ABR perspective on the ABR Written* Exam

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*Computer-based

Goals of the ABR

Certify MDs to practice Radiation Oncology…

This goal excludes training/education.

Certification

… issued to candidates who

- meet training requirements (ACGME)
- demonstrate knowledge and proficiency via
  - computer-based exams to evaluate knowledge of basic principles
  - one-on-one oral exams to evaluate clinical proficiency

Computer-based Exams

- Clinical oncology
- Radiation oncology physics
- Cancer biology

Must pass all for admission to oral exams.

Physics Computer Exam

- Eligibility begins after PG1+36 mos training
- ~225 multiple choice questions
- 4 hours (~ 1 min/question)

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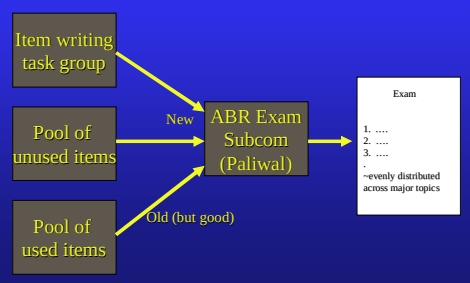
Physics Computer Exam



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Subject Matter for Physics Exam

ABR study guide (www.theabr.org)

Major headings

1. Atomic and Nuclear Structure
2. Radioactive Decay
3. Properties and Production of Radiation
4. Interactions of EM Radiation
5. Interactions of Particulate Radiation
6. Quantification and Measurement of Dose
7. Characteristics of Photon Beams
8. Dosimetry of Photon Beams in Water

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Subject Matter …

9. Dosimetry of Photon Beams in a Patient
10. Dosimetry of Electron Beams
11. Brachytherapy
12. Advanced Treatment Planning for EBRT
13. Quality Assurance
14. Radiation Protection and Safety
15. Quality Management Program
16. Special Topics

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Level of Detail for Study Guide

Dosimetry of Photon Beams in a Homogeneous Water Phantom

A. Dose distributions
  1. Central axis percent depth dose
  2. Isodose curves
  3. Factors affecting dose distributions and penumbra
    a. Beam energy or quality (including patient dose from neutrons)
    b. Source size
    c. SSD and SAD
      i. Measured P factor
      ii. Inverse square law
    d. Field size and shape
      i. Equivalent square
      ii. Scatter effects
    e. Flattening filters
    f. Depth
    g. Surface dose
    h. Other
  4. Dose distributions for multiple unshaped beams
    a. Open beams
    b. Wedged beams
B. Tissue-air ratio and backscatter factor
C. Tissue-maximum ratio
D. Tissue-phantom ratio
E. Relationships between PDD, TAR, TMR, TPR
F. Point dose and treatment time calculation methods for single unshaped fields
  1. Machine output factors (e.g., absolute and relative output, head scatter, patient scatter factors)
  2. Equivalent squares
  3. SSD vs SAD setups
  4. Beam modifier factors (e.g., wedge and tray factors)
G. Dose calculation at the isocenter of a rotating beam
H. Point dose and treatment time calculations for single shaped fields
  1. Separation and recombination of primary and scatter radiation (e.g., Clarkson techniques)
  2. Off-axis factors
  3. Dose under blocks
  4. Equivalent squares for shaped fields
I. Isodose distributions for multiple fields, including arc therapy
J. Measurement of photon dose distributions

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Sources for study guide

Syllabi/curricula (external to ABR)

- AAPM/ACR Syllabus and Study Guide
  - Out of date and no longer maintained
- ASTRO physics curriculum (new)
- AAPM Medical Physics Education of Physicians
  - Subcom on Review of Radiation Physics Syllabi for Residents (WIP)

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Sources for study guide…

Reports and regulations

- Professional reports (AAPM TGs, …)
  - Calibration, quality management, …
- Commission reports (ICRU, NCRP, …)
  - Dose specification and reporting
  - Radiation protection
- State and federal regulations
  - Radioactive materials
  - Events (misadministration)

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Summary of Computer-based Exam and Study Guide

- Subject material drawn from community standards and recommendations
- Guide not intended as physics course outline
- Guide in general lags behind new
  - technologies and clinical practices
  - reports
  - regulations
- Review and revision currently underway
  - ASTRO and AAPM curriculum recommendations

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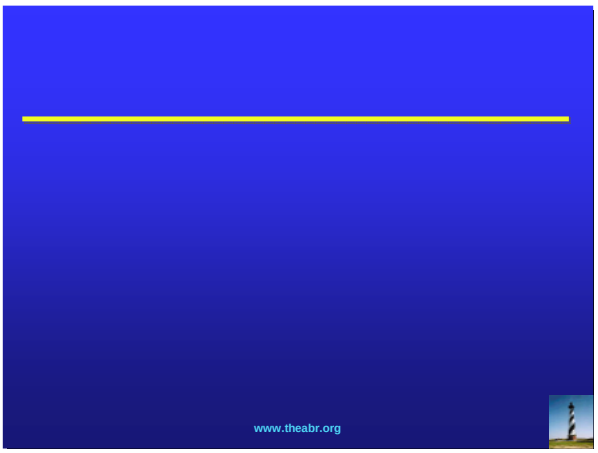
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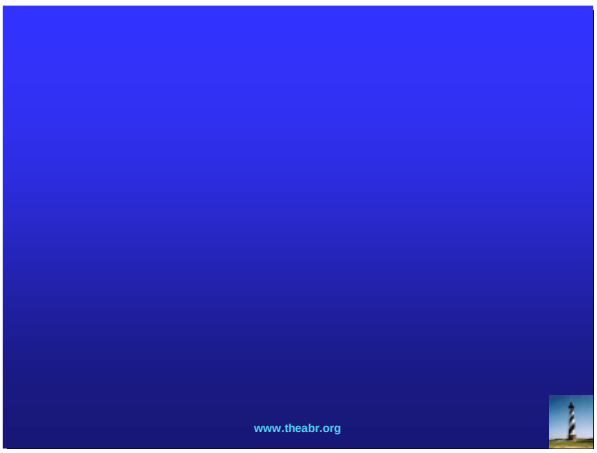
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