SUNY DOWNSTATE MEDICAL CENTER
UNIVERSITY HOSPITAL OF BROOKLYN
POLICY AND PROCEDURE

No: MRI-3

Subject: Screening patients & staff for Non-Compatible MR objects

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Standard PC.01.02.01 (EP.1
the hospital defines, in writing, the scope and content of screening, assessment, and reassessment information it collects.

EC.02.01.01 (EP.14) The hospital manages magnetic resonance imaging (MRI) safety risks associated with the following: Patients with medical implants, devices, or imbedded metallic foreign objects)
UP.01.03.01 A time out is performed before the procedure

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Issued by: Radiology Department

I. PURPOSE

To define the screening process for identifying MRI compatible objects,whether indwelling, external, or unforeseen and to define zone parameters to ensure staff and patient safety.

II. DEFINITIONS

MRI Zones: The MRI Area is divided into 4 zones.

Zone 1- includes the area that is freely accessible to the general public and is limited to the point of entry and reception area of the MRI suite.

Zone 2- Includes the area where patients are registered and screened. This zone is controlled by the MRI staff.

Zone 3- This area is under strict control of the MRI staff and is limited to patients and staff who have been screened for ferro-magnetic objects and serves as the waiting area for entry into the scanning room.

Zone 4-This is the actual “SCAN ROOM”. Only those trained individuals escorting patient to the scanner or screened clinicians directly involved with the immediate care of the patient are permitted to enter Zone 4.

Note: the department of Radiology does not permit family members or any persons accompanying a patient to pass beyond zone 2. The only exception to this rule is pediatric patients, a parent or guardian will be allowed to enter zone 3 after being screened for any ferrous objects(indwelling or external). Once the patient is taken into the scan room (zone 4) the individual will be asked to return to Zone 1.

POLICY/PROCEDURE:

:All patients and personnel must be properly screened and deemed free of any ferro-magnetic objects and non-MRI compatible implanted medical devices prior to entering Zone 3 of the MRI suite. In the event an unforeseen ferro object has entered into Zone 4, the following must be done immediately:

If the object is inside the patient or in the imaging field:

a. Stop the scan and move table out of the magnet .

b. Speak with the patient and identify the object .(i.e. Bobby pin)

c. remove the object with extreme caution

If the object is pinning a patient or staff member:

a.. If the object can’t be identified or is unsafe for the MRI (i.e.undocumented aneurysm clip) slowly move the patient out of the magnet onto an MRI safe stretcher. Do not allow the patient to sit upright until out of Zone 4.

If the object is pinning a patient or staff member:

1a. If the person is unconscious, bleeding profusely , at risk of losing a limb, or in severe pain, you must manually quench the magnet to bring down the field

in-order to release the ogject and/or the person.

1b. If the person is responsive and informs you they are OK, you may be able to

Leave them until a service engineer can arrive and ramp down the magnet slowly

To avoid a full quench. Any change in person condition will require a quench

1c. Once the person is released, remove them from room immediately and

Secure medical attention as per established emergency codes.

Process for an emergency shut down:

Power down and Power up procedure for the MRI unit

For complete shutdown of the unit, GE recommends:

1. First shut down the software.
2. Once the software and PC are down, go to the PGR cabinet located in the equipment room and press the Red Power Off button. This will trip the rotational handle on the PDU.
3. Once that is done you can manually turn off the PDU breaker on the Main Disconnect Panel on the wall.

NOTE: This procedure brings down your PGR cabinet, but you still have the HEC cabinet powered ON.

Unfortunately your coldhead compressor is powered from the HEC cabinet. If you shut down the HEC Breaker at the Main Disconnect Panel, you'll shut down the coldhead. GE recommends to shut down the HEC cabinet right before a generator test is performed to minimize the coldhead off status.

To power up the MRI unit:

Power up is in the reverse of the shut-down with one exception. After you turn ON the handle at the PDU to turn on the PGR cabinet, you have to press the Green EMO button to power up some of the electronics inside the cabinet.

All events of the above noted nature must be reported to the MR Manager,

The safety officer, and the MR Medical Director immediately. The safety officer

Must then report the incident to following website: www.fda.gov/medwatch

IV. RESPONSIBILITIES

ALL MRI Technologist, MRI supervisor, Radiology attending, Radiology Resident, Nursing Staff, Respiratory staff, Anesthesia Staff, and Ancillary support staff.

V. PROCEDURES/GUIDELINES:

Patient Screening:

- Patient screening is initiated in Zone #2
- All patients are required to have a completed "MRI Safety Form" (see attachment A). The form is completed by the ordering physician for inpatients; Outpatients complete the form as part of the registration process.
- Prior to beginning the screening process the technologist will conduct patient identification using two patient identifiers: "patient name & DOB".
- The technologist shall review the screening form with the patient.
- Unanswered questions or ambiguous answers require the technologist to contact the ordering physician for clarification.

- If the ordering physician cannot be contacted, the study will be rescheduled (for both inpatients and outpatients).
- Any implanted medical device indicated on the “MRI Safety Form: requires the technologist to confirm MRI compatibility by performing an internet search for “”MRI SAFE IMPLANTS”. On the website “MRI safety .com “
  PLEASE NOTE: * ALL HEART VALVES AND CARDIAC STENTS ARE CONSIDERED SAFE AT 1.5T.

