



Practice Analysis Report: Computed Tomography - Effective July, 2022

Introduction

The ARRT establishes the job relatedness of an examination via a practice analysis (also called a job analysis). Practice analyses document the role to be credentialed, the topics to be covered by the examination used in the credentialing decision, as well as the degree of emphasis that each topic receives. The rationale for practice analyses is outlined in *The Standards for Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, National Council on Measurement in Education, 2014) and in the National Commission for Certifying Agencies (NCCA) *Standards for the Accreditation of Certification Programs* (NCCA, 2021). Legislation and legal precedent also stress the importance of practice analysis in the development and validation of certification exams. The ARRT conducts a practice analysis for each discipline approximately every five years. Regular updates are important for professions that continually evolve due to advances in technology because they help ensure that the content specifications and other certification requirements reflect current practice.

This report describes the practice analysis for Computed Tomography conducted from October 2020 to October 2021. The project sought to identify tasks currently required of the typical Computed Tomographers and to determine what knowledge and cognitive skills are required to effectively perform those tasks.

To accomplish this task, ARRT hosted several meetings with a committee of subject matter experts (SMEs) to develop a survey of job tasks; evaluate survey results; and revise the content specifications, content outline, and clinical experience requirements. ARRT selected seven SMEs for this committee from across the United States and from a range of practice settings (e.g., hospitals, clinics, educational programs). These SMEs represented a range of expertise including six certified and registered technologists and one radiologist.

All statistical analyses were performed by trained statisticians employed by ARRT and meetings were primarily conducted by ARRT's Exam Development Coordinators with psychometric support provided by ARRT psychometric staff.

The ARRT Board of Trustees reviewed all changes to exam content and eligibility requirements before giving approval in January 2022. The first exam under the new content and eligibility requirements was administered in July 2022.



Task Inventory

Survey Development

ARRT begins the practice analysis process by revising the task inventory, which is a listing of clinical and supporting procedures related to practice. The committee reviewed the previous task inventory and content outline before creating an updated list of job tasks by adding, deleting, or rewording tasks as necessary to reflect changes in the profession.

The committee used the updated job task list to create a survey for distribution to individuals working in the profession. The first section of this survey consisted of 115 items asking current Computed Tomographers how frequently they perform each task utilizing a six-point scale with the following options: *Never Perform, Yearly, Quarterly, Monthly, Weekly, and Daily*. Based on past research, ARRT uses a frequency scale with absolute anchors because data from scales like importance and criticality, which use subjective anchors, have inferior statistical properties (Babcock, Risk, & Wyse 2020). The data gathered by absolute anchor frequency scales also correspond well to medical imaging practice as defined by external data sources (Babcock & Yoes, 2013) and add value beyond advisory committee members' judgement without data (Wyse & Babcock, 2018).

To reduce the length and burden of the practice analysis survey, the committee identified tasks from the previous task inventory that they believed were so ubiquitous in practice that over 90% of respondents would report that they do perform the task. The following tasks were omitted from the survey and included in the new task inventory without further discussion:

- Explain and confirm patient's preparation (*e.g., diet restrictions, preparatory) prior to a procedure.
- Review the examination request to verify information is accurate, appropriate, and complete (e.g., patient history, clinical diagnosis, physician's orders).
- Provide for patient safety, comfort, and modesty.
- Notify appropriate personnel of adverse events or incidents (patient fall, contrast reaction).
- Use positioning aids, as needed, to reduce patient movement and/or promote patient safety.
- Administer contrast agents as required by the procedure.
- Utilize bolus tracking to ensure peak enhancement.
- Assess the patient after administration of a contrast agent to detect adverse events.
- Recognize contrast extravasation and take appropriate action.
- Clean and disinfect or sterilize facilities and equipment.
- Document required information on the patient's medical record (e.g., imaging procedure, IV administration, contrast extravasation).
- Take appropriate precautions to minimize radiation exposure to the patient.
- Screen patients of child-bearing age for the possibility of pregnancy and take appropriate action.
- Notify appropriate personnel for equipment malfunction.
- Assess images to determine successful completion of the procedure (e.g., anatomy, artifacts).
- Perform tube warm-up.
- Enter/edit patient data necessary to initiate scan.
- Position patient according to type of study indicated.



