



# Magnetic Resonance Imaging

## 1. Introduction

Candidates for certification and registration are required to meet the Professional Education Requirements specified in the ARRT Rules and Regulations. ARRT's Magnetic Resonance Imaging Didactic and Clinical Competency Requirements are one component of the Professional Education Requirements.

The requirements are periodically updated based upon a [practice analysis](#) which is a systematic process to delineate the job responsibilities typically required of staff MRI technologists. The result of this process is a [task inventory](#) which is used to develop the clinical competency requirements (see section 4 below) and the content specifications which serve as the foundation for the didactic competency requirements (see section 3 below) and the examination.

## 2. Documentation of Compliance

To document that the Didactic and Clinical Competency Requirements have been satisfied by a candidate, the program director (and authorized faculty member if required) must sign the ENDORSEMENT SECTION of the Application for Certification and Registration included in the Certification and Registration Handbook.

Candidates who complete their educational program during 2014 or 2015 may use either the 2011 Didactic and Clinical Competency Requirements or the 2014 requirements. Candidates who graduate after December 31, 2015 must use the 2014 requirements.

## 3. Didactic Competency Requirements

The purpose of the didactic competency requirements is to verify that individuals had the opportunity to develop fundamental knowledge, integrate theory into practice and hone affective and critical thinking skills required to demonstrate professional competency. Candidates must successfully complete coursework addressing the topics listed in the [ARRT Content Specifications](#) for the Magnetic Resonance Imaging Examination. These topics would typically be covered in nationally-recognized curricula published by organizations such as the ASRT or SMRT. Educational programs accredited by a mechanism acceptable to ARRT generally offer education and experience beyond the minimum requirements specified here.

## 4. Clinical Competency Requirements

The purpose of the clinical competency requirements is to verify that individuals certified and registered by the ARRT have demonstrated competency performing the clinical activities fundamental to a particular discipline. Competent performance of these fundamental activities, in conjunction with mastery of the cognitive knowledge and skills covered by the magnetic resonance imaging examination, provides the basis for the acquisition of the full range of procedures typically required in a variety of settings. Demonstration of clinical competence means that the candidate has performed the procedure independently, consistently, and effectively during the course of his or her formal education. The following pages identify the specific procedures for the clinical competency requirements. Candidates may wish to use these pages, or their equivalent, to record completion of the requirements. The pages do NOT need to be sent to the ARRT.



## 4.1 General Performance Considerations

### 4.1.1 Patient Diversity

Demonstration of competence should include variations in patient characteristics such as age, gender, and medical condition.

### 4.1.2 Simulated Performance

The ARRT requirements specify that certain clinical procedures may be simulated as designated in the specific requirements below. Simulations must meet the following criteria:

- The candidate must competently demonstrate skills as similar as circumstances permit to the cognitive, psychomotor, and affective skills required for performing the procedures on patients;
- The program director must be confident that the skills required to competently perform the simulated task will generalize or transfer to the clinical setting, and, if applicable, the candidate must evaluate related images.

Examples of acceptable simulation include: demonstrating CPR on a mannequin; performing venipuncture by demonstrating aseptic technique on another person, but then inserting the needle into an artificial forearm or grapefruit.

### 4.1.3 Elements of Competence

Demonstration of clinical competence requires that the program director or the program director's designee has observed the candidate performing the procedure independently, consistently, and effectively during the course of the candidate's formal educational program.

## 4.2 Magnetic Resonance Imaging Specific Requirements

As part of the education program, candidates must demonstrate competence in the clinical activities identified below. These clinical activities are listed in more detail in the following sections.

- Seven mandatory general patient care activities;
- Eight mandatory MRI safety requirements;
- 18 mandatory MRI procedures and 10 electives to be selected from a list of 24 MRI procedures; and
- Seven mandatory quality control tests.



#### 4.2.1 General Patient Care

Candidates must have demonstrated competence in all seven patient care activities listed below. The activities should be performed on patients whenever possible, but simulation is acceptable if state or institutional regulations prohibit candidates from performing the procedures on patients.

<b>General Patient Care Procedures</b>	<b>Date Completed</b>	<b>Competence Verified By</b>
CPR		
Vital Signs (Blood Pressure, Pulse, Respiration)		
Sterile Technique		
Standard (Universal) Precautions		
Transfer of Patient		
Care of Patient Medical Equipment (e.g., Oxygen Tank, IV Tubing)		
Venipuncture		

#### 4.2.2 MRI Safety Requirements

Candidates must demonstrate competence in all eight areas of MRI Safety listed below.

