportunity to go to the toilet before the scan slot.
- The scrubs come in a variety of sizes and the shelves are labelled to indicate which is which.
● When changing participants into scrubs please ask them to remove all their own clothing apart from underpants and socks.
● Please also give your participant a trug (bucket) for their clothing and valuables. We suggest not locking this away until the session is ready to begin.

Pre-Scan Screening
● On the day of the scan you need to give the volunteer another screening form to fill out.
● Volunteers must be re-screened for each attendance regardless of how recent their last scan was.
● The radiographer or scanop with then go over the complete screening form with the participant before they enter the MR Controlled Area.
● This secondary check of the screening form should be done with only the radiographer or scanop present in order to maintain confidentiality.
● It is not uncommon for volunteers to omit surgeries or implants that cause them embarrassment but may contraindicate MRI.

Example Scanning Session
Bringing together all the above an example of a scanning session might look like the following.

1. Ten minutes before your booked scan time you should check in to see if scanning is running on time.
2. If so select the appropriate sized scrubs for your participant, ask them to remove any eye make-up and change, placing their clothing and valuables into a trug.
3. Lock away the trug, suggest they use the toilet and then ask them to fill out a volunteer screening form.
4. When the current study is finished the radiographer/scanop will come to screen your volunteer.
5. Once screened the session can begin.
6. At the end of your session you should retrieve your volunteer’s clothing and possessions.
7. Please put used scrubs into the clothing bins and the trug back with the others.
8. You should escort your participant out of the building.
MRI Scanning Service Agreement

We expect:

- To deliver a professional service to all researchers.
- To ensure that all subjects are safe to scan and to advise researchers on safety issues when they are recruiting subjects.
- To provide a skilled operator to acquire scans, unless otherwise indicated on the schedule that the slot will have no scanner cover. In case of sickness or other unplanned absence, the radiographer team will endeavour to find a replacement operator, or will notify the researcher if this is not possible. The operator will be there and ready to scan for the start of the booked session, provided session is booked prior to 12 noon the previous day.
- Not to change protocols without discussing with researchers, but to highlight possible areas for improvement. If researchers request a protocol change, radiographers will indicate what the consequences will be.
- To keep all sessions to time, if necessary by cutting scans in discussion with researchers.
- To work with the researcher to keep the subject briefed and at ease, to increase the likelihood of them completing the scan.
- To communicate to researchers affected when the scanner develops a fault, and to keep researchers updated on the progress of fixing the fault.
- To check all data for quality by eye immediately after scanning and inform researchers of any issues identified.

We expect researchers:

- To be professional in interactions with radiographers and operators.
- To respect the operator’s decision regarding admittance to the controlled area and the safety of scanning a subject.
- To respect the operator’s decision to stop scanning if they feel that the subject needs to stop the session, and to respond to the operator’s concerns about subject comfort.
- To book enough time for their scan slot, taking in to account the time necessary to set up, and if necessary make minor adjustments to equipment, and to get the subject into and out of the scanner. Researchers using particularly complex sequences or equipment, where there is an increased risk of system faults arising, should factor this in to their booking.
- To be ready to begin their experiment at the start of the booked scanning session. Should delays be unavoidable then this should be discussed with the operator as soon as possible. Subjects should be requested to arrive at for their scan well in advance of the scanning session.
- To finish their scan slot on time, by considering the possibility of cutting scans from their protocol if necessary. If delaying the subsequent scan slot is unavoidable then the researcher should discuss this with subsequent scanner users to evaluate the impact on the rest of the day.
- When a slot is unavoidably cancelled less than 24 hours in advance, to communicate this to the operator and advertise the availability of the slot using appropriate mailing lists.
- To leave shared equipment, such as stimulus presentation devices, in their default state at the end of the session, and inform the Radiography Team if they have any concerns about equipment functioning or data quality.
- To supervise new researchers, by being in the scan room, until both supervisor and Centre staff agree that the student can be approved as an 'Experienced Researcher' as defined in the 'Safe Scanning Policy'.
I have read the “WIN Scanning Service Agreement” and agree to the conditions of scanner use.

