

YORK DIAGNOSTIC IMAGING

MRI Local Rules for Operators

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Referenced Documents

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	Safety Guidelines for MRI Equipment in Clinical Use (MHRA)		2015
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	The Infection Control Policy		2017

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Local rules for MRI Operators

The MRI Operator is responsible for the safety of everyone who enters the MRI scanning room.

It is the responsibility of the MRI operator to go through the safety screening and consent forms for anyone entering the scanning room.

It is the responsibility of the MRI operator to check that no one takes any non – MR compatible objects into the scanning room.

1. INTRODUCTION

These Local Rules apply to the use of York Neuroimaging Centre MRI scanning facility. They are to be used alongside the Safety Guidelines for MRI Equipment in Clinical Use (MHRA), YNiC and YDI policy documents and the Protection of Patients and Volunteers Undergoing MRI Procedures (MHRA). A copy of these Local Rules must be kept for ease of reference in the MRI Scan Control Room. All staff whose duties may require them to work within the inner controlled area need to be fully conversant with these Local Rules.

2. SUPERVISION OF EXPOSED PERSONS

A. The MRI Responsible Person

The MRI Responsible Person is Professor A Morland. In his absence this function is assumed by his nominated delegate (A Wade). The Responsible Person carries overall responsibility for the MR facility, its staffing and operation.

Authorised Personnel

A list of authorised operators will be maintained and will include Level 3, Level 2, Level 1 and level 0 operators (Category A) Only level 3, level 2 and Level 1 operators from Category A are allowed to enter the inner controlled Area (Scanner Room) unaccompanied; all other personnel must be supervised by a Level 1, 2 or 3 operator.

A list of categories of personnel, their responsibilities and their training requirements are detailed in appendix B of the safety manual for operators and is summarised in section 5 of this document.

There is a duty under the Health and Safety at Work Act for every employee while at work:

- to take reasonable care for the health and safety of himself and of other persons who may be affected by his acts or omissions at work;
- to cooperate with his employer or any other relevant person to meet the requirements imposed on the employer as is necessary to ensure safety and welfare.

3. CONTROL OF ACCESS TO MRI CONTROLLED AREAS

GENERAL:

Electronic key fobs control access to all areas of the department. These fobs are coded to allow access to areas of the centre on the basis of privileges granted to individual fob holders. It is essential therefore that all individuals holding key-fobs do not lend or give them to other individuals. There are fobs available for loan for brief periods and to individuals who need temporary access to the changing area. This fob can

only be loaned by the Administrative staff. The fobs have a unique identification code and each time they are used to access areas, the event is logged on a computer. It is also essential that no doors with fob-activated locks are propped open.

Scanner Rooms and Equipment Rooms

The Scanner Rooms and Equipment Rooms form the Inner Controlled Areas. Access to these rooms is only permitted whilst accompanied and supervised by a level3, level 2 or level 1 operator. These rooms contain the high magnetic field (more than 5 Gauss). All patients, visitors, clinicians and volunteers are required to complete a Safety Questionnaire before being allowed to enter these rooms. They must also be informed of the dangers of loose metallic objects, have any such objects removed to a safe place, and informed of other MRI safety issues.

The Scanner Rooms are accessed through controlled doors from the reception area at the entrance to the unit.

All doors are operated with a security self-locking fob. Fob-operated doors have a break glass emergency release.

The doors to the Scanner Rooms must always remain closed and should be locked when the scanners are left unsupervised and out of hours. Only level 3, level 2 and level 1 operators may enter the Scanner Room unsupervised. All other personnel may enter only under the supervision of a level3, level2 or level 1 operator. Beyond this door is the Inner Controlled Area.

The key to the Inner Controlled Area should be kept in the top drawer of the under desk drawer unit, except in the event of a fire (see section 4). These keys must only be used by level3, level 2 and level 1 operators. In an emergency this authorization may extend to cover the emergency service personnel and emergency maintenance personnel.

Control Room

The Control Room is the Outer Controlled Area and is accessible to all categories of staff. This area although controlled is outside the 5 Gauss line. Access to the Control Room is via a security fob-operated doors, from the MRI corridor.

