MEDICAL COLLEGE OF WISCONSIN

Center for Imaging Research Standard

ACCESS CONTROL TO THE MAGNETIC ENVIRONMENT

Category: Center for Imaging Research Standard

Procedure #: CIR.SOP.5HS

Applies to: Medical College of Wisconsin (MCW) staff, faculty, investigators, and study personnel

PURPOSE:

The purpose of controlling access to Zone II, Zone III and Zone IV is to prevent injury, which could be fatal, to individuals entering the area. Access control also prevents damage to equipment due to the ever present and uncontrollable attraction of objects within the magnetic field of the scanner. The purpose of this document is to describe the guidelines pertaining to points of access, personnel with access to the appropriate zones, and equipment allowed in the magnetic environment.

DEFINITIONS:

- Magnetic Environment: The area where the magnetic field is greater than 5 gauss resulting in the potential for objects to become missiles or projectiles as they are attracted into the magnetic field of the scanner. Individuals who may have cardiac pacemakers or other implants and devices may be at risk to enter the magnetic environment. The magnetic field is always present and is three dimensional around the scanner. This environment lies within Zone IV.
- MR Controlled Access Area: The locally defined area around the MR system that contains the MR Environment (including its associated static magnetic field) to which access is controlled. Frequently, additional areas outside the MR Environment may also have access control.
- MR Personnel Level 1: Level 1 MR Personnel are those who have been educated and successfully mastered MR safety topics as defined by the facility's MRMD to ensure that they would not constitute a danger to themselves or others in the MR environment.
- MR Personnel Level 2: Level 2 MR Personnel are those who have been more extensively trained and educated in MR safety topics beyond Level 1 MR training. Due to their higher level of MR safety training and associated job responsibilities, Level 2 MR Personnel supervise Level 1 MR Personnel in MR safety–related aspects of a practice
- MRI: Magnetic Resonance Imaging which uses a strong static or main magnetic field, radio frequency pulses and time varying magnetic fields or gradients to produce anatomic images, spectroscopy, angiography, and functional data (fMRI).

- MRI Safety Training: Training that all Level 1 and Level 2 MR Personnel must undergo that will include topics emphasized in safety and are pertinent to the safe care and imaging of MR patients. This training is a condition for permitting site (zone) access.
- Non-MR Personnel: Non-MR Personnel are those that within the previous 12 months have not successfully completed the designated formal MR safety education defined by the MRMD of that facility to qualify as MR Personnel. Patients, visitors, facility staff, and health care providers including radiologists and technologists who do not meet the criteria for MR Personnel are non-MR Personnel.
- Safety Screening: Well-designed written or electronic MR safety screening forms that are essential in efforts to prevent unsafe exposures to the Zone IV MR environment for patients, research participants, and other individuals as well as for MR Personnel, non-MR Personnel, and any others. This process inquiries about the safety of individuals prior to entering Zones III and IV. Safety Screening also applies to checking equipment for safety prior to being used in Zone IV.
- Tesla: The unit of measurement for magnetic field strength. 1 Tesla equals 10,000 gauss.
- Zone I: This region includes all areas that are freely accessible to the general public. This area is outside the MR facility itself and is the area through which patients, health care personnel, and other employees of the MR facility access the MR environment.
- Zone II: This area is the interface between the publicly accessible, uncontrolled Zone I and the strictly controlled areas of Zones III and IV. This area typically contains a patient waiting area, patient prep areas, locker rooms, etc. Screening and ferromagnetic detection is often performed in Zone II. Access control to Zone II with personal badges is commonly used so that patients and companions must be allowed to enter into Zone II by MR Personnel.
- Zone III: Zone III primarily includes MR Controlled Access Areas where there is direct doorway access to Zone IV. A common Zone III could serve multiple scanners (Zone IVs). In addition, areas where the magnetic field (i.e., greater than 9 gauss) extends into spaces not connected directly by doorway to Zone IV and considered a B0 hazard risk area are also considered MR Controlled Access Areas and, as such, are included in the Zone III designation.
- Zone IV: Zone IV is synonymous with the MRI scanner room and is comprised of the physical walled confines where the scanner is located. It includes the MR Projectile Area where there is definite, potentially lethal projectile risk. Zone IV, by definition, is generally located within a surrounding MR Controlled Access Area.

POLICY:

A. The CIR follows all MCW MRI Safety committee guidelines (See MR.SOP.01, Access Control)
B. Access to the CIR is controlled by an electronic card access system (eCARD). Users requesting access to the CIR must provide a valid business reason for access on the eCARD request form.

C. All researchers expected to enter ACR Zone III or possibly enter Zone IV must complete MRI Safety training on an annual basis. If training is allowed to expire and is not renewed with 1 year of the expiration date, the individual will be required to attend the classroom session and take the corresponding final exam in order to renew training. (*MRISC SOP.08, 2019*)
    a. Anyone who has failed to complete safety training must be screened by a Level 2 MR Personnel to be in Zone III and cannot enter Zone IV without the direct supervision of Level 2 MR Personnel.
    b. For research exams where a study team member serves as one of the two Level 2 MR Personnel and no present study team members are currently active Level 2 MR Personnel, the scan will be canceled due to the inability of the study team to ensure the safety and wellbeing of the research subject.
D. MRI Safety training must be completed prior to obtaining badge access to the CIR.
    a. Badge access to the CIR will expire annually in accordance to a user's safety training renewal date.
E. Signs will be posted publicly indicating MRI zone access points.

PROCEDURES:

A. Obtaining Access & Approval
    a. Safety training process can be initiated by submitting an application to the MRI safety committee at https://www.mcw.edu/departments/research-mri-safety/training/application-for-mri-safety-training
    b. eCARD requests can be submitted on public safety's website
    c. For the safety of users, the MCW Access Office must confirm the status of MRI safety training with a department level approver before granting access. This includes departments that receive access to restricted areas as part of their role during onboarding (ie. Public safety, facilities & engineering, and EHS)
    d. Department eCARD access approvers must confirm completion or renewal of training in eBridge prior to granting a user access.
B. Personnel
    a. Personnel must display an identification badge at all times or be escorted by someone with authorized access.
    b. Individuals who have not completed MRI safety training must be escorted at all times while in Zones II, III, and IV.
        i. Those without MRI safety training must undergo MRI safety screening before entering the scanner magnet room.
C. Access Points
    a. The door to the scanner magnet room must be closed and locked when there is not a trained operator in the immediate control room (link to policy)

i. During the times that the door to the MR system room must remain open, a “caution” barrier **must** be at the entry to Zone IV to inhibit unintended passage of personnel and/or materials from Zone III to IV.

b. Questions or concerns about safe access to the MRI areas should be directed to the MRI Safety committee MRIresearch@mcw.edu

c. Any breaches in access must be reported back to the MCW MRI Safety committee MRIresearch@mcw.edu

D. Equipment

a. All equipment must be approved by the MRI Safety Committee prior to use for a research study, or entry into the magnetic environment. (See equipment and material, MR.SOP.02)

Approval Date:

Effective Date:

Review Due:

Revision History: 07/18/2024