Name: ____________________________________________

Signature: ____________________     Date: ____________________

This signature sheet should be returned to the Radiography Team
Safe Scanning Policy
For Studies on the OHBA 3T MRI Scanner

For scanning at OHBA the **minimum** number of people that must be in attendance:

<table>
<thead>
<tr>
<th>Scan Type</th>
<th>Hours</th>
<th>Operator</th>
<th>Within Control Room</th>
<th>Pager holder</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category 0</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phantom Scanning</td>
<td>Working hours</td>
<td>Trained operator</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Extended hours and late evening</td>
<td>Trained operator</td>
<td>-</td>
<td>Within building</td>
</tr>
<tr>
<td><strong>Category 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simple Scanning</td>
<td>Working hours</td>
<td>Trained operator</td>
<td>-</td>
<td>Within building</td>
</tr>
<tr>
<td></td>
<td>Extended hours and late evening</td>
<td>Trained operator</td>
<td>1 Experienced Researcher</td>
<td>-</td>
</tr>
<tr>
<td><strong>Category 1a</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthy Subjects</td>
<td>Working hours, extended hours and late evening</td>
<td>Trained operator</td>
<td>1 Experienced Researcher</td>
<td>-</td>
</tr>
<tr>
<td><strong>Category 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vulnerable Subjects</td>
<td>Working hours or extended hours ONLY</td>
<td>Advanced operator</td>
<td>1 Specifically Trained Researcher</td>
<td>-</td>
</tr>
<tr>
<td><strong>Category 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Risk</td>
<td>Working hours ONLY*</td>
<td>Radiographer</td>
<td>1 Researcher plus 1 Medic/Anaesthetist</td>
<td>-</td>
</tr>
</tbody>
</table>

**Hours:**

- **Working hours**: 08:00 – 18:00 Mon-Fri
- **Extended hours**: 06:00 – 08:00 Mon-Fri, 18:00 – 20:00 Mon-Fri, 08:00 – 20:00 Sat/Sun
- **Late Evening**: 20:00 – 22:00 Mon-Fri

*All Category 3 scans should be discussed with OHBA Director. Scanning out of hours may be permitted if appropriate cover is provided.*
Scan Types:

**Category 0**  Phantom scanning.

**Category 1**  Simple scanning, with no task fMRI or other additional experimental manipulation, on healthy and non-vulnerable subjects.

**Category 1a**  Task fMRI or other additional experimental manipulation on healthy and non-vulnerable subjects. A clinical event (e.g. cardiac arrest) is not expected and the subject population doesn’t require special care.

**Category 2**  Vulnerable subjects (e.g. very young, elderly, epilepsy, stroke, reduced mobility) or low risk intervention (e.g. simultaneous TDCS, contrast, IV drugs that do not affect metabolism, gases) There is an increased risk of clinical event or the subject population requires special care.

**Category 3**  High Risk (IV drugs that affect metabolism, anaesthetics, acutely ill subjects). There is a specific risk of clinical event.

Operators:

**Trained Operator:**

An operator who has completed their operator training, including yearly updating emergency evacuation training, basic life support (BLS) or higher and their scanner operator driving test.

**Advanced Operator:**

An operator who has significant experience in scanning subjects, is competent to deal with an emergency situation, as determined by the senior OHBA staff, and has yearly updating of basic life support plus automatic defibrillation device (BLS+AED) or higher.

**Radiographer:**  A trained radiographer who has yearly updating of basic life support plus automatic defibrillation device (BLS+AED) or higher.

Researchers:

**Experienced Researcher:**

A trained researcher who is competent to run their experiment. They should have had supervised experience of running MRI experiments and demonstrate safe working around the scanners. This does not include short term undergraduate or MSc project students. The OHBA Director will give clarification if in doubt.

**Specifically Trained Researcher:**

An experienced researcher who has specific training (medical or otherwise) in the intervention being used, or in dealing with subjects from that population group, as stated in the relevant ethics application.

**Medic/Anaesthetist:**

A currently practicing medic or anaesthetist with appropriate honorary or substantive clinical contract with the Oxford Radcliffe Hospitals NHS Trust and trained in Advanced Life Support (ALS).
**Pager holder:**

When scanning a subject alone in the control room, or scanning a phantom during extended hours, the operator must give the pager (small two-way radio handset) to a competent person who will be within OHBA at all times. If the holder wishes to leave the building they must formally hand-over the pager to another similarly qualified/responsible person who will cover in their absence e.g. lunch break.

