Practice Analysis Report: Radiologist Assistant - Effective January 2023

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*[1] and in the National Commission for Certifying Agencies (NCCA) *Standards for the Accreditation of Certification Programs*[2]. 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 the Radiologist Assistant exam conducted from November 2020 to October 2021. The project sought to identify tasks currently required of the typical radiologist extender 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 competency requirements. ARRT selected nine 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 seven certified and registered Radiologist Assistants and two radiologists.

All statistical analyses were performed by trained psychometric staff at 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 will be administered in January 2023.

Entry-Level Clinical Activities

Survey Development

ARRT begins the practice analysis process by revising the list of entry-level clinical activities, which is a listing of clinical and supporting procedures related to practice. The committee reviewed the previous task list 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 two different surveys, one for current radiologist extenders and one for radiologists. Due to the small population of radiologist assistants certified and registered by ARRT, the survey was sent to certified radiologist extenders irrespective of certifying organization (i.e. ARRT, CBRPA).

The surveys consisted of 129 tasks that the committee believed represented the role of the radiologist assistant. The same tasks were sent to both radiologist extenders and radiographers, but the question differed. Radiologist extenders were asked 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). Radiologists were asked what the appropriate level of supervision is for each item on a 4-point scale with the following options: *general (not in the facility), direct (in facility and available), personal (in the room),* and *should not perform.*

In addition to the tasks, each survey contained a second section containing items related to the individual's role and workplace. Radiologist extenders were asked 10 questions related to topics like hours worked, job experience, and department composition while radiologists received 9 questions covering topics like experience, specialities, and previous experience with radiologist extenders.

Survey Sample

ARRT started with the population of all known extenders; either certified and registered R.R.A.s (408) or certified and registered by the ARRT in Radiography and confirmed to be certified by the CBRPA (additional 168). Eight individuals were considered ineligible due to factors like invalid address, probation, or no contact status. The radiologist extender survey was sent to the remaining 568 individuals.

The radiologist survey was sent to 1000 radiologists randomly selected by the American College of Radiology as well as all ACR councilors and alternate councilors (589). Survey recipients were also allowed to request additional surveys for distribution within their network; an additional 29 were sent through this method for a total of 1618 individuals.

ARRT's survey vendor mailed the survey in January 2021 and responses were accepted through April 2021.

Of the 568 radiologist extender surveys sent, 3 could not be delivered and 160 were returned for an effective response rate of 28.3%. Of the 160 responses, 24 reported not currently performing

procedures and 1 was dropped for failing both attention check items. The final analysis sample consisted of 135 radiologist extenders.

Of the 1618 radiologist surveys sent, 13 could not be delivered and 362 were returned for a response rate of 22.4%. Of the 362 responses, 7 reported not working in an applicable speciality and 7 were dropped for failing attention check items. The final analysis sample consisted of 348 radiologists.

Analysis

ARRT psychometric staff first calculated the percentage of radiologist extenders who report performing the task and the percent who report performing the task daily or weekly (Table 1). ARRT typically allows tasks performed by 40% or more of respondents to be included on the list of entry-level clinical activities 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. Table 1 also includes the percentage of radiologists who selected each level of observation for the task.

Staff then summarized results for the 19 items that covered the respondent's role and workplace (Extenders: Tables 2-11, Radiologists: Tables 12-20).

Table 1
Percent of radiologist extenders performing tasks and recommended supervision