- Upon completion and review of the “MRI Safety Form “the technologist will perform an external body scan utilizing the “SAFE SCAN” hand held body scanning device which detects both internal and external ferro-magnetic objects. This serves as an additional safety precaution to identify objects or devices which the patient or physician may not have indicated on the “MRI Safety Form”
- If the hand held scanner detects a non-compatible object, the technologist must establish whether the object is external or internal. This shall be accomplished by asking several simple questions:
  a. Do you have any metal on you? i.e.: body piercings/ belt/watch/necklace
  b. Is there any metal inside of your clothing or hair? i.e.: metal reinforcements/hairpins
- Responses to the above questions will identify whether the object is internal or external.
- If the object is external, the patient will be instructed to remove the object. The patient will then be rescanned to confirm zero magnetic objects are present.
- Once the patient has been completely cleared for the procedure, they will be asked to remain in Zone 2 until the scan room is available. Patient movement in this area will be supervised by the MRI staff.
- When the scan room becomes available, the technologist will escort the patient Into Zone 3 and then into zone 4 the scan room.
- The technologist will explain the procedure to the patient, inform them of the approximate scan time, explain how to use the emergency call bell system and offer the patient either head phones or ear plugs.
- Prior to the start of the exam the technologist will again reaffirm the patient’s Identity and perform a complete time , which includes all of the following elements:
  a. Name
  b. DOB
  c. Correct procedure
  d. Correct Body part/ region
  e. Correct laterality
  f. Correct contrast (if applicable)
  g. Correct dose and route (if applicable)

VI. Personnel Screening:

- All personnel requiring access beyond Zone 2 are required to participate in annual MR safety training. The level of training is determined by the staff member's job function and/or level of involvement in direct care, as noted in section VII.
- All personnel required to enter into Zone 4 will undergo a secondary screening by the MRI technologist to ensure no ferro-magnetic objects are entering the scan room. This secondary screening is performed using the "Scan Safe" device prior to entering zone 4.
- In cases where emergency access to Zone 4 is necessary, secondary scanning will be accomplished when personnel enter the door way and auto scanned by the fixed detection system. Audible alarms will sound if any ferro-magnetic material is detected.

VII. MRI PERSONNEL TRAINING:

Personnel are divided into 3 categories

- **NON-MR personnel** – This includes patients, visitors, and ancillary staff who have not received any level of MR safety training. Zone 1 allows "free access" and Zone 2 access occurs under the direct supervision of the MRI staff, i.e.: family member accompanying a patient, or a clerk bringing registration papers to the suite.

- **Level 1 MR Personnel-** Level 1 personnel have received and passed the minimal safety educational requirements (In-Service on MRI Safety) to ensure their safety to enter into Zone 3. This group includes assigned Registration personnel, patient aides, nursing staff, and environmental workers. These individuals are permitted to move about in Zone 3 under direct supervision of the MR staff.

- **Level 2 MR personnel –** This includes personnel who have received more extensive training and education in MR safety including: thermal burns, MRI safe/compatible equipment, and emergency response in the MR scan room. This group includes MRI technologists, Radiologists, dedicated MR Nursing personnel and assigned Anesthesiologists. Only these specially trained individuals will be permitted to enter into Zone 4.

TRAINING: 2 levels of training

- **Level 1 Training –** The Hospital RSO provides in-servicing to all Level 1 personnel. The content of the presentation provides the staff with a basic

introduction to the dangers associated with working in an MR environment.

- **Level 2 training-** The training provided to level 2 personnel is more extensive and requires education in the safety aspects of proper patient and personnel screening, checking compatibility of implanted medical devices, dealing with patient emergencies in the scan room, how to prevent thermal injuries, etc. . Level 2 training requires successful completion of a post module examination. The RSO will be responsible for training all staff who are categorized as Level 2 personnel. Refer to attachment #4-**(ASRT Module "Safe MRI practices")**

VIII. Pregnancy:

- **Pregnant Health Care Practitioners-** are permitted to work in and around the magnetic environment throughout all stages of the pregnancy. Under no circumstance should a pregnant health care practitioner remain in Zone 4 during image acquisition.
- **Pregnant Patients-**There is no conclusive data to support refraining from scanning a patient during any stage of pregnancy. However, as with all diagnostic imaging of pregnant patients, consideration must be given to the risk vs benefit ratio. The decision to perform an MR on a pregnant patient MUST be made by a qualified MR Radiologist in consultation with the patient's primary care physician.

IX: ATTACHMENTS:

- **Attachment A (MRI SAFETY SCREENING FORM)**
- **Attachment B (Web link to identifying MR Compatible Implants)**
- **Attachment 4 (ASRT Module "Safe MRI practices")**

X: REASON FOR REVISION:

Revision

XI: REFERENCES:

Journal of magnetic Resonance Imaging 37:501-530 (2013)
Journal of magnetic Resonance Imaging 2-247-248 (1992)
American Journal radiology: 6:178 (2002)

Date Reviewed	Revision Required (Check One)		Responsible Staff Name and Title
10/2006	**Yes**		James Shanahan, Administrator Radiology
9/2016	**Yes**	**No**	Vincent Monte, Associate Director , Radiology
11/2018	**Yes**	**(No)**	Vincent Monte, Associate Director , Radiology
	Yes	**No**	