<table>
<thead>
<tr>
<th><strong>Subject populations</strong></th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychiatric patients (currently remitted or well controlled)</td>
<td>Category 1a</td>
</tr>
<tr>
<td>Elderly (fit and well)</td>
<td>Category 1a</td>
</tr>
<tr>
<td>Children under 16</td>
<td>Category 1a</td>
</tr>
<tr>
<td>Elderly (infirm)</td>
<td>Category 2</td>
</tr>
<tr>
<td>Children under 12</td>
<td>Category 2</td>
</tr>
<tr>
<td>Using mobility aids</td>
<td>Category 2</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>Category 2</td>
</tr>
<tr>
<td>Stroke or TIA</td>
<td>Category 2</td>
</tr>
<tr>
<td>Psychiatric patients (currently unwell)</td>
<td>Category 2</td>
</tr>
<tr>
<td>Neurodegeneration (dementia/PD/MND)</td>
<td>Category 2</td>
</tr>
<tr>
<td>Severe visual impairment</td>
<td>Category 2</td>
</tr>
<tr>
<td>Acutely ill</td>
<td>Category 3</td>
</tr>
<tr>
<td>Decreased GCS</td>
<td>Category 3</td>
</tr>
<tr>
<td>Haemodynamically unstable</td>
<td>Category 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Experimental manipulations</strong></th>
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<tr>
<td>Task related fMRI</td>
<td>Category 1a</td>
</tr>
<tr>
<td>Monitoring or recording from devices connected to subject</td>
<td>Category 1a</td>
</tr>
<tr>
<td>TMS/tDCS before scanning</td>
<td>Category 1a</td>
</tr>
<tr>
<td>IV drugs that don’t affect consciousness</td>
<td>Category 2</td>
</tr>
<tr>
<td>Administration of gases</td>
<td>Category 2</td>
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<tr>
<td>TMS/tDCS during scanning</td>
<td>Category 2</td>
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<tr>
<td>MR contrast</td>
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<td>Pain device</td>
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<td>CHEPS</td>
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<tr>
<td>IV drugs that affect consciousness</td>
<td>Category 3</td>
</tr>
<tr>
<td>Anaesthetics</td>
<td>Category 3</td>
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</table>
1. Stop scanning and appraise the situation.

2. If the subject is trapped by, or at risk of further injury from, a ferromagnetic object attracted to the magnet then quench the magnet, using the emergency run down button to the right of the scan room door in the control room.

3. If the subject is at risk from fire or electrocution then hit the ‘Emergency Electrical Power Down’ button, located to the right of the scan room door in the control room.

4. If the subject has a life-threatening injury or is in cardiac arrest then call then dial 999 and send someone to the main doors in OHBA to direct them to the subject.
5. Call for help – ideally 6 people should attend, ideally including someone with CPR training.

6. Remove the patient table from the scanner bore (manually if necessary) and clear all stimulus presentation equipment out of the way.

7. Undock the scanner table.

8. Remove the subject to MRI control room.

9. Close the magnet room door to avoid any external personnel entering the room inadvertently.

10. Proceed with CPR until the ambulance arrives.

**UNDER NO CIRCUMSTANCES SHOULD ANY RESUSCITATION EQUIPMENT SUCH AS DEFIBRILLATORS BE TAKEN INTO THE MAGNET ROOM.**
**FIRE**

<table>
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<th>Turn the electrical supply OFF</th>
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<tbody>
<tr>
<td>‘Scanner Emergency Electrical Power Down’ button</td>
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</tbody>
</table>

**Remove subject from magnet**

| Close magnet room door |

**Sound the alarm to evacuate building**

**Dial 999**

State ‘fire in OHBA magnet area, OHBA, Warneford Hospital, Warneford Lane, Oxford, OX3 7JX’

Senior member of OHBA to advise fire crew on arrival of magnet hazard

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**ELECTRIC SHOCK**

<table>
<thead>
<tr>
<th>Turn the electrical supply OFF</th>
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</thead>
<tbody>
<tr>
<td>‘Scanner Emergency Electrical Power Down’ button</td>
</tr>
</tbody>
</table>

**Shout for assistance, evacuate person from magnet area**

**Dial 999**

State ‘Ambulance required - OHBA, Warneford Hospital, Warneford Lane, Oxford, OX3 7JX’

**Carry out basic life support until medical help arrives**

**Send someone to open secure door for emergency team**

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**OTHER THREATS/EMERGENCIES**

