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**Name: MRI Screening of Patients and Other Individuals**

**Effective Date: 03/2017**

**Review / Revision History:**

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**Purpose: (including applicable intended audience)**

**Policy:**

**Background**

This guideline establishes screening standards for patients and other individuals prior to entry into the Magnetic Resonance (MR) environment.

There are potential risks associated with the MR environment for patients as well as accompanying family members, attending health care professionals, and others.

One of the important aspects of protecting patients and other individuals from MR system-related accidents and injuries involves understanding the risks associated with various implants, devices, accessories, and other objects that may cause problems in the MR environment. This requires constant attention and diligence to obtain information and documentation about these objects in order to provide the safest MR setting possible.

**Operational Definitions**

**MR Zoning**

1. Zone I: This region includes all areas that are freely accessible to the general public. This area is typically outside the MR environment itself and is the area which patients, health care personnel, and other employees of the MR site use to access the MR environment.
2. Zone II: This area is the interface between the publically accessible, uncontrolled Zone I and the strictly controlled Zone III. Movement into Zone II is restricted, and all personnel in Zone II must be supervised by MR personnel.
3. Zone III: This area is the region in which free access by unscreened non-MR personnel or ferromagnetic objects or equipment can result in serious injury or death as a result of interactions between the individuals or equipment and the MR scanner's particular environment.
4. Zone IV: This area is synonymous with the MR scanner room itself, that is, the physical confines of the room within which the MR scanner is located.

## **Non- MR Personnel and MR personnel**

1. Non- MR Personnel: Those who have not completed the MR safety-training program.
2. Level 1 MR personnel: Those who have passed minimal safety educational efforts to ensure their own safety as they work within Zones III and IV.
3. Level 2 MR personnel: Those who have been more extensively trained and educated in the broader aspects of MR safety issues.

## **Responsibilities of the Magnetic Resonance Medical Director and Safety Officer**

1. Magnetic Resonance Medical Director (MRMD): In conjunction with the Department of Radiology Policy Committee, establishes MR safety practices, policies, and guidelines for the site(s) and oversees decisions regarding MR site access and site access restriction decisions.
2. Magnetic Resonance Safety Officer (MRSO): Advises the MRMD and implements the MR safety practices as defined by the MRMD.

## **Guidelines**

### **Screening Patients and Other Individuals**

1. All non-MR personnel wishing to enter Zone III must first undergo an MR safety screening process. Only level 2 MR personnel are authorized to perform an MR safety screen before permitting non-MR personnel into Zone III.
2. The screening process for all patients, other individuals, non-MR personnel, and MR personnel must be uniformly applied.
3. Non-MR personnel should be accompanied by, or under the immediate supervision of and in visual and verbal contact with, one specifically identified level 2 MR personnel for the entirety of their duration within Zone III or Zone IV restricted regions.
4. All conscious, alert and oriented individuals shall be screened visually, verbally, and interactively to include the MRI safety screening form.
5. Any individual entering Zone IV must remove all readily removable metallic personal belongings and devices (including but not limited to watches, pagers, cell phones, body piercings [if removable], contraceptive rings, metallic drug delivery patches, cosmetics containing metallic particles, and clothing items that may contain metallic fasteners, hooks, zippers, loose metallic components, or metallic threads). Wedding and commitment rings are the ONLY exception, as they are consistently made of non-ferrous materials.
6. All individuals with a history of potential ferromagnetic foreign object penetration (e.g. bullets or shrapnel) must undergo further investigation prior to entry into Zone IV.
  - a. Acceptable methods of screening include patient history, patient x-ray films, prior CT or MR studies of the questioned anatomic area, and written documentation of the type of implant or foreign object that might be present.
  - b. Once positive identification of the type of implant has been made, investigation must include product labeling regarding the implant or object, and if needed a review of peer-reviewed publications regarding MR conditions and MR safety testing of the make, model, and type of object.
  - c. All patients who have a history of orbital trauma by a potential ferromagnetic foreign body for which they sought medical attention are to have their orbits cleared by plain film x-ray or CT of the orbits.
7. The screening form may be completed by another healthcare provider with the patient prior to presenting to MRI. Prior to the entry into Zone IV, the form and its contents must be reviewed and a verbal interview conducted by level 2 MR personnel per the MRI department time out policy.

## **MRI Screening Form**

The patient or designee as well as the screening MR staff member must both sign the completed form.

1. This form shall become part of the patient's medical record and be scanned into PACS upon completion of the MR examination.
2. No empty or unknown responses will be accepted; each question must be answered with a "yes" or "no," or specific information must be provided as requested.
3. Supporting documentation of any implant, device and/or object marked "yes" on the MRI screening form must be explained, in writing, by the MRI technologist.

