Imaging Assistant, Magnetic Resonance

1. Introduction

The purpose of the structured education requirement is to document that individuals have had the opportunity to develop fundamental knowledge, integrate theory into practice, and hone affective and critical thinking skills required to demonstrate professional competence.

2. Structured Education Requirement

Candidates for the Imaging Assistant, Magnetic Resonance certification must document structured education. The activities must be earned within the 24-month period immediately prior to submission of an application for certification. Structured education activities may be academic courses from an institution accredited by a mechanism recognized by ARRT,[1] CE activities approved by an ARRT recognized CE Approver, or a combination of the two.

Candidates must complete a minimum of 32 discipline-specific CE credits. Individuals who hold a current medical credential that requires maintenance of certification recognized by ARRT may be awarded up to 15 CE credits toward meeting the structured education requirement. If the prerequisite credential is submitted and approved by ARRT, the structured education minimum CE credits required will be adjusted appropriately.

Structured education documentation may be earned in the content below areas. Specific topics within each category are addressed in the content outline, which makes up the remaining pages of this document.

Content Category	Minimum CE Credits—Without Prerequisite Medical Credential	Minimum CE Credits—With Prerequisite Medical Credential
Patient Care	**8**	**1**
Patient Interactions and Management (1 must be in ethics)		
Safety	**12**	**12**
MRI Screening and Safety		
Positioning and Anatomical Landmarking	**8**	**4**
Neurological *Body* *Musculoskeletal*		
Additional CE Credits[2]	**4**	
Total	**32**	**17**

[1] Activities meeting the definition of an approved academic course will be awarded credit at the rate of 12 CE credits for each academic quarter credit or 16 CE credits for each academic semester credit. See the Education Requirements for Obtaining and Maintaining Certification and Registration for additional information.

[2] 4 additional CE credits in any content category with a credit distribution to Imaging Assistant, Magnetic Resonance (patient care, safety, and/or positioning and anatomical landmarking).

Patient Care

1. Patient Interactions and Management

A. Ethical and Legal Aspects
   1. patients' rights
      a. informed consent (e.g.*, written, oral, implied)
      b. confidentiality (HIPAA)
      c. American Hospital Association (AHA) Patient Care Partnership (Patients' Bill of Rights)
         1. privacy
         2. extent of care (e.g., DNR)
         3. access to information
         4. living will, health care proxy, advance directive
   2. legal issues
      a. verification (e.g., patient identification, compare order to clinical indication, exam coding)
      b. common terminology (e.g., battery, negligence, malpractice, beneficence)
      c. restraints versus positioning aids used to eliminate motion artifact
   3. ARRT Standards of Ethics

B. Interpersonal Communication
   1. modes of communication
      a. verbal/written
      b. nonverbal (e.g., eye contact, touching)
   2. challenges in communication
      a. interactions with others
         1. language barriers
         2. cultural and social factors
         3. physical, sensory, or cognitive impairments
         4. age
         5. emotional status, acceptance of condition (e.g., mental health concerns)
      b. explanation of medical terms
      c. strategies to improve understanding
   3. patient education
      a. explanation of current procedure (e.g., exam length, scanning expectations: squeeze ball if experiencing distress)
      b. pre- and post-procedure instructions (e.g., preparations, diet, discharge instructions)
      c. review of pertinent medical history
      d. communication with patient during procedure

C. Physical Assistance, Monitoring, and Critical Incidents
   1. body ergonomics (e.g., balance, alignment, movement)
      a. patient transfer techniques
      b. safe patient handling devices (e.g., transfer board)
   2. assisting patients with medical equipment
      a. infusion catheters and pumps
      b. oxygen delivery systems
      c. other (e.g., nasogastric tubes, urinary catheters, tracheostomy tubes)
   3. routine monitoring and documentation
      a. vital signs
      b. physical signs and symptoms (e.g., motor control, severity of injury)
      c. fall prevention
      d. patient comfort and privacy
      e. sedated patients/sedation
      f. claustrophobic patients
      g. time-out
   4. medical emergencies
      a. allergic reactions (e.g., contrast media, latex)
      b. cardiac/respiratory arrest (e.g., CPR, AED)
      c. physical injury, trauma, or RF burn
      d. other medical disorders (e.g., seizures, diabetic reactions)
   5. physiological devices (e.g., ECG [electrocardiogram] leads, PG [peripheral gating], respiratory trigger)

*The abbreviation "e.g.," is used to indicate that examples are listed in parenthesis, but that it is not a complete list of all possibilities.