Call University Security Services on 01865 289999

State emergency type
Dealing with Research Neuroimaging Incidental Findings

<table>
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<th>NAME</th>
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<th>SIGNATURE</th>
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<tr>
<td>Author</td>
<td>Martin Turner</td>
<td></td>
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</tr>
<tr>
<td>Author</td>
<td>Pieter Pretorius</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reviewer</td>
<td>Stuart Clare</td>
<td>Associate Professor, FMRIB</td>
<td></td>
</tr>
<tr>
<td>Reviewer</td>
<td>Clare Mackay</td>
<td>Professor of Imaging Neuroscience</td>
<td></td>
</tr>
<tr>
<td>Authoriser</td>
<td>Heidi Johansen-Berg</td>
<td>Director, FMRIB</td>
<td></td>
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</table>
1. **PURPOSE**

The purpose of this Standard Operating Procedure (SOP) is to describe the procedures to be followed if, in the course of neuroimaging for research protocols, an abnormal anatomy or pathology is detected. In addition, written statements describing these procedures are provided as guidelines for inclusion in ethical applications.

2. **INTRODUCTION**

All volunteers giving consent to take part in neuroimaging studies are asked to indicate that they understand the scans will not be routinely formally reported by a radiologist, and that they are designed only to be used in research. Nonetheless, in the course of scanning subjects for research protocols, abnormal anatomy or pathology may be detected by a researcher or scan operator.

The vast majority of such incidental findings require no specific action other than to inform the volunteer and their GP (so it can be noted on their medical record). However, regardless of its nature, the process of informing an individual about a possible abnormality is a highly sensitive one, that can lead to significant emotional distress if handled badly.

This document summarises the FMRIB, OCMR and OHBA policies that have been agreed to address the occasional instances of abnormal anatomy or pathology (i.e., an incidental finding) being detected as part of a University of Oxford volunteer neuro research scan. The document also describes the procedures that should be followed when an abnormal neuro research scan is detected during any of the FMRIB, OCMR or OHBA magnetic resonance imaging sessions. Finally, the document also discusses the written statements that should be included with any ethics application at the time the application is made (Appendix 1).

It should be noted that dealing with abnormal scans is an extremely sensitive issue, whether or not it has any further health implications, and needs to be dealt with in a very careful and methodical way. In particular, it is of paramount importance that the relevant research participant should not be unduly alarmed by the finding, and also that information about any subsequent interaction they may have with clinicians remains confidential and fully within their control in terms of any wider disclosure. To this end, a strict procedure (described herein) should be followed in the event that an incidental finding is noted and, importantly, the investigators/scan operators present when the scan is collected should not attempt to discuss anything with the participant during their scanning visit. Rather, it is necessary that the designated Contact Neurologist from whom advice is sought should form an opinion of the scan before the subject is contacted in any way about their scan.

3. **SCOPE**

This SOP relates to all neuro scans performed at FMRIB, OCMR or OHBA.

4. **DEFINITIONS**

PI=Principal Investigator

5. **RESPONSIBILITIES**

A list of individuals currently fulfilling the following roles is maintained on the FMRIB Website.
5.1 **Contact Radiographer**
A senior radiographer, who coordinates the recording and referral of the incidental finding to the Contact Neurologist.

5.2 **Contact Neurologist**
A consultant neurologist with a local NHS contract, who, together with the Contact Neuroradiologist, determines if the incidental finding should be pursued. Discusses the finding with the participant and assumes their NHS care if necessary.

5.3 **Contact Neuroradiologist**
A consultant neuroradiologist with a local NHS contract, who, together with the Contact Neurologist, determines if the incidental finding should be pursued. Specifies a scan protocol for follow up scans if required.

6. **SPECIFIC PROCEDURE**

6.1 **Procedure for dealing with an incidental finding on an MRI scan**
*Note that an incidental finding may be detected either at the time the scan is collected or may be identified some time later, potentially months or even years later. Regardless, as soon as any abnormality is detected the following course of action should be followed:*

6.1.1 Any scan that raises cause for concern to an investigator or scan operator should, in the first instance, be shown to the Contact Radiographer as soon as practically possible after it is noticed. The investigator can then assume that the matter is dealt with, but should not expect further feedback on outcome to protect the confidentiality of the participant (whether or not the finding is significant).

6.1.2 The Contact Radiographer will make an initial decision as to whether the abnormal finding is likely to be a scan artefact, or has already been referred. If the scan finding is determined to be artefact, or has been previously referred, then no further action will be taken, and the case will be considered closed.

