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 CT 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 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 2024, the ARRT surveyed a large, national sample of CT technologists to identify their responsibilities. When evaluating survey results, the committee considered tasks performed by 40% of respondents to be "typically required for practice" and included them on the task inventory, excluding those performed by fewer than 40%. However, the committee could elect to include some tasks below the threshold, either due to the criticality of the task or an expectation that the number of CT technologists performing the task would increase in the near future. Similarly, the committee could exclude tasks surveyed above the threshold if no longer relevant or if they expected the number of CT technologists performing the task would soon drop below the threshold.

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 discipline. 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. For an activity to be designated as a mandatory requirement, survey results had to indicate the majority of 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).

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 CT 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).

	Activity	**Content Categories** **PC** = Patient Care **S** = Safety **IP** = Image Production **P** = Procedures **FOQ** = Focus of Questions
1.	Schedule imaging procedures to avoid affecting subsequent examinations.	**PC:**1.A
2.	Perform tube warm-up.	**IP:**2.B
3.	Determine if the patient has had previous studies that may interfere with CT studies.	**PC:**1.A
4.	Obtain pertinent medical history.	**PC:**1.A
5.	Screen patients of child-bearing age for the possibility of pregnancy and take appropriate action.	**S:**1.B
6.	Explain and confirm the patient's preparation (*e.g., diet restrictions, preparatory medications) prior to a procedure.	**PC:**1.A
7.	Review the examination request to verify information is accurate, appropriate, and complete (e.g., patient history, clinical diagnosis, provider's orders).	**PC:**1.A
8.	Explain examination instructions (e.g., pre- and postprocedure) to the patient, patient's family, or authorized representative.	**PC:**1.A
9.	Respond as appropriate to examination inquiries (e.g., scheduling delays, safety concerns) from the patient, patient's family, or authorized representative.	**PC:**1.A
10.	Monitor the patient's accessory medical equipment (e.g., IVs, oxygen) during the procedure.	**PC:**1.A
11.	Provide for patient safety, comfort, and privacy.	**PC:**1.A
12.	Verify that informed consent is obtained, as necessary.	**PC:**1.A
13.	Verify a time-out is performed, as necessary.	**PC:**1.A
14.	Recognize abnormal or missing lab values (e.g., eGFR, creatinine, hCG) relative to the examination ordered.	**PC:**1.A
15.	Communicate relevant information (e.g., allergies, patient condition, abnormal lab results, radiation dose) with appropriate members of the care team.	**PC:**1.A
16.	Use proper body mechanics, ergonomic devices, and/or patient transfer devices to promote patient and personnel safety.	**PC:**1.A
17.	Position the patient according to type of study indicated.	**PC:**1.A, **S:**1.A, **S:**1.B, **IP:**2.C
18.	Use positioning aids (e.g., knee cushion, pillows, straps), as needed, to enhance the examination and promote patient comfort and/or safety.	**PC:**1.A
19.	Remove radiopaque materials (e.g., dentures, clothing, jewelry) and radiosensitive devices from the exposure field that could interfere with the image.	**PC:**1.A
20.	Recognize normal and abnormal effects of a medication other than a contrast media.	**PC:**1.A, **PC:**1.B

