

Magnetic Resonance Imaging: Annual Safety Training



Name: _____

Facility: _____

Once you have reviewed the material referenced, initial the left hand column for each item. Further information on select items listed can be found at the web links below.

	Patient screening, to include: ferromagnetic items, electrically conductive items, medical implants and devices, risk for Nephrogenic Systemic Fibrosis (NSF)
	Thermal injury protection: proper patient and equipment positioning
	MRI compatible equipment and supplies
	Safety response for patients requiring urgent medical care
	Emergency shutdown procedures: MR system quench and cryogen safety
	Patient hearing protection
	Management of patients with claustrophobia, anxiety, or emotional distress

Further MRI safety training can be found at:

<http://onlinelibrary.wiley.com/doi/10.1002/jmri.24011/pdf>

<http://www.fda.gov/Drugs/DrugSafety/ucm223966.htm>

<http://www.imrser.org/>

<http://www.appliedradiology.org/MRIsafety/>

I have read the documents and understand their content. I have visited the above linked websites and am familiar with the information available to myself and my patients referenced in these sites. If I have any questions in the future regarding these matters, I realize that I may request additional information from my supervisor, the Radiation Safety Officer, or a physicist at Medical Physics Consultants, Inc. (734-662-3197).

Signature: _____

Date: _____

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Patient screening:

Zoning

Access to the MR scan room should be restricted through a series of clearly indicated Zones.

- Zone I: General public with no restrictions
- Zone II: MR reception area, waiting area, toilets, inpatient entrance
- Zone III: Screened patients, holding area, and scan control area
- Zone IV: MR scan room

Screening

All patients should complete MR safety questionnaire.

All non-MR personnel entering Zone III should be screened for ferromagnetic material. Conventional metal detectors can be unreliable, but sophisticated ferromagnetic detection systems are useful to supplement the screening process.

All metallic belongings should be removed, including piercings, metallic cosmetics (e.g., eye shadow), and clothing with metal.

Patients with history of ferromagnetic foreign objects should be carefully assessed and cleared before entering Zone IV (scan room).

Patients with implanted pacemakers, electrically conductive devices, or mechanical devices, should be prohibited from entering Zone IV and exposed to no more than 5 gauss magnetic fringe fields, unless cleared by an extensively trained Radiologist (Level 2).

Administration of gadolinium-based contrast agents may be precluded if patients have had prior adverse reactions or are unable to adequately clear the agent. More information is available at: <http://www.fda.gov/Drugs/DrugSafety/ucm223966.htm>

Thermal injury protection:

Unused electrically conductive materials, outside the patient, should be removed.

Surface coil leads should be checked before scanning.

The patient's body should not touch the inner bore of the magnet. Pads can be used for separation.

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Electric currents can be induced in the patient while inside the magnet bore, and can cause thermal injury, especially in “loops” of electrically conductive material or patient tissue. Arms and legs should not cross or touch each other. They can be separated with pads. Careful positioning should be employed.

Cold compresses can be used over heavy tattoos to reduce tissue heating.

MRI compatible equipment:

Many medical devices and supplies are not safe for use in a MR scan room and should be prohibited.

MRI “safe” equipment is typically labeled with a square green label, with no restrictions.

MRI “conditional” equipment is typically labeled with a triangular yellow label, and may need to be tested or evaluated prior to use. A strong magnet (>1000 G) or a metal detector can be used for assessment.

MRI “unsafe” equipment has a red circle with diagonal strip, has been identified as strongly ferromagnetic, and must not be used in the scan room.

Additional resources for compatibility are at: <http://www.mrisafety.com/>



Safety response for patients requiring urgent care:

When a patient needs immediate medical attention in the scan room, any responders must have sufficient training in MR safety.

This applies to medical/technical staff as well as police and fire personnel.

Resuscitation attempts within the scan room can be complicated (EKG errors) and should be moved out into a safe area.

Emergency and disaster plans should be in place and conducted periodically.

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Emergency shutdown procedures:

A loss in superconductivity can result in a massive heat gain in the magnet, producing cryogen boil-off and release. This is called a “quench”. The resulting damage is costly and time-consuming. Emergency quenching should be avoided.

If extended power loss is expected (oncoming natural disaster), the strong magnetic field can be ramped down to prevent the quench.

Backup or temporary power should be available at all times.

Patient hearing protection:

MR systems can produce a very noisy environment for the patient. All patients should be offered hearing protection, especially those systems which have sound pressures above 99 dB. Some sites provide music through noise-reducing headphones.

Management of patients with claustrophobia, anxiety, or emotional distress:

Many patients experience anxiety prior to and during MR exams and some cannot complete the study due to claustrophobic reactions. Some patients fare better in open magnets. Others do well with visual distractions (virtual TV or reflective glasses).

Sedation is often used to calm patients with anxiety and emotional distress. The ACR guideline on sedation can be found at:

<http://www.acr.org/~media/F194CBB800AB43048B997A75938AB482.pdf>