



Only MR technologists are designated as Level 2 MR personnel. As such, only MR technologists are authorized to admit non-MR personnel into Zone IV. Furthermore, they are responsible for supervising all non-MR personnel in Zone III or IV.

In the event of a shift change or break for lunch or dinner, no Level 2 person may relinquish his/her responsibility to supervise non-MR personnel still remaining within Zone III or IV until such supervision has been formally transferred to another Level 2 person.

Non-MR Personnel

Non-MR personnel include patients, accompanying family members, and medical staff members such as nurses, anesthetists, or respiratory therapists who may be required periodically to monitor patients undergoing MR scans. These individuals must be under the immediate supervision of and in visual or verbal contact with one specifically identified MR technologist for the entire time they are in Zone III or IV.

SCREENING OF MR PERSONNEL AND NON-MR PERSONNEL

Just as patients enter the magnet bore to undergo an MR scan, non-MR personnel may also enter the bore of the MR scanner during the imaging process. For example, a mother may lean into the magnet to comfort her crying child undergoing a scan. Likewise, a respiratory therapist may lean into the bore to manually ventilate a patient undergoing a scan. All non-MR personnel wishing to enter Zone III must first complete and pass the MR safety screening process. The screening process that utilizes written screening forms is basically the same for MR and non-MR personnel. However, the patient questionnaire is longer, and requires more detailed medical history information.

All screening records must be maintained by each facility. Empty responses on the screening forms are unacceptable – each question must be answered with a “YES” or “NO” and specific information must be provided as requested on the form. Furthermore, whenever possible, each form must be signed appropriately – by the patient/guardian or the MR/non-MR person undergoing screening and by the screening MR staff member(s).

While the patient screening forms must be scanned into PACS, the screening records of MR personnel and non-patients may be conveniently organized in a loose-leaf binder or notebook. If any person other than the patient wishes to enter at least Zone III, the MR technologist should cross-check the notebook to attest that the person has been screened properly within the past year and that nothing has changed since he/she completed the form. Otherwise, he/she cannot enter Zone III or IV without completing a new form and being cleared by the MR technologist.

Authorization to Perform Safety Screening

Only Level 2 MR technologists and Level 1 MR personnel with additional training related to screening (i.e., operations assistants who have been trained to screen by a Level 2



MR technologist) are authorized to perform the MR safety screens. (Radiology Administration at each facility must maintain appropriate documentation to demonstrate that Level 1 operations assistants who screen non-MR personnel have completed such training.)

Screening of MR Personnel

To ensure their safety in the MR environment, all MR personnel must undergo the MR screening process as part of their interview process. Furthermore, for their own protection and for the protection of the non-MR personnel they accompany or supervise, all MR personnel should report immediately to the MR Supervisor or Lead MR Technologist any trauma, procedure, or surgery they experience or undergo in which a ferromagnetic metallic object or device may have been introduced within or on them. This will require an appropriate follow-up screening to determine whether or not the individual may be permitted to enter again at least Zone III.

Screening of Non-MR Personnel

All non-MR personnel wishing to enter at least Zone III must first complete and pass the written MR safety screening process. These individuals must be accompanied by, or under the immediate supervision of and in visual or verbal contact with, one specifically identified MR technologist the entire time they are in the Zone III or IV.

All patients and other non-MR personnel with a history of potential ferromagnetic foreign object penetration must undergo further investigation before being permitted to enter at least Zone III. Examples of acceptable screening methods for patients include history, plain x-rays, prior CT or MR studies of the questioned anatomic area, or access to written documentation regarding the type of implant or foreign object that might be present. Once positive identification of the implant or object has been made, best effort assessments must be completed to identify its MR compatibility or MR safety status. Identification efforts might include written records of formal testing results of the implant prior to implantation, product labeling regarding the implant or object, or peer-reviewed publications regarding the MR compatibility and MR safety testing of the specific make, model, and type of object. (Note that MR safety testing is of value only if the object or device has not been altered or modified since such testing has been published and only if it can be confirmed that the testing was performed on an object of precisely the same make, model, and type.)

