



## **Radiation Oncology MOC Study Guide**

The following study guide is intended to give a general overview of the type of material that will be covered on the Radiation Oncology Maintenance of Certification (MOC) examination. Examples of the scope and level of questions that may appear on the examination are also provided. The purpose of the cognitive examination is to assess practical knowledge in radiation oncology, and the examination is intended to be appropriate for the practicing radiation oncologist.

The MOC exam is computer-based and includes an Essentials of Radiation Oncology module and two diplomate self-selected modules based on the diplomate's practice areas.

### **Essentials of Radiation Oncology Module**

The Essentials section comprises the bulk of the examination and is intended to cover all of the common clinical diseases treated by the practicing radiation oncologist, in addition to physics, cancer and radiation biology, and non-clinical skills items. While the frequency of questions for a given clinical area may vary from exam to exam, the distribution of questions roughly reflects the scope of routine general radiation oncology practice.

*NOTE: All questions related to contemporaneous staging of hypothetical patients should be answered using the most recent edition of the American Joint Commission on Cancer (AJCC) Staging Manual (7th edition, Jan. 2010). Staging related to previously reported clinical trials should be answered using the staging system actually used in the report.*

Disease systems to be included in the Essentials section: *Questions may be related to either malignant and/or benign entities of these systems as related to radiation oncology management.*

**Breast**  
**Bone and Soft Tissue Sarcoma**  
**Central Nervous System (CNS), Adult**  
**Gastrointestinal (GI)**  
**Gynecology (GYN)**  
**Genitourinary (GU)**

**Lymphoma/Leukemia**  
**Head and Neck/Skin**  
**Lung/Mediastinum**  
**Pediatrics/Pediatrics Central Nervous System (CNS)**

The remainder of the Essentials of Radiation Oncology module will be composed of content related to the following three categories:

### **Physics**

Physics questions are intended to cover areas of physics knowledge, including quality assurance and safety, likely to be encountered in routine clinical practice.

### **Cancer and Radiation Biology**

The cancer and radiation biology questions are intended to cover the very basic principles of cancer and radiation biology on which the practice of radiation oncology is based.

### **Non-Clinical Skills**

The questions related to non-clinical skills include biostatistics, bioethics, patient safety, and quality assurance. Biostatistics questions are geared toward appropriate understanding and critical analysis of the medical literature. A [Non-clinical Skills Syllabus](#) has been developed to provide the essential material related to these topics.

## **Practice Profile Module**

The remainder of the exam consists of two modules selected by the diplomate. Two modules may be selected in the same clinical category or in separate clinical categories. General radiation oncology modules are also available for diplomate selection and will consist of material similar to the Essentials section, which comprises all clinical categories.

## **Sample Questions**

Below are examples of the types of questions that may appear on the MOC Part III exam. The scope and level of these sample questions roughly reflect that of exam questions.

### **Physics**

The depth in centimeters to which an electron beam provides effective coverage is roughly equivalent to which of the following?

- A. One-third the energy of the electrons
- B. One-half the energy of the electrons
- C. Total energy of the electrons
- D. Twice the energy of the electrons

Correct answer = A

## **Cancer and Radiation Biology**

DNA mismatch repair defects (as occur in Lynch syndrome) are associated with what phenomenon?

- A. Homologous recombination
- B. Nonhomologous end joining
- C. Pyridine dimer excision
- D. Microsatellite instability
- E. Limitless replicative potential

Correct answer = D

A patient is exposed to a total body dose of 3.5 Gy. Without any medical support, what will be the patient's most likely cause of death?

- A. Diarrhea
- B. Bone marrow failure
- C. Cerebral edema
- D. Pneumonitis

Correct answer = B

## **Breast**

According to the results of the National Surgical Adjuvant Breast and Bowel Project (NSABP) B06 trial, lumpectomy with radiation compared with lumpectomy alone results in higher rates of local control and which of the following?

- A. Higher overall survival rates
- B. Equivalent overall survival rates
- C. Higher rates of second malignancy
- D. Lower rates of distant metastasis

Correct answer = B

In patients with HER2-positive breast cancer, which of the following drugs is routinely given as adjuvant therapy?

- A. Carboplatin
- B. Cetuximab
- C. Trastuzumab
- D. Ipilimumab

Correct answer = C

## Central Nervous System (CNS)

In radiation therapy for suprasellar tumors in adults, which of the following structures is dose limiting?

- A. Retina
- B. Brain stem
- C. Optic chiasm
- D. Hypothalamic-pituitary axis

Correct answer = C

For patients who receive surgery and radiotherapy for craniopharyngioma, what is the 5-year survival rate?

- A. < 20%
- B. 20% to 40%
- C. 50% to 60%
- D. 70% to 80%
- E. > 80%

Correct answer = E

## Head and Neck

According to QUANTEC, what is the mean dose limit to the larynx for nonlaryngeal head and neck cancer IMRT?