The second section of the survey included 16 questions regarding the respondent's role and workplace such as hours worked, primary job title, and department composition.

Survey Sample

ARRT staff randomly selected individuals from the ARRT database of certified and registered technologists with the following conditions:

- Certified and registered in Computed Tomography:
- Report Computed Tomography as their primary discipline
- Working as a full-time technologist
- Report 10 or fewer years of experience in Computed Tomography
- Did not receive the previous practice analysis survey
- Not on probation or otherwise sanctioned

Before selection, individuals identified according to the criteria above were randomly divided into three groups, stratified by years of experience (0-3 years, 4-5 years, 6+ years) to facilitate an experiment (detailed below). Random samples of 1500 individuals were drawn from each of the three groups, and weighted towards entry-level (0-3 years = 50%, 4-5 years = 30%, 6+ years = 20%). The final surveyed sample consisted of 4500 Computed Tomographers.

ARRT's survey vendor mailed the survey in January 2021. A total of 1340 recipients returned their survey by close in March 2021, for an absolute response rate of 29.7%. ARRT staff screened responses to ensure that the surveys were correctly filled out by the intended population, retaining 1316 for an effective response rate of 29.4%.

Experiment

ARRT staff experimented with three different response scales with hopes of improving survey response rate. The first condition (control) consisted of the six-response scale described previously: *Never Perform*, *Yearly*, *Quarterly*, *Monthly*, *Weekly*, and *Daily*. A second condition reduced the scale to 4 options by removing *Quarterly* and *Daily*. Finally, the third condition further reduced the scale to 2 options (*No* and *Yes*). The experiment did not meaningfully alter response rate as the response rate was 30.2% for condition 1, 27.3% for condition 2, and 30.7% for condition 3.

Combining the data from conditions 2 and 3 with the control did not cause any significant change in the percent performing any task, so the data from all three conditions were included in the primary analysis. Due to limitations in the scale for condition 3, the secondary analysis of those performing each task daily/weekly was based on conditions 1 and 2 alone.

Analysis

ARRT psychometric staff first calculated the percentage of respondents who report performing the task and the percent who report performing the task daily or weekly (Table 1). ARRT allows tasks performed by 40% or more of respondents to be included on the task inventory without further discussion so that committees may focus on discussions most likely to impact task inclusion. However, committees still review all survey results and may choose to include tasks below the threshold or reject tasks above the threshold as they see fit based on their joint expertise.



To ensure that the practice analysis accurately reflects the discipline at entry level, staff compared the percent performing each task at entry level and reported any significant differences to the committee (Table 2) using a critical p-value corrected for multiple tests ($.05/115 = .0004$).

While developing the task analysis survey, the committee noted that some tasks are unlikely to be performed during certain shifts. To account for this, a three-way test of proportions was conducted for the percentage of RTs performing each task based on their self-reported shift (first, second, or third). Table 3 details all significant differences across shift, with the critical p-value corrected for multiple tests ($.05/115 = .0004$). This information was provided to the committee as additional context to aid forming recommendations.

Finally, ARRT staff summarized results for the 16 items that covered the respondent's role and workplace (Tables 4 - 19).



