Radiation Therapy

Certification and registration requirements for radiation therapy are based, in part, on the results of a comprehensive practice analysis conducted by The American Registry of Radiologic Technologists® (ARRT®) staff and the Practice Analysis and Continuing Qualifications Requirements (CQR) Advisory Committee. The purpose of the practice analysis is to identify job responsibilities typically required of staff radiation therapists at entry into the profession. In 2015, the ARRT surveyed a large national sample of radiation therapists who perform radiation therapy. 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 task inventory is the foundation for both the clinical competency requirements and content specifications.

Basis of Task Inventory

The practice analysis survey was used to identify the responsibilities typically required of staff therapists. 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 staff therapists at entry into the profession. Occasionally an activity that did not meet the 40% criterion was retained or added if there was a compelling rationale to do so (e.g., the task is especially critical in some settings, or the task is related to an emerging technology).

Application to Clinical Competency Requirements

The purpose of the clinical competency requirements is to verify that candidates have completed fundamental clinical procedures in radiation therapy. Successful performance of these fundamental procedures, in combination with mastery of the cognitive knowledge and skills covered by the radiation therapy 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 competency requirements. For an activity to be on the clinical competency requirements, survey results had to indicate that the vast majority of therapists performed that activity. The clinical competency requirements are available from ARRT's website (www.arrt.org) and appear in the *Radiation Therapy Certification and Registration Handbook*.

Application to Content Specifications

The purpose of the ARRT Radiation Therapy Examination is to assess the knowledge and cognitive skills underlying the intelligent performance of the tasks typically required of therapists at entry into the profession. The content specifications identify the knowledge areas underlying performance of the tasks on the task inventory. Every content area 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 *Radiation Therapy Certification and Registration Handbook*.

	Activity	Content Categories Legend: PC = Patient Care, S = Safety, P = Procedures
1.	Wear a radiation monitoring device while on duty.	S.2.E.
2.	Practice appropriate measures to minimize radiation exposure to patient (e.g., ALARA).	S.2.
3.	Practice appropriate precautions to minimize occupational radiation exposure (e.g., ALARA).	S.2.
4.	Review personal radiation exposure records.	S.2.E.
5.	Follow environmental protection standards for handling and disposing of toxic or hazardous materials.	PC.1.F., S.2.G
6.	Inspect treatment area/accessory devices for any unsafe conditions and report findings if necessary.	PC.1.E.
7.	Clean, wash, disinfect, and/or sterilize equipment.	PC.1.E.2.
8.	Follow standard/universal precautions.	PC.1.E.
9.	Use sterile or aseptic technique.	PC.1.E.2.
10.	Verify the identity of each patient with at least two forms of unique identification.	PC.1.A.2.A.
11.	Communicate schedule delays to patients.	PC.1.B.
12.	Explain the procedure in a way which is appropriate to the patient's level of understanding.	PC.1.B.
13.	Verify the patient understands the procedure.	PC.1.B.
14.	Inform patient of what will be required during the procedure.	PC.1.B.
15.	Identify/verify if patient is at risk for an allergic reaction or has contraindications prior to administration of contrast medium.	PC.1.D.1
16.	Verify that signed informed consent has been obtained prior to the procedure.	PC.1.A.1.A.
17.	Protect patient’s privacy and dignity.	PC1.A.1.C.
18.	Maintain the confidentiality of patient information (i.e., HIPAA).	PC.1.A.1.B.
19.	Identify and respond to cultural differences and sensitivities.	PC.1.B.2.
20.	Demonstrate and promote professional and ethical behavior.	PC.1.A.
21.	Obtain patient's vital signs, when necessary.	PC.2.B.4.
22.	Assess and follow department’s policy regarding patient’s clinical condition.	PC.2.B.
23.	Maintain oxygen administration as prescribed.	PC.1.C.2.B.
24.	Recognize an emergency situation and activate appropriate response.	PC.1.D.
25.	Administer emergency care to patient until assistance arrives.	PC.1.D.