Patient Screening

Non-Emergent Patients

Individuals scheduled to undergo an MR exam must be screened to ensure the procedure may be conducted safely and each patient/volunteer must answer his/her own MR safety screening questions whenever possible. Non-emergent patients must be safety screened on site by at least two separate or independent screeners. Furthermore, **one of the screenings must**

be completed by an MR technologist and one of the screenings must be performed verbally or interactively. The MR technologist must review the MR patient screening questionnaire and specifically ask the patient about aneurysm clips, pacemakers and implanted devices as well as a history of injury to the eyes. **These safety screenings must be completed in Zone II prior to moving the patient into Zone III.**



ABC's of Patient Screening (Snow 2017)

- Review the completed MRI Patient Screening Form with the patient, paying close attention to the questions answered YES.
- Verbally inquire if the patient has ever had:
 - Pacemaker or defibrillator
 - Aneurysm or brain surgery
 - Eye surgery
 - Metal shrapnel injury to the eyes, face, or body
 - Any other implant not previously discussed
- Confirm all surgeries
- Review the patient history pertaining to the reason for the exam and answer three questions:
 - **What** happened? How was the patient injured?
 - **Where** is the area of interest (AOI)? Include a marker on the imaging indicating the AOI.
 - **When** did the injury occur?
- Obtain as much information as possible and **document the information on the Screening Form. Write legibly.**
- Answer any questions from the patient.

In Zone II, patients preparing for the MR procedure must remove all readily removable metallic personal belongings and devices on or in them such as watches, jewelry, pagers, cell phones, removable body piercings, contraceptive diaphragms, metallic drug delivery patches, elbow and knee braces, cosmetics containing metallic particles (such as eye make-up), and clothing items which may contain metallic fasteners, hooks, zippers, loose metallic components or metallic threads.



Have the patient change into a gown with no metallic fasteners or a set of scrubs to wear during the MR procedure.

To maximum safety, the patient should remove his/her underwear for the study. If the patient indicates he/she wears absorbent, disposable underwear or pads for incontinence, explain that, for safety reasons, the protection must be dry for the MR procedure.

To maximize patient safety, the facility should provide the patient a gown with no metallic fasteners or a set of scrubs to wear during the procedure. Ideally, the patient should remove his/her underwear for the study. Lastly, patient walkers and wheelchairs that are not MR compatible must remain in Zone II.



All notes from the MR personnel pertinent to a particular patient and his/her exam should be added to the paperwork that will be in front of the radiologist when the images are read, i.e., the MRI Patient Screening Form. *Write legibly.*

Patients Unable to Answer Questions

If the patient is unable to communicate or is a poor historian who cannot adequately answer his/her own safety screening questions, the information may be obtained from a reliable family member or emergency contact. If the safety screening is performed by telephone, two separate screeners (including one MR technologist) must independently complete the process. Both must verbally review by telephone the screening questionnaire with the patient's family member or emergency contact, both must indicate the screening was completed via phone, and both must sign the form. The name of the patient's representative answering the screening questions must be noted on the form along with the representative's relationship to the patient.



Patients who are unable answer questions must be screened using an alternative method. Such non-emergent patients may be cleared by asking a family member the screening questions.

- If present, the family member who provided the information should sign the screening form.
- If the information is collected by phone, two separate screeners (including one MR technologist) must independently complete the screening process. Both must verbally review the screening questionnaire with the patient's family member or emergency contact. Both must document the person's name who provided the information and his/her relationship to the patient. Both must document the phone number, date, and time of the screening and both must sign the form.

Unreliable and/or Non-communicative Inpatient with No Available Family Member

In the case of an unreliable or non-communicative inpatient with no family members available, two MR screeners (including one MR technologist) must thoroughly review the patient chart. Furthermore, the MR technologist or operations assistant (as directed by the technologist) must obtain a medical order for radiographs to be used for MR safety screening.



Obtaining an Order for MR Safety Screening Radiographs

- At acute care facilities and provider-based outpatient imaging centers (including Novant Health Imaging Kernersville and Novant Health Imaging Maplewood), the MR technologist or operations assistant (as directed by the technologist) should contact any radiologist to obtain a verbal order for the MR safety screening radiographs.
 - The technologist or operations assistant should document the verbal order in the patient's electronic medical record (e.g., "V/O Do head, chest, abdomen screening x-rays for MR per Dr. Smith").
- At independent diagnostic testing facilities (IDTFs) or free-standing imaging centers (including Novant Health Imaging Piedmont and Novant Health Imaging Triad), the MR technologist or operations assistant (as directed by the technologist) must contact the referring physician for the order for MR safety screening radiographs.

