



Radiation Oncology Study Guide

For the Initial Certification Qualifying (Computer-Based) Exam

General and Radiation Oncology

This exam is designed to assess your understanding of the entire field of oncology and radiation oncology. Included are questions on the following topics related to cancer and cancer therapies of every type, as well as appropriate benign entities:

1. Epidemiology and pathology
2. Normal and pathologic anatomy
3. Elements of cancer diagnosis, staging, treatment (including the utilization of modalities other than radiation), and follow-up
4. Tumor markers for diagnosis and follow-up
5. Natural history and routes of local, regional, and distant spread
6. Selection of treatment modality (specific details of multimodality therapies including sequencing, interactions, and specific agents)
7. Management of both local and metastatic disease
8. Optimum radiation simulation, field design, and radiation techniques (including external beam, radiosurgery, brachytherapy employing HDR and LDR sources, and unsealed radioactive agents) for various clinical situations
9. Tumor localization and respiratory management
10. Radiation target and organs at risk dose distribution
11. Selection of optimum radiation volume, dose, and fractionation
12. Radiation dose constraints
13. Interpreting a dose-volume histogram
14. Understanding of how radiation affects normal tissues
15. Side effects of radiation and other modalities, and how to manage them
16. Evidence-based treatment results (e.g., with surgery, radiation therapy, chemotherapy, biological therapy, or other emerging interventions)
17. Patterns of failure
18. Palliative care
19. Precision and errors in treatment planning

21. Patient and personnel safety
22. Bioethics
23. Biostatistics

Categories for General and Radiation Oncology

May include, but are not necessarily limited to:

Pediatrics/Pediatric CNS Tumors	5% to 9%
Gastrointestinal (GI) Tract	10% to 14%
Gynecology	8% to 12%
Genitourinary (GU) Tract	10% to 14%
Lymphomas and Leukemias	6% to 10%
Head, Neck, and Skin	8% to 12%
Lung/Mediastinum	10% to 14%
Breast	10% to 14%
Soft Tissue/Bone	3% to 7%
Central Nervous System (CNS)	6% to 10%
Non-Clinical Skills	2% to 5%

The ranges above are those generally in effect for the exam to be administered in 2022 and are intended only for guidance in candidate preparation. They do not necessarily represent a precise number of scorable items.

Pediatrics

1. Retinoblastoma
2. Wilms tumor
3. Neuroblastoma
4. Rhabdomyosarcoma
5. Lymphomas
6. Leukemias
7. Histocytosis X
8. Ewing sarcoma and other bone and cartilage tumors
9. Pediatric solid tumors
10. Soft-tissue sarcoma
11. Germ cell tumor
12. Hepatic tumor
13. Osteosarcoma
14. Hodgkin lymphoma

Pediatric CNS Tumors

1. Medulloblastoma
2. Astrocytoma (glioma), low grade
3. Astrocytoma, high grade
4. Brain stem glioma
5. Ependymoma
6. Pineal/germ cell
7. Craniopharyngioma
8. Optic tract

Gastrointestinal (GI) Tract

1. Esophagus
2. Stomach
3. Small bowel
4. Colon/rectum
5. Anus
6. Pancreas
7. Biliary tract
8. Liver

Gynecology

1. Cervix
2. Endometrium/uterus
3. Ovaries and fallopian tubes
4. Vagina/urethra
5. Vulva

Genitourinary (GU)Tract

1. Prostate
2. Bladder
3. Testes
4. Kidneys
5. Ureter
6. Urethra
7. Penis

Lymphomas and Leukemias

1. Hodgkin lymphoma
2. Non-Hodgkin lymphoma
3. Leukemia, chronic and acute
4. Multiple myeloma/plasmacytoma

5. NK/T cell lymphoma
6. Cutaneous lymphomas

Head, Neck, and Skin

1. Lips
2. Larynx
3. Oral cavity
4. Oropharynx
5. Hypopharynx
6. Nasopharynx
7. Salivary glands (major and minor)
8. Orbits/eye
9. Thyroid gland
10. Paranasal sinuses
11. Skin (basal, squamous, melanoma, and Merkel)

Lung/Mediastinum

1. Non-small cell
2. Small cell
3. Superior sulcus tumor
4. Thymomas, thymic, and/or other mediastinal tumors
5. Mesothelial/pleural tumors

Breast

1. Early-stage
2. Locally advanced
3. Inflammatory
4. Carcinoma in situ
5. Locally recurrent
6. Metastatic carcinoma

Soft Tissue/Bone

1. Soft tissue sarcomas
2. Ewing sarcoma
3. Desmoid tumor
4. Osteosarcoma and/or chondrosarcoma
5. Other benign and malignant bone and joint tumors

Central Nervous System (CNS)

1. Astrocytoma, low grade

2. Astrocytoma, high grade
3. Medulloblastoma
4. Brainstem glioma
5. Ependymoma and ependymoblastoma
6. Pineal
7. Lymphoma
8. Optic tract glioma
9. Oligodendroglioma
10. Meningioma (benign and malignant)
11. Pituitary
12. Spinal cord
13. Craniopharyngioma
14. Arteriovenous malformation (AVM)
15. Acoustic neuroma

Non-Clinical Skills: A link to a detailed non-clinical skills syllabus has been provided for preparation of topics in this category: [Non-clinical skills \(NCS\) syllabus](#)

1. Consent in the impaired patient
2. HIPAA issues
3. Research issues
4. General consideration

Patient and personnel radiation safety and source handling

1. Human factors related to error
2. Communication of error
3. Frequency/necessity of repeat calculations
4. General considerations

Biostatistics

1. *P* value and significance
2. Risk ratio
3. True positive/negative
4. Meta-analysis
5. General considerations

Quality assurance (QA)

1. Routine vs exceptional QA
2. QA after linac service
3. Value of peer review
4. Root cause analysis
5. General considerations