

# Magnetic Resonance Imaging (MRI) Safety Policy

**Policy Owner: Imaging Quality**

## POLICY STATEMENT

To identify MRI safety guidelines for patients, MRI personnel, and non-MRI personnel and maintain MRI safe environment.

The MRI Division of the Department of Radiology will develop protocols to define MRI safety practices.

## AFFECTED STAKEHOLDERS

*Indicate all entities and persons within the Enterprise that are affected by this policy:*

- Hired Staff
- House Staff/Residents & Clinical Fellows
- Leased staff
- Medical Staff (includes Physicians, PAs, APNs)
- Vendors/Contractors
- Other: Include any other stakeholders not listed above.

## DEFINITIONS

N/A

## PROCESS & PROCEDURES

- A. MRI Safety Policy will be reviewed/approved by MRI Manager, MRI Lead Technologist, MRI Director(s), and MRI Safety Officer.
- B. MRI Safety Policy will be reviewed at least every three years or if significant changes in technology or equipment occur.
- C. Appoint a MRI Safety Officer who is responsible for reviewing and implementing safety procedures in MRI.
- D. MRI Safety Policy will include:
  - MRI Zoning

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*Printed copies are for reference only. Please refer to the electronic copy for the latest version*

**Policy No.** 3416

**Version:** 2

**Policy Sponsor:** Type the title of the Executive Lead of the department.

**Originally Issued:** Not Set

**Last Revision:** 08/24/2020

**Last Review:** 09/10/2020

**Next Review:** 09/10/2023

**Approved By:** Chief Executive Officer, AU Medical Center

**Date:** 09/10/2020

- MRI Safety for MRI and non-MRI personnel
- Screening patients for MRI procedures
- Emergency situations in a MRI environment
- Reporting MRI Safety incidents

#### E. MRI Zoning

- 1) Divide the MRI department into a four zone concept to restrict access to the MRI scanners.
  - Zone 1: General Public-White
  - Zone 2: Unscreened or screened MRI patients-Blue
  - Zone 3: Screened MRI patients and non-MRI personnel-Yellow
  - Zone 4: Screened MRI patients under constant supervision of trained MRI personnel-Red
- 2) Warning Signs will be posted outside of all rooms that have magnetic fields higher than 5 Gauss. Appropriate signage will indicate the presence of a high magnetic field and danger to people with pacemakers or medical implants susceptible to damage or malfunction in the presence of a magnetic field greater than 5 Gauss.

#### F. MRI Safety for MRI and non-MRI personnel

- 1) All MRI personnel will have annual MRI safety training.
  - a. The training will be approved by the MRI Safety Officer.
  - b. All new employees will receive training at time of employment.
  - c. All new MRI personnel will fill out a MRI screening form and it will be filed in Radiology personnel folder.
- 2) Non-MRI personnel who accompany patients to MRI will receive annual training.
- 3) All non-MRI personnel will be verbally screened before they enter the MRI scan room.
- 4) The Department of Anesthesiology is responsible for marking/tagging Anesthesia equipment which is MRI safe or conditional, and educating their staff as to the identification of the MRI safe or conditional anesthesiology equipment, and educating their staff as to this policy. As per other equipment, all anesthesiology equipment to be brought into a room containing an MRI scanner will first be surveyed by anesthesiology personnel to detect the presence of ferrous metal. Next, the equipment will be cleared by the MRI technologist prior to entering into an MRI magnet room.
- 5) All respiratory care equipment to be brought into a room containing an MRI scanner will first be surveyed by respiratory care personnel to detect the presence of ferrous metal. Next, the equipment will be cleared by the MRI technologist prior to entering into an MRI magnet room.
- 6) Environmental Services- the MRI area shall be cleaned according to normal hospital procedures, except for the magnet room itself. No person shall enter the magnet room until verbally directed to enter by an MRJ technologist. The MRI technologist will screen each person that needs to enter the magnet room as described previously to the presence of a cardiac pacemaker, cerebral aneurysm clips or other surgically implanted metal devices and conditions that are contraindicated. Persons entering the magnet room shall remove ferrous objects and magnetic media before entry. Environmental Services personnel shall be advised of the danger of taking any ferrous object into the magnet room and that the magnet is always turned on (24 hours per day, 365 days per year).