6.1.3 To ensure the outcome of all cases is clear and to prevent future duplicate referrals, the Contact Radiographer will track all referrals, whether or not they are passed on to the Contact Clinician, in an anonymised password-protected database that to which only they and the Contact Clinicians have access. Only the anonymised scan number, date of scanning, and findings are recorded.

6.1.4 Once an incidental finding is suspected, the Contact Radiographer will inform the Contact Neurologist as soon as practically possible. For this purpose, the scans will be provided on CD-ROM in DICOM compliant electronic format (DICOM viewer software should be included on the CD-ROM). The CD-ROM will be labelled only with the anonymized scan number. A separate piece of paper is supplied (later securely disposed) with the name and date of birth of the participant plus the scan number to allow registration for the purposes of reporting by the Neuroradiologist. These records are NOT linked to any existing NHS records that a participant may have. It should be stressed that the participant should NOT be told anything about the referral or contacted at this point, and that the number of people involved in the overall process should be minimised.
6.1.5 The Contact Neurologist will arrange for the scans to be uploaded for viewing by the Contact Neuroradiologist. The Contact Neurologist and Contact Neuroradiologist will make a joint determination as to whether the incidental finding should be pursued, with a strong aim of avoiding participant ‘harm’ by only including those findings clearly known to be medically important. In the event that the incidental finding does not need to be pursued (usually a normal anatomical variant that does not need to be recorded with volunteer’s GP medical records) the database will be labelled as ‘no action necessary’, and the case will be closed.

6.1.6 ‘Possibly significant’ findings include those without any future consequence that nonetheless need to be recorded on a volunteer’s medical record so that future healthcare professionals might know when it was first observed. This GP disclosure requires the consent of the volunteer, who must then have ultimate control over who else is informed.

6.1.7 The Contact Neurologist will ask the Contact Radiographer to obtain a method of contact (ideally telephone) to discuss the scan findings. The Contact Neurologist may offer a formal consultation and physical examination at the earliest opportunity, depending on the nature of the finding. If so, then this will be done under the auspices of the NHS in a formal outpatient clinical setting. Whether or not a formal meeting is required, as a matter of standard clinical practice, the volunteer’s GP will be informed of the finding and any plan for further investigation or other recommendation in a letter from the Contact Neurologist (with the prior consent of the volunteer).

6.1.8 The nature of the finding and any further action undertaken will be added to the anonymised database.

6.1.9 The Contact Neurologist will explicitly advise all volunteers who have been contacted about their scans that it would be helpful if they let the official contact mentioned in the study’s Research Ethics Committee-approved Patient Information Sheet know about the finding. Additionally, they will be advised that they should NOT take part in any future neuroimaging research without disclosing the finding to the researcher beforehand. However, any decision to disclose personal health-related information (which may be highly sensitive) RESIDES WITH THE VOLUNTEER, and there must be no attempt by any researcher to ask either the subject or the Contact Radiographer to reveal the outcome of a current or previous referral.

6.1.10 Although in some cases a researcher will be informed retrospectively by the volunteer of the outcome of an incidental finding (as advised by the Contact Neurologist), the decision on whether to remove a volunteer’s scan from a study lies with the PI and must be made without the expectation of automatic disclosure by the volunteer. In theory, a PI’s decision to remove a volunteer from a longitudinal study because of a significant structural abnormality risks indirect disclosure when the Contact Neurologist may not have deemed it necessary to contact the volunteer. In this rare circumstance, the PI should always inform the Contact Radiographer prior to telling a volunteer that they are being removed from further study, so that it is possible for the Contact Neurologist to make contact with the volunteer to reassure them.
Figure 1. Summary of procedures for reporting incidental findings.

7. **OUTLINE OF PROCEDURES TO BE FOLLOWED BY RESEARCHERS**

   If you identify a possible abnormality on a scan of any subject undergoing a scan at FMRIB, OCMR or OHBA, then:

   a) Inform the PI for the project, who will then inform the Contact Radiographer
b) Do NOT inform the subject of your suspicions or discuss the findings with anyone beyond the PI

c) Do NOT ask the Contact Radiographer or participant later on to reveal the outcome of any further investigation that may (or may not) have taken place

8. GUIDELINES ON VOLUNTEERS VIEWING THEIR SCANS

8.1.1 Notes on Showing Scans to Subjects

Under no circumstances should a volunteer research subject be confronted with an abnormal scan finding during their scanning visit. It is therefore recommended that subjects are not shown the images of their brains when they emerge from the scanner. Further, any promises to “show the subject their brain” should be avoided, both during volunteer recruitment and during the scan session itself. In the event that it is felt essential to show images to the volunteer, then only images that have been previewed by the scan operator should be shown.