An MR Radiologist must then review the x-rays and authorize the MR procedure. The MR technologist must document on the *MRI Patient Screening Form* the name of the MR Radiologist who approved the exam.

If the MR Radiologist does not authorize the MR procedure, the scan cannot be performed. For inpatients, the MR technologist or operations assistant (as directed by the technologist) should then make a note in the Progress Notes and notify the patient's nurse that the scan could not be performed. For outpatients, the MR technologist or operations assistant (as directed by the technologist) should notify the referring physician that the scan could not be performed.



If the MR procedure cannot be delayed and the patient is unreliable and/or non-communicative and has no available family member to provide information for MR safety screening, diagnostic x-rays or CT of the head, chest, abdomen, and pelvis may be reviewed by the MR Radiologist to clear the patient for the MR procedure.

- While previous diagnostic x-ray or CT procedures may already be available in PACS, additional screening x-rays may be needed by the MR Radiologist to authorize the scheduled MR exam.
 - To determine what (if any) x-ray procedures must be ordered, the MR technologist should review the patient's medical record including PACS.
 - ◇ If a recent previous head CT is available, the MR technologist should confirm whether axial images extend through the orbits to rule out foreign bodies such as metal shrapnel in the eyes. If the head CT does not include the orbits, head x-rays (i.e., two identical Water's views, same projection, not tilted) of the orbits for must be ordered for MR safety screening.
 - If there are NO previous imaging studies available for review, the following x-rays must be ordered for the purpose of MR safety screening:
 - ◇ Single angled Water's view of the orbits
 - ◇ One lateral view of the skull
 - ◇ Single view of the chest
 - ◇ Supine abdominal images include entire abdomen and pelvis from diaphragm to rectum.
- After determining what x-rays (if any) are necessary for screening, the MR technologist or operations assistant (as directed by the technologist) must obtain a medical order for the MR safety screening radiographs.
 - At acute care facilities and provider-based outpatient imaging centers (including Novant Health Imaging Kernersville and Novant Health Imaging Maplewood), the MR technologist or operations assistant (as directed by the technologist) should contact any radiologist to obtain a verbal order for the screening radiographs.
 - ◇ The technologist or operations assistant should document the verbal order in the patient's electronic medical record (e.g., "V/O Do head, chest, abdomen screening x-rays for MR per Dr. Smith").
 - At independent diagnostic testing facilities (IDTFs) or free-standing imaging centers (including Novant Health Imaging Piedmont and Novant Health Imaging Triad), the MR technologist or operations assistant (as directed by the technologist) must contact the referring physician for the order for the screening radiographs.



In the acute care setting, “Code Purple” refers to an incoming patient with a suspected stroke. Because time is critical to these patients, a whole body CT topogram is performed immediately after the head CT exam while the patient is still on the CT scanner bed. The head CT and the whole body topogram are then reviewed by an MR Radiologist to confirm quickly that the patient may safely undergo the MR procedure.

Periodically, to expedite a pending MR procedure, a referring physician may order a whole body CT topogram rather than screening x-rays. Although such a topogram may be used to clear the chest, abdomen, and pelvis, **the topogram of the head is INADEQUATE for clearing the patient’s orbits.** Head x-rays (i.e., two identical Water’s views, same projection, not tilted) must still be ordered for review by the MR Radiologist.



If an MR Radiologist does not authorize the exam for a particular patient:

- For inpatients, the MR technologist or operations assistant (as directed by the technologist) should make a note in the Progress Notes and notify the patient’s nurse that the scan could not be performed.
- For outpatients, the MR technologist or operations assistant (as directed by the technologist) should notify the referring physician that the scan could not be performed.

Emergent Patients

Emergent patients and their accompanying non-MR personnel may be screened only one time, *provided the screening is completed by the MR technologist.* **There are no exceptions.**

Non-Patient Screening

Individuals who are not patients (such as patient family members, ancillary staff, or service engineers) who must access Zone III or IV may be screened only once, provided the screening is completed by an MR technologist. **There are no exceptions.**

PREGNANCY-RELATED ISSUES

Pregnant Health Care Practitioners

Pregnant health care practitioners are permitted to work in and around the MR environment throughout their entire pregnancies. However, while they may position