Patient Care (continued)

D. Infection Prevention and Waste Safety
   1. asepsis
      a. equipment disinfection
      b. equipment sterilization
      c. medical aseptic technique
      d. sterile technique
   2. CDC Standard Precautions
      a. hand hygiene
      b. use of personal protective equipment (PPE) (e.g., gloves, gowns, masks)
      c. safe handling of contaminated equipment and surfaces
      d. disposal of contaminated materials
         1. linens
         2. needles
         3. patient supplies
         4. blood and body fluids
      e. safe injection practices
   3. transmission-based precautions
      a. contact
      b. droplet
      c. airborne
   4. types of materials (e.g., chemicals, disinfectants)
   5. safety data sheet

E. Pharmacology
   1. administration
      a. routes (e.g., IV, oral)
      b. supplies (e.g., needles)
      c. procedural technique (e.g., venipuncture)
      d. power injector
   2. appropriateness of contrast media to examination
      a. patient condition
      b. patient age and weight
   3. complications/reactions
      a. local effects (e.g., extravasation, infiltration, phlebitis)
      b. systemic effects
         1. mild
         2. moderate
         3. severe
      c. emergency medications
      d. response and documentation

Safety

1. MRI Screening and Safety

A. Screening and Education (patients, personnel, nonpersonnel)
   1. biomedical implants (active, passive)
      a. identify and document device, year, make, model
      b. research and verify device labeling (device field strength, MR Safe, MR Conditional, MR Unsafe)
   2. ferrous foreign bodies and projectile risks
   3. medical conditions (e.g., pregnancy, claustrophobia, large body habitus, pediatric)
   4. contrast agent safety
   5. prior diagnostic or surgical procedures
   6. topical or externally applied items (e.g., clothing, body piercing, jewelry, tattoos, restraints)
   7. onplants (e.g., CGM [continuous glucose monitor], medication patches)
   8. Level 1 and Level 2 MR personnel
   9. roles of MR Medical Director, MR Safety Officer, and MR Safety Expert

B. Electromagnetic Fields
   1. static field: “Magnet is Always On”
      a. translational and rotational forces
      b. magnetic shielding
      c. spatial gradient of the static magnetic field
   2. RF field
      a. thermal heating (SAR)
      b. conductive loops
      c. proximity burns
      d. RF shielding
   3. gradient field
      a. current induction
      b. acoustic noise (e.g., hearing protection)
      c. peripheral neurostimulation
      d. magnetophosphenes

C. MR Environment and Equipment Management
   1. MR system inspection (e.g., coil/cable inspection, malfunction)
   2. placement of conductors (e.g., ECG leads, coils, cables)
   3. RF (radiofrequency) coils
      a. transmit/receive
      b. receive only
   4. cryogen safety
   5. FDA labeling criteria (ancillary equipment)
      a. MR Safe
      b. MR Conditional
      c. MR Unsafe
   6. communication
      a. audio and visual connectivity between local and remote operators
      b. communication with patient during MRI exam
   7. monitor scan/equipment room conditions (e.g., temperature, humidity)
   8. secure MR Unsafe or Conditional equipment in Zone III and Zone IV (e.g., tether, locked storage)
   9. designated MR Safety Zones
   10. gauss lines
   11. precautions/procedures for alternative MR environments (e.g., point-of-care MRI, mobile)
   12. emergency procedures
      a. quench
      b. fire
      c. emergency table stop
      d. emergency power-off
   13. emergency response (e.g., fire fighters, weapons, rapid response team)
   14. MR Safety events and near miss reporting
      a. projectile
      b. thermal injury
      c. acoustic injury
      d. other reportable events (e.g., screening failure, undisclosed implant)
   15. downtime procedures (e.g., internet outage in remote scanning situation)
   16. quality control phantom setup
   17. information systems (e.g., HIS, RIS, EMR, PACS/MIMPS)

Positioning and Anatomical Landmarking

1. Neurological

A. Head and Neck
   1. brain (e.g., pituitary, IAC, orbits MR angiogram [MRA], MR venogram [MRV])
   2. temporomandibular joints (TMJs)
   3. neck (e.g., soft tissue, MRA, MRV)

B. Spine
   1. cervical
   2. thoracic
   3. lumbar
   4. sacrum-coccyx

2. Body

A. Breast (e.g., screening, implant rupture)

B. Thorax
   1. chest (noncardiac)
   2. chest (cardiac)
   3. brachial plexus

C. Abdomen (e.g., liver, MRCP, pancreas, kidneys, MR enterography, MR urography)

D. Pelvis
   1. soft tissue pelvis (e.g., female and male)
   2. bony pelvis (e.g., sacroiliac [SI] joints)

3. Musculoskeletal

A. Joints
   1. wrist
   2. hand
   3. fingers (thumb and nonthumb)
   4. elbow
   5. shoulder
   6. hip
   7. knee
   8. ankle
   9. foot/toes

B. Non-joints
   1. long bones (upper)
   2. long bones (lower)

FOCUS OF QUESTIONS

Questions about each of the studies listed on the left may focus on any of the following factors:

Anatomy

- anatomical landmarks
- anatomical terminology

Patient Setup

- coil selection and position
- patient positioning (e.g., supine, prone, left versus right)
- patient considerations (e.g., pediatric, geriatric, bariatric, trauma)
- isocenter landmarking