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Activity		**Content Categories** **PC** = Patient Care **S** = Safety **IP** = Image Production **P** = Procedures **FOQ** = Focus of Questions
21.	Review pertinent information to prepare appropriate type and dosage prior to the administration of a contrast media.	**PC:**1.B
22.	Determine if the patient is at risk for an adverse reaction prior to the administration of a contrast media.	**PC:**1.A, **PC:**1.B
23.	Determine if the patient's central line is power injectable prior to the administration of a contrast media.	**PC:**1.A, **PC:**1.B
24.	Use aseptic or sterile technique when indicated.	**PC:**1.B
25.	Perform venipuncture.	**PC:**1.B
26.	Prepare IV contrast for administration.	**PC:**1.B
27.	Use power injector (e.g., syringeless, dual head, single head).	**PC:**1.B
28.	Enter/edit necessary patient data into the host computer to initiate scan.	**IP:**1.A
29.	Select appropriate protocol (e.g., FOV, type of acquisition, imaging parameters).	**IP:**1.B, **IP:**1.C
30.	Modify imaging parameters to compensate for patient conditions or artifacts (e.g., patient motion, metal artifact, pathology).	**IP:**1.B, **IP:**1.C
31.	Take appropriate precautions to minimize radiation exposure to the patient.	**S:**1.A, **S:**1.B
32.	Use appropriate options (e.g., technical factors, gating, image reconstruction) to produce optimal images while minimizing patient radiation dose.	**S:**1.B
33.	Maintain controlled access to restricted area during radiation exposure.	**S:**1.B
34.	Administer contrast media as required for the examination.	**PC:**1.B
35.	Use a scanning technique to ensure peak IV contrast enhancement (e.g., timing bolus, bolus tracking, scan delay).	**PC:**1.B
36.	Use direct patient monitoring during contrast injection, when possible.	**PC:**1.B
37.	Assess the patient after administration of a contrast media to detect adverse events (e.g., allergy, extravasation) and take appropriate action.	**PC:**1.B
38.	Obtain vital signs (e.g., pulse, blood pressure), when appropriate.	**PC:**1.A
39.	Recognize abnormal ECG patterns.	**PC:**1.A
40.	Recognize the need for and administer emergency care (e.g., call a code, initiate CPR, retrieve crash cart).	**PC:**1.A, **PC:**1.B
41.	Document required information (e.g., imaging examination, IV administration, contrast extravasation) in the patient's medical information system (e.g., EMR, HIS, RIS).	**PC:**1.B, **IP:**2.D
42.	Notify appropriate personnel of adverse events or incidents (e.g., patient fall, scanning errors).	**PC:**1.A, **S:**1.B

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43.	Document adverse events (e.g., incorrect patient or body part scanned), as needed.	**S:**1.B
44.	Alert provider or other members of the patient care team of critical findings (e.g., hemorrhage, pneumothorax) on examination.	**PC:**1.A
45.	Handle, label, and submit laboratory specimens (e.g., biopsy tissue).	**FOQ**
46.	Clean, disinfect, and/or sterilize facilities and equipment.	**PC:**1.A
47.	Respond appropriately to radiation dose alert or dose notification.	**S:**1.B
48.	Verify radiation dose documentation.	**S:**1.B
49.	Advocate for radiation safety and protection.	**S:**1.B
50.	Visually inspect equipment (e.g., cable, cords, table, accessories, straps) and take appropriate action, if needed.	**IP:**1.A
51.	Notify appropriate personnel of equipment malfunction.	**PC:**1.A
52.	Perform sequential scanning techniques (e.g., step-and-shoot).	**IP:**1.C
53.	Use advanced energy acquisition (e.g., dual energy, dual source).	**IP:**1.C
54.	Perform retrospective reconstruction (e.g., MIP, MPR).	**S:**1.B, **IP:**1.D, **IP:**1.E
55.	Perform advanced image postprocessing (e.g., VR, SSD, 3D).	**IP:**1.E
56.	Use image display functions (e.g., magnification, windowing, annotation).	**IP:**2.A
57.	Use image evaluation tools (e.g., distance measurement, ROI).	**IP:**2.A
58.	Perform and document the results of QC tests.	**IP:**2.B
59.	Evaluate the results of QC tests.	**IP:**2.B
60.	Gather high quality images and documentation for accreditation.	**IP:**2.B
61.	Assess images (e.g., anatomy, artifacts) to determine successful completion of the examination.	**IP:**2.C, **P:**1, **P:**2, **P:**3
62.	Transfer, retrieve, or delete images to/from data storage (e.g., PACS/MIMPS, EMR).	**IP:**2.D
Perform the following examinations with specific protocols for:		
	Head	
63.	brain/cranium	**P:**1.A
64.	brain perfusion	**P:**1.A
65.	head trauma	**P:**1.A, **FOQ**
66.	temporal bones (IACs)	**P:**1.A
67.	orbits	**P:**1.A
68.	sinuses	**P:**1.A
69.	maxillofacial bones	**P:**1.A

