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 and Continuing Qualifications Requirements (CQR) Advisory 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 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 2015, the ARRT surveyed a large, national sample of CT technologists to identify their responsibilities. 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 CT technologists. 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 Experience Requirements

The purpose of the clinical experience requirements is to verify that candidates have completed a subset of the clinical procedures in CT. Successful performance of these fundamental procedures, in combination with mastery of the cognitive knowledge and skills covered by the CT 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 the vast majority of CT technologists performed that activity. The advisory committee designated clinical activities performed by fewer CT technologists, 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 *Computed Tomography Certification and Registration Handbook* also located on the ARRT website.

Application to Content Specifications

The purpose of the ARRT CT Examination is to assess the knowledge and cognitive skills underlying the intelligent performance of the tasks typically required of CT technologists 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 *Computed Tomography Certification and Registration Handbook*.

Activity		Content Categories Legend: PC = Patient Care, S = Safety, IP = Image Production, P = Procedures
1.	Make arrangements with other departments for ancillary patient services (*e.g., transportation, anesthesia).	PC.1.A.2.
2.	Assist with scheduling patients and coordinating exams to assure smooth work flow.	PC.1.A.2.
3.	Instruct patient regarding preparation prior to imaging procedures (e.g., oral or bowel prep., allergy prep).	PC.1.A.3.
4.	Educate patient and family to requirements necessary to achieve an exam of diagnostic quality.	PC.1.A.3.
5.	Provide information regarding CT procedures and safety to patients and family members.	PC.1.A.3.
6.	Provide reassurance to patients who are anxious about CT.	PC.1.A.
7.	Obtain patient's medical history prior to procedure.	PC.1.A.1.
8.	Evaluate for contraindications to IV or oral contrast.	PC.1.B.
9.	Evaluate renal function prior to administration of IV contrast agent.	PC.1.A.8.A., PC.1.B.2.A.
10.	Determine if patient has had previous contrast studies that may interfere with CT studies.	PC.1.A.2.
11.	Obtain prior studies for comparison.	PC.1.A.2.
12.	Review patient's medical record and provider's request to determine appropriate scan parameters for suspected pathology.	PC.1.A.1., P.Focus of Questions (FOQ)
13.	Modify the exam protocol based upon patient condition and diagnosis.	PC.1.A.1., P.FOQ
14.	Select and use appropriate patient patient positioning aids.	PC.1.A.5.
15.	Perform c-spine immobilization during patient transfer.	PC.1.A., P.FOQ
16.	Assure that artifact-producing objects have been removed from patient (e.g., dentures, chest leads, jewelry).	PC.1.A.2., PC.1.A.7.
17.	Adjust patient position or imaging parameters to minimize artifacts.	P.FOQ
18.	Assist patient on and off the scanning table.	PC.1.A., P.FOQ
19.	Monitor patient's condition during scanning procedure and prior to discharge from the scanning procedure.	PC.1.A.6.
20.	Monitor patient's vital signs.	PC.1.A.6.B., PC.1.A.6.C., PC.1.A.6.D.
21.	Monitor patient's comfort level during procedure.	PC.1.A.6.
22.	Alert physician or other medical staff of change in patient's condition.	PC.1.A.6.
23.	Verify completion of documentation for procedure requiring informed consent.	PC.1.A.4.

* 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.