Table 1
Percent of technologists performing tasks

Item	Task	% Performing	% Daily/Weekly
1	Sequence imaging procedures to avoid affecting subsequent examinations	90.0%	79.5%
2	Determine if patient has had previous studies that may interfere with CT studies	97.1%	90.9%
3	Explain the procedure instructions to patient, patient's family, or authorized representative (e.g., pre-procedure, post-procedure)	99.4%	98.4%
4	Respond as appropriate to procedure inquiries from the patient, patient's family, or authorized representative (e.g., scheduling delays, safety concerns)	98.9%	95.4%
5	Assume responsibility for the patient's auxiliary medical equipment (e.g., IVs, oxygen) during the procedure	97.2%	93.4%
6	Verify informed consent as necessary	94.3%	87.2%
7	Recognize abnormal or missing lab values relative to the procedure ordered	99.4%	98.1%
8	Communicate relevant information to appropriate members of the care team	99.4%	96.7%
9	Use proper body mechanics and/or ergonomic devices when assisting the patient or performing a procedure	99.6%	97.2%
10	Prior to the administration of a medication other than a contrast agent, review pertinent information to prepare appropriate type and dosage (e.g., lidocaine)	58.2%	48.4%
11	Prior to the administration of a contrast agent, review pertinent information to prepare appropriate type and dosage	98.7%	97.8%
12	Prepare IV contrast for administration	99.5%	99.0%
13	Prior to the administration of a contrast agent, determine if the patient is at risk for an adverse reaction	99.8%	99.1%
14	Use sterile or aseptic technique when indicated	95.6%	81.7%
15	Perform venipuncture	90.8%	75.9%
16	Obtain vital signs	54.9%	28.8%
17	Recognize and communicate the need for prompt medical attention	99.3%	70.2%
18	Assist with providing emergency care (e.g., CPR, get crash cart)	92.4%	24.1%
19	Alert physician or other medical staff of critical findings (e.g., hemorrhage, pneumothorax)	96.3%	68.1%
20	Utilize appropriate options to produce optimal images while minimizing patient dose (e.g., technical factors, gating, image reconstruction)	99.0%	95.4%
21	Respond to dose alert or dose notification	88.8%	65.5%
22	Verify procedural dose documentation	89.6%	81.0%
23	Maintain controlled access to restricted area during radiation exposure	99.2%	97.5%
24	Advocate radiation safety and protection	99.8%	96.1%



Item	Task	% Performing	% Daily/Weekly
25	Visually inspect equipment and take appropriate action (e.g., cable, cords, table, attachments, straps)	98.1%	87.6%
26	Select appropriate protocol (e.g., pathology, type of acquisition)	99.8%	98.5%
27	Perform axial scanning techniques	96.5%	89.8%
28	Utilize dual source/dual energy acquisition	64.3%	51.6%
29	Remove radiopaque materials that could interfere with the image from the exposure field (e.g., dentures, clothing, jewelry)	99.9%	99.2%
30	Modify imaging parameters to compensate for patient conditions or artifacts (e.g., patient motion, metal artifact, pathology)	97.9%	93.7%
31	Perform retrospective reconstruction	98.0%	87.9%
32	Perform image postprocessing (e.g., MPR, MIP, VR, SSD)	99.2%	93.4%
33	Utilize image display functions (e.g., magnification, windowing, annotation)	96.4%	85.0%
34	Utilize image evaluation tools (e.g., distance measurement ROI)	96.0%	84.6%
35	Please mark 'monthly'	NA	NA
36	Perform and document the results of QC tests	89.6%	67.3%
37	Evaluate the results of QC tests	71.4%	51.3%
38	Store, transfer, retrieve, or delete images from data storage	92.3%	73.4%
39	Gather quality images and documentation for accreditation	53.6%	19.1%
40	head	99.9%	98.7%
41	trauma head	95.5%	87.5%
42	temporal bones (IACs)	93.7%	35.7%
43	dedicated pituitary fossa	26.8%	4.5%
44	orbits	95.7%	43.1%
45	dedicated mandible	45.0%	15.1%
46	CTA head	98.5%	84.5%
47	CTV head	76.3%	30.7%
48	sinuses	97.7%	72.6%
49	maxillofacial	98.3%	84.0%
50	temporomandibular joints (TMJs)	51.0%	11.2%
51	dedicated base of skull	18.5%	5.5%
52	brain perfusion	55.9%	34.7%
53	dedicated larynx	16.2%	5.2%
54	soft tissue neck	99.4%	86.4%
55	CTA neck	98.6%	87.4%



