Radiation Therapy

Certification and registration requirements for radiation therapy are based on the results of a comprehensive practice analysis conducted by The American Registry of Radiologic Technologists (ARRT) staff and the Radiation Therapy Practice Analysis Committee. The practice analysis identifies job responsibilities typically required of radiation therapists at entry into the profession. This document reflects the results of the practice analysis. The attached task inventory is the foundation for the Clinical Requirements and the content outline that, in turn, is the foundation for the Content Specifications and the Continuing Qualifications Requirements (CQR) Structured Self-Assessment (SSA) Content Specifications.

Basis of Task Inventory

In 2024, ARRT surveyed a large, national sample of radiation therapists to identify their responsibilities. When evaluating survey results, the committee considered tasks that 40% or more of respondents perform to be typically required for practice. They included these tasks on the task inventory and excluded tasks that fewer than 40% of respondents perform. The committee also made exceptions to the 40% threshold, as necessary, to ensure that the task inventory would be comprehensive. They included critical, but infrequent tasks, or those that would likely soon rise above the threshold and excluded those that would likely soon fall below it.

Application to Clinical Competency Requirements

The purpose of the clinical competency requirements is to document that individuals have demonstrated competence performing the clinical activities fundamental to a particular discipline. Competent performance of these fundamental activities, in conjunction 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 procedures typically required in a variety of settings. Demonstration of clinical competence means that the candidate has performed the procedure independently, consistently, and effectively during the course of their formal education.

An activity must appear on the task inventory to be considered for inclusion in the clinical requirements. For an activity to be designated as a mandatory requirement, survey results had to indicate that radiation therapists performed that activity. The committee designated clinical activities that fewer radiation therapists perform, or that they perform only in selected settings, as elective. The *Radiation Therapy Clinical Requirements* are on ARRT's website.

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 the discipline 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 *Radiation Therapy Content Specifications* are on ARRT's website.

Activity		**Content Categories** **PC** = Patient Care **S** = Safety **P** = Procedures
1.	Wear a radiation monitoring device while on duty.	**S**:2.B
2.	Review personal radiation exposure records.	**S**:2.B
3.	Practice appropriate measures to minimize unnecessary radiation exposure to the patient.	**S:**1, **S**:2.A
4.	Practice appropriate precautions to minimize occupational radiation exposure (e.g., ALARA).	**S**:2.B
5.	Advocate for radiation safety and protection.	**S:**2
6.	Restrict access to the control area.	**S**:2.C
7.	Demonstrate and promote professional and ethical behavior (e.g., confidentiality, regulation compliance).	**PC:**1.A
8.	Manage interpersonal interactions in an effective manner.	**PC:**1.B
9.	Review the treatment or procedure to verify information (e.g., patient history, clinical diagnosis, physician's orders) is accurate, appropriate, and complete.	**PC**:1.B, **PC:**2
10.	Enter pertinent patient demographic data into simulation/treatment planning software.	**P:**2, **S**:2.F
11.	Ensure that all diagnostic studies and pertinent medical records are available prior to simulation.	**PC**:1.B, **PC:**2.A
12.	Review order with radiation oncologist before simulation.	**PC**:1.B, **PC:**2.A, **P**:2.C
13.	Review patient's record for previous or pending treatments/procedures (e.g., chemotherapy, transfusions, surgery, radiation therapy).	**PC:**2.A, **PC**:2.C
14.	Verify the patient's identity.	**PC**:1.A
15.	Verify procedure coding (e.g., billing, charge capture).	**PC**:2.C
16.	Provide for the patient's safety, comfort, and modesty.	**PC**:1.C
17.	Assess and follow department's policy regarding patient's clinical condition.	**PC**:1.C, **PC**:2.B,
18.	Assess patient's ambulatory condition and provide assistance as necessary.	**PC**:1.C
19.	Use proper technique during patient transfer.	**PC**:1.C
20.	Use proper body mechanics and/or ergonomic devices when performing procedures to prevent work-related musculoskeletal disorders.	**PC**:1.C
21.	Obtain vital signs when appropriate.	**PC**:1.C
22.	Recognize and communicate the need for prompt medical attention.	**PC**:1.D
23.	Recognize the need for and administer emergency care.	**PC**:1.D