Item	Task	Extenders		Radiologists			
		Perform	Weekly+	General	Direct	Personal	Should Not
1	Review the patient's medical record to verify the appropriateness of a specific exam or procedure and report significant findings to the supervising radiologist.	100.0	100.0	81.9	16.1	0.6	1.4
2	Assist the supervising radiologist in determining whether indications meet the ACR Appropriateness Criteria® when advising those who order examinations.	82.7	78.2	79.8	17.0	1.4	1.4
3	Interview the patient to obtain, verify, or update medical history.	97.8	96.3	76.6	21.9	0.9	0.3
4	Explain procedure to the patient or authorized representative, including a description of risks, benefits, alternatives, and follow-up. (Patient or authorized representative must be able to communicate with the radiologist if they request or if any questions arise that cannot be appropriately answered by the radiologist assistant)	100.0	98.5	54.6	40.5	0.9	4.0
5	Participate in obtaining informed consent. (Patient or authorized representative must be able to communicate with the radiologist if they request or if any questions arise that cannot be appropriately answered by the radiologist assistant)	92.6	87.4	45.7	45.7	3.4	5.2
6	Determine if the patient has followed instructions in preparation for the exam (e.g., diet, premedications).	99.3	99.3	79.9	19.8	0.3	0.0
7	Assess risk factors that may contraindicate the procedure (e.g., health history, medications, pregnancy, psychological indicators, alternative medicines). (Note: Must be reviewed with the supervising radiologist.)	100.0	97.8	69.0	27.0	2.6	1.1
8	Recognize abnormal or missing lab values relative to the procedure or imaging ordered (e.g., eGFR, creatinine, beta-hCG)	97.0	94.7	78.1	20.2	1.2	0.6
	Perform and document a procedure-focused physical examination, and review relevant data (e.g., signs and symptoms, laboratory values, significant abnormalities, vital signs); report findings to the supervising radiologist for the following systems or anatomical areas:	---	---	---	---	---	---
9	a. abdominal	70.7	60.9	41.5	40.9	4.3	7.8
10	b. thoracic	66.7	52.3	41.4	40.8	4.3	7.8
11	c. cardiovascular	53.8	36.9	39.8	40.6	4.9	7.8

Item	Task	Extenders		Radiologists			
		Perform	Weekly+	General	Direct	Personal	Should Not
12	d. musculoskeletal	65.9	56.1	42.0	40.5	4.3	7.8
13	e. peripheral vascular	56.1	35.6	40.3	41.5	4.6	7.5
14	f. neurological	53.0	40.2	38.8	41.4	4.9	8.0
15	g. endocrine	39.8	21.8	39.8	39.8	4.0	8.1
16	h. breast and axillae	35.9	21.4	36.0	38.6	6.9	10.4
17	Observe ECG for changes and recognize abnormal rhythms.	59.8	37.1	24.1	35.3	10.6	18.4
18	Perform urinary catheterization.	54.9	18.8	35.1	51.6	3.8	3.8
19	Perform venipuncture.	69.9	36.8	50.7	43.5	2.3	1.2
20	Monitor IV therapy for flow rate and complications.	35.9	24.4	34.7	49.7	6.4	2.9
21	Participate in the administration of moderate/conscious sedation as prescribed by the supervising radiologist.	36.8	24.1	3.8	29.5	39.9	19.9
22	Observe and assess patients who have received moderate/conscious sedation as part of the radiologist led team.	55.6	36.1	6.6	54.9	24.1	10.3
23	Assess patient's vital signs and level of anxiety/pain and inform the supervising radiologist when appropriate.	91.7	74.4	33.0	58.9	6.3	1.4
24	Recognize and respond to medical emergencies (e.g., drug reactions, cardiac arrest, hypoglycemia) and activate emergency response systems, including notification of the supervising radiologist.	91.7	40.9	18.7	58.2	16.4	5.2
25	Administer oxygen as prescribed.	82.4	49.6	38.1	50.3	8.7	2.6
26	Explain effects and potential side effects to the patient or authorized representative of the pharmaceutical(s) required for the examination.	94.7	90.2	43.5	48.7	3.2	4.6
27	Administer contrast agents and radiopharmaceuticals as prescribed by the supervising radiologist.	97.0	94.0	29.7	62.2	4.9	1.7
28	Administer medications (EXCLUDING contrast agents and radiopharmaceuticals) as prescribed by a licensed practitioner and approved by the supervising radiologist.	63.9	42.9	17.1	52.6	15.6	11.3
29	Monitor patient for side effects or complications of the pharmaceutical(s).	87.9	70.5	26.8	60.9	8.7	2.3
30	Operate medical imaging equipment (e.g., ultrasound, fixed/mobile fluoroscopic unit.)	99.3	95.5	55.0	38.3	4.9	1.4
31	Document fluoroscopy time and radiation dose.	92.4	90.8	74.3	25.1	0.6	0.0