- 7) Precautions for Public Safety Personnel- even in an emergency, Public Safety personnel shall remove firearms before entering the magnet room. Magnet compatible constraints (plastic shackles) must be used for restraint of prisoners taken into the MRI magnet room. At the conclusion of an MRI scan on a prisoner wearing plastic shackles, the prisoner must be removed from the magnet room before the shackles are cut off using ferrous tools.
- G. Screening Patients for MRI Procedures
- 1) The MRI technologists will be responsible for giving clearance for all patients, health care providers, other individuals and equipment to enter Zone 4 (MRI magnet room). **Without clearance, no one may enter Zone 4 (MRI magnet room), and no equipment may be taken into Zone 4 (MRI magnet room).** The screening process and the approved screening form will be completed and reviewed by a trained MRI Technologist before each MRI procedure.
  - 2) Patients with Aneurysm Clips  
Aneurysm clips can be either MRI conditional or MRI unsafe. MRI procedures on individuals with aneurysm clips can, in situations where conditions are not met for MRI safety, lead to patient injury or death. As a result, MRI studies on patients having aneurysm clips will not be performed unless a) the referring surgeon submits a written attestation that the aneurysm clip is MRI conditional for use at 1.5T or 3T, or b) medical records contains an attestation or clip identification which can be used to investigate the safety of performing a procedure on a patient with that particular clip.
  - 3) Syringe Infusion Pumps and the MRI Environment  
The only syringe pumps that will be allowed in an MRI magnet room for delivery of medication must be suitable for operation in the MRI environment. As per other equipment operating in an MRI environment, MR conditional syringe pumps will first be cleared by the MRI technologist prior to entering into an MRI magnet room.
- H. Emergency Situations in a MRI Environment
- 1) Do not attempt to run a Code Blue, rapid response or resuscitation within the MRI magnet room. Patients must be removed from the magnet room to address these situations.
  - 2) If the magnet quenches:
    - a. Immediately evacuate all patients and personnel as quickly and safely as feasible from the MRI scan room.
    - b. Restrict all access to the MRI scan room.
    - c. Call Radiology engineering.
  - 3) Inadvertent introduction of a ferrous object into the magnetic field.
    - a. If a patient is in the scanner and a ferrous object has been pulled into the scanner and can't be physically removed without causing injury to the patient/personnel, quench the magnet to remove and treat the patient/personnel.
    - b. If a ferrous object has been pulled into the MRI scan room and no one has been injured or is in danger of injury, remove all patients/personnel and call Radiology Engineering to take responsibility of removing object.
  - 4) Incidental finding of unknown implant in a patient.
    - a. Leave patient in scanner and call the radiologist.
    - b. Radiologist will make the decision to either finish or terminate the exam.
    - c. When finished, remove the patient from the scanner as slowly as possible.

- d. **Do not** allow the patient to sit up.
  - e. Laterally slide the patient off the MRI table onto a MRI safe stretcher. Do not sit the patient up until they are out of the MRI scan room.
  - f. Radiologist will examine the patient following removal from the MRI scan room.
  - g. Fill out a report in the Safety Online RL6 Alert System. .
- 5) Fire (Code Red):
- a. First evacuate the patient from the scan room.
  - b. Evacuate patients from the department following the **RACE** fire safety procedures.
  - c. As soon as possible and if the situation allows to be done safely, push emergency power off button for the MRI scan room(s) after patients have been removed. **Do not** push the quench button for the MRI scan room(s).

I. Reporting MRI Safety Incidents

- 1) Immediately report MRI safety violation to MRI Lead Technologist and/or Chief Technologist and MRI Medical Director.
- 2) Submit a report using the Safety Online RL6 Alert System.
- 3) Call Risk Management at 1-RISK (7475) and inform them of the incident.
- 4) Examples of a MRI Safety Incident:
  - a. Licensed independent practitioner did not adequately fill out patient's screening form or adequately document patient's history in the patient's chart.
  - b. Discovering that the patient has a MRI unsafe implant that the patient did not report.
  - c. Any accidental induction of a ferromagnetic item into the MRI scanner.
  - d. Any thermal burn to a patient

J. MRI Safety Committee Members

Committee Members include:

- Physician Director of MRI services
- Assistant Physician Director of MRI services
- Medical Physics
- MSK Radiologist
- Pediatric Radiologist
- Chief Technologist
- Lead MRI Technologist
- MRI Technologist
- Imaging Quality Coordinator

## REFERENCES, SUPPORTING DOCUMENTS, AND TOOLS

The Joint Commission Standards Accreditation Manual. (2020, Jan) Environment of Care, Human Resources, and Performance Improvement Chapters.

## RELATED POLICIES

N/A



## MRI Safety Screening Form

The Radiation Therapy Program faculty need to ensure your safety and everyone who will be clinically operating around you. If you are not safe to operate within the MRI scanner room, you are not a safe candidate to perform clinical internship rotations in MRI.

Before entering the MRI scanner room, you will be asked to fill out a screening form asking about anything that might create a health risk. If you have a bullet, shrapnel, or similar metallic fragment in your body, there is a potential risk that it could change position, possibly causing injury. Also, the magnetic field of the scanner can damage an external hearing aid or cause a heart pacemaker to malfunction.

After reading the following passages if you have any questions about your safety, please feel free to contact the Clinical Coordinator or Program Director.

Do any of the following apply to you personally?

\_\_\_\_ History of any surgical procedure that entails implanted electronic device(s), or any implant within/on your body you were not naturally born with? If yes, please list:

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Please mark all others that apply to you:

- \_\_\_\_ Cardiac pacemaker, wires, or defibrillator
- \_\_\_\_ Brain aneurysm clips
- \_\_\_\_ Intracranial shunt: Programmable Type: Codman or Strata
- \_\_\_\_ History of welding, grinding, or metal in eyes
- \_\_\_\_ History of eye injury with metal or metal removed from eye
- \_\_\_\_ Middle ear prosthesis, hearing aid, or implant
- \_\_\_\_ Eye implant or prosthesis
- \_\_\_\_ Any known metal fragments, bullets, BB, pellets

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Do you have any contraindications that would prevent you from performing routine tasks in the MRI Department as a student or future technologist?

\_\_\_\_\_

*\*\*I understand that if my medical history changes to include any of the procedures mentioned above, I am required to notify the Clinical Coordinator and Program Director.*

I understand that this information is essential for not only my own safety but that of the patient and other MRI personnel.

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Signature

Date \_\_\_\_\_



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