



Mammography

Certification and registration requirements for mammography are based on the results of a comprehensive practice analysis conducted by The American Registry of Radiologic Technologists (ARRT) staff and the Mammography Practice Analysis and Continuing Qualification Requirements (CQR) Advisory Committee. The purpose of the practice analysis is to identify job responsibilities typically required of mammographers at entry into the profession. The results of the practice analysis and an interim update are reflected in this document. The purpose of the task inventory is to list or delineate those responsibilities. The attached task inventory is the foundation for both the clinical experience requirements and the content specifications.

Basis of Task Inventory

In 2013, the ARRT surveyed a large, national sample of mammographers to identify their responsibilities. In 2015, an interim update survey was done to survey a short list of tasks that may have changed. When evaluating survey results, the advisory committee applied a 40% criterion. That is, to be included on the task inventory, an activity must have been the responsibility of at least 40% of mammographers. 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% criterion but is expected to rise above the 40% criterion in the near future).

Application to Clinical Experience Requirements

The purpose of the clinical experience requirements is to verify that candidates have completed fundamental clinical procedures in mammography. Successful performance of these fundamental procedures, in combination with mastery of the cognitive knowledge and skills covered by the mammography 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 experience requirements. For an activity to be designated as a mandatory requirement, survey results had to indicate that the vast majority of mammographers performed that activity. The advisory committee designated clinical activities performed by fewer mammographers or which are carried out only in selected settings, as elective. The clinical experience requirements are available from ARRT's website (www.arrt.org) and appear in the *Mammography Certification and Registration Handbook* also located on the ARRT website.

Application to Content Specifications

The purpose of the ARRT Mammography Examination is to assess the knowledge and cognitive skills underlying the intelligent performance of the tasks typically required of mammographers at entry into the profession. 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 *Mammography Certification and Registration Handbook*.



Activity	Content Categories
	Legend: PC = Patient Care, IP = Image Production, P = Procedures
1. Review physician's order and requisition to assure appropriateness of examination requested.	PC.1.A.
2. Explain the importance of having prior images available.	PC.1.A.2.E., PC.1.B.4.
3. Provide pre-mammographic instructions such as changing clothes or removal of deodorant, jewelry, etc.	PC.1.A.1.
4. Solicit and record patient clinical history.	PC.1.B.3.
5. Ask patient about prior breast surgery, including surgery related to breast augmentation or reduction.	PC.1.B.3.
6. Explain mammography procedure to patient (*e.g., positioning, compression).	PC.1.A.2.
7. Assess patient's physical ability to comply with the examination and implement modifications as necessary to obtain quality mammographic images.	PC.1.A.2.C.
8. Perform targeted breast exam based on patient communication (e.g., palpable lumps, breast changes, physical changes).	PC.1.B.2.
9. Document location of lumps, scars, moles, etc. by means of radiopaque markers on breast and/or diagram on clinical information sheet.	PC.1.B.3.
Respond to questions from patient or family about:	
10. benefits and risks of mammography, including typical patient dose	PC.1.A.2.D.
11. importance of mammography	PC.1.A.2.
12. guidelines for mammography screening (ACS, ACR)	PC.1.A.3.
13. importance of breast self-examination	PC.1.A.4.
14. importance of clinical breast examination	PC.1.A.5.
15. incidence and risk factors for breast cancer	PC.1.B.1.
16. gene mutations (e.g., BRCA1 and BRCA2, HER2)	PC.1.B.1.B.6.
17. hormone replacement therapy	PC.1.B.1.B.15.
18. breast density	PC.1.B.1.B.16.
19. surgical treatment options for breast cancer (e.g., lumpectomy versus mastectomy)	PC.1.C.1.
20. nonsurgical treatment options for breast cancer	PC.1.C.2.
21. breast reconstructive surgery	PC.1.C.3.
22. external and internal anatomy, histology, and pathology of the breast	P.1.
23. benign, high risk, and malignant conditions of the breast	P.1.E.
24. BI-RADS [®] scores	P.1.E.1.
25. other breast imaging procedures (e.g., sentinel node mapping, MRI)	P.2.C.