UNDER NO CIRCUMSTANCES SHOULD THE SECURITY CODED DOOR BE LEFT PROPPED OPEN

Fob access for this door is only to be given to staff whose duties may require them to enter the outer controlled area.

Visitors to the MRI unit may enter the Outer Controlled Area under the supervision and responsibility of a staff member who has fob access. If they need to enter the Inner Controlled Area then completion of a Safety Questionnaire, removal of metallic objects and supervision by a level 3 or level 2 operator is required.

Out of hours the Control Room is locked.

TMS Laboratory

This is a magnetically-safe area, used for conduction TMS experiments and is not to be accessed by unauthorised personnel.

Interview Office

This is a magnetically-safe area and may used to interview patients and volunteers in privacy.

Preparation Area

This is in the main MRI corridor. It is a magnetically-safe area to be used only by Authorised Personnel, screened MRI patients and emergency personnel (when necessary). Access is restricted due of the close proximity of the Scanner Room. Access to this area is via self-locking security doors from the Control Room or from reception.

THIS AREA IS NOT A KITCHEN AND MUST NOT BE USED FOR THE PREPARATION OF ANY FOOD OR DRINK ITEMS UNDER ANY CIRCUMSTANCES

Reception Office

This is a magnetically-safe area, however confidential information is kept in this office and therefore access for persons other than staff will be granted only with prior permission.

Waiting Area

This is a magnetically-safe area used by staff, patients and participants. Access to this area is via the main entrance to YNiC.

4. OPERATIONAL SAFETY

Nurse call buttons and table releases will be tested every 6 months.

MRI operators have a duty to familiarise themselves with the Local Rules and emergency procedures.

Medical Emergency

The primary aim of the operators working in the MRI suite in the event of a medical emergency is to alert the emergency services and remove the patient/participant from the dangers of the magnetic environment to a safe area where emergency medical treatment may be carried out.

The rescuer should ensure his own safety first before touching the patient. The rescuer should take all reasonable precautions to ensure the safety of the patient.

Procedure for Cardiac Arrest:

The person should be assessed for responsiveness, i.e. gently shaking them and shouting, "Are you alright?". If the person is unresponsive and/or his/her vital signs are deteriorating the following procedure should be carried out:

- Summon local assistance by activating the nearest 'nurse call' buttons or pull cord.
- Alert emergency services by dialling 3333 (University security will receive call and contact emergency services and send assistance). State - "Biocentre, York Neuroimaging, York science Park, YO10 5NY".
- Commence resuscitation as soon as possible.
- If the person is in the scanner remove them from the magnet and transfer them from the Scanner Room to the Recovery Room using the undocking mechanism of the scanner table. Elevate the cot sides to prevent patient rolling off during transit. Ensure that the doorway from the main corridor to the Recovery Room is open.
- Once the person has been taken to the Recovery Room commence emergency resuscitation first aid (CPR). AED (Heartstart automatic defibrillator) can be used only if operator is trained in its use. Ensure Scanner room door is CLOSED after removal of patient.
- Telephone through to reception to explain the situation. Ask the Administrator to ensure that no other patients or unauthorized persons enter the Controlled Areas during the emergency and can direct the emergency team to the patient.
- Continue first aid until the arrival of the emergency services who will then take medical control of the patient.
- Assist emergency services with any patient management or transfer.
- Following a medical emergency an Incident Report form must be completed .

UNDER NO CIRCUMSTANCES SHOULD RESUSCITATION EQUIPMENT BE TAKEN INTO THE INNER CONTROLLED AREA

Fire

YNiC operate a fire sweeper policy. The MRI operator acts as the sweeper for the MRI department and corridor. Upon hearing a fire alarm they should don the Fire Warden High Visibility Jacket and proceed with evacuation. It is their responsibility to ensure all rooms including toilet and changing area are vacated and report to the fire brigade upon their arrival that MRI is unoccupied.

Fire in another part of the building

Upon hearing a fire alarm they should don the Fire Warden High Visibility Jacket and proceed with evacuation.

- If a person is in the scanner, remove them manually from the MRI scanner and leave the scan room locking the door behind you. (Retain the key in case the emergency services require access)
- If it is safe to do so, Isolate equipment from the power (Emergency System Stop Button Located in the Control Room or in the Equipment Room).
- Evacuate the area closing all doors and assemble at the designated Assembly Point (Bike sheds outside the Biocentre reception).