Item	Task	Extenders		Radiologists			
		Perform	Weekly+	General	Direct	Personal	Should Not
33	Use sterile or aseptic technique as required to help prevent infection.	97.0	92.5	64.9	31.3	3.5	0.3
	Advocate for patient's radiation safety and protection:	---	---	---	---	---	---
34	a. assess the patient's radiation dose history	54.3	36.4	83.6	15.0	0.0	0.0
35	b. provide radiation procedure exposure and cumulative dose education	75.2	44.4	79.5	16.2	0.6	1.7
36	c. recommend alternative procedures based on patient radiation dose	70.5	35.6	60.6	21.4	4.1	11.3
37	Perform procedures in compliance with Standards of Care, facility and regulatory requirements, and ARRT Standards of Ethics.	99.2	99.2	53.0	37.5	2.4	3.0
	Perform the following GI and chest examinations and procedures including contrast media administration and operation of imaging equipment:						
38	esophageal study	84.2	81.2	35.6	49.0	5.2	7.9
39	swallowing function study	78.9	73.7	36.8	50.1	4.9	5.8
40	upper GI study	83.6	79.1	35.5	48.3	5.5	8.7
41	d. post-operative study (e.g., bariatric surgery, anastomosis check)	84.3	61.2	27.2	51.0	9.9	9.9
42	small bowel study	84.2	71.4	37.3	48.3	5.5	6.9
43	enema with barium, air, or water soluble contrast	82.0	62.4	30.3	50.3	7.8	9.2
44	nasogastric/enteric and orogastric/enteric tube placement	69.9	40.6	28.1	53.3	7.8	7.5
45	percutaneous, nasogastric/enteric, and orogastric/enteric tube evaluation	72.0	38.6	27.2	54.3	7.2	7.8
46	t-tube cholangiogram	65.2	18.2	21.7	51.7	9.5	11.6
47	CT colonography	18.7	7.5	23.2	44.9	5.8	15.7
48	chest fluoroscopy	80.6	32.8	32.4	46.5	6.6	10.7
49	defecography	21.6	9.0	25.7	41.9	5.5	11.3
	Perform the following GU examinations and procedures including contrast media administration and operation of imaging equipment:						
50	antegrade urography through an existing catheter (e.g., nephrostography)	72.6	34.1	24.6	52.8	7.2	10.7
51	cystography, not voiding	81.5	39.3	31.4	49.7	8.1	7.8
52	retrograde urethrography or urethrocystography	64.4	17.8	22.0	49.7	12.4	11.0
53	voiding cystography/cystourethrography	76.1	32.8	27.6	48.0	10.5	9.9