With regard to providing subjects with images of their brain to take away, some subjects may attempt to make “diagnoses” based on their scans, and will not be able to distinguish everyday scan artefacts (signal drop out, susceptibility distortions, flow artefacts etc.) from pathology. Therefore, for many projects, it is inappropriate to provide subjects with images to take away in any form. In the cases that subjects are provided with an image of their brain then only relatively low quality laser-printer images (possibly also pseudo-colour) should ever be provided. The following text should be appended to the bottom of the images:

“These images are for illustrative purposes only. They should not be used for diagnosis.”

Electronic images should never be provided, other than to close collaborators on the project. In the event that a volunteer requests them under the Freedom of Information Act then this request should be referred via the appropriate University channels.

8.1.2 Abnormalities Noted by Scan Operators During Volunteer Scanning

If the scan operator notes an abnormality during the scan session (i.e. when the volunteer is still in the magnet) then extreme care should be taken to avoid alarming the volunteer. The acquisition of “special” additional scans should not be attempted. Instead, the procedures referred to earlier in this document should be followed. Also, in such circumstances, it is essential that the volunteer should not be shown their scans.

9. GUIDELINES FOR WRITING ETHICS APPLICATIONS

When writing your ethics application, there are a number of issues that should be addressed in the documentation that relate to the potential of abnormal scan findings.

9.1.1 In the Patient Information Sheet that you write, it is recommended that the following text be included in the section titled ‘Are there any risks in taking part in this study?’:

*It is important to note that we do not carry out scans for diagnostic purposes, and therefore these scans are not a substitute for a doctor’s appointment. Our scans are not routinely looked at by a doctor, rather our scans are intended for research purposes only. Occasionally a researcher may detect a possible abnormality. In this case, we would have the scan checked by a doctor. If the doctor felt that the abnormality was medically*
important, you would be contacted directly and recommended to have a hospital (NHS) diagnostic scan arranged. All information about you is kept strictly confidential.

9.1.2 In the body of the application itself the following text is recommended:

During the consent process, subjects would be informed of our standard procedure for incidental findings (“SOP – Dealing with Incidental Findings”). This outlines the process of involving a dedicated local hospital NHS consultant clinician in the case of a suspected abnormality, although it is stressed that a routine inspection and reporting of research scans is not carried out. In the case of a suspected abnormality, the Principal Investigator would alert our Contact Radiographer who, if appropriate (i.e. not a simple artefact) would independently inform the Contact Neurologist. They would in turn obtain the opinion of the Contact Neuroradiologist, and decide on the appropriate course of action, which might involve contact with the individual at the earliest opportunity and possible further investigation. This would all take place within the NHS framework and in communication with the volunteer’s GP.

9.1.3 It is recommended that the following statement is included in the Consent Form itself:

“I understand that this is a research scan that is not useful for medical diagnosis, and that scans are not routinely looked at by a doctor. If a concern is raised about a possible abnormality on my scan, I will be informed if a doctor thinks it is medically important.”

10. INTERNAL AND EXTERNAL REFERENCES

University of Oxford Clinical Trials and Research Governance:
http://www.admin.ox.ac.uk/researchsupport/ctrg/classification/

WIN Web Pages
http://www.win.ox.ac.uk/support

OCMR Web Pages
http://www.ocmr.ox.ac.uk/internal/information-for-researchers/
## 11. CHANGE HISTORY

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<td>002-V1/ Neuro_002_V1</td>
<td>1 October 2007</td>
<td>Formatted to new template. Slightly amended wording on giving scans to subjects.</td>
<td>May 2006</td>
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<td>List of named contacts moved to website. Initial contact to be by clinician not researcher.</td>
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<td>Amended wording with regard to feedback and recording of outcome in scans referred.</td>
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<td>2nd February 2014</td>
<td>Amended wording with regard to feedback to the PI from the Contact Radiographer when no contact with the GP is needed Clarification of no feedback to researchers Clarified flowchart</td>
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<td>FMRIB_002_V5</td>
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<td>OHBA added to SOP. Removed reference to supplying images as TIFF since all scanners now produce DICOM.</td>
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