Item	Task	% Performing	% Daily/Weekly
56	CTV neck	50.8%	22.8%
57	cervical	99.7%	94.4%
58	thoracic	99.5%	77.2%
59	lumbosacral	99.4%	84.6%
60	post myelography	67.7%	28.2%
61	spinal trauma	89.9%	73.2%
62	discography	15.1%	3.8%
63	chest	99.8%	97.2%
64	CTA chest	99.0%	93.5%
65	CTV chest	56.3%	34.1%
66	calcium scoring	62.6%	36.8%
67	prospective gated studies	54.1%	31.7%
68	retrospective gated studies	47.2%	26.1%
69	coronary artery angiogram	56.4%	34.7%
70	pulmonary embolus (PE) study	99.4%	95.4%
71	lung nodule study	87.4%	70.5%
72	low dose lung screening	82.2%	58.2%
73	high resolution computed tomography (HRCT)	88.7%	44.5%
74	chest trauma	91.5%	73.4%
75	abdomen	99.9%	99.0%
76	liver	92.9%	59.5%
77	dedicated biliary	25.1%	6.9%
78	dedicated spleen	27.9%	6.4%
79	enterography	77.4%	22.1%
80	pancreas	87.8%	41.3%
81	adrenals	84.1%	26.7%
82	kidneys	90.9%	61.3%
83	urogram/IVU	86.4%	55.1%
84	renal stone protocol	99.4%	95.1%
85	appendicitis study	88.9%	82.4%
86	CTA abdomen	98.2%	76.4%
87	CTV abdomen	67.1%	39.9%
88	abdominal trauma	91.7%	74.9%



Item	Task	% Performing	% Daily/Weekly
89	pelvis	99.4%	86.4%
90	dedicated bladder	54.6%	20.1%
91	cystogram (retrograde)	66.5%	12.8%
92	CTA pelvis	85.7%	53.6%
93	CTV pelvis	57.4%	31.9%
94	pelvis with rectal contrast	73.4%	10.2%
95	please mark "Yearly"	NA	NA
96	pelvic trauma	90.6%	65.1%
97	upper extremity	99.2%	60.1%
98	lower extremity	99.5%	66.8%
99	arthrography	50.0%	12.0%
100	sternum	30.9%	3.9%
101	shoulder	97.1%	45.4%
102	bony pelvis	98.0%	64.9%
103	hips	95.2%	59.2%
104	SI joints	41.4%	10.3%
105	CTA extremity	89.9%	38.0%
106	CTV extremity	58.7%	19.1%
107	CTA run-off	95.2%	53.4%
108	biopsies	63.0%	40.7%
109	drainages	59.7%	36.3%
110	aspirations	55.0%	29.7%
111	ablations	33.2%	10.1%
112	pain injections	27.7%	10.5%
113	CTA for aortic dissection	96.0%	65.4%
114	TAVR	38.0%	22.0%
115	virtual colonography	20.4%	6.1%
116	radiographic procedures	58.9%	37.8%
117	portable CT procedures	8.9%	4.3%



Table 2.
Significant differences in percent of RTs performing task by years of experience

Item	Task	0-3 Years	6-10 years
16	Obtain vital signs	59.6%	43.3%
43	Head: dedicated pituitary fossa	32.2%	16.2%
45	Head: dedicated mandible	50.0%	35.1%
50	Head: temporomandibular joints (TMJs)	56.4%	42.2%
85	Abdomen/Pelvis: appendicitis study	93.1%	82.0%