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70.	dedicated mandible	**P:**1.A
71.	temporomandibular joints (TMJs)	**P:**1.A
72.	CTA head	**P:**1.A, **FOQ**
73.	CTV head	**P:**1.A, **FOQ**
	Neck	
74.	soft tissue neck	**P:**2.A
75.	CTA neck	**P:**2.A, **FOQ**
76.	CTV neck	**P:**2.A, **FOQ**
	Spine	
77.	cervical	**P:**1.B
78.	thoracic	**P:**1.B
79.	lumbosacral	**P:**1.B
80.	postmyelogram	**P:**1.B
81.	spine trauma	**P:**1.B, **FOQ**
	Chest	
82.	chest	**P:**2.B
83.	chest trauma	**P:**2.B, **FOQ**
84.	CTA chest	**P:**2.B, **FOQ**
85.	CTA for aortic dissection	**P:**2.B, **FOQ**
86.	pulmonary embolus (PE) study	**P:**2.B, **FOQ**
87.	CTV chest (SVC, pulmonary vein)	**P:**2.B, **FOQ**
88.	coronary artery angiogram	**P:**2.B
89.	coronary artery calcium scoring	**P:**2.B
90.	prospective gated studies	**P:**2.B
91.	retrospective gated studies	**P:**2.B
92.	transcatheter aortic valve replacement (TAVR)	**P:**2.B
93.	high-resolution computed tomography (HRCT, ILD)	**P:**2.B
94.	lung nodule study	**P:**2.B
95.	low-dose lung screening	**P:**2.B
96.	esophagram	**P:**2.B

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Activity		Content Categories **PC** = Patient Care **S** = Safety **IP** = Image Production **P** = Procedures **FOQ** = Focus of Questions
	Abdomen/Pelvis	
97.	abdomen	**P:**3.A
98.	abdomen trauma	**P:**3.A, **FOQ**
99.	multiphase liver	**P:**3.A
100.	multiphase pancreas	**P:**3.A
101.	multiphase adrenals	**P:**3.A
102.	multiphase kidneys	**P:**3.A
103.	urogram/IVU	**P:**3.A
104.	renal stone	**P:**3.A
105.	enterography	**P:**3.A
106.	appendicitis	**P:**3.A
107.	CTA abdomen	**P:**3.A, **FOQ**
108.	CTV abdomen (IVC, DVT)	**P:**3.A, **FOQ**
109.	pelvis	**P:**3.B
110.	pelvis trauma	**P:**3.B, **FOQ**
111.	dedicated delay bladder	**P:**3.B
112.	retrograde cystogram	**P:**3.B
113.	colorectal (rectal contrast)	**P:**3.B
114.	CT colonography (“virtual”)	**P:**3.B
115.	CTA pelvis	**P:**3.B, **FOQ**
116.	CTV pelvis (e.g., May-Thurner, DVT)	**P:**3.B, **FOQ**
	Musculoskeletal	
117.	upper extremity	**P:**1.C
118.	lower extremity	**P:**1.C
119.	postarthrogram	**P:**1.C
120.	shoulder	**P:**1.C
121.	bony pelvis	**P:**1.C
122.	hip	**P:**1.C
123.	CTA run-off	**P:**1.C, **FOQ**
124.	CTA extremity	**P:**1.C, **FOQ**
125.	CTV extremity (e.g., DVT)	**P:**1.C, **FOQ**

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Activity		Content Categories **PC** = Patient Care **S** = Safety **IP** = Image Production **P** = Procedures **FOQ** = Focus of Questions
Perform the following procedures with specific protocols for:		
126.	biopsy	**FOQ**
127.	drainage	**FOQ**
128.	aspiration	**FOQ**
129.	surgical planning (e.g., musculoskeletal, craniofacial)	**FOQ**

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