Item	Task	Extenders		Radiologists			
		Perform	Weekly+	General	Direct	Personal	Should Not
54	loopography (urinary diversion study)	69.4	10.4	24.6	47.1	11.1	11.4
55	hysterosalpingography - imaging only	52.6	26.7	27.3	45.3	10.5	12.2
56	hysterosalpingography - procedure and imaging	45.1	30.8	8.6	44.2	17.1	23.3
Perform the following invasive nonvascular procedures with image guidance including contrast media administration and needle or catheter placement:							
57	therapeutic bursa aspiration and/or injection	64.4	40.0	13.6	47.5	13.0	22.0
58	tendon sheath injection	32.8	10.4	8.7	43.5	16.5	24.6
59	diagnostic joint aspiration	76.3	43.0	15.0	49.1	12.7	20.8
60	therapeutic joint injection	74.2	58.3	13.7	49.4	13.7	20.6
	arthrography (radiography, CT, and MR)	---	---	---	---	---	---
61	a. shoulder	74.8	63.7	18.0	52.6	8.1	18.3
62	b. elbow	64.4	16.3	17.3	47.7	11.3	19.9
63	c. wrist	68.1	25.9	17.3	48.0	11.6	19.7
64	d. hip	75.6	60.7	18.5	51.2	9.2	18.2
65	e. knee	70.4	28.9	18.3	49.3	9.9	18.8
66	f. ankle	54.1	7.5	17.7	46.7	11.6	20.0
67	lumbar puncture without injection	69.6	55.6	12.0	52.2	12.2	21.3
68	lumbar puncture for myelography, cisternography, or medication injection	63.7	49.6	5.8	46.0	19.4	26.0
69	cervical, thoracic, or lumbar myelography – imaging only	40.3	28.4	17.1	47.2	11.6	19.7
70	lumbar puncture with intrathecal catheter placement	14.1	5.9	1.7	20.9	18.6	49.3
71	epidural steroid injection	18.5	9.6	2.9	25.3	17.2	45.1
72	epidural injection for blood patch	14.9	1.5	2.9	23.4	16.2	46.8
73	nerve block	10.5	3.0	1.7	19.7	18.3	47.2
74	thoracentesis with or without catheter	62.7	49.3	8.0	51.4	18.1	19.5
75	placement of catheter for pneumothorax	40.3	13.4	3.7	33.1	29.1	29.1
76	paracentesis with or without catheter	68.2	52.3	13.5	53.3	13.8	17.0
77	abscess, fistula, or sinus tract study	78.2	29.3	15.9	48.7	15.9	17.1
78	placement of percutaneous enteric tube	27.8	12.0	4.3	21.2	21.2	46.4
79	percutaneous drainage with or without placement of catheter (excluding thoracentesis and paracentesis)	50.0	23.1	2.9	32.4	26.8	33.8
80	removal of percutaneous drainage catheter (e.g., tunneled or non-tunneled)	59.3	33.3	21.9	52.4	12.1	10.1

Item	Task	Extenders		Radiologists			
		Perform	Weekly+	General	Direct	Personal	Should Not
81	change of percutaneous tube or drainage catheter	50.4	26.7	9.0	46.4	19.7	20.0
82	removal of foreign body (nonvascular)	17.0	0.7	4.3	27.5	16.8	38.4
83	injection for sentinel node localization	24.4	11.9	20.9	41.4	10.4	21.4
84	breast needle localization	12.6	7.4	4.0	24.6	15.3	46.0
	biopsy	---	---	---	---	---	---
85	a. thyroid	42.2	28.9	7.8	37.1	16.2	33.6
86	b. superficial lymph node	41.5	27.4	9.3	38.4	16.3	32.3
87	c. liver (non-targeted)	39.8	19.5	1.4	35.3	19.9	38.7
88	d. liver (targeted)	33.1	18.0	1.2	23.7	22.8	47.4
89	e. bone marrow	25.2	15.6	4.0	29.8	18.5	39.6
90	f. bone (targeted)	26.1	9.0	1.7	20.1	24.7	47.7
91	g. lung	23.7	11.9	0.3	14.5	20.2	59.0
92	h. breast (core or fine needle aspiration)	13.3	9.6	2.9	18.9	16.0	52.3
93	i. kidney (non-targeted)	17.8	8.1	0.3	22.0	19.7	51.3
94	j. kidney (targeted)	18.7	4.5	0.3	16.5	20.5	56.1
95	k. superficial soft tissue mass	44.4	21.1	7.6	36.0	18.0	33.7
96	l. disc	11.2	1.5	1.7	19.5	15.7	53.2
	Perform the following invasive vascular procedures with image guidance including contrast media administration and needle or catheter placement:						
97	peripheral insertion of central venous catheter (PICC) placement	51.1	33.1	21.9	48.1	11.0	15.0
98	insertion of non-tunneled central venous catheter	35.3	26.3	8.6	43.8	14.1	27.1
99	insertion of tunneled central venous catheter (not including ports)	27.4	19.3	4.9	31.7	19.6	36.9
100	insertion of port for venous access	25.4	16.4	4.0	26.7	21.6	40.5
101	central venous catheter or port injection	47.0	29.9	19.9	45.0	10.4	19.9
102	port removal	26.1	14.2	8.9	42.7	16.1	25.1
103	tunneled venous catheter removal	34.1	25.2	13.5	45.7	13.5	20.4
104	venous sampling	7.4	1.5	12.4	20.2	14.1	37.8
105	venous ablation	3.0	2.2	1.1	8.6	15.5	59.8
106	extremity venography	28.4	6.7	9.8	30.5	17.0	34.8
107	central venography (vena cava	17.8	5.2	1.1	21.0	18.4	48.6
108	percutaneous placement of IVC filter	13.4	5.2	0.3	8.4	16.4	65.1