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24.	Initiate incident reports.	PC.1.B.6.B., PC.1.B.7.C.
25.	Provide post procedure information to patient according to department guidelines.	PC.1.A.9.C., PC.1.B.6.
26.	Administer first aid or basic life support in emergency situation.	PC.1.B.7.B.
27.	Educate providers, staff technologists, ancillary staff, and students regarding mechanical and radiation safety.	S.1.
28.	Assist providers with CT guided interventional procedures.	P.FOQ
29.	Localize region of interest for CT guided interventional procedure.	P.FOQ
30.	Assist the provider in collection, documentation, and delivery of specimen.	P.FOQ
31.	Maintain controlled access to restricted area during radiation exposure to ensure safety of patients, visitors, and hospital personnel.	S.1.B.2.A.
32.	Screen female patients for the possibility of pregnancy.	PC.1.A.2., PC.1.B.2.C., S.1.B.
33.	Ensure appropriate radiation protection during procedure.	S.1.B.5.
34.	Inspect equipment to make sure it is operable and safe (e.g., cable, cords, table, attachments, straps).	IP.1.A.
35.	Notify appropriate personnel for equipment malfunction.	IP.1.A.
36.	Perform tube warm-up.	IP.1.A.1.B.
37.	Perform phantom QC tests.	IP.2.B.5.
38.	Evaluate phantom QC test data.	IP.2.B.5.
39.	Clean, disinfect, or sterilize work area as needed.	PC.1.A., PC.1.B.4.B.
40.	Maintain adequate supplies.	PC.1.A.
41.	Electronically transmit image data to long-term storage (e.g., PACs).	IP.2.D.
42.	Archive images to local data storage devices.	IP.2.D.2.
43.	Retrieve image data (raw or reconstructed).	IP.2.D.
44.	Electronically transmit image data to other workstations (e.g., teleradiology, 3D workstation).	IP.2.D.5.
45.	Perform deletion of data from scanner.	IP.2.D.
46.	Enter/edit patient data necessary to initiate scan.	IP.2.D.5.
47.	Perform retrospective reconstruction using raw data to create images with change to slice thickness, kernel/algorithm, and DFOV.	IP.1.C.1.
48.	Perform multiplanar reconstruction.	IP.1.C.2.A.
49.	Perform shutdown, power off, and restart of scanner equipment.	IP.1.A.
50.	Position patient according to type of study indicated.	PC.1.A., P.FOQ

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51.	Perform non-spiral/non-helical scanning techniques.	IP.1.B.2.
52.	Perform multi-row detector scanning techniques.	IP.1.B.2.
53.	Assess image quality to determine completion of procedure.	IP.1.B.2.A., IP.1.B.2.B., IP.2.B.2.C., P.FOQ
54.	Respond to dose alert or dose notification.	S.1.B.5.E., S.1.B.5.F.
55.	Document dose report.	S.1.B.5.
56.	Utilize iterative reconstruction to reduce dose.	S.1.B.5.D.
57.	Alert physician or other medical staff of life threatening conditions (e.g., hemorrhage, pneumothorax).	PC.1.B.6., P.FOQ
58.	Provide information regarding contrast agent to nursing mother.	PC.1.B.2.C.
59.	Determine appropriate dose of contrast agent to be administered based on patient's age, weight, and renal function.	PC.1.B.3.
60.	Administer oral contrast agent.	PC.1.B.1.
61.	Prepare IV contrast for administration.	PC.1.B.3.
62.	Perform venipuncture.	PC.1.B.4.
63.	Evaluate the existing line for compatibility for IV contrast injection.	PC.1.B.3.E., PC.1.B.5.
64.	Access the existing line for IV contrast injection.	PC.1.B.3.E., PC.1.B.5.
65.	Select appropriate flow rate for contrast delivery according to imaging protocols.	PC.1.B.5., P.FOQ
66.	Administer IV contrast agent.	PC.1.B.3.
67.	Administer rectal contrast.	PC.1.B.3.C.
68.	Utilize bolus tracking to ensure peak enhancement triggered automatically from an ROI.	PC.1.B.5.B.5., PC.1.B.5.B.6.
69.	Document amount, rate, and location for successful IV contrast administration.	PC.1.B.4.C.
70.	Document IV attempts (number and location).	PC.1.B.4.C.
71.	Document IV contrast extravasation.	PC.1.B.6.B.
72.	Recognize contrast extravasation and determine initial response.	PC.1.B.6.A.
73.	Monitor patient for reactions to contrast agent.	PC.1.B.7.A.
74.	Set or adjust image display functions (e.g., magnification, filters, windowing, annotation).	IP.2.A.
75.	Perform image evaluation (e.g., distance measurement, ROI).	IP.1.C.2.C., IP.2.A.7.
76.	Gather quality images and documentation for acceditation.	IP.2.B.5.
	Perform the following type of scans or procedures with specific protocols for:	
	<u>Head</u>	
77.	head	P.1.A., P.1.A.8., P.1.A.9.