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26.	Assess patient's ambulatory condition and provide assistance as necessary.	PC.1.C.1.
27.	Utilize proper technique during patient transfer.	PC.1.C.
28.	Maintain awareness of medical equipment associated with the patient.	PC.1.C.2.
29.	Position patient on simulator table using positioning aids and immobilization devices.	P.2.
30.	Explain breathing instructions prior to exposure.	PC.1.B.3.
31.	Review patient's treatment record for completeness and accuracy.	PC.2.C.
32.	Ensure that all diagnostic studies and pertinent medical records are available prior to simulation.	PC.2.A.
33.	Recognize abnormal laboratory values and follow department policy.	PC.2.B.2.
34.	Consult with radiation oncologist before simulation.	P.2.
35.	Determine appropriate immobilization and/or positioning aids for simulation and/or treatment.	P.2.A.
36.	Fabricate individualized immobilization devices.	P.4.D.2.
37.	Identify the skin surface contour information for use in treatment planning.	P.2.
38.	Utilize knowledge of disease to simulate treatment fields.	P.1., P.2.
39.	Remove materials from patients that could interfere with imaging and treatment.	PC.2.C.1.K.
40.	Select factors to obtain optimal images.	P.2.B., P.4.B.6.
41.	Enter pertinent patient demographic data into simulation/treatment planning software.	P.2.
42.	Administer non-IV contrast medium.	P.2.A.5.
43.	Administer IV contrast medium.	P.2.A.5.
44.	Acquire an appropriate CT volume for treatment planning according to physician order.	P.2.B.
45.	Establish reference point(s) within the CT data set.	P.2.
46.	Mark treatment fields and set-up points on patient (e.g., tattoos/permanent reference marks, fiducial markers).	P.2.C.6.
47.	Instruct patient on maintenance of treatment reference marks.	PC.1.B.3.
48.	Record simulation and treatment machine parameters and document patient positioning instructions in treatment record.	P.2.C., P.4.B.

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49.	Review simulation images with radiation oncologist for approval or modification.	P.2.
50.	Review patient's record for previous or pending treatments/procedures (e.g., chemotherapy, transfusions, surgery, radiation therapy).	PC.2.A.
51.	Review the isodose plan and treatment prescription prior to implementation.	P.3., P.4.B.
52.	Determine and record factors used for calculating monitor units/ treatment time.	P.3.C.
53.	Calculate the number of monitor units/treatment time for a prescribed treatment.	P.3.C.
54.	Create and label custom beam shaping devices (e.g., electron blocks, bolus).	P.4.D.
55.	Verify the treatment plan is consistent with the prescription and can be accurately implemented in the treatment room.	P.3.
56.	Review treatment record and parameters prior to each treatment delivery.	P.4.
57.	Verify treatment fields by acquiring portal images.	P.4.E.3.
58.	Review portal images for approval or field modification and initiate changes as required.	P.4.E.4.
59.	Label images and photos appropriately.	P.2.C.
60.	Document changes in prescribed course of treatment (e.g., treatment breaks, isocenter shifts, beam modifications).	PC.2.C.2.D.
61.	Communicate relevant information to other members of the patient's health care team.	PC.2.
62.	Respond as appropriate to inquiries from patient about his/her course of treatment.	PC.1.B.
63.	Instruct patient regarding appropriate nutrition during course of treatment and refer him/her to appropriate personnel as required.	PC.2.B.3.
64.	Instruct patient concerning proper skin care of treatment area(s).	PC.1.B.3, PC.2.B.1.
65.	Position patient, treatment machine, and accessory equipment according to the approved treatment plan.	P.4.
66.	Utilize beam modification devices according to the treatment plan.	P.3.A.
67.	Verify accuracy of custom beam shape prior to treatment.	P.3.B.
68.	Deliver treatment by setting and activating controls on a linear accelerator console.	P.4.
69.	Monitor patient visually and audibly during treatment.	P.4.E.1.