<b>MRI Safety Requirements</b>	<b>Date Completed</b>	<b>Competence Verified By</b>
Screening Patients, Personnel, and Non-Personnel for MRI Safe, Conditional, and Unsafe Devices and Objects		
Identify MRI Safety Zones		
Static Field (e.g., Projectiles)		
Radiofrequency Field (e.g., Thermal Loading, Coil Positioning, Patient Positioning, and Insulation)		
Time-Varying Gradient Magnetic Fields (e.g., Inducted voltages, Auditory Considerations)		
Communication and Monitoring Considerations (e.g., Sedated Patients, Verbal and Visual Contact, Vital Signs)		
Contrast Media Safety (e.g., NSF, Renal Function)		
Other MRI Safety Considerations (e.g., Cryogen Safety, Fire, Medical Emergencies, Laser Alignment Lights)		



### 4.2.3 MRI Procedures

Candidates must demonstrate competence in the 18 mandatory procedures listed in the following table. For the mandatory procedures, candidates must be evaluated while scanning actual patients. Candidates are also required to demonstrate competence for 10 of 24 elective procedures. Elective procedures should be performed on patients; however, up to one-half of the elective procedures may be performed on volunteers, as long as your institution has a policy that assures the protection of both the volunteer's and the institution's interests.

When performing the MRI procedures the candidate must demonstrate appropriate:

Patient skills including:

- Evaluation of requisition or medical record;
- Patient identification;
- Documentation of patient history including allergies;
- Safety screening; patient assessment;
- Explanation of procedure;
- Appropriate MRI safety procedures; and
- Patient discharge with post-procedure instructions.

Technical and procedural skills including:

- Selection of imaging coil;
- Patient positioning; protocol selection;
- Parameter selection;
- Image display; filming (if applicable);
- Networking; archiving; and
- Documentation of procedure and patient data in appropriate records.

Evaluation skills including:

- Analysis of the image for technical quality;
- Demonstration of correct anatomic regions;
- Recognition of relevant pathology; and
- Proper labeling.



4.2.3 MRI Procedures (continued)

MRI Procedures	Mandatory or Elective		Date Completed	Patient or Simulated	Competence Verified By
	Mandatory	Elective			
<b>Head and Neck</b>					
Brain	✓				
IAC	✓				
Orbit		✓			
Pituitary	✓				
Head MRA	✓				
Face/Soft Tissue Neck (e.g., Parotids, Thyroid)		✓			
Neck MRA	✓				
<b>Spine</b>					
Cervical	✓				
Thoracic	✓				
Lumbar	✓				
Sacrum/Coccyx		✓			
Brachial Plexus		✓			
<b>Thorax</b>					
Chest		✓			
Breast		✓			
Thoracic MRA		✓			
<b>Abdomen and Pelvis</b>					
Abdomen	✓				
MRCP	✓				
Abdominal MRA		✓			
Male Pelvis		✓			
Female Pelvis	✓				
<b>Musculoskeletal</b>					
Elbow		✓			
Hand/Wrist	✓				
Finger/Thumb		✓			
Hip	✓				



4.2.3 MRI Procedures (continued)

MRI Procedures	Mandatory or Elective		Date Completed	Patient or Simulated	Competence Verified By
	Mandatory	Elective			
<b>Musculoskeletal (continued)</b>					
Bony Pelvis		✓			
SI Joints		✓			
Ankle/Hind Foot	✓				
Shoulder	✓				
Scapula		✓			
Sternum/SC		✓			
Fore Foot	✓				
Humerus		✓			
Forearm		✓			
Femur		✓			
Lower Leg		✓			
Knee	✓				
Temporomandibular Joint		✓			
MR Arthrography		✓			
<b>Special Imaging Procedures</b>					
MRV		✓			
Image Post-Processing	✓				
Extremity MR Angiography		✓			
Spectroscopy		✓			



#### 4.2.4 Quality Control Procedures

Candidates must demonstrate competence in the quality control activities listed below. The first four procedures are performed on a QC phantom.

Quality Control Procedures	Date Completed	Competence Verified By
Signal to Noise		
Center Frequency		
Transmitter Gain or Attenuation		
Geometric Accuracy		
Equipment Inspection (e.g., Coils, Cables, Door Seals)		
Monitor Cryogen Levels		
Room Temperature		