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24.	Follow environmental protection standards for handling and disposing of hazardous materials (e.g., disinfectants, chemotherapy IV, radioactive implant).	**PC**:1.F, **S**:2.E
25.	Follow environmental protection standards for handling and disposing of biohazardous materials (e.g., sharps, body fluids).	**PC:**1.E, **S**:2
26.	Follow appropriate transmission-based precautions.	**PC:**1.E
27.	Clean, disinfect, or sterilize facilities and equipment.	**PC:**1.E
28.	Practice standard precautions.	**PC:**1.E
29.	Use sterile or aseptic technique when indicated.	**PC:**1.E
30.	Monitor the patient's auxiliary medical equipment (e.g., IVs, catheters, supplemental oxygen).	**PC:**1.C, **S**:2.D
31.	Maintain oxygen administration as prescribed.	**PC:**1.C
32.	Verify informed consent is obtained as necessary.	**PC:**1.A
33.	Obtain pertinent medical history.	**PC:**1.B
34.	Evaluate the patient's ability to understand and comply with requirements for the requested treatment or procedure (e.g., need for medical interpreter; physical, sensory, or cognitive impairments).	**PC:**1.B
35.	Explain treatment or procedure (e.g., scheduling delays, treatment duration) to the patient, patient's family, or authorized representative.	**PC**:1.B
36.	Review pertinent information to prepare appropriate type and dosage and determine if the patient is at risk for an adverse event prior to administration of contrast media.	**PC**:1.G
37.	Administer contrast media as required by the procedure.	**PC**:1.G
38.	Monitor the patient during and after administration of a contrast media to detect adverse reactions.	**PC**:1.G
39.	Recognize abnormal or missing lab values relative to the treatment or procedure ordered.	**PC**:2.A
40.	Use knowledge of disease to perform simulation procedures.	**P**:1.B, **P**:2
41.	Ensure removal of materials that could interfere with imaging, treatment, or safety of the patient.	**PC**:1.B**, S**:2.D, **P**:2.C
42.	Screen patients for ferrous and radiofrequency sensitive materials (e.g., pacemaker, biomedical implant, aneurysm clips) prior to entering MRI magnetic field.	**S**:2.D
43.	Screen patients for ferrous materials (e.g., glucose monitor, pacemaker) prior to entering CT simulator.	**P**:2.C
44.	Use positioning aids, as needed, to reduce patient movement and/or promote patient safety.	**P**:2.A
45.	Fabricate individualized immobilization devices.	**P**:4.D
46.	Fabricate individualized custom bolus.	**P**:4.D

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47.	Use individualized custom 3D printed bolus.	**P**:4.D
48.	Position patient on simulator table using positioning aids and immobilization devices.	**P**:2
49.	Use programmable lasers during simulation.	**P**:2.B
50.	Explain breathing instructions prior to procedure.	**PC**:1.B, **P**:2.B
51.	Select factors to obtain optimal images.	**S**:2.A, **P**:2.B, **P**:4.B,
52.	Acquire an appropriate and complete CT volume for treatment planning according to physician order.	**P**:2.B
53.	Establish reference point(s) within the CT data set (e.g., isocenter, origin).	**P**:2.B
54.	Mark treatment fields and set-up points on patient (e.g., permanent, temporary, radiopaque marker).	**P**:2.C
55.	Instruct the patient on maintenance of treatment reference marks.	**PC**:1.B
56.	Record/verify simulation parameters.	**P**:2.C
57.	Document patient positioning instructions in treatment record.	**P**:2.C
58.	Label simulation and treatment photos appropriately.	**P**:2.C
59.	Review simulation images with radiation oncologist for approval or modification.	**P**:2.B, **P**:2.C
60.	Review PET or PET/CT simulation scan.	**PC**:2.A, **P**:3.A
61.	Calculate the number of monitor units for a prescribed treatment.	**P**:3.C
62.	Enter parameters used to calculate monitor units for a prescribed treatment.	**P**:3.C, **P**:4.B
63.	Use adaptive planning.	**S:**1.D, **P**:3
64.	Create the template for custom beam shaping devices (e.g., electron blocks).	**P**:4.A
65.	Fabricate the custom beam shaping devices (e.g., electron blocks).	**P**:4.D
66.	Label custom beam shaping devices (e.g., electron blocks).	**P**:4.D, **P**:2.C
67.	Perform clinical treatment setup (e.g., en face electrons, whole brain).	**P**:2, **P**:4
68.	Review the isodose plan, imaging order, and treatment prescription prior to implementation.	**S:**1.C, **P**:3, **P**:4.B
69.	Review patient's treatment record for completeness and accuracy.	**PC**:2.C, **P**:4
70.	Review treatment record and parameters prior to each treatment delivery.	**PC**:2.C, **P**:4.E
71.	Verify treatment fields by acquiring images.	**S**:1.A**, P**:3.B
72.	Verify accuracy of custom beam shape prior to treatment.	**P**:3.B, **P**:4.B