Table 3
Significant differences in percent of RTs performing task by work shift

Item	Task	First	Second	Third
10	Prior to the administration of a medication other than a contrast agent, review pertinent information to prepare appropriate type and dosage (e.g., lidocaine)	61.9%	59.3%	45.6%
36	Perform and document the results of QC tests	91.8%	81.4%	93.7%
37	Evaluate the results of QC tests	76.6%	61.6%	69.2%
39	Gather quality images and documentation for accreditation	62.3%	44.2%	43.0%
60	Spine: post myelography	69.2%	76.3%	52.6%
61	Spine: spinal trauma	85.6%	94.0%	94.4%
66	Chest: calcium scoring	66.8%	66.1%	48.4%
67	Chest: prospective gated studies	56.6%	58.3%	43.2%
71	Chest: lung nodule study	93.4%	87.1%	71.6%
72	Chest: low dose lung screening	86.2%	84.8%	68.7%
73	Chest: high resolution computed tomography (HRCT)	93.3%	90.2%	75.0%
74	Chest: chest trauma	87.6%	94.0%	97.2%
76	Abdomen/Pelvis: liver	96.5%	94.0%	81.9%
79	Abdomen/Pelvis: enterography study	80.5%	83.2%	62.7%
80	Abdomen/Pelvis: pancreas	92.5%	89.6%	74.2%
81	Abdomen/Pelvis: adrenals	91.2%	86.8%	62.5%
82	Abdomen/Pelvis: kidneys	95.8%	92.1%	77.6%
83	Abdomen/Pelvis: urogram/IVU	89.5%	89.9%	74.9%
88	Abdomen/Pelvis: abdominal trauma	87.5%	95.0%	97.2%
96	Abdomen/Pelvis: pelvic trauma	85.9%	93.7%	97.6%
99	Musculoskeletal: arthrography	58.9%	46.2%	30.3%
105	Musculoskeletal: CTA extremity	86.5%	94.3%	92.1%
108	Other Procedures: biopsies	65.4%	71.6%	44.4%
109	Other Procedures: drainages	61.6%	67.8%	43.3%
110	Other Procedures: aspirations	57.2%	63.7%	37.3%
111	Other Procedures: ablations	37.6%	34.4%	18.7%
112	Other Procedures: pain injections	33.2%	24.6%	14.7%



Table 4
Is CT your primary discipline of employment?

Response	Count	Percentage
Yes	1155	93.6%
No	67	5.3%

Table 5
How many years have you worked as a CT technologist?

Response	Count	Percentage
Less than 1 year	22	1.8%
1-3 years	473	38.2%
4-5 years	357	28.9%
6-10 years	303	24.5%
More than 10 years	78	6.3%

Table 6
How many hours per week of work do you average in CT?

Response	Count	Percentage
Less than 32 hours	120	9.7%
32 or more hours	1110	89.7%

Table 7
How would you describe your typical work shift?

Response	Count	Percentage
First	639	51.7%
Second	317	25.6%
Third	252	20.4%

Table 8
Which of the following best describes your primary place of employment?

Response	Count	Percentage
University hospital	154	12.4%
For profit hospital	253	20.5%
Not for profit hospital	515	41.6%
Government hospital	49	4.0%
Outpatient imaging center	110	8.9%
Physician's office or clinic	25	2.0%
Mobile unit	1	0.1%
Free-standing emergency clinic or urgent care	68	5.5%
Other	32	2.6%



Table 9

If you work in a hospital, what is the approximate size (number of beds)?

Response	Count	Percentage
Less than 50	102	8.2%
50-100	137	11.1%
101-250	263	21.3%
251-500	312	25.2%
More than 500	233	18.8%
Not applicable	172	13.9%

Table 10

How many CT scanners are there at your facility?

Response	Count	Percentage
1	351	28.3%
2	381	30.8%
3	227	18.4%
4	271	21.9%

Table 11

How many CT technologists are employed at your primary place of employment?

Response	Count	Percentage
Less than 3	77	6.2%
3-5	139	11.2%
6-10	389	31.4%
11-15	288	23.3%
More than 15	337	27.3%

Table 12

In the last year, has the number of approved full time equivalent (FTE) positions for technologists at your facility changed?

Response	Count	Percentage
Yes, increased FTEs	348	28.1%
Yes, decreased FTEs	163	13.2%
No change	715	57.8%

Table 13

In the last year, has the number of employed technologists at your facility changed?

Response	Count	Percentage
Increased	360	29.1%
Decreased	350	28.3%
No change	519	42.0%



Table 14

Has your CT department experienced a change in CT exam volume since the COVID pandemic declaration (March 2020)?

Response	Count	Percentage
Increased volumes	683	55.2%
Decreased volumes	286	23.1%
No change	254	20.6%

Table 15

Do you use ionic contrast for any procedures

Response	Count	Percentage
Yes	483	39.1%
No	735	59.4%

Table 16

What lab value do you use to evaluate renal function? (Check all that apply)

Response	Count	Percentage
eGFR	1095	88.5%
Creatinine	1016	82.1%
BUN	267	21.6%

Table 17

Do you use shielding when performing a CT? (check all that apply)

Response	Count	Percentage
No	716	57.9%
Yes, lead	613	49.6%
Yes, bismuth	74	6.0%

Table 18

Which of the following best describes your role in determining the imaging parameters used for the patients you scan?