Item	Task	Extenders		Radiologists			
		Perform	Weekly+	General	Direct	Personal	Should Not
109	removal of IVC filter	10.4	3.0	0.3	5.5	17.0	66.6
110	arterial access	17.0	3.7	2.9	18.7	28.5	41.2
111	angiography including catheter placement	11.9	3.0	0.6	10.1	20.5	58.8
112	angiography through existing catheter	10.4	1.5	3.2	14.4	28.2	44.4
113	arteriovenous graft/ fistula angiography (e.g., dialysis)	11.2	3.7	1.1	16.1	22.4	49.4
114	declotting arteriovenous graft/fistula	11.1	3.7	1.4	7.8	13.2	66.7
115	transluminal balloon angioplasty, venous	11.2	3.7	0.0	6.1	13.9	69.1
116	intravascular therapy (e.g., coils, thrombin injections)	8.9	1.5	0.0	2.6	12.6	75.0
117	intravascular retrieval of foreign body	7.4	0.0	0.0	2.9	11.1	76.0
	Other Tasks						
119	Perform CT post-processing.	24.4	11.1	67.9	20.2	3.8	2.0
120	Perform MR post-processing.	13.3	5.2	67.4	20.5	3.2	2.6
121	Evaluate images for completeness and diagnostic quality, and recommend additional images as required (e.g., general radiography, CT, and MR). (Note: Additional images only in the same modality such as additional CT slices.)	87.4	74.8	56.5	25.9	8.9	7.2
122	Review imaging procedures, make initial observations, and communicate observations only to the supervising radiologist. (R.R.A.s do not perform interpretations – preliminary, final, or otherwise – of any radiological examination. The R.R.A. may make and communicate initial observations only to the supervising radiologist.)	97.0	94.8	47.4	34.5	7.5	10.1
123	Record initial observations of imaging procedures following the supervising radiologist approval. (R.R.A.s do not perform interpretations – preliminary, final, or otherwise – of any radiological examination. The R.R.A. may make and communicate initial observations only to the supervising radiologist.)	92.6	91.1	44.5	32.5	8.9	12.6
124	Communicate the radiologists' reports to appropriate health care provider consistent with the ACR Practice Parameter for Communication of Diagnostic Imaging Findings.	93.3	77.8	68.4	25.0	3.4	2.0
125	Provide pre- and post- care instructions to the patient or authorized representative as prescribed by the supervising radiologist or other licensed provider.	97.0	91.9	69.3	27.9	1.7	1.1

Item	Task	Extenders		Radiologists			
		Perform	Weekly+	General	Direct	Personal	Should Not
126	Perform follow-up patient evaluation, and post-procedure care, as part of the radiologist led team, and communicate findings to the supervising radiologist.	79.3	65.9	64.1	31.9	2.9	1.1
127	Document procedure and post-procedure evaluation in appropriate record.	87.1	83.3	65.6	28.3	3.5	2.3
128	Document patient admission and/or discharge summary for review and co-signature by the supervising radiologist.	52.2	47.8	60.6	31.3	2.0	3.4
129	Participate in quality improvement activities within the radiology practice.	85.1	44.0	80.7	16.1	2.3	0.3
130	Assist with data collection and review for clinical trials or other research.	51.9	20.7	82.8	12.1	2.3	0.3
131	Assist or present at multi-disciplinary conferences as part of the radiologist led team (e.g., tumor boards and case conferences).	43.0	12.6	48.6	16.8	13.3	18.8

Table 2.
(Extenders) Which of the following titles best describes your primary job?