Fire in any part of the MRI department

- Activate the fire call by breaking the nearest fire alarm call point.
- Fire alarm break glass points are located in the MR suite and next to the fire exits.
- Push the Emergency System Stop on the wall in the Control Room to isolate the power supply to the scanner.
- Remove the patient/volunteer manually from the MRI scanner.
- Evacuate the patient/volunteer and all staff from the unit, by the nearest exit.
- **If you are not trained to handle a fire extinguisher, continue with the following steps:**
 - Dial 3333 and give the location of the fire. Advise security to tell the emergency services there is MR equipment on site.
 - If safe to do so, isolate the power supply to any electrical equipment. The mains power isolator is located in the Equipment Room in the GE scanner and on the control room wall in the Siemens scanner.
 - Close all doors as you leave.
 - The MRI operator must proceed to designated Assembly Point (Bike sheds outside the Biocentre reception).
- **If you have been trained to handle a fire extinguisher:**
 - All fire extinguishers in the MRI corridor and MRI outer controlled rooms are MRI safe and are clearly marked with a blue handle. ENSURE THE FIRE EXTINGUISHER HAS A BLUE HANDLE BEFORE TAKING IT INTO THE INNER SCAN ROOM.
 - Isolate the power supply to any electrical equipment. The mains power isolator is located in the Equipment Room in the GE scanner and on the control room wall in the Siemens scanner.
 - Attempt to tackle the fire.
 - Should you not be able to contain the fire:
 - Dial 3333 and give the location of the fire. Advise security to tell the emergency services there is MR equipment on site.
 - Press the Quench button.
 - Close all doors as you leave.

- Proceed to designated Assembly Point (Bike sheds outside the Biocentre reception).

On arrival of the Fire Brigade the Operator in charge must inform the fire officers of the dangers of the magnetic field, and the ceiling ducted air conditioning

THE FIRE MUST BE FOUGHT BY THE FIRE BRIGADE FROM THE SCANNER ROOM DOOR (INNER CONTROLLED AREA). THE MAGNET MUST ONLY BE QUENCHED IF THERE IS A PERSON TRAPPED BY A FERROMAGNETIC OBJECT AGAINST THE MAGNET OR AT THE INSISTENCE OF THE SENIOR FIRE OFFICER

Ferromagnetic Object Emergencies

In the event of a ferromagnetic object being taken into the Inner Controlled Area:

- The MRI Responsible Person should be informed immediately. If the incident occurs outside of normal working hours, call Security on (9) 01904 323333.
- If injury has taken place, and it is deemed that the ferromagnetic object may cause further danger, or is preventing the injured person to be removed to safety, then the emergency quenching procedure may be employed.
- The decision to quench the magnet should be made only if the ferromagnetic object traps a person against the magnet.
- If no person is severely injured, and there is little or no likelihood of such an injury taking place, then YNiC staff will manage the removal of the object from the scan room without quenching the magnet. This may involve a controlled 'ramp-down', which must be performed by an MRI Engineer. DO NOT ATTEMPT TO REMOVE ITEMS IF YOU ARE NOT QUALIFIED TO DO SO (i.e. if you are not a YNiC level 3 operator or a manufacturer engineer leave the item).
- Any such incident should be reported using university incident reporting procedure. The Director and the MR system providers service department should also be informed as soon as possible.

Access Outside Normal Hours

In the event that personnel require access to the MRI suite, for example, in an emergency outside normal working hours of 9:00am – 5:00pm Monday to Friday, they must telephone Security on (9) 01904 323333.

In the case of emergency Security must be contacted as soon as possible.

In all instances, persons entering the Controlled Areas should follow the advice of the member of staff in attendance.

5.MRI SAFETY

All Category A personnel are required to read this document and MRI Safety Manual for operators.

General principal: If it is not already in the inner controlled area it should not be taken into the inner controlled except by a level 3 operator who will be responsible for appropriate testing and approval for use.

Rules for Operators

MRI operators are responsible for the safe and efficient management of the scanner. They should identify and report any problems or safety issues to MR Radiographer or MR Responsible Person that arise in the course of carrying out their duties and they should take steps to prevent any accidents occurring.