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78.	trauma head	P.1.A.8., P.1.A.9., P.FOQ
79.	temporal bones (IAC)	P.1.A.1.
80.	pituitary fossa	P.1.A.2.
81.	orbits	P.1.A.3.
82.	mandible	P.1.A.5.
83.	CTA head	P.FOQ
84.	sinuses	P.1.A.4.
85.	maxillofacial	P.1.A.5.
86.	temporomandibular joint (TMJ)	P.1.A.6.
87.	base of skull	P.1.A.7.
88.	brain perfusion	P.1.A.10.
	Neck	
89.	larynx	P.2.A.1.
90.	soft tissue neck	P.2.A.2.
91.	CTA neck	P.FOQ
	Spine	
92.	cervical	P.1.B.1.
93.	thoracic	P.1.B.2.
94.	lumbosacral	P.1.B.3., P.1.B.4.
95.	post myelography	P.1.B.5.
96.	spinal trauma	P.FOQ
97.	discography	P.1.B.6.
	Chest	
98.	chest	P.2.B., P.2.B.1., P.2.B.2., P.2.B.4.
99.	CTA chest	P.FOQ
100.	calcium scoring	IP.1.C.2.C., P.2.B.3.
101.	prospective gated studies	IP.1.C.1.F., P.2.B.3.
102.	retrospective gated studies	IP.1.C.1.F., P.2.B.3.
103.	coronary artery angiogram	P.2.B.3.
104.	pulmonary embolus (PE) study	P.FOQ
105.	lung nodule study	P.2.B.2.
106.	low dose lung screening	P.2.B.5.
107.	high resolution computed tomography (HRCT)	P.2.B.2.
108.	chest trauma	P.FOQ

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	Abdomen/Pelvis	
109.	abdomen	P.3.A.
110.	liver	P.3.A.1.
111.	biliary	P.3.A.2.
112.	spleen	P.3.A.3.
113.	enterography study	P.3.A.7.
114.	pancreas	P.3.A.4.
115.	adrenals	P.3.A.5.
116.	kidneys	P.3.A.6.
117.	urogram/IVU	P.3.A.6.
118.	renal stone protocol	P.3.A.6.
119.	appendicitis study	P.3.A.7.
120.	CTA abdomen	P.FOQ
121.	abdominal trauma	P.FOQ
122.	pelvis	P.3.B., P.3.B.2., P.3.B.3.
123.	bladder	P.3.B.1.
124.	cystogram (retrograde)	P.3.B.1.
125.	CTA pelvis	P.FOQ
126.	pelvis with rectal contrast	P.3.B.2.
127.	pelvic trauma	P.FOQ
	Musculoskeletal	
128.	upper extremity	P.1.C.1.
129.	lower extremity	P.1.C.2.
130.	arthrography	P.1.C.6.
131.	sternum	P.1.C.5.
132.	shoulder	P.1.C.4.
133.	pelvic girdle	P.1.C.3.
134.	hips	P.1.C.3.
135.	SI joints	P.1.C.3.
136.	CTA extremity	P.FOQ

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	Special Procedures	
137.	CTA run-off	P.FOQ
138.	biopsies	P.FOQ
139.	drainages	P.FOQ
140.	aspirations	P.FOQ
141.	3D post-processing: surface shaded display (SSD)	IP.1.C.2.B., P.FOQ
142.	3D post-processing: maximum intensity projection (MIP)	IP.1.C.2.B., P.FOQ
143.	3D post-processing: volume rendering (VR)	IP.1.C.2.B., P.FOQ
144.	CTA for aortic dissection	P.FOQ
145.	venogram (CTV)	P.FOQ