



# Computed Tomography

Certification and registration requirements for computed tomography (CT) are based on the results of a comprehensive practice analysis conducted by The American Registry of Radiologic Technologists (ARRT) staff and the Computed Tomography Practice Analysis Committee. The purpose of the practice analysis is to identify job responsibilities typically required of CT technologists at entry into the profession. The results of the practice analysis are reflected in this document. The attached task inventory is the foundation for both the clinical experience requirements and the content outline which in turn is the foundation for the content specifications and the CQR SSA content specifications.

## Basis of Task Inventory

In 2021, the ARRT surveyed a large, national sample of CT technologists to identify their responsibilities. 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 performed by at least 40% of CT technologists. The 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 document that candidates have performed a subset of the clinical procedures within a modality. Successful performance of these fundamental procedures, in combination with mastery of the cognitive knowledge and skills as documented by the examination requirement, provides the basis for the 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. If an activity is designated as a mandatory requirement, survey results had to indicate that CT technologists performed that activity. The committee may designate clinical activities performed by fewer CT technologists, or which are carried out only in selected settings, as elective. The *Computed Tomography Clinical Experience Requirements* are available from ARRT's website ([www.arrt.org](http://www.arrt.org)).

## Application to Content Specifications

The purpose of the examination requirement is to assess whether individuals have obtained the knowledge and cognitive skills underlying the intelligent performance of the tasks typically required in the discipline for practice at entry level. 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 *Computed Tomography Content Specifications* are available from ARRT's website ([www.arrt.org](http://www.arrt.org)).

\* 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  |
|---|---|
|   | Legend: PC = Patient Care,<br>S = Safety, IP = Image<br>Production,<br>P = Procedures |
| 1. Sequence imaging procedures to avoid affecting subsequent examinations.  | PC.1.A.3.   |
| 2. Determine if patient has had previous studies that may interfere with CT studies.  | PC.1.A.1.   |
| 3. Obtain pertinent medical history.  | PC.1.A.1.   |
| 4. Explain and confirm patient's preparation (e.g., diet restrictions, preparatory medications) prior to a procedure.   | PC.1.A.   |
| 5. Review the examination request to verify information is accurate, appropriate, and complete (e.g., patient history, clinical diagnosis, physician's orders).     | PC.1.A.   |
| 6. Explain the procedure instructions to patient, patient's family, or authorized representative (e.g., pre-procedure, post-procedure).                             | PC.1.A.4., PC.1.A.11.   |
| 7. Respond as appropriate to procedure inquiries from the patient, patient's family, or authorized representative (e.g., scheduling delays, safety concerns).       | PC.1.A.2.   |
| 8. Assume responsibility for the patient's auxiliary medical equipment (e.g., IVs, oxygen) during the procedure.  | PC.1.A.9.   |
| 9. Provide for patient safety, comfort, and modesty.  | PC.1.A.6., PC.1.A.7.B.  |
| 10. Notify appropriate personnel of adverse events or incidents (patient fall, contrast reaction).  | PC.1.B.8., PC.1.A.2.  |
| 11. Verify informed consent as necessary.   | PC.1.A.5.   |
| 12. Recognize abnormal or missing lab values relative to the procedure ordered.   | PC.1.A.10.  |
| 13. Communicate relevant information to appropriate members of the care team.   | PC.1.A.2.   |
| 14. Use positioning aids, as needed, to reduce patient movement and/or promote patient safety.  | PC.1.A.6.   |
| 15. Use proper body mechanics and/or ergonomic devices when assisting the patient or performing a procedure.  | PC.1.A.8.   |
| 16. Prior to the administration of a medication other than a contrast agent, review pertinent information to prepare appropriate type and dosage (e.g., lidocaine). | PC.1.B.3., PC.1.A.11.   |
| 17. Prior to the administration of a contrast agent, review pertinent information to prepare appropriate type and dosage.   | PC.1.B.   |
| 18. Prepare IV contrast for administration.   | PC.1.B.5–6.   |
| 19. Prior to the administration of a contrast agent, determine if the patient is at risk for an adverse reaction.   | PC.1.B.2.   |
| 20. Use sterile or aseptic technique when indicated.  | PC.1.B.5.B., PC.1.B.9.  |
| 21. Perform venipuncture.   | PC.1.B.5.   |
| 22. Administer contrast agents as required by the procedure.  | PC.1.B.4.   |