Activity		**Content Categories** **PC** = Patient Care **S** = Safety **P** = Procedures
73.	Review images for approval or field modification and initiate changes as requested by the physician.	**P**:4.B
74.	Document changes in prescribed course of treatment (e.g., treatment breaks, isocenter shifts, beam modifications).	**PC**:2.C
75.	Communicate relevant information to appropriate stakeholders (e.g., health care providers, ancillary staff).	**PC**:1.D
76.	Schedule patients, taking into consideration the length of the procedure, the patient's condition and age, and preparation for the procedure.	**PC**:1.B
77.	Respond as appropriate to treatment or procedure inquiries from the patient, patient's family, or authorized representative (e.g., scheduling changes, procedure duration, other treatment modalities).	**PC**:1.B, **S**:1.B
78.	Explain and confirm the patient's preparation (e.g., diet restrictions, preparatory medications, bladder filling) prior to treatment or procedure.	**PC**:1.B
79.	Instruct the patient regarding appropriate nutrition during course of treatment and refer the patient to appropriate personnel as required.	**PC**:1.B, **PC**:2.B
80.	Instruct the patient concerning proper skin care of treatment area(s).	**PC**:1.B, **PC**:2.B, **B**:1
81.	Inspect treatment area/accessory devices for any unsafe conditions and report findings if necessary.	**P:**4.E
82.	Position the patient, treatment machine, and accessory equipment according to the approved treatment plan.	**P**:4
83.	Perform and document shifts according to the approved treatment plan.	**PC**:2.C
84.	Record/verify treatment machine parameters.	**P**:4
85.	Use beam modification devices according to the treatment plan.	**P**:3.A
86.	Perform pre-treatment equipment clearance check on applicable treatment plans (e.g., dry run in the treatment room).	**S**:2.H
87.	Deliver treatment by setting and activating controls on a linear accelerator console.	**P**:4
88.	Monitor the patient visually and audibly during treatment or procedure.	**P**:4.E
89.	Notify appropriate personnel of adverse events or incidents (e.g., patient fall, wrong patient treated).	**PC**:2.C, **PC**:1.C
90.	Recognize any side effects or treatment-related problems and take appropriate action.	**PC:**2.B
91.	Verify the documentation of treatment delivery in the patient record.	**PC:**2.C
92.	Document required information on the patient's medical record (e.g., treatment documentation).	**PC:**2.C, **P**:4.E

Activity		**Content Categories** **PC** = Patient Care **S** = Safety **P** = Procedures
93.	Participate in quality assurance discussions to review patient issues (e.g., history, diagnostic studies, disease stage, type of treatment).	**PC**:2
94.	Perform daily warm-up procedures (e.g., CT simulator, treatment units) and document results.	**S**:2.H
95.	Monitor treatment equipment/software and report any malfunctions.	**S**:2.H, **P**:4.E
96.	Troubleshoot and correct treatment equipment/software malfunctions, if appropriate.	**S**:2.H, **P**:4.E
97.	Perform CT simulator quality assurance checks.	**S**:2.H
98.	Identify abnormal quality assurance results and take appropriate action.	**S**:2.H
99.	Deliver IMRT quality assurance plan for physicist review.	**S**:2.H
100.	Verify quality assurance checks on a treatment plan have been completed before initial treatment delivery.	**S**:2.H
101.	Use image registration / image comparison software.	**P**:4.B
102.	Apply shifts obtained through image registration without physician approval before daily treatment (not including V-SIM, new start, SRS, SRT, and SBRT).	**P**:4
103.	Use MV imaging.	**P**:4.B
104.	Use kV imaging.	**P**:4.B
105.	Use cone beam CT (CBCT).	**P**:4.B
106.	Use multileaf collimators (MLCs).	**P**:4.D
107.	Use respiratory gating protocols for treatment delivery.	**P**:4.B
108.	Use surface guided radiation therapy (SGRT) (e.g., AlignRT®, OSMS).	**P**:4.C
109.	Use enhanced dynamic wedge.	**P**:4.D
110.	Use couch indexing capability.	**P**:4.C
111.	Use six-degrees-of-freedom treatment couch (e.g., HexaPOD™, PerfectPitch™).	**P**:4.C
112.	Use record and verify system.	**P**:4.E
113.	Use diodes/thermoluminescent dosimeters (TLDs).	**S**:2.G
114.	Use stereotactic delivery methods (e.g., SRS, SBRT).	**P**:4.B
115.	Administer intensity modulated radiation therapy (IMRT).	**P**:4.B
116.	Use Image Guided Radiation Therapy (IGRT).	**P**:4.B
117.	Use volumetric arc therapy (e.g., VMAT, RapidArc®).	**P**:4.B
118.	Perform 3D CT simulations.	**P**:2.B
119.	Perform 4D CT simulations.	P:2.B