Response	Count	Percentage
I am required to use preset protocols all of the time unless otherwise directed by senior management	268	21.7%
I use preset protocols most of the time, but occasionally decide to modify imaging parameters as required by particular cases	913	73.8%
I sometimes use preset protocols, but I usually set the imaging parameters based on provider's orders and clinical indications	43	3.5%
I seldom use preset protocols, but almost always set the imaging parameters based on provider's orders and clinical indications	6	0.5%



Table 19

What type of training or education specific to CT have you had? (check all that apply)

Response	Count	Percentage
Informal, on the job training	772	62.5%
Structured on the job trainings, including didactic and supervised clinical instruction	620	50.1%
Formal coursework provided by college or university	541	43.7%
Self-guided learning (journal and textbook reading, etc.)	661	53.4%
In-house (on-site) training sponsored by equipment vendor	266	21.5%
Off-site trainings sponsored by equipment vendor	96	7.8%
Seminar given by CE provider (e.g., ASRT, MTMI, state society, other)	203	16.4%
Self-funded, off-site training	138	11.2%

Changes to Task Inventory

The practice analysis committee met in April 2021 to review the practice analysis survey data and determine whether any tasks should be dropped from or added to the task inventory. The committee also clarified the wording of several tasks.

The following tasks were removed:

- Obtain prior studies for comparison
- Educate patient and family to requirements necessary to achieve an exam of diagnostic quality.
- Provide post procedure information to patient according to department guidelines.
- Provide information regarding contrast agent to nursing mother.
- Perform c-spine immobilization during patient transfer.
- Initiate incident reports.
- Administer oral contrast agent.
- Evaluate the existing line for compatibility for IV contrast injection.
- Access the existing line for IV contrast injection.
- Select appropriate flow rate for contrast delivery according to imaging protocols.
- Administer IV contrast agent.
- Administer rectal contrast.
- Document IV attempts (number and location).
- Document IV contrast extravasation.
- Maintain adequate supplies.
- Perform multi-row detector scanning techniques.
- Adjust patient position or imaging parameters to minimize artifacts.
- Multiplanar reconstruction.
- 3D post-processing: surface shaded display (SSD).
- 3D post-processing: maximum intensity projection (MIP).
- 3D post-processing: volume rendering (VR).



- Electronically transmit image data to long-term storage (e.g., PACs).
- archive images to local data storage devices.
- electronically transmit image data to other workstations (e.g., teleradiology, 3D workstation).
- perform deletion of data from scanner.
- Assist providers with CT guided interventional procedures.
- Localize region of interest for CT guided interventional procedure.
- Assist the provider in collection, documentation, and delivery of specimen.
- Perform shutdown, power off, and restart of scanner equipment.
- Perform the following type of scans or procedures with specific protocols for:
 - venogram (CTV)
 - discography
 - sternum
 - SI joints
 - 'dedicated' pituitary fossa
 - 'dedicated' base of skull
 - 'dedicated' larynx
 - 'dedicated' biliary
 - 'dedicated' spleen

The following tasks were added:

- Assume responsibility for the patient's auxiliary medical equipment (e.g., IVs, oxygen) during the procedure.
- Prior to the administration of a medication other than a contrast agent, review pertinent information to prepare appropriate type and dosage (e.g., lidocaine).
- Use sterile or aseptic technique when indicated.
- Select appropriate protocol (e.g., pathology, type of acquisition).
- Utilize dual source/dual energy acquisition.
- Store, transfer, retrieve, or delete images from data storage.
- Perform the following type of scans or procedures with specific protocols for:
 - CTV head
 - CTV neck
 - CTV chest
 - CTV abdomen
 - CTV pelvis
 - CTV extremity
 - Ablations
 - TAVR

The Board of Trustees approved the final task inventory in July 2021. The final task inventory may be found on the ARRT website: <https://www.arrt.org/pages/arrt-reference-documents/by-document-type/task-inventories>



Content Specifications and Clinical Experience Requirements

Changes to Content Specifications

The practice analysis committee updated the content specifications based on changes to the task inventory and the field. The committee considered the knowledge and cognitive skills required to successfully perform the tasks in the final task inventory and verified that those topics were covered in the content specifications, adding additional content as necessary. The committee also removed any topics that could not be linked to the updated task inventory.