Category A: MRI Operators (Level 0,1, 2 and 3)

These are persons whose activities require them to work within the inner controlled area.

They must have completed training appropriate to the activities they are required to perform and should not perform activities for which they have not been trained unless they are being supervised by a level 3 or level 2 operator. (See MRI Operator training scheme).

All operators have a duty of care to patients/participants, staff and their colleagues. Duty of care involves the individual acting in a way that will not endanger staff or patients/participants by any misuse of equipment, by reporting of faults and unsafe practices, and taking steps identified to avoid accidents or injury to themselves and others.

MR system provider service personnel are automatically conferred Category A status and the MR system providers are responsible for their training and actions

Category B: Other persons in the inner controlled area

On occasion a person undergoing a scan may require another individual to be present in the room during the scan. These persons must

- satisfactorily complete the safety screening form
- remove all metal objects (jewellery etc) from their person prior to entering
- Only enter the inner controlled area under instruction from a level 2 operator
- wear appropriate hearing protection
- made aware of the risks associated with their presence in the room

Category C: Clerical and domestic service personnel

These are staff whose duties will bring them into the controlled area but not normally into the inner controlled area. These persons must be aware that they are not permitted to enter the inner controlled area except under the direct supervision of a level 3 operator who will conduct all necessary safety checks prior to granting them access.

General Safety Rules

The department should be kept clean and tidy at all times and should always be left in a state suitable to receive a clinical patient.

Environmental cleaning of the main department areas is carried out daily.

Environmental cleaning of the inner controlled area is carried out daily by the Radiographers.

Operators should clean any equipment that has been in contact with a patient or participant immediately after use. (This is an important part of infection control).

The emergency box and the Laerdal mask must be displayed in a prominent position. It is the responsibility of the operator to notify the Radiographer to arrange for the replenishment of any stocks used.

Consumption of food and drink should not compromise infection control.

It is not recommended that drinks be consumed in the Control Room (However it is recognised that due to the nature of the work it may be inevitable that drinks will be consumed. If this is the case, cups should be disposable and disposed of straight away after use and they should not be placed anywhere near electrical equipment.

Consumption of food within the Control Room is, again, not recommended. If staff are unable to take a short break, outside of the Control Room to consume food then measures should be taken to do so

discretely. Food should not be consumed in the presence of patients or visitors. Cups or plates should not be left on show and should be removed as soon as is feasible.

6. MANAGEMENT OF PATIENTS

Patients will only be scanned by clinically trained, HCPC registered radiographic staff. The care and management of patients and their records are fully documented in YDI clinical policies which will be followed at all times.

Infection Control and Sharps Policy

The Infection Control Policy is to be followed at all times.

Rules for Visitors Accompanying Patients

All visitors accompanying patients into the scanning environment must satisfactorily complete a Safety Questionnaire) and be screened for metal objects prior to being admitted to the inner controlled area.

7. MANAGEMENT OF VOLUNTEERS

Specific Rules for Volunteers

- Only level 3, level 2 or level 1 operators may scan volunteers (a level 0 operator training to become a level 1 operator may do so under direct supervision of a level 3 or level 2 operator)
- Principal Investigators (PIs) book MRI scans for volunteers through the booking form on the YNiC website.
- The PI is responsible for the volunteer until the volunteer is handed over to the MRI operator immediately prior to scanning.
- Volunteers must complete the Safety Questionnaire and Scan Consent form before scanning takes place, as well as any relevant project-specific consent forms.
- The volunteer, the PI and the MRI operator must sign the Safety Questionnaire and Scan Consent forms. It is the responsibility of the PI to explain what is expected of the volunteer during the experiment and the responsibility of the MRI operator to explain the practicalities of the scan.
- Volunteers must be screened in two stages: once by the PI and then again by the MRI operator just prior to scanning (where the PI is also the operator then another member of the research project team should perform the stage 1 screening). Volunteers must be screened for loose metallic objects, metallic objects in clothing and items of equipment that may be damaged by magnetic fields before entering the Controlled Area. Screening of volunteers must be made in line with the Guidelines of the MHRA and YDI policies.
- The following should not be accepted as volunteer subjects for an MR examination, unless otherwise approved, in writing, by the insurers of The University of York:
 - i) Women who are or may be pregnant
 - ii) Persons under the age of 16 years of age.
 - iii) Persons with any type of metallic implant.
 - iv) Persons with a history of mental illness.
 - v) Any proposed volunteer who does not pass all of the relevant safety checks.
- All MR examinations performed for research purposes are subject to approval by the local Research and Governance Committee.
- All volunteers must be kept under supervision during the MR examination. No volunteer may be left unattended at any time whilst in the MRI Scanner Room or Control Room.

