



Magnetic Resonance Imaging

Certification and registration requirements for Magnetic Resonance Imaging (MRI) are based on the results of a comprehensive practice analysis conducted by The American Registry of Radiologic Technologist® (ARRT®) staff and the Practice Analysis Advisory Committee. The purpose of the practice analysis is to identify job responsibilities typically required of staff MRI technologists at entry into the profession. In 2014, the ARRT did an interim update and reviewed a select number of tasks that were of interest. The results of the practice analysis and interim update are reflected in this document. The purpose of the task inventory is to list or delineate those responsibilities. The task inventory is the foundation for both the clinical requirements and the content specifications.

Basis of Task Inventory

The practice analysis survey was used to identify the responsibilities typically required of technologists who perform MRI. When evaluating survey results, the advisory committee applied a 40% guideline. That is, to be included on the task inventory, an activity must have been the responsibility of at least 40% of technologists who perform MRI. The advisory committee could include an activity that did not meet the 40% criterion if there was a compelling rationale to do so (e.g., a task that falls below the 40% guideline but is expected to rise above the 40% guideline in the near future).

Application to Clinical Requirements

The purpose of the clinical requirements is to verify that candidates have completed fundamental clinical procedures in MRI. Successful performance of these fundamental procedures, in combination with mastery of the cognitive knowledge and skills covered by the MRI examination, provides the basis for acquisition of the full range of clinical skills required in a variety of settings. An activity must appear on the task inventory to be considered for inclusion in the clinical requirements. For an activity to be designated as a mandatory requirement, survey results had to indicate that the vast majority of technologists who perform MRI performed that activity. The advisory committee designated clinical activities performed by fewer technologists, or which are carried out only in selected settings, as elective. The clinical requirements are available from ARRT's website (www.arrt.org) and appear in the *Magnetic Resonance Imaging Certification and Registration Handbook*.

Application to Content Specifications

The purpose of the Magnetic Resonance Imaging Examination is to assess the knowledge and cognitive skills underlying the intelligent performance of the tasks typically required of technologists who perform MRI. The content specifications identify the knowledge areas underlying performance of the tasks on the task inventory. Every content category can be linked to one or more activities on the task inventory. Note that each activity on the task inventory is followed by a content category that identifies the section of the content specifications corresponding to that activity. The content specifications are available from ARRT's website (www.arrt.org) and appear in the *Magnetic Resonance Imaging Certification and Registration Handbook*.



Activity	Content Categories
1. Coordinate pre- and post exam arrangements with other departments for patient support services (*e.g., transportation, anesthesia, nursing).	PC.1.D.
2. Confirm patient's identity.	PC.1.A.1.A.
3. Demonstrate and promote professional and ethical behavior.	PC.1.A.
4. Instruct patient regarding preparation prior to imaging procedures.	PC.1.C.
5. Consult radiologist and verify protocol as needed.	PC.1.A.1.B.
6. Orient patient and family to requirements necessary to achieve an exam of diagnostic quality.	PC.1.C.3.
7. Assist with scheduling patients and coordinating exams to assure smooth work flow.	PC.1.A.1.B., S.1.
8. Practice CDC Standard Precautions.	PC.1.B.
9. Determine patient's mobility status and assist special needs.	PC.1.D.
10. Use proper body mechanics when assisting a patient.	PC.1.D.3.
11. Assist patient on and off the scanning table.	PC.1.D.3.
12. Maintain communication and provide reassurance to patient throughout scanning procedure.	PC.1.C.3.B.
13. Review and record patient's medical history prior to scan (e.g., duration, location, signs, and symptoms).	PC.1.A.1.
14. Recognize life threatening changes of the patient's vital signs (e.g., blood pressure, pulse, respiration).	PC.1.D.1., PC.1.D.2.
15. Observe patient's level of consciousness during scanning procedure.	PC.1.D.1.
16. Observe patient's physical status prior to release from the MRI suite.	PC.1.C.3.C., PC.1.D.1.
17. Evacuate patient in emergency situation (e.g., quench, code, metallic object).	PC.1.D.2.
18. Provide hearing protection to patient and others in zone 4.	S.1.D.3.
19. Maintain controlled access to restricted area of strong magnetic field to ensure safety of patients, visitors, and hospital personnel.	S.1.
20. Screen patient for ferrous and RF-sensitive material prior to entrance into magnetic field.	S.1.A.
21. Monitor specific absorption rate (SAR).	S.1.D.1.
22. Perform and document the results of daily QC tests (e.g., center frequency, signal to noise, image quality and artifacts).	IP.1.D.
23. Interpret results of daily QC tests to assure that performance standards are met.	IP.1.D.
24. Inspect equipment to make sure it is operable and safe (e.g., coils, cables, door seals).	S.1.B., IP.1.D.8.