## **Implant, Device, and Object Clearance**

1. MR safety status (unsafe, MR conditional, or safe) of an implant, device and/or object cannot be assumed if it is not clearly documented in writing. If an implant, device, and/or object has not been tested, or if MR safety status is unknown, it should not be permitted unrestricted access to Zones III or IV without consultation with the MRMD and MRSO. If an approved device must be scanned with parameters that fall outside manufacturer guidelines, it will be treated as it is a non-approved device.
  - a. Final determination of whether to proceed with the scan on any given patient with any given implant, foreign body, etc., is to be made by the level 2 MR personnel-designated attending MR radiologist, MRMD, or MRSO following criteria for acceptability predetermined by the MRMD.
2. Supporting documentation must include:
  - a. Manufacturer, type or model, material, lot, and serial number(s).
  - b. Approved methods of device verification include:
    - i. Verbal confirmation of implant, device, and/or object with identification of manufacturer, type or model, material, lot, and serial number(s).
    - ii. A surgical report with supporting documentation.
    - iii. Manufacturer implant, device, and/or object information card.
    - iv. Information obtained from the approved online safety reference <http://mrisafety.com>.
    - v. Review and assessment by an attending radiologist. If the patient is cleared to enter Zone IV, the MR technologist will document the approving attending radiologist name and approved implant, device, and/or object to include all information listed above on the MRI screening form and scan into PACS.

## **Conscious, alert and oriented patients who can reliably provide a medical history**

1. Conscious and alert patients are to complete a written MR safety screening form prior to entry into Zone III.
2. If questionable patient metal exposure history or no reliable history is obtained, the patient shall undergo plain film imaging of the skull and/or orbits, neck, chest, abdomen and pelvis to exclude metallic foreign objects (if recently obtained plain films, CT, or MR studies of such areas are not already available).
  - a. Such imaging studies are to be ordered by clinician/service ordering the original MR examination. If this is not possible for reasons of availability and/or timeliness, they may be ordered by a radiologist from the clinical Division performing the MRI examination.
  - b.

## **Unconscious, Unresponsive Patients and those who cannot provide reliable medical histories**

1. Family or guardians of non-responsive patients or of patients who cannot reliably provide their own medical histories are to complete a written MR screening form prior to their introduction into Zone III
2. Screening of patients for whom an MR examination is deemed clinically indicated or necessary, but who are unconscious/unresponsive or cannot provide their own reliable histories regarding prior possible exposures to surgery, trauma, or metallic foreign objects, and for whom such histories cannot be reliably obtained from others:
  - a. If no reliable patient metal exposure history can be obtained, and if the requested MR examination cannot reasonably wait until a reliable history might be obtained, the ordering clinician shall perform the following:
    - i. Review the patient's medical record for documented history of any history of prior surgeries or procedures and mark the appropriate area(s) in sections 1 & 2 on the MRI screening form.
    - ii. Ensure imaging of the skull and/or orbits, chest, abdomen and pelvis to exclude metallic foreign objects (if recently obtained plain films, CT, or MR studies of such areas are not already available). If this is not possible for reasons of availability and/or timeliness, they may be ordered by a radiologist from the clinical Division performing the MRI examination.
    - iii. Perform a physical exam on the patient to evaluate for any unexplained scars or surgeries not documented in the patient's medical record. Orders for radiographs must be placed for any additional area(s) of concern.
    - iv. Document the above precautions in the patient's medical record.
  - b. The investigation described above should be made to ensure there are no potentially harmful embedded or implanted metallic foreign objects or devices.
3. Final determination of whether to proceed with the scan on any given patient with any given implant, foreign body, etc., is to be made by the level 2 MR personnel-designated attending MR radiologist, MRMD, or MRSO following criteria for acceptability predetermined by the MRMD.
  - a. An attending radiologist must give approval to override the contraindication. Approval is documented and signed off by the performing level 2 MR technologist on the MRI screening form and scanned into PACS with the name of the approving Radiologist.

### **Cross Reference:**

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2. American Board of Magnetic Resonance Safety. (2016). Certification Types. Retrieved from: [http://www.abmrs.org/?page\\_id=106](http://www.abmrs.org/?page_id=106)
3. Shellock, F. G. (2016). Guidelines for Managing Patients with Coronary Artery Stents with Unknown Labeling Information Referred for MRI Procedures. Retrieved from: [http://www.ismrm.org/smrt/safety\\_page/2016.Shellock.Coronary%20Stent.MRI.Guidelines.pdf](http://www.ismrm.org/smrt/safety_page/2016.Shellock.Coronary%20Stent.MRI.Guidelines.pdf)
4. The Joint Commission (2008). Joint Commission Sentinel Event Alert, Issue 38. Preventing accidents and injuries in the MRI suite. Retrieved from: [https://www.jointcommission.org/sentinel\\_event\\_alert\\_issue\\_38\\_preventing\\_accidents\\_and\\_injuries\\_in\\_the\\_mri\\_suite/](https://www.jointcommission.org/sentinel_event_alert_issue_38_preventing_accidents_and_injuries_in_the_mri_suite/)

The Joint Commission. (2016). New Requirements for Diagnostic Imaging Services. Retrieved from: [https://www.jointcommission.org/assets/1/6/Prepub\\_HAP\\_CAH\\_Diag\\_Img.pdf](https://www.jointcommission.org/assets/1/6/Prepub_HAP_CAH_Diag_Img.pdf)

**Applicable Standards:**

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**Developed By: MRI Division**

**Policy Primary: Department of Radiology Policy Committee**

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