The updated content specifications were then made available for public comment in August 2021 and the committee met again in October 2021 to discuss the comments before making any final adjustments.

The most notable changes from the previous version of the content specifications were:

- Patient Care
 - Added content in patient assessment and preparation
 - Added content in contrast and medication
- Safety
 - Added details to the radiation physics area
 - Expanded the radiation protection area
- Image Production
 - Added slip rings
 - Added shuttle/continuous/cine
 - Added dual energy/dual source
- Procedures
 - Replaced sternum and ribs with chest wall
 - Removed pituitary fossa, base of skull, and cranium
 - Removed discography
 - Added cross sectional anatomy and trauma to the focus of questions

In addition, the committee edited all sections of the content specifications for clarity and updated terminology to reflect current practice.

The Board of Trustees approved the final content specifications in January 2022. The final content specifications may be found on the ARRT website: <https://www.arrt.org/pages/arrt-reference-documents/by-document-type/examination-content-specifications>

Content Weighting

The practice analysis committee determined the number of items that should be assigned to each section of the exam through a process known as content weighting. First, the committee performed a bottom-up exercise where members individually estimated the number of unique items that should be included in each section. Second, the committee performed a top-down exercise where members individually estimated the relative proportion of the exam that should be dedicated to each section. Finally, ARRT staff provided the committee with summary values from the two exercises and the committee held a discussion to finalize their recommendation for the number of items assigned to each section (Table 20).



Table 20
Number of Items per Section

Content Area	Number of Scored Items
Patient Care	22
Patient Interactions and Management (22)	
Safety	22
Radiation Safety and Dose (22)	
Image Production	50
Image Formation (28)	
Image Evaluation and Archiving (22)	
Procedures	71
Head, Spine, and Musculoskeletal (25)	
Neck and Chest (21)	
Abdomen and Pelvis (25)	
Grand Total	165

Changes to Clinical Experience Requirements

ARRT created clinical experience requirements to verify that candidates have completed a subset of clinical procedures within a modality. Successful performance of these fundamental procedures, in combination with mastery of the cognitive knowledge and skills covered by the certification examination, provides the basis for the acquisition of the full range of clinical skills required in a variety of settings.

The practice analysis committee reviewed and updated the previous clinical experience requirements considering the final task inventory and content specifications. The updated clinical experience requirements were then made available for public comment in August 2021 and the committee met again in October 2021 to discuss the comments before making any final adjustments.

The most notable changes from the previous version of the clinical experience requirements were:

- Split CTA and CTV into separate exams for head, extremity, neck, and abdomen/pelvis.
- Added a separate Pulmonary angiography/PE study (CTPA)
- Added TAVR (transcatheter aortic valve replacement) and PVS (premature ventricular contractions) as examples to heart study
- Added a separate calcium artery scoring study
- Removed pituitary fossa
- Removed lung nodule study
- Removed bladder
- Removed discography
- Added a requirement that 30 out of 125 be performed with iodinated IV contrast
- Added additional notice that 9 repetitions may be logged each day



The Board of Trustees approved the final clinical requirements in March 2022. The final clinical experience requirements may be found on the ARRT website: <https://www.arrt.org/pages/arrt-reference-documents/by-document-type/didactic-and-clinical-competency-requirements>

Conclusion

Numerous individuals contributed to this project, as committee members, document reviewers, or as survey respondents. Periodic practice analysis is a necessary step in the life cycle of an exam program to ensure that the content of the exam and the eligibility requirements remain relevant with current practice. This study noted significant changes to the field of Computed Tomography, and thanks to the efforts of all involved it assures that the ARRT Computed Tomography exam program will continue to be an excellent assessment of Computed Tomographer wishing to demonstrate their qualifications by seeking certification and registration.