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



Activity	Content Categories
26. accreditation of mammography facilities and personnel	IP.1.C.
27. MQSA process for documenting and resolving serious patient complaints	IP.1.C.2.D.
28. Refer questions about diagnosis or prognosis to referring physician.	PC.1.A.
29. Review previous mammograms prior to exam.	PC.1.B.4.A.
30. Verify previous mammograms are available for interpreting physician.	PC.1.B.4.B.
31. Select equipment appropriate to the patient and the examination to be performed (e.g., magnification platform, grid, compression device).	IP.1.
32. Select exposure factors based upon breast tissue density, compressed thickness, patient characteristics, and equipment characteristics.	IP.1.E.
33. Select appropriate target filter combination.	IP.1.E.1.F.
34. Select positioning and identification markers according to ACR guidelines.	IP.1.E.2.
35. Instruct patient in proper breathing (e.g., inspiration, expiration) prior to exposure.	PC.1.A.2.
36. Position patients with special situations (e.g., males, kyphotic patients) to obtain appropriate mammographic images.	P.2.B.
37. Locate a lesion using triangulation.	P.1.A.3.
Position patient and equipment to obtain the following mammographic views:	
38. craniocaudal (CC)	P.2.A.1.
38. mediolateral oblique (MLO)	P.2.A.2.
40. 90° mediolateral (ML)	P.2.A.3.
41. 90° lateromedial (LM)	P.2.A.4.
42. exaggerated craniocaudal lateral (XCCL)	P.2.A.5.
43. exaggerated craniocaudal medial (XCCM)	P.2.A.5.
44. cleavage (CV)	P.2.A.6.
45. axillary tail (AT)	P.2.A.7.
46. tangential (TAN)	P.2.A.8.
47. rolled views (RL, RM, RI, RS)	P.2.A.9.
48. caudocranial (FB)	P.2.A.10.
49. lateromedial oblique (LMO)	P.2.A.11.
50. superior inferior oblique (SIO)	P.2.A.12.
51. implant displaced views (CCID, MLOID)	P.2.A.13.
52. nipple in profile	P.2.A.14.



Activity	Content Categories
53. anterior compression	P.2.A.15.
54. spot compression	P.2.A.16.
55. magnification	P.2.A.17.
56. Observe an MQSA qualified interpreting physician to receive feedback about radiographic technique, positioning, breast anatomy, and pathology.	P.2., IP.1.E.
57. Verify CAD has been applied per protocol.	IP.1.B.6.
58. Archive and retrieve images.	IP.1.B.5.
59. Verify images are in PACS.	IP.1.B.5.D.
60. Interact with digital image display and informatics (e.g., HIS/RIS, DICOM).	IP.1.B.5.
61. Evaluate image to verify that it contains proper identification and is of diagnostic quality.	IP.1.E.2.
62. Determine corrective action for suboptimal images.	IP.1.E.
63. Process the digital image.	IP.1.B.
64. Identify and document mammographic unit malfunctions.	IP.1.D.
Perform and evaluate the results of the following QC tests:	
65. phantom images	IP.1.D.1.A.1.
66. visual checklist	IP.1.D.1.A.2.
67. repeat analysis	IP.1.D.1.A.3.
68. viewboxes	IP.1.D.1.A.4.
69. viewing conditions (e.g., lighting)	IP.1.D.1.A.4.
70. compression force	IP.1.D.1.A.5.
Perform and evaluate the results of the following digital QC tests:	
71. monitor cleanliness	IP.1.D.1.B.1.
72. laser imager QC test	IP.1.D.1.B.2.
73. artifact evaluation (e.g., flat field, detector calibration)	IP.1.D.1.B.3.
74. system resolution test (modulation transfer function [MTF], signal-to-noise ratio [SNR], contrast-to-noise ratio [CNR])	IP.1.D.1.B.4.
75. monitor calibration QC and test pattern (e.g., SMPTE, AAPM task group 18 templates)	IP.1.D.1.B.5.
76. Recognize QC tests that should be performed by physicist.	IP.1.D.2.
77. Review physicist's mammography annual survey report.	IP.1.D.2.
78. Maintain personnel qualification documents to meet all regulatory requirements.	IP.1.C.2.A.
79. Comply with MQSA regulations.	IP.1.C.2.



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Activity

Verify presence of signed informed consent as required by institutional policy:

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|-----|---|-----------|
| 80. | screening and/or diagnostic mammograms | PC.1.A.7. |
| 81. | augmented breast mammograms | PC.1.A.7. |
| 82. | interventional procedures | PC.1.A.7. |
| 83. | Use sterile and aseptic technique when indicated. | P.2.C.5. |

Assist with the following interventional procedures:

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|-----|------------------------------|------------|
| 84. | ultrasound core biopsy | P.2.C.5.B. |
| 85. | stereotactic core biopsy | P.2.C.5.B. |
| 86. | cyst aspiration | P.2.C.5.C. |
| 87. | ductography/galactography | P.2.C.5.D. |
| 88. | fine needle aspiration | P.2.C.5.E. |
| 89. | needle localization | P.2.C.5.F. |
| 90. | tissue marker clip placement | P.2.C.5.G. |

Perform the following procedures:

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| 91. | breast specimen imaging | P.2.C.5.A. |
| 92. | breast tomosynthesis | P.2.C.1.C. |

Educate (e.g., purpose) patients about the following procedures:

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| 93. | breast tomosynthesis | PC.1.A.6., P.2.C.1.C. |
| 94. | breast ultrasound | P.2.C.2. |
| 95. | breast MRI | P.2.C.3. |
| 96. | sentinel node mapping | P.2.C.4. |