- A. 40 to 45 Gy
- B. 50 to 55 Gy
- C. 60 to 65 Gy
- D. 70 to 75 Gy

Correct answer = A

In patients undergoing primary surgical resection for squamous cell carcinoma of the head and neck, an indication for concurrent cisplatin chemoradiation therapy is the presence of what pathologic feature?

- A. Perineural invasion
- B. Angiolymphatic invasion
- C. Extracapsular extension
- D. Muscle invasion

Correct answer = C

## Gastrointestinal (GI)

According to the Gastrointestinal Tumor Study Group (GITSG) postoperative randomized trial for pancreatic cancer, postoperative chemoradiation compared with surgery alone was associated with which of the following?

- A. **No** improvement in overall or disease-free survival
- B. Approximate doubling of median and 2-year survival
- C. **No** improvement in survival but significant improvement in local control
- D. 5-year survival of more than 50% in the chemoradiation arms

Correct answer = B

What lymph node station is typically treated in anal cancer but **not** in rectal cancer?

- A. Presacral
- B. Internal iliac
- C. Para-aortic
- D. Inguinal

Correct answer = D

## Gynecology (GYN)

For patients with stage I endometrial cancer who undergo total abdominal hysterectomy, what is the most common relapse site?

- A. Pelvic lymph nodes
- B. Vagina
- C. Lungs
- D. Ovaries
- E. Liver

Correct answer = B

The RTOG 90-01 randomized trial evaluating chemotherapy in combination with radiation demonstrated which of the following outcomes for cervical cancer?

- A. **No** improvement in local control or survival with any form of chemotherapy
- B. Improved survival and local control with neoadjuvant chemotherapy followed by radiation
- C. Improved pelvic control but **no** improvement in overall or disease-free survival with chemotherapy
- D. Improved disease-free and overall survival with concurrent chemoradiation

Correct answer = D

## Lymphoma

In addition to the standard staging studies for NHL, a patient with a newly diagnosed diffuse large cell lymphoma of the testis should also have which of the following procedures performed?

- A. Liver biopsy
- B. Laparotomy and splenectomy
- C. Gastroscopy and biopsies of mucosal abnormalities
- D. Cytologic examination of cerebrospinal fluid
- E. Radioisotopic bone scan

Correct answer = D

A 55-year-old man presents with a 4-cm right groin lymph node. Biopsy reveals a grade II follicular lymphoma. Completion of the staging work-up shows no other evidence of disease. What is the most appropriate next step in management?

- A. Involved-site radiation delivered to 4 Gy
- B. Involved-site radiation delivered to 24 Gy
- C. Involved-site radiation delivered to 36 Gy
- D. Involved-site radiation delivered to 45 Gy

Correct answer = B

## Genitourinary

Which of the following isotopes is used for prostate high-dose-rate brachytherapy?

- A.  $^{125}\text{I}$
- B.  $^{103}\text{P}$
- C.  $^{198}\text{Au}$
- D.  $^{192}\text{Ir}$

Correct answer = D

Goserelin is used as hormonal therapy in locally advanced and metastatic adenocarcinoma of the prostate. What class of agent is it?

- A. Progestin
- B. Antiandrogen
- C. 5-alpha-reductase inhibitor
- D. Gonadotropin-releasing hormone agonist
- E. Gonadotropin-releasing hormone antagonist

Correct answer = D

## Lung/Thorax

A patient with squamous cell carcinoma has a CT scan of the lungs that shows a 4-cm superior sulcus tumor that has invaded the chest wall with subcarinal metastasis. According to the AJCC Cancer Staging Manual, 7<sup>th</sup> edition, what is the most appropriate stage?

- A. T3N1
- B. T3N2
- C. T4N1
- D. T4N2
- E. T4N3

Correct answer = B

In the Lung Cancer Study Group randomized trial (LCSG 773) of postoperative radiotherapy after surgical resection of stage II and III squamous cell carcinoma of the lung, what was the main effect of postoperative radiation therapy?

- A. Decreased local recurrence
- B. Decreased overall survival
- C. Increased overall survival
- D. Increased distant metastasis

Correct answer = A

## Pediatrics

A 4-year-old boy receives standard chemotherapy for a left-sided Wilms tumor with intraoperative spill confined to the left flank. Histology is favorable. He has a complete surgical resection with a positive ipsilateral node. Imaging results of the liver and lung are negative for metastases. What is the most appropriate radiation volume?

- A. Left flank and adjacent para-aortic nodes only
- B. Whole abdomen only
- C. Left flank and lung
- D. Left flank and liver
- E. Whole abdomen with left flank boost

Correct answer = A

For children older than 3 years, what is the most appropriate treatment of medulloblastoma?

- A. Platinum-based chemotherapy, craniospinal radiation, and tumor bed boost
- B. Craniospinal radiation and posterior fossa boost **without** chemotherapy
- C. Platinum-based chemotherapy and cranial radiation with a tumor bed boost
- D. Platinum-based chemotherapy and radiation to the tumor bed only

Correct answer = A