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70.	Recognize any deviations in delivery of treatment and take appropriate action.	P.4.E.6.
71.	Recognize any side effects or treatment-related problems and take appropriate action.	PC.2.B.
72.	Verify the documentation of treatment delivery in the patient record.	PC.2.C.
73.	Identify and capture charges for billable devices and procedures.	PC.2.C.3.,
74.	Participate in quality assurance discussions to review patient issues such as history, diagnostic studies, disease stage, type of treatment, etc.	PC.2.
75.	Perform daily warm-up procedures (e.g., CT simulator, treatment units) and document results.	S.1.E.
76.	Conduct routine quality assurance checks on imaging and treatment equipment.	S.1.
77.	Monitor treatment equipment/software and report any malfunctions.	S.1.E., P.4.E.6.
78.	Troubleshoot and correct treatment equipment/software malfunctions, if appropriate.	C.4.E.6.B.
79.	Identify abnormal quality assurance readings and take appropriate action.	S.1.
80.	Complete quality assurance checks on a 2D treatment plan before initial treatment delivery.	P.4.B.5.A.
81.	Complete quality assurance checks on a 3D conformal treatment plan before initial treatment delivery.	P.4.B.5.B.
82.	Complete quality assurance checks on a 4D conformal treatment plan before initial treatment delivery.	P.4.B.5.C.
83.	Complete quality assurance checks on an IMRT treatment plan before initial treatment delivery.	P.4.B.5.D.
84.	Complete quality assurance checks on a stereotactic treatment plan before initial treatment delivery.	P.4.B.5.F.
85.	Utilize programmable lasers at simulation.	P.2.B.5.
86.	Utilize image registration/image comparison software.	P.4.B.6.
87.	Utilize MV imaging.	P.4.B.6.C
88.	Utilize kV imaging.	P.4.B.6.A.
89.	Administer intensity modulated radiation therapy (IMRT).	P.4.B.5.D.
90.	Utilize multileaf collimator (MLC).	P.4.D.1.D.
91.	Utilize respiratory gating protocols.	P.4.B.5.C.
92.	Utilize enhanced dynamic wedge.	P.4.D.1.F.

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93.	Utilize couch indexing capability.	P.4.C.1.A.
94.	Utilize record and verify system.	P.4.E.2.
95.	Utilize stereotactic delivery methods (SRS, SBRT).	P.4.B.5.F.
96.	Utilize custom electron block fabrication equipment.	P.4.D.1.C.
97.	Utilize diodes/thermoluminescent dosimeters (TLDs).	S.2.C., P.4.E.5.
98.	Utilize cone beam CT (CBCT).	P.4.B.6.B.
99.	Utilize Image Guided Radiation Therapy (IGRT).	P.4.B.
	Participate in the following procedures:	
100.	Brachytherapy	S.2.G., P.4.A.3.B
101.	TBI (Total Body Irradiation)	P.1.A.8.G., P.4.
102.	TSE/TBE (Total Skin/Body Electrons)	P.1.A.8.D., P.4.
	Set-up patient and treatment unit to personally perform the following radiation therapy treatments:	
103.	Brain: SRS	P.1.A.1., P.4.
104.	Brain: Primary	P.1.A.1., P.4.
105.	Brain: Metastatic (whole brain)	P.1.A.1., P.4.
106.	Brain: Craniospinal	P.1.A.1., P.4.
107.	Head and Neck: Laterals only	P.1.A.2., P.4.
108.	Head and Neck: 3D Conformal	P.1.A.2., P.4.
109.	Head and Neck: IMRT	P.1.A.2., P.4.
110.	Lung: AP/PA	P.1.A.4., P.4.
111.	Lung: 3D Conformal	P.1.A.4., P.4.
112.	Lung: IMRT	P.1.A.4., P.4.
113.	Lung: SBRT	P.1.A.4., P.4.
114.	Breast: Tangents only	P.1.A.3., P.4.
115.	Breast: Tangents with Supraclavicular	P.1.A.3., P.4.
116.	Breast: Tangents with Supraclavicular and Posterior Axilla	P.1.A.3., P.4.
117.	Breast: Tangents with Supraclavicular and Separate Internal Mammary	P.1.A.3., P.4.

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118.	Breast: IMRT	P.1.A.3., P.4.
119.	Abdomen: AP/PA	P.1.A.5., P.4.
120.	Abdomen: 3D Conformal	P.1.A.5., P.4.
121.	Abdomen: Para-Aortic	P.1.A.5., P.4.
122.	Abdomen: IMRT	P.1.A.5., P.4.
123.	Abdomen: SBRT	P.1.A.5., P.4.
124.	Pelvis: AP/PA	P.1.A.6., P.4.
125.	Pelvis: 3D Conformal Supine	P.1.A.6., P.4.
126.	Pelvis: 3D Conformal Prone	P.1.A.6., P.4.
127.	Pelvis: Inguinal Lymph Nodes	P.1.A.6., P.4.
128.	Pelvis: IMRT	P.1.A.6., P.4.
129.	Pelvis: SBRT	P.1.A.6., P.4.
130.	Skeletal: Spine	P.1.A.7., P.4.
131.	Skeletal: Extremity	P.1.A.7., P.4.
132.	Electron Fields: Single	P.4.
133.	Electron Fields: Abutting Fields	P.4
134.	Heterotopic Treatment	P.1.A.8.H., P.4.