Response	Count	Percentage
Radiologist Extender/Radiologist Assistant	133	98.5
Interventional Radiographer	0	0.0
Radiographer	0	0.0
Senior/Lead Radiographer	1	0.7
Dept Administrator/Manager	0	0.0
Educator	0	0.0
Applications Specialist	0	0.0
Medical Sales	0	0.0
Other	1	0.7

Table 3.
(Extenders) How many hours per week do you perform clinical activities related to your training or certification and registration as a radiologist extender?

Response	Count	Percentage
15 or fewer hours	7	5.2
16 to 31 hours	5	3.7
32 or more hours	121	89.62

Table 4.
(Extenders) How many years have you worked as a radiologist extender?

Response	Count	Percentage
Less than 1 year	2	1.5
1 to 3 years	15	11.1
4 to 5 years	11	8.1
6 to 10 years	34	25.2
More than 10 years	72	53.3

Table 5.
(Extenders) What physician extenders other than you work in your radiology practice? (select all that apply)

Response	Count	Percentage
None	33	24.4
Radiologist extenders (R.R.A., RPA)	73	54.1
Physician assistants	48	35.6
Nurse practitioners	37	27.4
Other	2	1.5

Table 6.
(Extenders) Which of the following settings best describes your primary work site?

Response	Count	Percentage
Hospital - community	72	53.3
Hospital - academic	34	25.2
Children's hospital	4	3.0
Outpatient clinic	16	11.9
Freestanding general imaging center	5	3.7
Freestanding women's imaging center	0	0.0
Freestanding vascular and/or dialysis center	0	0.0
Other	2	1.5

Table 7.
(Extenders) If you work primarily in a hospital, how many beds does the hospital have?

Response	Count	Percentage
I do not work primarily in a hospital	18	13.3
50 beds or fewer	4	3.0
51 to 150 beds	17	12.6
151-300 beds	34	25.2
More than 300 beds	57	42.2

Table 8.
(Extenders) What types of imaging guidance do you use to access the joint when performing arthrography? (select all that apply)

Response	Count	Percentage
I do not perform arthrography	28	20.7
No imaging used for access in some studies	0	0.0
Fluoroscopy	105	77.8
CT	7	5.2
Sonography	18	13.3

Table 9.
(Extenders) Which of the following drugs are you involved with assessing for indications, contraindications, and interactions or monitoring patients for side effects? (select all that apply)

Response	Count	Percentage
Anti-infectives (e.g., antibiotics, antifungals)	34	25.2
Cardiovascular (e.g., beta blockers)	16	11.9
Gastrointestinal	42	31.1
Coagulation modifiers	78	57.8
Hemostatics (e.g., thrombin)	33	24.4
Thrombolytics	39	28.9
Anti-inflammatories (e.g., corticosteroids)	70	51.9
Endocrine (e.g., insulin)	17	12.6
Diuretics	11	8.1
Local anesthetics	96	71.1
Anxiolytics (e.g., diazepam)	30	22.2
Analgesics (e.g., morphine)	31	23.0
Moderate/conscious anesthetics	55	40.7
Emergency drugs (e.g., atropine)	31	23.0

Table 10.
(Extenders) Have you experienced a change in exam volume since the COVID pandemic declaration (March 2020)?

Response	Count	Percentage
Increased volumes	26	19.3
Decreased volumes	56	41.5
No change	51	37.8

Table 11.
(Extenders) Have the types of procedures you perform changed significantly since the COVID pandemic declaration (March 2020)?

Response	Count	Percentage
No significant change in the types of procedures	117	86.7
These types of procedures have increased or decreased (free text)	14	10.4

Table 12.
(Radiologists) How many hours per week are you employed as a radiologist?