- Volunteers may stop the scan at any time without giving a reason. Therefore if volunteers feel too claustrophobic or anxious to complete the scan, the scan must be stopped immediately.

Records and Archiving for Volunteers

Records of all volunteers' examinations must be recorded in the MRI Research Log Book

The MHRA requires records of volunteers scanned to be kept for a minimum of 10 years.

The raw digital data from an MRI scan is kept for 10 years, as a permanent record of the procedure.

Therefore all MRI operators must ensure the data is saved on the appropriate archiving media.

The following information for volunteers must be maintained in archived records:

- Volunteer Name
- Date of Birth
- Weight
- Body part
- Type of Scan
- Approximate time spent in the scanner
- Operator

The Research Log Book must have clear indications of all volunteer data specified above.

All volunteers and staff undergoing an MRI scan must also have details of sequences and time of scanning of the MRI procedure recorded in the Research Log Book kept within the centre. A record of frequent visitors to the scanner who remain in the Inner Controlled Area during scanning should also have details of the scans performed and time spent in the Inner Controlled Area recorded in the Scanner Log Book.

Staff should not scan, or be involved in the care of, relatives or friends who are referred to the unit for MRI investigation.

8. GENERAL MANAGEMENT

Patient/Volunteer Monitoring During MRI Scanning

Every patient/volunteer is given a clear description of the MRI procedure and all questions addressed prior to the commencement of scanning.

It is the duty of Category A and B personnel to monitor every patient as follows:

- i) Every patient/volunteer must be given instructions as to how to contact the staff whilst being scanned, including how to operate the panic button.
- ii) The patient intercom should be switched on at all times and, between scans at a suitable volume to hear patients within the magnet..
- iii) Visual monitoring of the patient via the RF window must be carried out. It is not acceptable to leave this area and lose visual contact with the patient.
- iv) Verbal monitoring of the patient must occur after each scanning sequence.
- v) Any patient who is seriously ill, uncooperative, unconscious, a child, or any person who is unable to understand the procedure must have a person in the Scanner Room during the procedure to be in close visual and physical contact with the patient.

Incident Reports

Any accidents or serious incidents relating to equipment must be reported to the MR Responsible person. A record of the incident must be kept in the Incident/Accident Book. If necessary these incidents must also be reported to the manufacturers of the equipment and if appropriate the MDA. The Senior Radiographer should also be informed of any untoward incidents involving equipment.

Equipment Faults/Maintenance

The equipment is serviced and maintained on a regular basis by the manufacturers to their recommendations. A comprehensive emergency call-out system is also employed for dealing with urgent faults and image quality issues. At the time of service and maintenance image quality and performance checks are also carried out by the manufacturers. If deemed appropriate YDI will also obtain an independent third party report on issues related to scanner performance or image quality.

It is the responsibility of all MRI operators to report all equipment failures or image quality issues in order that these can be dealt with in a timely fashion. No staff other than trained GE engineers must attempt to perform any maintenance or repair of the MRI equipment at any time. In the event of equipment failure or malfunction the MRI operators must not attempt to interfere with any of the high voltage equipment. Observations or simple testing at the request of the manufacturer's representative may be carried out providing the appropriate safety measures are addressed (i.e. turn off power supply to equipment before accessing). There is a danger of electrocution from all damaged or faulty equipment and MRI operators should not interfere with such equipment.

Helium Filling

MR system providers monitor helium levels remotely. MR system providers will advise YNiC when the Helium level is falling abnormally or has reached a low level.

Helium filling is carried out by qualified engineers under the management of the manufacturers of the equipment. No patients or staff must enter the Controlled Area during helium filling.

System Helium level and magnet pressure are continuously monitored and can be observed by viewing the magnet monitor in the equipment room (GE) or in the control interface on the Siemens scanner.