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| 23. Utilize bolus tracking to ensure peak enhancement.   | PC.1.B.6.C.6.   |
| 24. Assess the patient after administration of a contrast agent to detect adverse events.  | PC.1.B.8.   |
| 25. Recognize contrast extravasation and take appropriate action.  | PC.1.B.7.   |
| 26. Obtain vital signs.  | PC.1.A.7.   |
| 27. Recognize and communicate the need for prompt medical attention.   | PC.1.B.8.A., PC.1.A.2.  |
| 28. Assist with providing emergency care (e.g., CPR, get crash cart).  | PC.1.A.7.F.,<br>PC.1.B.8.B.   |
| 29. Clean and disinfect or sterilize facilities and equipment.   | PC.1.   |
| 30. Document required information on the patient's medical record (e.g., imaging procedure, IV administration, contrast extravasation).          | PC.1.B.5.C.,<br>PC.1.B.7.B.,<br>PC.1.B.8.C.   |
| 31. Alert physician or other medical staff of critical findings (e.g., hemorrhage, pneumothorax).  | PC.1.A.2.   |
| 32. Take appropriate precautions to minimize radiation exposure to the patient.  | S.1.B.  |
| 33. Screen patients of child-bearing age for the possibility of pregnancy and take appropriate action.   | S.1.B.3.F.  |
| 34. Utilize appropriate options to produce optimal images while minimizing patient dose (e.g., technical factors, gating, image reconstruction). | S.1.B.1.  |
| 35. Respond to dose alert or dose notification.  | S.1.B.1.K.  |
| 36. Verify procedural dose documentation.  | S.1.B.4.E.  |
| 37. Maintain controlled access to restricted area during radiation exposure.   | S.1.B.5.A.  |
| 38. Advocate radiation safety and protection.  | S.1.B.5.B.  |
| 39. Visually inspect equipment and take appropriate action (e.g., cable, cords, table, accessories, straps).                                     | S.1.  |
| 40. Notify appropriate personnel for equipment malfunction.  | PC.1.A.2.   |
| 41. Select appropriate protocol (e.g., pathology, type of acquisition).  | IP.1., P.1–3.   |
| 42. Perform axial scanning techniques.   | IP.1.C.1.   |
| 43. Utilize dual source/dual energy acquisition.   | IP.1.C.5.   |
| 44. Remove radiopaque materials that could interfere with the image from the exposure field (e.g., dentures, clothing, jewelry).                 | IP.2.C.   |
| 45. Modify imaging parameters to compensate for patient conditions or artifacts (e.g., patient motion, metal artifact, pathology).               | IP.1.B., IP.2.C.  |
| 46. Assess images to determine successful completion of the procedure (e.g., anatomy, artifacts).  | IP.2.   |
| 47. Perform retrospective reconstruction.  | S.1.B.1.G., IP.1.D.   |
| 48. Perform image postprocessing (e.g., MPR, MIP, VR, SSD).  | IP.1.E., P.1–3.   |