Response	Count	Percentage
15 or fewer hours	5	1.4
16 to 31 hours	11	3.2
32 or more hours	326	93.7

Table 13.
(Radiologists) Are you board certified or board eligible in radiology?

Response	Count	Percentage
No	337	96.8
Yes	5	1.4

Table 14.
(Radiologists) How many years have you worked as a radiologist?

Response	Count	Percentage
Less than 1 year	3	0.9
1 to 3 years	20	5.7
4 to 5 years	24	6.9
6 to 10 years	43	12.4
More than 10 years	252	72.4

Table 15.
(Radiologists) Which of the following settings best describes your primary practice?

Response	Count	Percentage
Hospital - community	203	58.3
Hospital - academic	79	22.7
Children’s hospital	6	1.7
Outpatient clinic	21	6.0
Freestanding general imaging center	9	2.6
Freestanding women’s imaging center	5	1.4
Freestanding vascular and/or dialysis center	0	0.0
Teleradiology	3	0.9
Other	7	2.0

Table 16.
(Radiologists) Approximately how many radiologists (FTEs) are employed in your practice?

Response	Count	Percentage
1-10	82	23.6
11-20	55	15.8
21-50	99	28.4
More than 50	108	31.0

Table 17.
(Radiologists) Please indicate the specialties in which you spend 20% or more of your clinical work time. (select all that apply)

Response	Count	Percentage
General diagnostic radiology	227	65.2
Nuclear medicine/PET/SPECT	37	10.6
Neuroradiology	68	19.5
Neurointerventional radiology	7	2.0
Chest (thoracic imaging)	94	27.0
Cardiac/cardiovascular imaging	22	6.3
Interventional/vascular radiology	107	30.7
Mammography/breast imaging	102	29.3
Abdominal imaging	123	35.3
Gastrointestinal radiology	88	25.3
Genitourinary radiology	77	22.1
Musculoskeletal radiology	89	25.6
Ultrasound	130	37.4
MR imaging	119	34.2
CT imaging	162	46.6
Pediatric radiology	20	5.7
Other	6	1.7

Table 18.
(Radiologists) Have you ever worked with or trained any of the following physician extenders?

Response	Count	Percentage
Registered Radiologist Assistant (R.R.A.)	172	49.4
Radiology Practitioner Assistant (RPA)	118	33.9
Nurse Practitioner	139	39.9
Physician Assistant	166	47.7
Other	10	2.9
None	54	15.5

Table 19.
(Radiologists) If your facility or practice allowed, would you be willing to train or hire an R.R.A. or RPA?

Response	Count	Percentage
No	294	84.5
Yes	48	13.8

Table 20.
(Radiologists) I believe that radiologist extenders add value to a radiologist's practice.

Response	Count	Percentage
Strongly disagree	35	10.1
Disagree	13	3.7
Neutral	35	10.1
Agree	101	29.0
Strongly agree	160	46.0

Changes to Entry-Level Clinical Activities

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 list of entry-level clinical activities. The committee also clarified the wording of several tasks.

The following tasks were removed:

- CT colonography
- Breast needle localization
- Insertion of tunneled central venous catheter (not including ports)

The following tasks were added:

- Recognize abnormal or missing lab values relative to the procedure of imaging
- Use sterile or aseptic technique as required to help prevent infection
- Percutaneous, nasogastric/enteric, and orogastric/enteric tube evaluation
- Removal of percutaneous drainage catheter
- Biopsy: superficial soft tissue mass
- Report findings to the supervising radiologist for the following systems or anatomical areas: breast and axillae
- Monitor IV therapy for flow rate and complications
- Participate in the administration of moderate/conscious sedations as prescribed by the supervising radiologist
- Injection for sentinel node localization
- Insertion of non-tunneled central venous catheter
- Tunneled venous catheter removal
- Extremity venography
- Perform CT post-processing
- Perform MR post-processing

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

Content Specifications and Clinical Portfolio Requirements

Changes to Content Specifications

The practice analysis committee updated the content specifications based on changes to the entry-level clinical activities and the field. The committee considered the knowledge and cognitive skills required to successfully perform the tasks in the final list of entry-level clinical activities 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 clinical activities.