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Participate in the following procedures:		
120.	Brachytherapy	**S**:2.G, **P**:4.A
121.	TBI (Total Body Irradiation)	**P**:4.A
122.	TSE/TBE (Total Skin / Body Electrons)	**P**:4.A
Set up patient and treatment unit to personally perform the following radiation therapy treatments:		
123.	Brain: SRS/SRT	**P**:1.A, **P**:4
124.	Brain: primary	**P**:1.A, **P**:4
125.	Brain: metastatic 3D whole brain	**P**:1.A, **P**:4
126.	Brain: metastatic IMRT/VMAT (e.g., hippocampus sparing)	**P**:1.A, **P**:4
127.	Brain: craniospinal	**P**:1.A, **P**:4
128.	Head and Neck: 3D conformal/lateral only	**P**:1.A, **P**:4
129.	Head and Neck: IMRT/VMAT	**P**:1.A, **P**:4
130.	Head and Neck: SBRT	**P**:1.A, **P**:4
131.	Lung: 3D conformal (e.g., AP/PA)	**P**:1.A, **P**:4
132.	Lung: IMRT/VMAT	**P**:1.A, **P**:4
133.	Lung: SBRT	**P**:1.A, **P**:4
134.	Breast: tangents only	**P**:1.A, **P**:4
135.	Breast: tangents with supraclavicular (3D mono-isocentric)	**P**:1.A, **P**:4
136.	Breast: tangents with supraclavicular (multi-isocentric)	**P**:1.A, **P**:4
137.	Breast: tangents with supraclavicular and posterior axilla (3D mono-isocentric)	**P**:1.A, **P**:4
138.	Breast: tangents with supraclavicular and posterior axilla (multi-isocentric)	**P**:1.A, **P**:4
139.	Breast: tangents with supraclavicular and separate internal mammary	**P**:1.A, **P**:4
140.	Breast: IMRT/VMAT	**P**:1.A, **P**:4
141.	Breast: ultra-hypofractionation (SBRT)	**P**:1.A, **P**:4
142.	Breast: DIBH	**P**:1.A, **P**:4
143.	Breast: prone	**P**:1.A, **P**:4
144.	Breast: partial 3D conformal (e.g., APBI)	**P**:1.A, **P**:4
145.	Abdomen: 3D conformal (e.g., AP/PA)	**P**:1.A, **P**:4
146.	Abdomen: IMRT/VMAT	**P**:1.A, **P**:4
147.	Abdomen: SBRT	**P**:1.A, **P**:4
148.	Pelvis: 3D conformal supine (e.g., AP/PA)	**P**:1.A, **P**:4
149.	Pelvis: 3D conformal prone	**P**:1.A, **P**:4

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150.	Pelvis: IMRT/VMAT	**P**:1.A, **P**:4
151.	Pelvis: SBRT	**P**:1.A, **P**:4
152.	Skeletal: 2D (nonconformal) spine	**P**:1.A, **P**:4
153.	Skeletal: 3D spine	**P**:1.A, **P**:4
154.	Skeletal: IMRT/VMAT spine	**P**:1.A, **P**:4
155.	Skeletal: SBRT spine	**P**:1.A, **P**:4
156.	Skeletal: extremity	**P**:1.A, **P**:4
157.	Electron fields: single	**P**:4
158.	Abutting fields	**P**:4
159.	Heterotopic treatment	**P**:1.A, **P**:4