* "e.g.," is used here and in the remainder of this document to indicate examples, but not a complete list.



Activity	Content Categories	
	Legend: PC = Patient Care, S = Safety, IP = Image Production, P = Procedures	
25. Notify appropriate personnel of equipment malfunctions and potential repairs as needed.	S.I.B., S.I.C.	
26. Research implantable medical devices for safe, conditional, or unsafe labeling.	S.I.A.	
27. Monitor cryogen levels.	S.I.B.2.	
28. Store, transfer, or retrieve images from data storage devices.	IP.3.	
29. Enter patient data needed to initiate scan.	PC.I.A., P.~.2.	
30. Select alternate sequences to compensate for patient related issues or patient limitations (e.g., metal artifact, magnetic susceptibility artifact, claustrophobia).	PC.I.D.1., IP.I.C.1., IP.2.	
31. Manipulate parameters to compensate for patient related issues or patient limitations (e.g., metal artifact, magnetic susceptibility artifact, claustrophobia).	PC.I.D.1., IP.I.C.1., IP.2.	
32. Evaluate quality of hard copy images.	IP.2.	
33. Perform image post-processing.	IP.3.B.	
34. Review patient's chart to verify physician's orders.	PC.I.A.	
35. Position patient according to type of study indicated.	P.~.2.	
36. Select optimal imaging coils.	P.~.2.	
37. Perform automatic or manual frequency tuning.	IP.I.B.3.F., IP.2.A.10., IP.I.D.5.	
38. Differentiate between normal and abnormal images to assess completion of procedure.	P.~.1.	
39. Monitor image production and discriminate between technically acceptable and unacceptable images.	IP., D.~.1., P.~.2.,	
40. Screen patient prior to administration of contrast.	S.I.A.3., PC.I.E.	
41. Explain precautions regarding contrast agents.	PC.I.C., PC.I.E.	
42. Determine appropriate dose of contrast agent to be administered based on the patient's age and weight.	PC.I.E.	
43. Program and/or activate the power injector.	PC.I.E.	
44. Use sterile or aseptic technique when indicated.	PC.I.B.1.	
45. Administer IV contrast agent.	PC.I.E.	
46. Observe patient after administration of a contrast agent to detect adverse reactions.	PC.I.D.	
47. Select or adjust one or more basic imaging parameters (e.g., TR, TE, FOV, imaging plane, bandwidth, gap, slice thickness).	IP.2.A.	
48. Select or adjust one or more imaging options (e.g., saturation pulse, flow compensation, fat suppression, gating).	IP.2.B.	
49. Adjust parameters or sequence with SAR limits.	S.I.D.1.	
50. Maintain confidentiality of patient information.	PC.I.A.3.B.	



Activity

51. Clean, disinfect, or sterilize facilities and equipment, and dispose of contaminated items in preparation for next examination.

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PC.I.B.3., PC.I.B.5.