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
  - Removed redundant entries for morals, values, ethics
  - Added “burden of proof” and “borrowed servant” under medical law
  - Added “sedation and/or pain control” under patient monitoring and assessment
  - Expanded infection control area
- Safety
  - Added “American College of Radiology (ACR), Contrast Manual, Practice Parameters, Technical Standards, and Appropriateness Criteria ®” to safety standards, organizations, and their roles
  - Changed “effective dose limits” to “benchmarking patient radiation dose”
  - Added “diagnostic reference levels” and “radiation safety resources”
  - Replaced “patient protective shielding” with “vary beam angulation”
  - Moved “Reporting and data system (BI-RADS)” from procedure section to regulations area of safety
  - Expanded MRI safety to include “emergency response” and “FDA labeling criteria”
- Procedures
  - Added “percutaneous drainage with or without placement of catheter”, “removal of percutaneous drainage catheter”, “percutaneous”, “nasogastric/enteric and orogastric/enteric tube evaluation”, “nasogastric/enteric and orogastric/enteric tube placement”, and “liver biopsy (non-targeted)” to the abdomen section
  - Moved “ECG”, “perfusion status”, “signs and symptoms” from the thoracic to the descriptors section
- Attachment A
  - Removed the number of procedure areas that could be included in the second portion of the Radiologist Assistant examination
  - Removed references to essay items

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 in the "Selected Response" section of the exam (Table 21).

Table 21
Number of Items per Section

Content Area	Number of Scored Items
Patient Care	**56**
Patient Management (38)	
Pharmacology (18)	
Safety	**28**
Patient Safety, Radiation Protection, and Equipment Operation (28)	
Procedures	**116**
Abdominal (41)	
Thoracic (25)	
Musculoskeletal and Endocrine (25)	
neurological, Vascular, and Lymphatic (25)	
Grand Total	**200**

In addition to the items listed in Table 21, the exam will also contain a "Case Study" section, replacing the essay items with at least 30 scored items. The number of items will vary by case, and a particular form may include more than 30 items to accommodate the selected cases. Because the number of scored items in the case study section is not fixed, the section will continue to make up 25% of the total exam score like the previous essay items.

Changes to Clinical Portfolio Requirements

The purpose of the clinical portfolio 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 range of clinical skills required in a variety of settings.

The practice analysis committee reviewed and updated the previous clinical portfolio requirements considering the final entry-level clinical activities and content specifications. The updated clinical portfolio 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 portfolio requirements were:

- Added Advanced Cardiac Life Support (ACLS) certification to the certification and eligibility checklist
- Increased requirement from 1 to 2 years of full-time patient care related clinical experience in medical imaging after radiography certification and registration.
- Require a master's degree for eligibility effective January 1, 2024
- Added the following procedures:
    - Percutaneous, nasogastric/enteric and orogastric/enteric tube evaluation – verification with contrast injection
    - Post Operative Esophageal or Upper GI study (e.g., bariatric surgery, anastomosis check
    - Superficial soft tissue mass biopsy
    - Central Venous catheter or port injection
    - Tunneled venous catheter removal
- Removed the following procedures:
    - CT Colonography
    - Breast Needle Localization
    - Insertion of tunneled central venous catheter

The Board of Trustees approved the final clinical requirements in January 2022. The final clinical portfolio 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 and, thanks to the efforts of all involved, it assures that the ARRT Radiologist Assistant exam program will continue to be an excellent assessment of radiologist assistants wishing to demonstrate their qualifications by seeking certification and registration.

References

1. American Educational Research Association, AERA, et al. *Standards for Educational and Psychological Testing*. American Educational Research Association, 2014.

2. *Standards for the Accreditation of Certification Programs*. National Commission for Certifying Agencies, 2021.