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| 49. Utilize image display functions (e.g., magnification, windowing, annotation).     | IP.2.A.   |
| 50. Utilize image evaluation tools (e.g., distance measurement, ROI).                 | IP.2.A.7.   |
| 51. Perform tube warm-up.   | IP.1.A.1.A.2.   |
| 52. Perform and document the results of QC tests.                                     | IP.2.B.5.   |
| 53. Evaluate the results of QC tests.   | IP.2.B.   |
| 54. Store, transfer, retrieve, or delete images from data storage.                    | IP.2.D.   |
| 55. Enter/edit patient data necessary to initiate scan.                               | IP.1.A.   |
| 56. Gather quality images and documentation for accreditation.                        | IP.2.B.5.   |
| 57. Position patient according to type of study indicated.                            | PC.1.A.4., S.1.B.3.,<br>IP.2.C.6.   |
| <b>Perform the following type of scans or procedures with specific protocols for:</b> |   |
| <b><u>Head</u></b>  |   |
| 58. head  | P.1.A.  |
| 59. trauma head   | P.1.A.  |
| 60. temporal bones (IACs)   | P.1.A.1.  |
| 61. orbits  | P.1.A.2.  |
| 62. dedicated mandible  | P.1.A.4.  |
| 63. CTA head  | P.1.A.6.  |
| 64. CTV head  | P.1.A.6.  |
| 65. sinuses   | P.1.A.3.  |
| 66. maxillofacial   | P.1.A.4.  |
| 67. temporomandibular joints (TMJs)   | P.1.A.5.  |
| 68. brain perfusion   | P.1.A.7.  |
| <b><u>Neck</u></b>  |   |
| 69. soft tissue neck  | P.2.A.2.  |
| 70. CTA neck  | P.2.A.  |
| 71. CTV neck  | P.2.A.  |
| <b><u>Spine</u></b>   |   |
| 72. cervical  | P.1.B.1.  |
| 73. thoracic  | P.1.B.2.  |
| 74. lumbosacral   | P.1.B.3–4.  |
| 75. post myelography  | P.1.B.5.  |
| 76. spinal trauma   | P.1.B.  |



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**Activity**

**Chest**

- |  |          |
|--|----------|
| 77. chest                                      | P.2.B.   |
| 78. CTA chest                                  | P.2.B.   |
| 79. CTV chest                                  | P.2.B.   |
| 80. calcium scoring                            | P.2.B.3. |
| 81. prospective gated studies                  | P.2.B.3. |
| 82. retrospective gated studies                | P.2.B.3. |
| 83. coronary artery angiogram                  | P.2.B.3. |
| 84. pulmonary embolus (PE) study               | P.2.B.2. |
| 85. lung nodule study                          | P.2.B.2. |
| 86. low dose lung screening                    | P.2.B.6. |
| 87. high resolution computed tomography (HRCT) | P.2.B.2. |
| 88. chest trauma                               | P.2.B.   |

**Abdomen/Pelvis**

- |                                  |                    |
|----------------------------------|--------------------|
| 89. abdomen                      | P.3.A.             |
| 90. liver                        | P.3.A.1.           |
| 91. enterography study           | P.3.A.7.           |
| 92. pancreas                     | P.3.A.4.           |
| 93. adrenals                     | P.3.A.5.           |
| 94. kidneys                      | P.3.A.6.           |
| 95. urogram/IVU                  | P.3.A.6., P.3.B.1. |
| 96. renal stone protocol         | P.3.A.6., P.3.B.1. |
| 97. appendicitis study           | P.3.A.7.           |
| 98. CTA abdomen                  | P.3.A.             |
| 99. CTV abdomen                  | P.3.A.             |
| 100. abdominal trauma            | P.3.A.             |
| 101. pelvis                      | P.3.B.             |
| 102. dedicated bladder           | P.3.B.1.           |
| 103. cystogram (retrograde)      | P.3.B.1.           |
| 104. CTA pelvis                  | P.3.B.             |
| 105. CTV pelvis                  | P.3.B.             |
| 106. pelvis with rectal contrast | P.3.B.2.           |
| 107. pelvic trauma               | P.3.B.             |



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**Activity**

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**Musculoskeletal**

- |                      |            |
|----------------------|------------|
| 108. upper extremity | P.1.C.1.   |
| 109. lower extremity | P.1.C.2.   |
| 110. arthrography    | P.1.C.5.   |
| 111. shoulder        | P.1.C.4.   |
| 112. bony pelvis     | P.1.C.3.   |
| 113. hips            | P.1.C.3.   |
| 114. CTA extremity   | P.1.C.1–2. |
| 115. CTV extremity   | P.1.C.1–2. |

**Other Procedures**

- |                                |                |
|--------------------------------|----------------|
| 116. CTA run-off               | P.1.C.2., P.3. |
| 117. biopsies                  | P.1–3.         |
| 118. drainages                 | P.1–3.         |
| 119. aspirations               | P.1–3.         |
| 120. CTA for aortic dissection | P.2.B., P.3.   |
| 121. TAVR                      | P.2.B.3.       |