Perform the following types of scans or procedures:

Head and Neck

- | | | |
|-----|--------------------------|--------------------|
| 52. | Brain | P.I.A.1. |
| 53. | Head trauma | P.I.A.2. |
| 54. | Brain for stroke | P.I.A.3. |
| 55. | Brain for MS | P.I.A.4. |
| 56. | Brain for seizure | P.I.A.5. |
| 57. | Brain for CSF flow study | P.I.A.6. |
| 58. | Pediatric brain | P.I.A.7. |
| 59. | IAC | P.I.A.8. |
| 60. | Pituitary | P.I.A.9. |
| 61. | Orbits | P.I.A.10. |
| 62. | Face | P.I.A.10. |
| 63. | Cranial nerves | P.I.A.8., P.I.A.1. |
| 64. | Sinuses | P.I.A.10. |
| 65. | Parotids | P.I.A.11. |
| 66. | Salivary glands | P.I.A.11. |
| 67. | Posterior fossa | P.I.A.1. |
| 68. | Soft tissue neck | P.I.A.11. |
| 69. | Vascular head | P.I.A.12. |
| 70. | Vascular neck | P.I.A.12. |

Spine

- | | | |
|-----|-------------------|----------|
| 71. | Cervical | P.I.B.1. |
| 72. | Thoracic | P.I.B.2. |
| 73. | Sacroiliac joints | P.3.N. |
| 74. | Lumbar | P.I.B.3. |
| 75. | Sacrum-coccyx | P.I.B.4. |
| 76. | Spinal trauma | P.I.B. |
| 77. | Whole spine | P.I.B. |
| 78. | Vascular spine | P.I.B. |



Activity	Content Categories
Thorax	
79. Chest	P.2.A.1.
80. Axilla	P.2.A.
81. Brachial plexus	P.1.B.5.
82. Sternum	P.3.P.
83. Vascular thorax	P.2.A.3.
Abdomen	
84. Liver	P.2.B.1.
85. Spleen	P.2.B.1.
86. Pancreas	P.2.B.2.
87. Adrenals	P.2.B.4.
88. Kidneys	P.2.B.3.
89. Psoas muscle	P.2.B.
90. MRCP	P.2.B.5.
91. Enterography	P.2.B.7.
92. Liver specific contrast study (Eovist)	P.2.B.1.
93. Diffusion liver	P.2.B.1.
94. Vascular abdomen	P.2.B.6.
Pelvis	
95. Soft tissue pelvis	P.2.C.1.
96. Bladder	P.2.C.1.
97. Rectum	P.2.C.1.
98. Uterus/cervix	P.2.C.2.
99. Vagina	P.2.C.2.
100. Prostate	P.2.C.3.
101. Vascular pelvis (femoral, iliac)	P.2.C.4.
Musculoskeletal	
102. Temporomandibular joint	P.3.A.
103. SC joints	P.3.A.
104. Shoulder	P.3.A.
105. Elbow	P.3.C.
106. Wrist	P.3.D.



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107.	Hand/fingers	P.3.E.
108.	Thumb	P.3.F.
109.	Hip	P.3.G.
110.	Ankle	P.3.H.
111.	Knee	P.3.I.
112.	Achilles tendon	P.3.H.
113.	Fore foot	P.3.J.
114.	Hind foot	P.3.J.
115.	Bony pelvis	P.3.Q.
116.	Long bones (bone marrow)	P.3.K.
117.	Arthrogram	P.3.L.
118.	Vascular musculoskeletal	P.3.M.
Special Procedures		
119.	CINE	IP.3.C.3.
120.	Perfusion	IP.3.C.2.B.
121.	Spectroscopy	IP.3.C.2.C.
122.	Fast imaging techniques (HASTE, SSFSE)	IP.3.A.3.
Breast MRI		
123.	Implant imaging	P.2.A.2.
124.	Post-processing (e.g., subtraction, mean curve)	P.2.A.2.
Advanced Brain Imaging		
125.	Dynamic pituitary	IP.3.C.3.
126.	Brain perfusion	IP.3.C.2.B.
127.	Brain spectroscopy	IP.3.C.2.C.
128.	Surgical preplanning (e.g., stealth, brain lab, gamma knife)	P.1., P.2., P.3.
129.	Susceptibility weighted imaging	P.1.A.1.